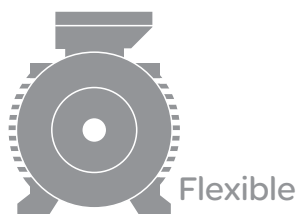


TeSys

Motor control and protection components



Motor starters **M**



Smart Circuit breakers

Protection Contactors

Thermal overload relays

Fuse switch-disconnectors

Reliable

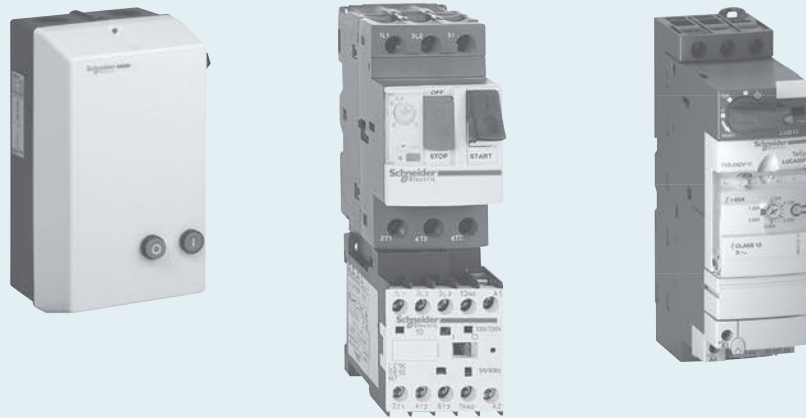
Motor controllers



Enter in your New catalogue

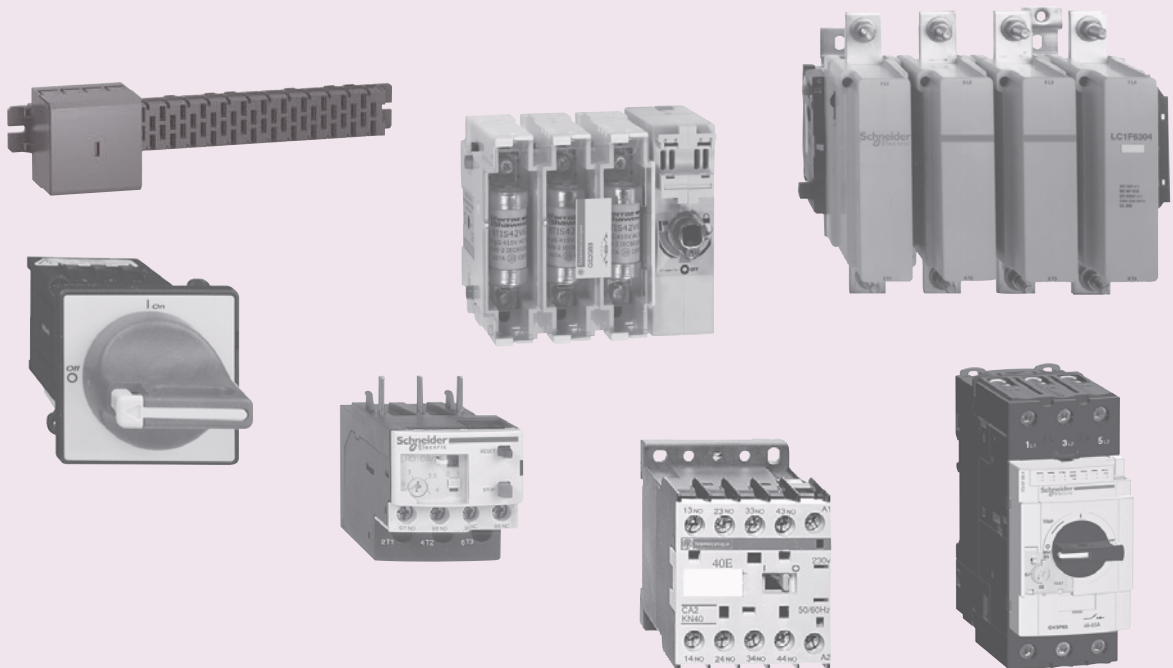
A

Assembled motor starters Fully coordinated



B

Components For customer made solutions



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Open pre-cabled motor starters		A2/1
All-in-one motor starters: TeSys U		A3/1
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Complementary technical information: coordination and standards		A5/1


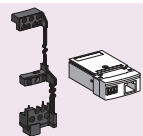

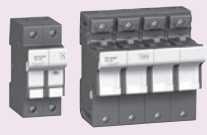


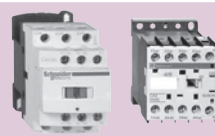


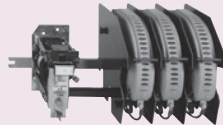
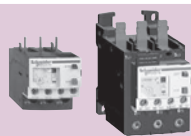

Enclosed starters

Open pre-cabled motor starters

TeSys U

Integral 63

Coordination and standards

Type of product	Product views	Page
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Motor starter wiring systems		B2/1
Switch-disconnectors: TeSys Vario		B3/1
Fuse carriers: TeSys DF, GK		B4/1
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Control relays: TeSys K, SK, D		B7/1
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Overload relays: TeSys LR● (for TeSys K, D, F), RM1X, LRD97		B11/1
Motor controllers: TeSys U, T		B12/1

Power busbar systems

Wiring systems

Switch-disconnectors

Fuse carriers

Switch-disconnectors fuses

Circuit breakers

Control relays

Contactors

High power contactors

Bar mounted contactors

Overload relays

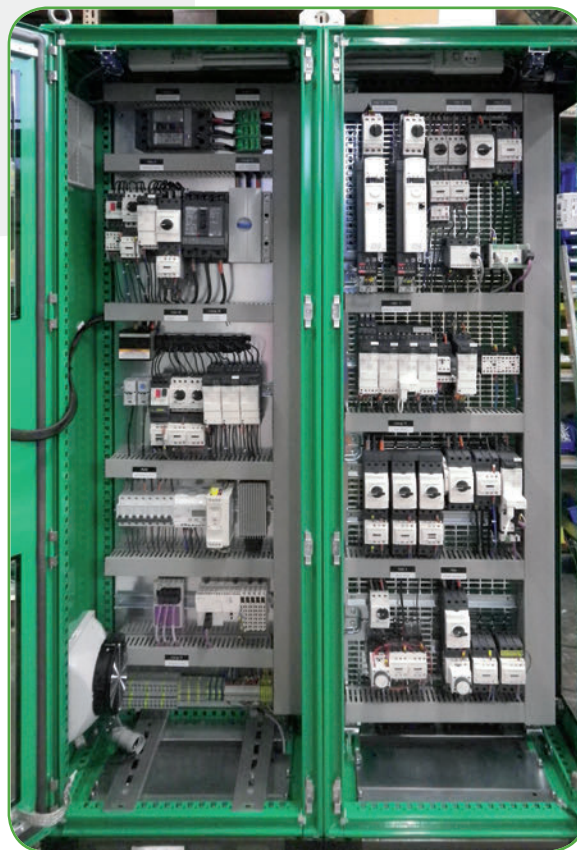
Motor controllers

Let TeSys be your drive

Intuitive solutions to protect, monitor and control your motor

TeSys offers the best in class features you need for protection, safety, monitoring and control of motor and power applications. TeSys matches a diverse range of solutions from the most common through the most advanced.

Wherever you are in the world, and whichever TeSys products you choose like contactors, circuit breakers, thermal relays, among others, you can count on receiving the reliability, standards-compatibility, ease of ordering and installation you need.



Boosts your productivity

- **Make installation easier**
 - > The widest range of installation accessories available.
 - > Intuitive installation.
- **Optimize the organization of your switchboards**
 - > Compact solutions.
 - > Low heat dissipation.
- **Increase service continuity**
 - > Total coordination.
 - > Communication and preventive maintenance.

Improves safety

- **Equip your machines with TeSys products**
 - > Integrated safety features.
 - > Compliance with international standards.

Adapts to any situation

- **Discover a wide range of protection and control products**
 - > The right response for the applications you need.
 - > A solution for each electrical function.
- **Export your machines worldwide**
 - > A single product lineup and identical part numbers worldwide.
 - > Multi-standard products IEC/UL/CSA/CCC.

Simplifies smart installation design

- **Choose the right products quickly and easily**
 - > Motor starters selection software available
 - > www.schneider-electric.com
- **Recommend supervision and control solutions**
 - > Preventive maintenance
 - > Energy management
- **Extend motor lifetime**
 - > High-performance advanced protection
 - > Energy efficiency



TeSys selection tools

To find the right combinations of products for your motor starters is simpler and quicker now.

> To download applications, connect on:

Motor Starter Selection Guide App

- It includes the most common solutions of enclosed motor starters
- Motor rated power up to 30 kW

App for iPad



TeSys Enclosed Motor Starter Solution Guide

- Quick selection of TeSys motor starter most common combinations
- Motor rated power up to 75 kW

App for iPad and iPhone



App for Smartphone and tablet



Low Voltage Motor Starter Solution Guide

- Define your motor starter solution among the complete TeSys offer
- Motor rated power up to 710 kW

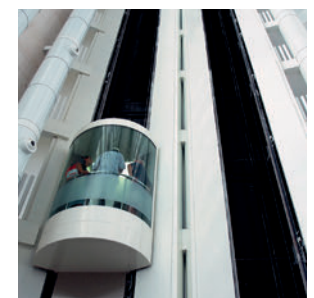
App for iPad



> To discover the TeSys range and stay updated, connect on:



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LADT●	A2/15, A2/17, B7/10, B8/16, B9/11, B9/27
LADT9R●●	B8/24
LAZR9●●	B8/22, B9/16
LB1LD03●●●	A4/3, A4/5
LB6LD03●●●	A4/3
LC1BL●●●●	A5/44, A5/45, A5/47, B10/2
LC1BM●●●●	A5/44, A5/45, A5/47, B10/2, B10/3
LC1BP●●●●	A5/44, A5/45, A5/47, B10/2, B10/3
LC1BR●●●●	A5/44, A5/45, A5/47, B10/2, B10/3

LC1D●●●●●	A2/13, A2/17, A5/5, A5/6, A5/7, A5/8, A5/9, A5/10, A5/11, A5/12, A5/13, A5/14, A5/16, A5/17, A5/18, A5/19, A5/20, A5/21, A5/44, A5/45, A5/47, B8/2, B8/3, B8/4, B8/5, B8/6, B8/7, B8/8, B12/3, B12/38, B12/39, B12/40, B12/41
LC1D●K●●	B8/13
LC1DT ●●●●●●	B8/6, B8/7, B8/11, B8/12, B8/13, B10/6, B10/8, B10/9
LC1DWK12●●	B8/13
LC1F●●●●●	A2/17, A5/6, A5/7, A5/8, A5/9, A5/10, A5/12, A5/14, A5/16, A5/17, A5/19, A5/21, B9/2, B9/3, B9/43, B12/3, B12/38, B12/40, B12/41
LC1FG●●●●	B9/6
LC1K●●●●●	A1/12, A1/13, A5/4, A5/5, A5/9, A5/11, B8/31, B8/33
LC1SK ●●●●●●	B8/29, B8/44
LC1V●●●●	B9/4
LC2D●●●●●●	B8/9, B8/10, B8/11
LC2DT●●●●	B8/11, B8/12
LC2F●●●●	B9/8, B9/9
LC2K●●●●●	B8/35, B8/37
LC2V●●●●●	B9/4
LC3D●●●●●●	A2/10, A5/15, A5/18, A5/20
LC3F●●●●●●	A2/11, A5/15, A5/20

LC3K●●●●	A2/10, A5/15, A5/18, A5/20	LRD●●●●●	A5/5, A5/6, A5/7, A5/8, A5/11, A5/12, A5/13, A5/14, A5/15, A5/16, A5/17, A5/20, A5/21, B11/4, B11/5, B11/6, B11/7	LU9R●●	A3/22, B2/11	LX1V610●●●	B9/5	V									
LC4D●●●●●	A2/3	LS1D32●●●	A5/4, A5/5, A5/15, B4/5, B4/6	LU9RCD●●	A3/29	LX4F8●●●	B9/20, B9/24		V●●	A1/3, B3/8							
LC7K●●●●●●●	B8/31, B8/33		LT3S●●●●●●	B11/16	LU9RDD●●	A3/29	LX4FF●●●		B9/23, B9/26	VBD●●	B3/2, B3/7						
LC8K●●●●●●●	B8/35, B8/37		LT4706●●●	B11/18	LU9RPB●●●	A3/30	LX4FG●●●		B9/23, B9/26	VBF●●●●	A1/2, B3/7						
LD1LC030●	A4/2, A4/5		LT4730●●●	B11/18	LU9SP0	A3/33	LX4FH●●●		B9/23, B9/26	VBF01	B3/7						
LD4LD●30●	A4/2, A4/5		LT4760●●●	B11/18	LUA●●●●	A3/10, A3/14	LX4FJ●●●		B9/23	VBFXGE●	A1/3						
LD5LD●30●	A4/2		LT6CT●●●●	B12/6, B12/38, B12/40, B12/41	LUAL●1	A3/33	LX4FK●●●		B9/24	VC●GUN	A1/6						
LE1D●●●●●	A1/10		LTM9C●●●●●	B12/5, B12/7	LUB●2●	A3/10, A3/13, A3/77	LX4FL●●●		B9/24	VCCD●●	B3/6						
LE1GV●●●●●	A1/13			LTM9F	B12/4	LUCB●●●●	A3/13		LX4FJ●●●	B9/23	VCCDN●●	B3/2					
LE1M35●●●●	A1/12			LTM9KCU	B12/5	LUCC●●●●	A3/13		LX4FK●●●	B9/24	VCCF●●	B3/6					
LE2D●●●●●	A1/10			LTM9T●●	B12/5	LUCD●●●●	A3/13		LX4FL●●●	B9/24	VCD●●	B3/6					
LE2K●●●●●	A1/10	LTM9T●●		B12/5	LUCD●●●●	A3/10, A3/76, A3/77	LX4FX●●●		B9/24	VCDN●●	B3/2						
LE3D●●●●●	A1/14, A1/16	LTM9T●●		B12/5	LUC●●	A3/10	LX5FJW●●		B9/26	VCF●●	B3/6						
LE4K●●●●●	A1/14	LTM9T●●		B12/5	LUC●●	B12/3	LX9FF●●●		B9/21	VCF●●GE	A1/2						
LE6D●●●●●	A1/14, A1/18	LTM9T●●		B12/5	LUFC00	A3/14, A3/22, B2/13	LX9FG●●●		B9/21	VCF●GE	A1/2						
LE8K0●5●●	A1/14	LTM9T●●		B12/5	LUF000	A3/14, A3/22, B2/13	LX9FH●●●		B9/21	VCF●GEN	A1/2						
LF3MP●●●●	A1/31	LTM9T●●		B12/5	LUF●●●	A3/14	LX9FJ●●●		B9/22, B9/25	VCFN●●GE	A1/2						
LF3P●●●	A1/30	LTM9T●●	B12/5	LUFN●●	A3/10, A3/14	LX9FK●●●	B9/22, B9/25		VCFXGE●	A1/3							
LF4MP●●●●	A1/31	LTM9T●●	B12/5	LUFN●●	A3/10, A3/14	LX9FL●●●	B9/22, B9/25		VN●●	A1/3, B3/3							
LF4P●●●	A1/30	LTM9T●●	B12/5	LUFN●●	A3/10, A3/14	LXD1●●	B7/11, B8/25		VVD●	B3/7							
LG1D●●●●●●	A1/23	LTM9T●●	B12/5	LUFN●●	A3/10, A3/14	LXD3●●●	B8/26	VVE●	B3/7								
LG1K●●●●●●	A1/23	LTM9T●●	B12/5	LUFN●●	A3/10, A3/14	N	NS●●●●●●	A5/12, A5/14, A5/20, A5/21	VW3A8●●●R●●	A3/28, B12/7							
LG7D●●●●●	A1/22	LTM9T●●	B12/5	LUFN●●	A3/10, A3/14			NSX●●●●●●	B12/3, B12/39, B12/40	VW3A8●●●TF●●	A3/28, B12/7						
LG7K●●●●●	A1/22, A1/24	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LUTC●●●●	B12/2, B12/3			NSYTR●●●●●	A1/7	VW3G4104	A3/70						
LJ7K●●●●●	A1/26	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LUTM●●●●	B12/3			P	PA1LB●●	B10/4, B10/12, B10/15	VZ●●	A1/4, A1/6, B3/8, B3/14					
LJ8K●●●●●	A1/27	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LV4●●●●●	B1/7					PA1PB●●	B10/4, B10/12, B10/15	VZN●●	A1/5, B3/3, B3/5, B3/14				
LP1D●●●●●●	A5/44, A5/45, B8/6	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX0FF●●●	B9/34, B9/35					PA1RB●●	B10/4, B10/12, B10/15	W	WB1KB●●●	B10/6, B10/7, B10/8, B10/9, B10/11			
LP1DT●●●●●●	B10/7	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX0FG●●●	B9/34, B9/35					PA2FB●●	B10/15			X	XB5●●●●●●●	B11/9	
LP1K●●●●●●	A5/44, A5/45, B8/32, B8/34	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX0FH●●●	B9/34, B9/35					PA2GB●●	B10/15					XBTN●●●●	A3/13, B12/5
LP1SK0600●●	B8/29	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX0FJ●●●	B9/34, B9/35					PA2HB●●	B10/15					XBTZ938	A3/13, B12/5
LP2K●●●●●●	B8/36, B8/38	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX0FK●●●	B9/34, B9/35					PN1●B●●	B10/12, B10/15					XBY2U	B7/11, B8/21
LP4K●●●●●●	B8/32, B8/34	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX0FL●●●	B9/34, B9/35	PN3●B●●	B10/15			XZCG0142	A3/26						
LP5K●●●●●●	B8/36, B8/38	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1D6●●●	B8/27	PR4FB●●●●	B10/11, B10/12			XZMC11	A3/26						
LR2D●●●●	A5/7, B11/6	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1D8●●●	B8/28	PV1FA80	B10/12			XZMG12	A3/26						
LR2K●●●●	A5/4, A5/11, A5/15, A5/20, B11/2	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1FF●●●●	B9/17, B9/28	R	RHZ66	B11/17	Z	Z01	B3/15						
LR97D●●●●	B11/18	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1FH●●●●●	B9/18, B9/29			RM1XA●●●●			B11/14, B11/15					ZA2B●●●●	B11/12
LR9D●●●●	A5/6, A5/7, A5/8, A5/14, A5/16, A5/17, A5/20, A5/21, B11/7	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1FJ●●●●	B9/18, B9/29			RM1ZG21			B11/14	ZB5AD●	A1/19			ZB5AL432	A1/19
LR97D●●●●	B11/18	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1FK●●●●	B9/19, B9/20, B9/29			RM1ZH21			B11/15	ZB5AS834	A1/28	ZB5AS639	A1/19		
LR9D●●●●	A5/6, A5/7, A5/8, A5/14, A5/16, A5/17, A5/20, A5/21, B11/7	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1FL●●●●	B9/19, B9/29			T			TCSATV01N2	A3/26	ZC4GM●	B10/4, B10/6, B10/7, B10/8, B10/9, B10/11, B10/12			
LR97D●●●●	B11/18	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1FX●●●	B9/20							TSXCAN●●●●●	B12/7	ZEN●●●●	, A1/19		
LR9D●●●●	A5/6, A5/7, A5/8, A5/14, A5/16, A5/17, A5/20, A5/21, B9/81, B11/10, B11/11	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1LD●●●●●	A4/11, A4/13							TSXCDP●●●	A3/22				
LR97D●●●●	B11/18	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1V160●●●	B9/5							TSXPBSCA●●●	A3/30, B12/7				
LR9D●●●●	A5/6, A5/7, A5/8, A5/14, A5/16, A5/17, A5/20, A5/21, B9/81, B11/10, B11/11	LTM9T●●	B12/4, B12/38, B12/39, B12/40, B12/41	LX1V320●●●	B9/5												

Part A Assembled motor starters

Fully coordinated

Type of product		Nominal range	Product views	Page
Enclosed starters	>	From 5.5 to 37 kW		A1/1
Open pre-cabled motor starters	>	From 0.06 to 375 kW		A2/1
All-in-one motor starters: TeSys U	>	From 0.09 to 15 kW		A3/1
All-in-one motor starters: Integral 63	>	Up to 32 kW Up to 63 A		A4/1
Complementary technical information: coordination and standards				A5/1

Enclosed

Open pre-cabled

TeSys U

Integral 63

Coordination and

Direct-on-line					
Enclosure main composition	Direct	Reversing	Range		Page
Rotary switch Add-on modules, UL versions TeSys Vario	☑		Up to 45 kW		A1/2
Motor circuit breaker TeSys GV	☑		Up to 11 kW		A1/7
Motor circuit breaker TeSys GV	☑		Up to 30 kW		A1/8
Contactor + Overload relay TeSys LE1, LE2	☑	☑	Up to 37 kW		A1/10
Motor circuit breaker + Contactor + Overload relay TeSys LE1GV	☑		Up to 5.5 kW		A1/12
Fuse switch-disconnector + Contactor + Overload relay TeSys LE4, LE8	☑	☑	Up to 15 kW		A1/14
Star-delta					
3 contactors + Overload relay TeSys LE3	☑		Up to 30 kW		A1/16
Fuse switch-disconnector + 3 contactors + Overload relay TeSys LE6	☑		Up to 22 kW		A1/18
Replacement parts					A1/19
For safety application					
Motor circuit breaker + Emergency stop push button TeSys GV	☑		Up to 11 kW		A1/21
Motor circuit breaker + Contactor + Emergency stop switch TeSys LG1	☑		Up to 9 kW		A1/22
Motor circuit breaker + Contactor + Emergency stop push button TeSys LG7, LG8, LJ7, LJ8	☑	☑	Up to 9 kW		A1/24
Replacement parts					A1/28
For AS-interface bus					
Motor circuit breaker + Contactor + AS-Interface com. module TeSys LF3, LF4	☑	☑	Up to 5.5 kW		A1/30

Direct-on-line



VCF 0GE



VCF 3GE



VCF 5GEN



VCFN 12GE

Enclosed switch-disconnectors for high performance applications

- 3-pole rotary switch-disconnectors, 10 to 140 A, conforming to IEC 60947-4-1 and IEC 60204.
- Marking on operator $\text{O} \rightarrow \text{I}$.
- Padlockable operating handle (padlocks not included).
- IP 65 degree of protection enclosures, sealable and lockable.
- Cover lockable in position "I" (ON) up to 63 A rating.

3-pole main and Emergency Stop switch-disconnectors ⁽¹⁾

Operator Handle	Front plate Dimensions	Ithe	Power AC-23 at 400 V	Incorporated switch body	Possible attachments ⁽²⁾	Reference	Weight
	mm	A	kW				kg
Red, standard, padlockable with up to 3 padlocks (Ø 4 to Ø 8 shank)	Yellow 60 x 60	10	4	V02	2	VCF02GE	0.500
		16	5.5	V01	2	VCF01GE	0.500
		20	7.5	V0	2	VCF0GE	0.500
		25	11	V1	2	VCF1GE	0.500
		32	15	V2	2	VCF2GE	0.500
		50	22	V3	3	VCF3GE	0.930
Red, long, padlockable with up to 3 padlocks (Ø 4 to Ø 8 shanks)	Yellow 90 x 90	100	37	V5	1	VCF5GEN	2.190
		140	45	V6	1	VCF6GEN	2.190

3-pole main switch-disconnectors ⁽¹⁾

Black, standard, padlockable with up to 3 padlocks (Ø 4 to Ø 8 shank)	Black 60 x 60	10	4	V02	2	VBF02GE	0.500
		16	5.5	V01	2	VBF01GE	0.500
		20	7.5	V0	2	VBF0GE	0.500
		25	11	V1	2	VBF1GE	0.500
		32	15	V2	2	VBF2GE	0.500
		50	22	V3	3	VBF3GE	0.930
Black, long, padlockable with up to 3 padlocks (Ø 4 to Ø 8 shank)	Black 90 x 90	100	37	V5	1	VBF5GEN	2.190
		140	45	V6	1	VBF6GEN	2.190

Enclosed switch-disconnectors for standard applications

- 3-pole rotary switch-disconnectors, 10 to 32 A, conforming to IEC 60947-4-1.
- Degree of protection IP 55.

3-pole main and Emergency Stop switch-disconnectors ⁽¹⁾

Operator Handle	Front plate Dimensions	Ithe	Power AC-23 at 400 V	Incorporated switch body	Possible attachments ⁽²⁾	Reference	Weight
	mm	A	kW				kg
Red padlockable, either by 1 (Ø 8 shank) or by 3 padlocks (Ø 6 shank)	Yellow 60 x 60	10	4	VN 12	2	VCFN12GE ⁽²⁾	0.422
		16	5.5	VN 20	2	VCFN20GE ⁽²⁾	0.422
		20	7.5	V0	0	VCFN25GE	0.512
		25	11	V1	0	VCFN32GE	0.512
		32	15	V2	0	VCFN40GE	0.512

⁽¹⁾ For characteristics of switch-disconnectors, please consult your Regional Sales Office.

⁽²⁾ For VCF and VBF enclosures, see page A1/4. For VCFN enclosures, see page A1/5.

Note: For VCF and VBF enclosures from 02GE to 2GE, only one auxiliary contact block VZ7 or VZ20 can be mounted.

Direct-on-line



VBFX GE2

Empty enclosures

IP65 enclosure with red padlockable handle operator and yellow front plate
(for mounting a main or Emergency Stop switch-disconnector)

For switch body	Ithe	Possible attachments ⁽¹⁾	Reference	Weight
A				
				kg
VN12, VN20 V02...V2	10...32	2	VCFXGE1	0.340
V02...V2	10...32	4	VCFXGE4	0.660
V3	50	3	VCFXGE2	0.660
V5 - V6	100.... 140	1	VCFXGE6	1.04

IP65 enclosure with black padlockable handle and black front plate
(for mounting a main switch-disconnector)

VN12, VN20 V02...V2	10...32	2	VBFXGE1	0.340
V02...V2	10...32	4	VBFXGE4	0.660
V3	50	3	VBFXGE2	0.660
V5 - V6	100.... 140	1	VBFXGE6	1.04

Switch bodies for standard applications ⁽²⁾

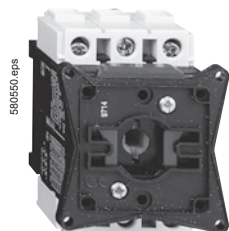
Description	Rating	Reference	Weight
A			
			kg
3-pole switch-disconnectors	10	VN12	0.110
	16	VN20	0.110

Switch bodies for high performance applications ⁽²⁾

Description	Rating	Reference	Weight
A			
			kg
3-pole switch-disconnectors	10	V02	0.200
	16	V01	0.200
	20	V0	0.200
	25	V1	0.200
	32	V2	0.200
	50	V3	0.200
	63	V4	0.200

⁽¹⁾ See pages A1/4. and A1/5.

⁽²⁾ For characteristics of switch-disconnectors, please consult your Regional Sales Office.



V0

TeSys enclosed starters

VARIO enclosed switch-disconnectors

Add-on modules

Direct-on-line



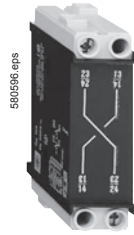
VZ 0



VZ 11



VZ 15



VZ 20

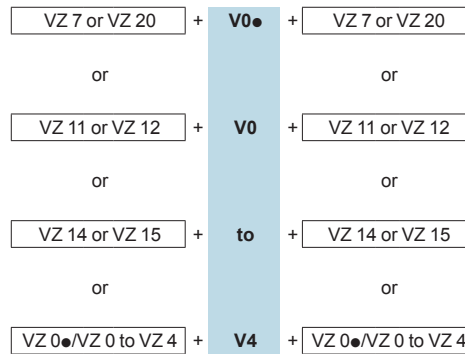
Add-on modules for enclosures VCF and VBF

Description	Rating	Reference
	A	
Main pole module (mounted in enclosure)	10	VZ02
	16	VZ01
	20	VZ0
	25	VZ1
	32	VZ2
	50	VZ3
	63	VZ4
Neutral pole modules with early make and late break contacts	10 to 32	VZ11
	50 and 63	VZ12
	100 and 140	VZ13
Earthing modules	10 to 32	VZ14
	50 and 63	VZ15
	100 and 140	VZ16

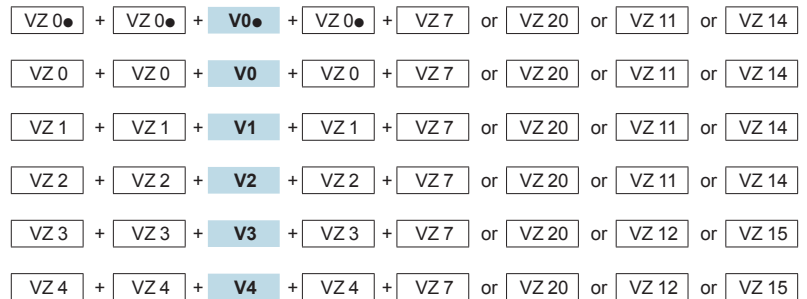
Description	Type of contacts	Reference
Auxiliary contact block modules with 2 auxiliary contacts	N/O + N/C ⁽¹⁾	VZ7
	N/O + N/O	VZ20

Maximum number of add-on modules that can be fitted on a switch body

1 add-on module on each side of the switch body



2 add-on modules on each side of the switch body



Note: The add-on modules mounted next to the switch body are main pole modules. Maximum of 3 main pole modules per switch body.

(1) Late make N/O, early break N/C contacts.

TeSys enclosed starters

VARIO enclosed switch-disconnectors

Add-on modules

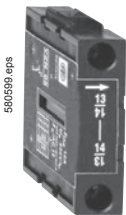
Direct-on-line



VZN 11



VZN 14



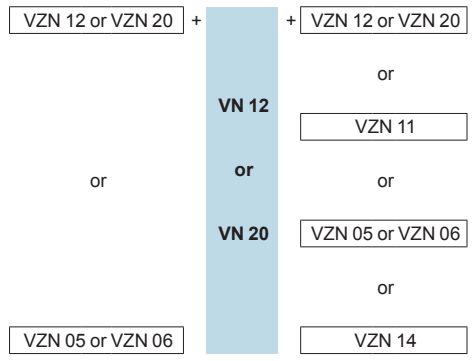
VZN 05

Add-on modules for enclosures VCFN 12GE and 20GE

Description	Rating	Reference
Main pole modules	10	VZN12
	16	VZN20
Neutral pole module with early make and late break contacts	10 and 16	VZN11
Earthing module	10 and 16	VZN14

Description	Type of contacts	Reference
Auxiliary contact block modules	1 N/O late make contact	VZN05
	1 N/C early break contact	VZN06

Maximum number of add-on modules that can be fitted on a switch body



Enclosed starters

TeSys enclosed starters

VARIO enclosed switch-disconnectors for the North American market, conforming to UL and CSA standards

Direct-on-line



VC1 GUN



VC3 GUN



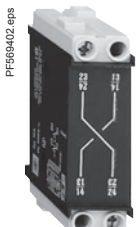
VC5 GUN



VZ 11



VZ 15



VZ 20

Enclosed switch-disconnectors for high performance applications

- 3-pole rotary switch-disconnectors, 25 to 140 A, conforming to IEC 60947-4-1, IEC 60204, UL 508 and CSA 22.2 n° 14.
- Marking on operator $\circ \downarrow$
- Padlockable operating handle (padlocks not included).
- NEMA type 1 and type 12 enclosures, IP65 degree of protection, sealable and lockable.

3-pole main and Emergency stop switch-disconnectors ⁽¹⁾

Operator Handle	Front plate Dimensions	Rating		Standard power ratings of UL motors			Incorporated switch body	Possible attachments	Reference	Weight
		IEC (lth)	UL	240 V	480 V	600 V				
		A	A	HP	HP	HP				
	mm	600 V		240 V 480 V 600 V						kg
Red, standard, padlockable with up to 3 padlocks (Ø 4 to Ø 8)	Yellow 60 x 60	32	20	5	10	10	V1	2	VC1GUN	0.500
		40	25	5	10	15	V2	2	VC2GUN	0.500
		63	45	10	20	30	V3	2	VC3GUN	0.930
		80	63	15	30	40	V4	2	VC4GUN	0.930
Red, long, padlockable with up to 3 padlocks (Ø 4 to Ø 8)	Yellow 90 x 90	125	100	25	50	50	V5	1	VC5GUN	2.190
		175	115	30	50	60	V6	1	VC6GUN	2.190

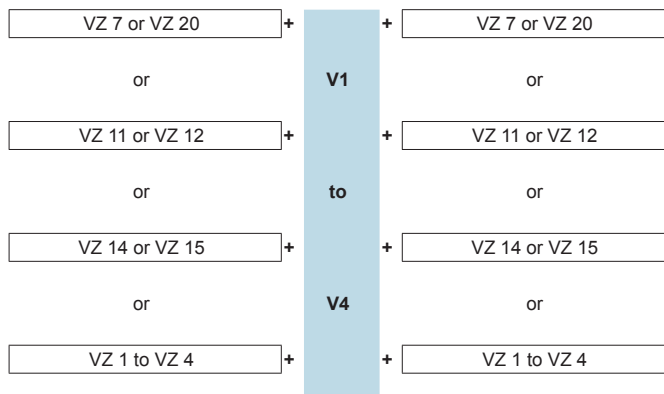
Add-on modules for VC enclosure

Description	Rating A	Reference
Main pole module (mounted in enclosure)	25	VZ1
	32	VZ2
	50	VZ3
	63	VZ4
Neutral pole module with early make and late break contacts	10 to 32	VZ11
	50 and 63	VZ12
	100 and 140	VZ13
Earthing modules	10 to 32	VZ14
	50 and 63	VZ15
	100 and 140	VZ16

Description	Type of contacts	Reference
Auxiliary contact block modules with 2 auxiliary contacts	N/O + N/C ⁽²⁾	VZ7
	N/O + N/O	VZ20

Maximum number of add-on modules that can be fitted on a switch body

1 add-on module on each side of the switch body



(1) For characteristics of switch-disconnectors, please consult your Regional Sales Office.
 (2) Late make N/O, early break N/C contacts.

TeSys enclosed starters

D.O.L. starters, manual control, with GV2ME thermal magnetic circuit breaker



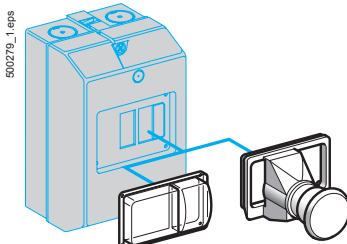
GV2 MC



GV2 MP



GV2 CP21



GV2 K011

Characteristics ⁽¹⁾

Conforming to standards	IEC 60947-2, IEC 60947-4-1
Operational voltage U _e	690 V
Material	Polycarbonate ⁽²⁾

GV2	ME 01	ME 02	ME 03	ME 04	ME 05	ME 06	ME 07	ME 08	ME 10	ME 14	ME 16	ME 20	ME 21	ME 22
lthe in enclosure (A)	0.16	0.25	0.4	0.63	1	1.6	2.5	4	6.3	9	13	17	21	23

References

Enclosures for thermal-magnetic circuit breakers GV2 ME ⁽³⁾

Type	Degree of protection	Possible no. of side mounting auxiliary contact blocks on GV2 ME		Reference	Weight kg
		LH side	RH side		
Surface mounting, double insulated with protective conductor. Sealable cover	IP41	1	1	GV2MC01	0.290
	IP55	1	1	GV2MC02	0.300
Flush mounting, with protective conductor	IP55 for temperature < +5 °C	1	1	or GV2MCK04 ⁽⁴⁾	0.420
	IP41 (front face)	1	1	GV2MC03	0.300
Flush mounting, with protective conductor	IP41 (front face reduced – flush mounting)	–	1	GV2MP01	0.115
	IP41 (front face reduced – flush mounting)	–	1	GV2MP03	0.115
	IP55 (front face)	1	1	GV2MP02	0.130
	IP55 (front face reduced flush mounting)	–	1	GV2MP04	0.130

Front plate

Description	Reference	Weight kg
For direct control, through a panel, of a chassis mounted GV2 ME	IP55 GV2CP21	0.800

Accessories common to all enclosures (to be ordered separately)

Description	Sold in lots of	Unit reference	Weight kg
Padlocking device ⁽⁵⁾ for GV2 ME operator (padlocking is only possible in the "O" position)	1 to 3 padlocks Ø 4 to 8 mm	1 GV2V01	0.075
Mushroom head pushbutton	Spring return ⁽⁵⁾	1 GV2K011	0.052
Ø 40 mm, red, IP55	Emergency stop Latching ⁽⁵⁾	Key release, key n° 455 1 GV2K021	0.160
		Turn to release 1 GV2K031	0.115
		1 GV2K04 ⁽³⁾	0.120
Sealing kit	For enclosures and front plate	IP 55 for temperature between +5 °C and +40 °C 10 GV2E01	0.012
		IP 55 for temperature between -20 °C and +40 °C 10 GV2E02	0.012
Neutral terminal		100 NSYTRV62BL	0.015
Partition		50 NSYTRAC22BL	0.003

⁽¹⁾ Characteristics of GV2ME circuit breakers and additives: see chapter B6 "Circuit breakers".

⁽²⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽³⁾ Circuit breaker to be ordered separately. Commercial references of GV2ME01 to M22: see chapter B6 "Circuit breakers".

⁽⁴⁾ Enclosure GV2 MCK04 is fitted with a GV2 K04 mushroom head Emergency stop pushbutton as standard.

⁽⁵⁾ Supplied with IP55 GV2 E01 sealing kit. To be fitted with enclosure GV2 M●01.

⁽⁶⁾ Padlockable in "O" position using Ø 4 to 8 mm shank padlocks.

TeSys enclosed starters

D.O.L. starters manual control, with magnetic circuit breaker GV2 L or thermal-magnetic GV2 P

Characteristics ⁽¹⁾

Conforming to standards	IEC 60947-2, IEC 60947-4-1 (GV2 P only)
Degree of protection conforming to IEC 60529	IP65 / IK08
Operational voltage U _e	690 V
Material	Polycarbonate ⁽²⁾

GV2	L/P 01	L/P 02	L/P 03	L/P 04	L/P 05	L/P 06	L/P 07	L/P 08	L/P 10	L/P 14	L/P 16	L/P 20	L/P 21	L/P 22
lthe in enclosure (A)	0.16	0.25	0.4	0.63	1	1.6	2.5	4	6.3	9	13	17	21	23

References

Enclosures fitted with padlockable rotary handle, for GV2P/L circuit breakers ⁽³⁾

Composition	Type	Reference
<ul style="list-style-type: none"> ■ Insulating enclosure ■ Black handle, padlockable in ON/OFF position 	Surface mounting	GV2PC01
<ul style="list-style-type: none"> ■ Insulating enclosure ■ Red handle on yellow background, padlockable in OFF position 	Surface mounting	GV2PC02

⁽¹⁾ Circuit breaker characteristics:

GV2 L: see chapter B6 "Circuit breakers".

GV2 P: see chapter B6 "Circuit breakers".

⁽²⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽³⁾ Circuit breaker to be ordered separately.

References **GV2 L01 to L22:** see chapter B6 "Circuit breakers".

References **GV2 P01 to P22:** see chapter B6 "Circuit breakers".



GV2 PC

TeSys enclosed starters

D.O.L. starters, manual control, with GV3P thermal magnetic or GV3L magnetic circuit breaker

Characteristics ⁽¹⁾

Conforming to standards	IEC 60947-2, IEC 60947-4-1 (GV3 P only)
Degree of protection conforming to IEC 60529	IP65/IK09
Operational voltage Ue	690 V
Material	Steel sheet

GV3	L40 P40	L50 P50	L65 P65
Ithe in enclosure (A)	35	41	55

References**Enclosures fitted with a padlockable rotary handle for GV3P/L circuit breakers ^{(2) (3)}**

Composition ⁽⁴⁾	Type	Référence	Masse kg
<ul style="list-style-type: none"> ■ Metal enclosure ■ Black handle, padlocking in ON/OFF position ■ Circuit breaker/handle adapter 	Surface mounting	GV3PC01	2,000
<ul style="list-style-type: none"> ■ Metal enclosure ■ Red handle, padlocking in OFF position ■ Circuit breaker/handle adapter 	Surface mounting	GV3PC02	2,000

(1) Circuit breakers characteristics:

GV3L: see chapter B6 "Circuit breakers".

GV3P: see chapter B6 "Circuit breakers".

(2) Circuit breakers to be ordered separately:

GV3L40 to 65: see chapter B6 "Circuit breakers".

GV3P40 to 65: see chapter B6 "Circuit breakers".

(3) Assembling possibility: 1 GV3 P or GV3 L alone circuit breaker + 1 LC1D●●A●● contactor + GV3 S S-shape busbar.

(4) Components for customer assembly.



GV3 PC

PB112221_L32.eps

TeSys enclosed starters

D.O.L. starters ⁽¹⁾

without isolating device

Direct-on-line

Characteristics	
Conforming to standards	IEC 60947-4-1
Degree of protection conforming to IEC 60529	LE2 K: IP65 / IK09 LE● D09...D35: IP65 / IK07 LE● D40A...D65A: IP65 / IK09
Ambient air temperature	Operation: - 5...+ 40 °C
Operating positions	Same as that of the contactors
Material	LE2 K and LE● D09...D35: Polycarbonate ⁽²⁾ LE● D40A...D65A: Sheet steel

References

Non-reversing starters

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3							Maximum current I _n the up to	Basic reference, to be completed by adding the voltage code ⁽³⁾	Weight
220 V	380 V	415 V	440 V	500 V	660 V	690 V			
kW	kW	kW	kW	kW	kW	kW	A		kg
2.2	4	4	4	5.5	5.5	5.5	9	LE1D09●●	0.920
3	5.5	5.5	5.5	7.5	7.5	7.5	12	LE1D12●●	0.920
4	7.5	9	9	10	10	10	18	LE1D18●●	1.015
5.5	11	11	11	15	15	15	25	LE1D25●●	1.015
7.5	15	15	15	18.5	18.5	18.5	35	LE1D35●●	4.320
11	18.5	22	22	22	30	30	40	LE1D40A●●	4.820
15	22	25	30	30	33	33	50	LE1D50A●●	4.850
18.5	30	37	37	37	37	37	65	LE1D65A●●	4.850

Reversing starters

1.5	2.2	2.2	3	-	-	-	6	LE2K065●●	1.080
2.2	4	4	4	-	-	-	9	LE2K095●●	1.080
-	-	-	-	5.5	5.5	5.5	9	LE2D09●● ⁽⁴⁾	2.100
-	-	-	-	5.5	5.5	5.5	9	LE2D09●●	2.100
3	5.5	5.5	5.5	7.5	7.5	7.5	12	LE2D12●●	2.100
4	7.5	9	9	10	10	10	18	LE2D18●●	2.410
5.5	11	11	11	15	15	15	25	LE2D25●●	2.570
7.5	15	15	15	18.5	18.5	18.5	35	LE2D35●●	4.100
11	18.5	22	22	22	30	30	40	LE2D40A●●	5.270
15	22	25	30	30	33	33	50	LE2D50A●●	5.470
18.5	30	37	37	37	37	37	65	LE2D65A●●	5.470

⁽¹⁾ Overload protection must be provided by a thermal overload relay, to be ordered separately, see chapter B11 "Overload relays".

⁽²⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽³⁾ Standard control circuit voltages:

Volts	24	48	110	115	120	220	230	240	380	400	415	440
~ 50/60 Hz												
LE1 D09 to D35	B7	E7	F7	FE7	G7	M7	P7	U7	Q7	V7	N7	R7
LE1 D40A to D65A, LE2 D40A to D65A	-	-	-	FE7	-	-	P7	-	Q7	-	-	-
LE2 D09 to D35	B7	-	-	-	-	M7	P7	U7	Q7	V7	N7	-
LE2 K	-	-	-	-	-	M7	P7	U7	Q7	V7	-	-

⁽⁴⁾ Selection according to the dimensions and the number of operating cycles, please consult your Regional Sales Office.



LE1 D●●



LE1 D●●A●●



LE2 D●●



LE2 D●●A●●



LE1 D●●A04



LE1 D●●A05



LE1 D●●A09



LE1 D●●A13

Description

Standard versions comprise:

■ For non-reversing starters:

- LE1 D09...D65A:
 - 1 green Start button "I",
 - 1 red Stop/Reset button "O".

■ For reversing starters:

- LE2 K:
 - 1 Start button ↑,
 - 1 Start button ↓,
 - 1 red Stop/Reset button.
- LE2 D09...D65A:
 - 1 2-position spring return selector switch "I"- "II",
 - 1 red Stop/Reset button "O",

For supply voltages between 380 and 440 V (codes Q7, V7, N7 or R7) the control circuit is pre-wired between phases. For other supply voltages, the control circuit must be wired by the customer.

Variants (pre-assembled)

Description	Available variants for starter ⁽²⁾	Suffix to be added to the starter reference ⁽³⁾
No pushbuttons on cover	LE1 D09...D65A●● LE2 D40A...D65A●●	A04
1 blue Reset button "R"	LE1 D09...D65A●● LE2 D40A...D65A●●	A05
1 3-position stay put selector switch ("I"- "O"- "II") ("I": Automatic Start; "O": Stop; "II": Manual Start) 1 blue Reset button "R"	LE1 D09...D25●●	A09
1 2-position stay put selector switch "O"- "I" ("O": Stop; "I": Manual Start) 1 blue Reset button "R"	LE1 D09...D25●●	A13
Mounting of an LC1 D09 contactor in an enclosure identical to LE1 D18	LE1 D09P7 LE1 D09P7A13	T

For LE1D09 à D35 and LE2 D09 à D35 starters:

A04, A29 and A39 versions can also be made from parts.

Empty enclosures, contactor and circuit breaker must be ordered separately.

A customer assembly.

DE1DS / DE2DS empty enclosures: see page A1/20.

LC1D / LC2D contactors: see chapter B8 "Contactors".

LRD thermal relays: see chapter B11 "Overload relays".

⁽¹⁾ See previous page.

⁽²⁾ Standard control circuit voltages:

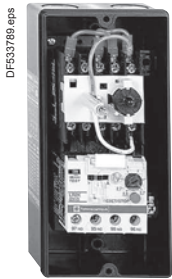
Volts	220	230	240	380	400	415
~ 50/60 Hz						
LE1 D09 to D35	M7	P7	U7	Q7	V7	N7
LE1 D40A to D65A,	–	P7	–	Q7	–	–
LE2 D40A to D65A						

⁽³⁾ Example: **LE1 D09P7A04**.

TeSys enclosed starters

D.O.L. starters

with 3-phase thermal overload relay
with 3 protected phases



LE1 M35●●●●●

Characteristics ⁽¹⁾	
Conforming to standards	IEC 60947-4-1
Degree of protection conforming to IEC 60529	IP 65
Ambient air temperature	Operation: - 5 to + 40 °C
Operating positions	Same as for the TeSys K contactors
Material	Self-extinguishing ABS

References

Non-reversing starters

Starter LE1 M, combined with short-circuit protection components, provides type 1 or type 2 coordination, depending on the type of devices used.

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3				Setting range of thermal overload relay LR2 K ⁽²⁾	Basic reference, to be completed by adding the voltage code ⁽³⁾
220 V 230 V	240 V	380 V 400 V	415 V		
kW	kW	kW	kW	A	
0.12	0.12	0.25	0.25	0.54...0.8	LE1M35●●05
0.18	0.18	0.37	0.37	0.8...1.2	LE1M35●●06
0.25	0.25	0.55	0.55	1.2...1.8	LE1M35●●07
0.37	0.37	1.1	0.75	1.8...2.6	LE1M35●●08
0.55	0.55	1.5	1.5	2.6...3.7	LE1M35●●10
1.1	0.75	2.2	2.2	3.7...5.5	LE1M35●●12
1.5	1.1	3	3	5.5...8	LE1M35●●14
2.2	2.2	4	4	8...11.5	LE1M35●●16
3	3	5.5	5.5	10...14	LE1M35●●21
3.7	4	7.5	7.5	12...16	LE1M35●●22

- The standard version comprises:
 - 1 TeSys contactor LC1 K●●,
 - 1 TeSys thermal overload relay LR2 K,
 - 1 green Start button "I",
 - 1 red Stop/Reset button "O/R",
 - 1 yellow operating indicator.
- For supply voltages between 380 and 440 V (codes Q7, V7, N7 or R7) the control circuit is pre-wired between phases. For other supply voltages, the control circuit must be wired by the customer.
- Control may be pulsed or maintained.
- An earth terminal and a neutral terminal are provided on the bottom of the enclosure.
- For safety applications, see enclosed starters: GV2 MC, LG1 K, LG1 D, LG7 K, LG7 D, LJ7 K, LG8 K and LJ8 K.

Variant

Starter without thermal overload relay LR2 K

Example: LE1 M35●●

Replacement part

Description	Basic reference, to be completed by adding the voltage code ⁽³⁾
Contactor	LC1K●●A80

⁽¹⁾ For characteristics of contactor, LC1 K, see chapter B8 "Contactors".
For characteristics of TeSys thermal overload relay LR2 K, see chapter B11 "Overload relays".

⁽²⁾ Thermal overload relay fitted as standard.

⁽³⁾ Standard control circuit voltages:

Volts ~ 50/60 Hz	24	110	220	230	240	380	400	415	440
Code	B7	F7	M7	P7	U7	Q7	V7	N7	R7

TeSys enclosed starters

D.O.L. starters

with thermal magnetic circuit breaker and contactor

Direct-on-line



LE1 GVMEK

PB112286_L32_eps

Characteristics

Conforming to standards	IEC 60947-4-1
Degree of protection conforming to IEC 60529	IP 55
Ambient air temperature	Operation: - 5 to + 40 °C
Operating positions	Same as for the TeSys K contactors
Material	Polycarbonate ⁽¹⁾

References

Enclosures for GV2ME thermal magnetic circuit breakers and LC1K contactors ⁽²⁾

Composition	Reference
Insulating enclosure with GV2E01 sealing device	LE1GVMEK
Insulating enclosure with GV2E01 sealing device, neutral terminal	LE1GVMEKA59

Accessories (to be ordered separately)

Description		Sold in lots of	Unit reference
Padlocking device ⁽³⁾ for GV2 ME operator (padlocking is only possible in the "O" position)	1 to 3 padlocks Ø 4 to 8 mm	1	GV2V01
Mushroom head "Stop" pushbutton Ø 40 mm, red	Spring return ⁽³⁾	1	GV2K011
	Lockable	1	GV2K021
	Key release, key n° 455	1	GV2K031
	Emergency Stop, IP55 ⁽³⁾	1	GV2K04 ⁽⁴⁾
Sealing kit	IP 55 for temperature between +5 °C and +40 °C	10	GV2E01
	IP 55 for temperature between -20 °C and +40 °C	10	GV2E02

D.O.L. starters, non-reversing

Standard power ratings of 3-phase motors 50/60 Hz in AC-3			Setting range of thermal trips	Fixed magnetic current 13 Irth	For customer assembly	
400/415 V	440 V	500 V			Motor circuit breaker Reference	Contactor Reference to be completed with the reference voltage ⁽⁵⁾
kW	kW	kW	A	A		
0.37	0.37	0.37	1...1.6	22.5	GV2ME06	LC1K0610
0.55	0.55	0.55				
-	-	0.75				
0.75	0.75	-	1.6...2.5	33.5	GV2ME07	LC1K0610
-	1.1	1.1				
1.1	-	1.5	2.5...4	51	GV2ME08	LC1K0610
1.5	1.5	2.2				
2.2	2.2	-	4...6.3	78	GV2ME10	LC1K0610
-	3	3				
3	-	4	6...10	138	GV2ME14	LC1K0910
4	4	5.5				
5.5	5.5	7.5	9...14	170	GV2ME16	LC1K1210

⁽¹⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽²⁾ Starter to be ordered separately. Commercial references of motor starters: see chapter A5 "Complementary technical information: coordination and standards".

⁽³⁾ Supplied with IP 55 GV2 E01 sealing kit.

⁽⁴⁾ Padlockable in position "O" using Ø 4 to 8 mm shank padlocks

⁽⁵⁾ Standard control circuit voltages:

Volts	24	110	220/230	230	230/240	380/400
~ 50/60 Hz	B7	F7	M7	P7	U7	Q7
— ⁽⁶⁾	BW3	-	-	-	-	-

⁽⁶⁾ Coil: low consumption (1.5 W), wide range (0.7...1.3 Uc) with integral suppression device as standard.

TeSys enclosed starters

D.O.L. starters ⁽¹⁾

with isolating device

Direct-on-line

Characteristics

Conforming to standards	IEC 60947-4-1
Degree of protection conforming to IEC 60529	LE●K : IP65/IK09 LE●D09...D35 : IP65/IK07
Ambient air temperature	Operation: -5...+40 °C
Operating positions	Same as that of the contactors
Material	Polycarbonate ⁽²⁾

References

Non-reversing starters

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3						Maximum current I _{th} up to	Fuses to be fitted by the customer		Basic reference, to be completed by adding the voltage code ⁽³⁾	Weight
220 V	380 V	415 V	440 V	500 V	660 V		Size	Type aM		
230 V	400 V				690 V		A		kg	
1.5	2.2	2.2	3	–	–	6	10 x 38	10	LE4K065●●	1.450
2.2	4	4	4	–	–	9	10 x 38	12	LE4K095●●	1.450
									or LE4D09●● ⁽⁴⁾	1.960
2.2	4	4	4	5.5	–	9	10 x 38	12	LE4D09●●	1.960
3	5.5	5.5	5.5	7.5	–	12	10 x 38	16	LE4D12●●	1.960
4	7.5	9	9	10	–	18	10 x 38	20	LE4D18●●	2.200
5.5	11	11	11	15	–	25	10 x 38	25	LE4D25●●	2.200
7.5	15	15	15	18.5	18.5	35	14 x 51	32	LE4D35●●	5.190

Reversing starters

1.5	2.2	2.2	3	–	–	6	10 x 38	10	LE8K065●●	1.600
2.2	4	4	4	–	–	9	10 x 38	12	LE8K095●●	1.600
									or LE8D09●● ⁽⁴⁾	3.550
–	–	–	–	5.5	–	9	10 x 38	12	LE8D09●●	3.550
3	5.5	5.5	5.5	7.5	–	12	10 x 38	16	LE8D12●●	3.550
4	7.5	9	9	10	–	18	10 x 38	20	LE8D18●●	3.700
5.5	11	11	11	15	–	25	10 x 38	25	LE8D25●●	4.670
7.5	15	15	15	18.5	18.5	35	14 x 51	32	LE8D35●●	5.800

⁽¹⁾ Overload protection must be provided by a thermal overload relay, to be ordered separately.

References **LRD**: see chapter B11 "Overload relays".

⁽²⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽³⁾ Standard control circuit voltages.

Volts	24	48	110	115	120	220	230	240	380	400	415	440
~ 50/60 Hz												
LE4 D	B7	E7	F7	FE7	G7	M7	P7	U7	Q7	V7	N7	R7
LE4 K	–	–	–	–	–	M7	P7	U7	Q7	V7	–	–
LE8 K, LE8 D	–	–	–	–	–	–	P7	–	Q7	V7	–	–

⁽⁴⁾ Selection according to dimensions and the number of operating cycles, please consult your Regional Sales Office.



LE4 D●●



LE8 D●●



LE4 D●●A04



LE4 D●●A05

Description

Standard versions comprise:

■ For non-reversing starters:

- LE4 K and LE4:
 - 1 green Start button "I",
 - 1 red Stop/Reset button "O".

■ For reversing starters:

- LE8 K:
 - 1 Start button ↑,
 - 1 Start button ↓,
 - 1 red Stop/Reset button.
- LE8 D:
 - 1 2-position spring return selector switch "I"- "II",
 - 1 red Stop/Reset button "O",

Protection	Power circuit	Control circuit
LE4 and LE8 K	1 3-pole isolating device	None
LE4 and LE8 D	1 3-pole isolating device	+ 1 additional pole

For supply voltages between 380 and 440 V (codes Q7, V7, N7 or R7) the control circuit is pre-wired between phases. For other supply voltages, the control circuit must be wired by the customer.

Variants (pre-assembled)

Description	Available variant for starter	Suffix to be added to the starter reference ⁽²⁾
No pushbuttons on cover	LE4 D09...D35 P7 (230 V), V7 (400 V)	A04
1 blue Reset button "R"	LE4 D09...D35 P7 (230 V), V7 (400 V)	A05

⁽¹⁾ See previous page

⁽²⁾ Example: **LE4 D09P7A04**.

TeSys enclosed starters

Star-delta starters

without isolating device ⁽¹⁾

Star-delta

Characteristics

Conforming to standards	IEC 60947-4-1
Degree of protection conforming to IEC 60529	IP65 / IK07
Ambient air temperature	Operation: -5 to +40 °C
Operating positions	Same as that of the contactors
Material	Polycarbonate ⁽²⁾

References

- Maximum operating rate: 30 starts/hour.
- Maximum starting time: 30 seconds.
- LE3 D: an LAD S2 timer imposes a delay of 40 ms ±15 ms on the delta contactor at the moment of changeover to ensure that the star contactor has sufficient breaking time.

Star-delta starters

Standard power ratings of squirrel cage motors Mains voltage - delta connection				Basic reference, to be completed by adding the voltage code ⁽³⁾	Weight kg
220 V kW	380/400 V kW	415 V kW	440 V kW		
4	7.5	7.5	7.5	LE3D09●●	3.650
5.5	11	11	11	LE3D12●●	3.650
11	18.5	22	22	LE3D18●●	3.750
15	30	30	30	LE3D35●●	5.160

⁽¹⁾ Overload protection must be provided by a thermal overload relay, to be ordered separately. Select appropriate overload relay for setting at 0.58 of the full load rated motor current. References LRD: see chapter B11 "Overload relays".

⁽²⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽³⁾ Standard control circuit voltages:

Volts ~ 50/60 Hz	24	220	230	240	380	400	415
LE3 D	B7	M7	P7	U7	Q7	V7	N7



LE3 D●●

Star-delta



LE3 D●●A04

Description

The standard version comprises:

- LE3 D:
- 1 green Start button "I",
- 1 red Stop/Reset button "O".

For supply voltages between 380 and 415 V (codes Q7, V7 or N7) the control circuit is pre-wired between phases. For other supply voltages, the control circuit must be wired by the customer.

Variants (pre-assembled)

Description	Available variant for starter	Suffix to be added to the starter reference ⁽¹⁾
No pushbuttons on cover	LE3 D09...D35 P7 (230 V) V7 (400 V)	A04

⁽¹⁾ Starter references, see previous page - Example: **LE3D09P7A04**.

TeSys enclosed starters

Star-delta starters ⁽¹⁾

with isolating device

Star-delta



LE6 D●●

PB112280_L32R.eps

Characteristics

Conforming to standards	IEC 60947-4-1
Degree of protection conforming to IEC 60529	IP 65 / IK07
Ambient air temperature	Operation: - 5 to +40 °C
Operating positions	Same as that of the contactors
Material	Polycarbonate ⁽²⁾

References

- Maximum operating rate: 30 starts/hour.
- Maximum starting time: 30 seconds.
- An LA2 DS2 timer imposes a delay of 40 ms ±15 ms on the delta contactor at the moment of changeover to ensure that the star contactor has sufficient breaking time.

Standard power ratings of squirrel cage motors. Mains voltage - Delta connection				Fuses to be fitted by the customer		Basic reference, to be completed by adding the voltage code ⁽³⁾	Weight
220 V	380 V	415 V	440 V	Size	Type aM		
kW	kW	kW	kW		A		kg
4	7.5	7.5	7.5	10 x 38	20	LE6D09●●	3.900
5.5	11	11	11	10 x 38	25	LE6D12●●	3.900
11	18.5	22	22	14 x 51	40	LE6D18●●	4.850

⁽¹⁾ Overload protection must be provided by a thermal overload relay, to be ordered separately. Select appropriate overload relay for setting at 0.58 of the full load rated motor current.

Reference **LRD**: see chapter B11 "Overload relays".

⁽²⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽³⁾ Standard control circuit voltages.

Volts ~ 50/60 Hz	24	230	400
LE6 D	B7	P7	V7

Description

The standard version comprises:

- LE6 D:
 - 1 green Start button "I",
 - 1 red Stop/Reset button "O".

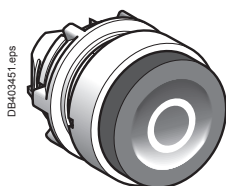
For supply voltages between 380 and 415 V (codes Q7, V7 or N7) the control circuit is pre-wired between phases. For other supply voltages, the control circuit must be wired by the customer.

Protection	Power circuit	Control circuit
LE6 D09 and D12	1 3-pole isolating device	+ 1 additional pole
LE6 D18	1 3-pole isolating device	+ 1 circuit breaker GB2 CB08

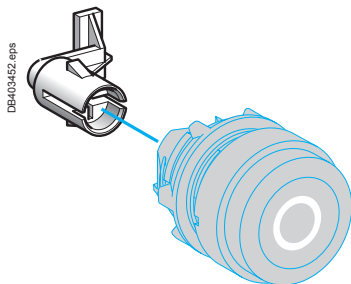
Direct-on-line



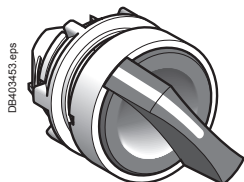
ZB5 AA331



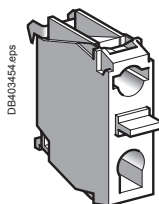
ZB5 AL432



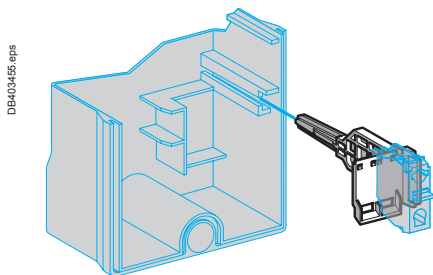
LAD 9091



ZB5 AD



ZEN L1111



LAD 91809

Heads for Start and Stop/Reset pushbuttons

Description	For use on	Unit reference
Flush, green "I" ⁽¹⁾	LE1, LE3, LE4, LE6 D09...D35	ZB5AA331
Projecting, red "O" ⁽¹⁾	LE● D09...D35	ZB5AL432
Adaptation kit for head ZB5 AL432	LE1 D09 and D12	LAD9091
	LE1 D18...D35, LE2 D09...D35	LAD91810
	LE3, LE4, LE6 and LE8 D09...D35	LAD9T4

Heads for Reset pushbuttons

Flush, blue "R" ⁽²⁾	LE● D09...D35	ZB5AA0 + ZBA639 ⁽³⁾
Adaptation kit for head ZB5 AA0 + ZBA 639	LE1 D09 and D12	LAD9092
	LE1 D18...D35, LE2 D09...D35	LAD91810
	LE3, LE6, LE4 and LE8 D09...D35	LAD9T4

Heads for selector switches

3-position stay put	LE1 D09...D35●●A09	ZB5AD3
2-position stay put	LE1 D09...D35●●A13	ZB5AD2
3-position spring return to centre	LE2 D09...D35 LE8 D09...D35	ZB5AD5

Contact blocks

1 N/O spring return	LE● D09...D35	ZENL1111
1 N/C spring return	LE● D09...D35	ZENL1121
Mounting for contact block	LE1 D09 and D12	LAD90909
	LE1 D18...D35, LE2, LE3, LE4, LE6 and LE8 D09...D35	LAD91809

⁽¹⁾ Remember to order adaptation kit LAD 9091 or LAD 91810 or LAD 9TA, depending on size.

⁽²⁾ Remember to order adaptation kit LAD 9092 or LAD 91810 or LAD 9TA, depending on size.

⁽³⁾ Sold in lots of 10.

Direct-on-line

PB11264_L32.eps



DE1 DS1A04

PB11266_L32.eps



DE1 DS1A05

PB11269_L32.eps



DE1 DS1

PB11275_L32.eps



DE1 DS1A13

Empty enclosures for starters without isolating device

Head(s) mounted on cover	Designed for use with	Reference
Without	LE1 D09 and D12	DE1DS1A04
	LE1 D18...D35	DE1DS2A04
	LE2 D09...D35	DE1DS2A04
1 flush blue head "R"	LE1 D09 and D12	DE1DS1A05
	LE1 D18...D35	DE1DS2A05
	LE2 D09...D35	DE1DS2A05
1 flush green head "I" 1 projecting red head "O"	LE1 D09 and D12	DE1DS1
	LE1 D18...D35	DE1DS2
1 flush blue head "R" 1 switch with 3 fixed positions	LE1 D09 and D12	DE1DS1A09
	LE1 D18...D35	DE1DS2A09
1 flush blue head "R" 1 switch with 2 fixed positions	LE1 D09 and D12	DE1DS1A13
	LE1 D18...D35	DE1DS2A13
1 flush blue head "R" 1 switch 3 positions with spring center	LE2 D09...D35	DE2DS2

TeSys enclosed starters

D.O.L. starters, manual control, with GV2ME thermal magnetic circuit breaker

Assembly of a safety enclosure



GV2 MC + GV2 K04

Assembly of a safety enclosure

(conforming to standards IEC 60974-4-1, IEC 60204-1)

Type of product	Page	Reference
Enclosure	A1/7	GV2MC●●
Circuit breaker	See chapter B6 "Circuit breakers"	GV2ME●●
Undervoltage trip or INRS trip ⁽¹⁾	See chapter B6 "Circuit breakers"	GV●A●●●● or GV●AX●●●●
Mushroom head Emergency stop pushbutton Ø 40 mm, red	A1/7	GV2K021 or GV2K031 or GV2K04

⁽¹⁾ Safety device for dangerous machines conforming to INRS and VDE 0113.

TeSys enclosed starters

Safety starters

Conforming to standards: IEC 60204-1

"Safety of machinery - Electrical equipment of machines"

For safety applications

PE111896_L32Feps



LG7 K06●●

PE111896_L32Feps



LG7 D12●●

Characteristics

Conforming to standards	IEC 60947-4-1, IEC 60204-1
Material	Polycarbonate ⁽¹⁾

References

Non-reversing starters (with pushbutton control of isolation)

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3			Circuit breaker Setting range of thermal trips	Dust & damp protected starter Basic reference, to be completed by adding the voltage code ⁽²⁾	Weight
220/ 230 V	400/ 415 V	440 V	A		kg
–	0.06	0.06	0.16...0.25	LG7K06●●02	1.300
0.06	0.09	0.12	0.25...0.40	LG7K06●●03	1.300
–	0.18	0.18	0.40...0.63	LG7K06●●04	1.300
0.12	0.25	0.37	0.63...1	LG7K06●●05	1.300
0.25	0.55	0.55	1...1.6	LG7K06●●06	1.300
0.37	0.75	1.1	1.6...2.5	LG7K06●●07	1.300
0.75	1.5	1.5	2.5...4	LG7K06●●08	1.300
1.1	2.2	3	4...6.3	LG7K06●●10	1.300
1.5	4	4	6...10	LG7K09●●14	1.450
3	5.5	5.5	9...14	LG7D12●●16	1.600
4	7.5	9	13...18	LG7D18●●20	1.630
4	9	9	17...23	LG7D18●●21	1.630

Specifications

Functions performed by the starter:

- isolation,
- locking of isolation fitted as standard as from LG7 K09,
- lockable Emergency Stop (1/4 turn) ⁽³⁾,
- short-circuit protection,
- overload protection,
- voltage drop protection from LG7 K09. For LG7 K06, a GVA X●● undervoltage trip may be added,
- pushbutton control: 1 white Start button "I" and 1 black Stop button "O",
- degree of protection of enclosure: IP55, double insulated.

Switching back on of power supply after tripping must be by a deliberate action.

AGV2 SN●● indicator light may be added (to be assembled by customer), please consult your Regional Sales Office.

For supply voltages between 380 and 415 V (codes Q7, V7 or N7) the control circuit is pre-wired between phases. For other supply voltages, the control circuit must be wired by the customer.

Variants (pre-assembled)

See page A1/25.

⁽¹⁾ Avoid allowing the material to come into contact with strong bases (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽²⁾ Standard control circuit voltages:

LG7 K						
Volts ~	24	220/ 230	230	380/ 400	400	400/ 415
Code	B7	M7	P7	Q7	V7	N7

LG7 D						
Volts ~	24	220/ 230	230	380/ 400	400	415
Code	B7	M7	P7	Q7	V7	N7

⁽³⁾ **LG7 K06**: the mushroom head type Emergency Stop acts mechanically on the circuit breaker.

LG7 K09, D12, D18: the Emergency Stop function is performed by an undervoltage trip, acting on the circuit breaker.

This circuit breaker is always supplied pre-wired for use on 380/400/415 V 50 Hz.

For a 60 Hz supply, please consult your Regional Sales Office.



LG1 K●●

Characteristics

Conforming to standards	IEC 60947-4-1, IEC 60204-1
Material	Polycarbonate ⁽¹⁾

References

Non-reversing starters (with rotary operator for control of isolation)

Enclosure cannot be opened when energised in position "I".

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3			Circuit breaker Setting range of thermal trips	Dust & damp protected starter Basic reference, to be completed by adding the voltage code ⁽²⁾	Weight
220/230 V	400/415 V	440 V	A		kg
–	0.06	0.06	0.16...0.25	LG1K065●●02	0.970
0.06	0.09	0.12	0.25...0.40	LG1K065●●03	0.970
–	0.18	0.18	0.40...0.63	LG1K065●●04	0.970
0.12	0.25	0.25	0.63...1	LG1K065●●05	0.970
0.25	0.55	0.55	1...1.6	LG1K065●●06	0.970
0.37	0.75	1.1	1.6...2.5	LG1K065●●07	0.970
0.75	1.5	1.5	2.5...4	LG1K065●●08	0.970
1.1	2.2	3	4...6.3	LG1K065●●10	0.970
1.5	4	4	6...10	LG1K095●●14	1.120
3	5.5	5.5	9...14	LG1D122●●16	1.270
4	7.5	9	13...18	LG1D182●●20	1.290
4	9	9	17...23	LG1D182●●21	1.290

Specifications

Functions performed by the starter:

- isolation,
- locking of isolation,
- lockable Emergency Stop (red/yellow switch-disconnector),
- short-circuit protection,
- overload protection,
- pushbutton control: 1 white Start button "I" and 1 black Stop button "O",
- degree of protection of enclosure: IP55, double insulated.

Switching back on of power supply after tripping must be by a deliberate action.

A GVA X●● undervoltage trip may be added.

A GV2 SN●● indicator light may be added (to be assembled by customer), please consult your Regional Sales Office.

For supply voltages between 380 and 415 V (codes Q7, V7 or N7) the control circuit is pre-wired between phases.

For other supply voltages, the control circuit must be wired by the customer.

Variants (pre-assembled)

See page A1/25.

⁽¹⁾ Avoid allowing the material to come into contact with strong bases (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽²⁾ Standard control circuit voltages:

LG1 K					
Volts ~ 50/60 Hz	220/230	230	380/400	400	400/415
Code	M7	P7	Q7	V7	N7

LG1 D					
Volts ~ 50/60 Hz	220	230	380	400	415
Code	M7	P7	Q7	V7	N7

TeSys enclosed starters

Safety starters

Conforming to standards: IEC 60204-1

"Safety of machinery - Electrical equipment of machines"

PB111996_L32R.eps



LG8 K06●●

Characteristics

Conforming to standards	IEC 60947-4-1, IEC 60204-1
Material	Polycarbonate ⁽¹⁾

References

Reversing starters (with pushbutton control of isolation)

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3			Circuit breaker Setting range of thermal trips	Dust & damp protected starter Basic reference, to be completed by adding the voltage code ⁽²⁾	Weight
220/ 230 V	400/ 415 V	440 V	A		kg
–	0.06	0.06	0.16...0.25	LG8K06●●02	1.640
0.06	0.09	0.12	0.25...0.40	LG8K06●●03	1.640
–	0.18	0.18	0.40...0.63	LG8K06●●04	1.640
0.12	0.25	0.25	0.63...1	LG8K06●●05	1.640
0.25	0.55	0.55	1...1.6	LG8K06●●06	1.640
0.37	0.75	1.1	1.6...2.5	LG8K06●●07	1.640
0.75	1.5	1.5	2.5...4	LG8K06●●08	1.640
1.1	2.2	3	4...6.3	LG8K06●●10	1.640
1.5	4	4	6...10	LG8K09●●14	1.640
3	5.5	5.5	9...14	LG8K12●●16	1.640

PB111996_L32R.eps



LG8 K09●●

Specifications

Functions performed by the starter:

- isolation,
- locking of isolation fitted as standard as from LG8 K09,
- lockable Emergency Stop (1/4 turn) ⁽³⁾,
- short-circuit protection,
- overload protection,
- voltage drop protection from LG8 K09. For LG8 K06, a GVA X●● undervoltage trip may be added,
- control by selector switch "I-II", position non maintained and Stop press button "O" (black),
- degree of protection of enclosure: IP55, double insulated.

Switching back on of power supply after tripping must be by a deliberate action.

A GV2 SN●● indicator light may be added (to be assembled by customer), please consult your Regional Sales Office.

For supply voltages between 380 and 415 V (codes Q7, V7 or N7) the control circuit is pre-wired between phases. For other supply voltages, the control circuit must be wired by the customer.

Variants (pre-assembled)

See page A1/25.

⁽¹⁾ Avoid allowing the material to come into contact with strong bases (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽²⁾ Standard control circuit voltages:

Volts ~	220/	380/	400/
50/60 Hz	230	400	415
Code	M7	Q7	N7

⁽³⁾ **LG8 K06:** the mushroom head type Emergency Stop acts mechanically on the circuit breaker.

LG8 K09: the Emergency Stop function is performed by an undervoltage trip, acting on the circuit breaker.

This circuit breaker is always supplied pre-wired for use on 380/400/415 V 50 Hz.

For a 60 Hz supply, please consult your Regional Sales Office.

TeSys enclosed starters

Safety starters

Conforming to standards: IEC 60204-1

"Safety of machinery - Electrical equipment of machines"

PB111887_L32R.eps



LG7 ●●A04

Variants (pre-assembled)

Description	Variants available for starter	Suffix to be added to the starter reference ⁽¹⁾
With Emergency Stop No control pushbuttons	LG7 K06M705...K09M714 LG7 K06Q705...K09Q714	A04
With Emergency Stop, mushroom head ⁽²⁾	LG1 K06M705...K09M714 LG1 K06Q705...K09Q714	A37
With padlocking facility (fitted as standard from LG7 K09)	LG7 K06M705...K06M710	A29
Without circuit breaker ⁽³⁾ (or undervoltage release voltage)	LG1●●M7, LG1●●Q7, LG7●●M7, LG7●●Q7, LG8●●M7, LG8●●Q7	⁽⁴⁾

For LG7 starters: A04, A29 and A39 variants (Without Emergency Stop) can also be made from parts. Empty enclosures, contactor and circuit breaker must be ordered separately. A customer assembly.

DE1KS empty enclosures: see page A1/29.

LC1 K contactors: see chapter B8 "Contactors".

GV2 ME circuit breakers: see chapter B6 "Circuit breakers".

⁽¹⁾ Example: **LG7 D12M716A04**.

⁽²⁾ The mushroom head type Emergency Stop acts mechanically on the circuit breaker.

⁽³⁾ Order circuit breaker separately. References GV2 ME: see chapter B6 "Circuit breakers".

⁽⁴⁾ Delete the last 2 digits of the selected starter reference. Example: **LG1 K065●●08** becomes **LG1 K065●●**.

TeSys enclosed starters

Safety starters

Conforming to standards: IEC 60204-1

"Safety of machinery - Electrical equipment of machines"

For safety applications



LJ7 K06●●

Characteristics

Conforming to standards	IEC 60947-4-1, IEC 60204-1
Material	Polycarbonate ⁽¹⁾

References

Non-reversing motor starters with integral transformer, pre-wired for operation on a 3-phase 380 to 400 V 50 Hz supply (with pushbutton control of isolator function)

Standard power ratings of 3-phase motors 50 Hz in category AC-3	Circuit breaker	Dust and damp protected starter	Weight
380/400 V	Setting range of thermal trips	Reference ⁽²⁾	
kW	A		kg
0.06	0.16...0.25	LJ7K06Q702	2.270
0.09	0.25...0.40	LJ7K06Q703	2.270
0.18	0.40...0.63	LJ7K06Q704	2.270
0.25	0.63...1	LJ7K06Q705	2.270
0.55	1...1.6	LJ7K06Q706	2.270
0.75	1.6...2.5	LJ7K06Q707	2.270
1.5	2.5...4	LJ7K06Q708	2.270
2.2	4...6.3	LJ7K06Q710	2.270
4	6...10	LJ7K09Q714	2.270

Specifications

Functions performed by the starter:

- isolation,
- locking of isolation fitted as standard on LJ7 K09,
- lockable Emergency Stop (1/4 turn) ⁽³⁾,
- short-circuit protection,
- overload protection,
- voltage drop protection from LJ7 K09. For LJ7 K06, a GVA X●● undervoltage trip may be added,
- pushbutton control: 1 white Start button "I" and 1 black Stop button "O",
- terminal allowing connection of a volt-free contact, if required, in the control circuit,
- degree of protection of enclosure: IP55, double insulated.

Switching back on of power supply after tripping must be by a deliberate action.

A GV2 SN●● indicator light may be added (to be assembled by customer), please consult your Regional Sales Office.

Integral transformer: 400/24 V, 25 VA.

Variants (pre-assembled)

Description	Variants available for starter	Suffix to be added to the starter reference ⁽⁴⁾
With Emergency Stop No control pushbuttons	LJ7 K06Q705...K09Q714	A04
With padlocking facility (fitted as standard on LJ7 K09)	LJ7 K06Q705...K06Q710	A29
Without circuit breaker ⁽⁶⁾ (or undervoltage release voltage)	LJ7	⁽⁵⁾
Without circuit breaker ⁽⁶⁾ With Emergency Stop No control pushbuttons	LJ7 K09Q7	A04
Without circuit breaker ⁽⁶⁾ Without Emergency Stop (if the emergency stop is on the machine)	LJ7 K09Q7	A39
Without circuit breaker ⁽⁶⁾ Without Emergency Stop No control pushbuttons	LJ7 K09Q7	A04A39

⁽¹⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽²⁾ In the reference, the voltage code Q7 (380/400 V) indicates the power supply voltage to which the starter will be connected, it being assumed that the contactor has a ~ 24 V coil (see control circuit scheme).

⁽³⁾ LJ7 K06: the mushroom head type Emergency Stop acts mechanically on the circuit breaker.

LJ7 K09: the Emergency Stop function is performed by an undervoltage trip GV AX385, acting on the circuit breaker. This circuit breaker is always supplied pre-wired for use on 380/400 V 50 Hz.

⁽⁴⁾ Example: LJ7 K06Q705A04.

⁽⁵⁾ Delete the last 2 digits of the selected starter reference. Example: LJ7 K06Q705 becomes LJ7 K06Q7.

⁽⁶⁾ Circuit breaker to be ordered separatel. References GV2 ME: see chapter B6 "Circuit breakers".

Dimensions:
A1/52

Schemes:
A1/53

Characteristics

Conforming to standards	IEC 60947-4-1, IEC 60204-1
Material	Polycarbonate ⁽¹⁾

References

Reversing motor starters with integral transformer, pre-wired for operation on a 3-phase 380 to 400 V 50 Hz supply (with pushbutton control of isolator function)

Standard power ratings of 3-phase motors 50 Hz in category AC-3	Circuit breaker	Dust and damp protected starter	Weight
380/400 V	Setting range of thermal trips	Reference ⁽²⁾	
kW	A		kg
0.06	0.16...0.25	LJ8K06Q702	2.650
0.09	0.25...0.40	LJ8K06Q703	2.650
0.18	0.40...0.63	LJ8K06Q704	2.650
0.25	0.63...1	LJ8K06Q705	2.650
0.55	1...1.6	LJ8K06Q706	2.650
0.75	1.6...2.5	LJ8K06Q707	2.650
1.5	2.5...4	LJ8K06Q708	2.650
2.2	4...6.3	LJ8K06Q710	2.650
4	6...10	LJ8K09Q714	2.650



LJ8 K06●●



LJ8 K09●●

Specifications

Functions performed by the starter:

- isolation,
- locking of isolation fitted as standard on LJ8 K09,
- lockable Emergency Stop (1/4 turn) ⁽³⁾,
- short-circuit protection,
- overload protection,
- voltage drop protection from LJ8 K09. For LJ8 K06, a GVA X●● undervoltage trip may be added,
- 1 spring return selector switch "I-II" for command, non-maintained positions and 1 Stop pushbutton control "O" (black),
- terminal allowing connection of a volt-free contact, if required, in the control circuit,
- degree of protection of enclosure: IP55, double insulated.

Switching back on of power supply after tripping must be by a deliberate action.

A GV2 SN●● indicator light may be added (to be assembled by customer), please consult your Regional Sales Office.

Integral transformer: 400/24 V, 25 VA.

Variants (pre-assembled)

Description	Variants available for starter	Suffix to be added to the starter reference
Without circuit breaker ⁽⁵⁾ (or undervoltage release voltage)	LJ8	⁽⁴⁾

⁽¹⁾ Avoid placing this material in contact with harsh substances (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽²⁾ In the reference, the voltage code Q7 (380/400 V) indicates the power supply voltage to which the starter will be connected, it being assumed that the contactor has a ~ 24 V coil (see control circuit scheme).

⁽³⁾ LJ8 K06: the mushroom head type Emergency Stop acts mechanically on the circuit breaker.

LJ8 K09: the Emergency Stop function is performed by an undervoltage trip GV AX385, acting on the circuit breaker. This circuit breaker is always supplied pre-wired for use on 380/400 V 50 Hz.

⁽⁴⁾ Delete the last 2 digits of the selected starter reference. Example: LJ8 K06Q702 becomes LJ8 K06Q7.

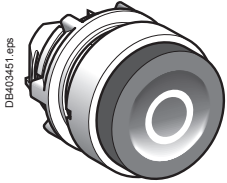
⁽⁵⁾ Circuit breaker to be ordered separatel. References GV2 ME: see chapter B6 "Circuit breakers".

For safety applications



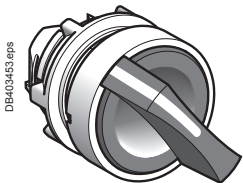
DB403450.eps

ZB5 AA331



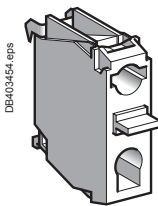
DB403451.eps

ZB5 AL432



DB403453.eps

ZB5 AD5



DB403454.eps

ZEN L1111



827*_L32R.eps

GV2 K04



11036*_L32R.eps

ZB5 AS834

Heads for Start and Stop/Reset pushbuttons

Description	For use on	Unit reference
Flush, green "I"	LG1, LG7, LJ7	ZB5AA331
Projecting, red "O"	LG1, LG7, LJ7, LG8, LJ8	ZB5AL432

Heads for selector switches

3-position stay put	LG8, LJ8	ZB5AD5
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Mushroom head pushbutton

Emergency stop, latching, turn to release, Ø 40 mm, red, IP55	LG1 ●A37, LG7 K06, LJ7 K06, LG8 K06, LJ8 K06	GV2K04 ^{(1) (2)}
	LG7 K09...D18, LJ7 K09, LG8 K09...K12, LJ8 K09	ZB5AS834

Contact blocks

1 N/O spring return	LG1, LG7, LJ7, LG8, LJ8	ZENL1111
1 N/C spring return	LG1, LG7, LJ7, LG8, LJ8	ZENL1121

Add-on blocks

Padlocking device ⁽²⁾ for GV2 ME operator (padlocking is only possible in the "O" position), 1 to 3 padlocks Ø 4 to 8 mm	LG1, LG7, LJ7, LG8, LJ8	GV2V01	
Sealing kit	IP 55 for temperature between +5 °C and +40 °C	LG1, LG7, LJ7, LG8, LJ8	GV2E01
	IP 55 for temperature between -20 °C and +40 °C	LG1, LG7, LJ7, LG8, LJ8	GV2E02

⁽¹⁾ Registration the "O" position by a padlock Ø4 to 8 mm.

⁽²⁾ Supplied with IP55 GV2 E01 sealing kit.

For safety applications

PB111891_L32R.eps



DE1 KS217A06

PB111892R.eps



DE1 KS217A06A29

PB111898_L32R.eps



DE1 KS217A06A37

PB111899_L32R.eps



DE1 KS217A29A37

Empty enclosures for security starters

Designed for use with	Head(s) mounted on cover	Add-on blocks	Reference
LG7	Without		DE1KS217A04
	1 flush white head "I" 1 projecting black head "O"		DE1KS217A06
	1 flush white head "I" 1 projecting black head "O"	Padlocking devices	DE1KS217A06A29
	1 flush white head "I" 1 projecting black head "O" 1 head emergency stop	Padlocking devices	DE1KS217A06A37
	Without	Padlocking devices	DE1KS217A29
	1 head emergency stop		DE1KS217A37
	1 head emergency stop	Padlocking devices	DE1KS217A29A37

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Characteristics		
Conforming to standards		IEC 60204-1, IEC 60947-4-1, IEC 60439-1
Degree of protection	Conforming to IEC 60529	IP54
Ambient air temperature	Operation	-5 to +40 °C
Operating positions		Same as that of the contactors
Material		LF●P: polycarbonate ⁽¹⁾

Starters in insulated (plastic) enclosure

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3		Circuit breaker adjustment range of thermal trips	Starter with extended addressing	Weight
220/230 V	400/415 V			
kW	kW	A		kg

Non-reversing starters with rotary control knob, with black handle on blue background

–	–	Without	LF3P00E ⁽²⁾	1.020
–	0.06	0.16...0.25	LF3P02E	1.300
0.06	0.09	0.25...0.40	LF3P03E	1.300
–	0.12	0.40...0.63	LF3P04E	1.300
–	0.18			
0.09	0.25	0.63...1	LF3P05E	1.300
0.12	–			
0.18	0.37	1...1.6	LF3P06E	1.350
0.25	0.55			
0.37	0.75	1.6...2.5	LF3P07E	1.350
0.55	1.1	2.5...4	LF3P08E	1.350
0.75	1.5			
1.1	2.2	4...6.3	LF3P10E	1.350
1.5	3	6...10	LF3P14E	1.350
–	4			
2.2	5.5	9...14	LF3P16E	1.350
3	–			

Reversing starters with rotary control knob, with black handle on blue background

–	–	Without	LF4P00E ⁽²⁾	1.020
–	0.06	0.16...0.25	LF4P02E	1.550
0.06	0.09	0.25...0.40	LF4P03E	1.550
–	0.12	0.40...0.63	LF4P04E	1.550
–	0.18			
0.09	0.25	0.63...1	LF4P05E	1.550
0.12	–			
0.18	0.37	1...1.6	LF4P06E	1.600
0.25	0.55			
0.37	0.75	1.6...2.5	LF4P07E	1.600
0.55	1.1	2.5...4	LF4P08E	1.600
0.75	1.5			
1.1	2.2	4...6.3	LF4P10E	1.600
1.5	3	6...10	LF4P14E	1.600
–	4			
2.2	5.5	9...14	LF4P16E	1.600
3	–			

Variants (pre-assembled)

Description	For mounting on	Suffix to be added to the starter reference ⁽³⁾
With HARTING connectors ⁽⁴⁾	Insulated or metal enclosure	A74
With local/AS-Interface control	Insulated or metal enclosure	A79
With local/AS-Interface control and with HARTING connectors ⁽⁴⁾	Insulated or metal enclosure	A79A74

⁽¹⁾ Avoid allowing the material to come into contact with strong bases (detergents, chlorine solvents, ketones, alcohol, aromatic hydrocarbons).

⁽²⁾ Supplied without GV2 P motor circuit breaker.

⁽³⁾ Example: LF3 P00EA79A74.

⁽⁴⁾ Connectors to be fitted to cables (to be ordered separately, see page A1/69).



LF3 P●●E



LF3 P●●EA79A74



LF4 P●●E



LF4 P●●EA79A74

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Characteristics

Conforming to standards		IEC 60204-1, IEC 60947-4-1, IEC 60439-1 UL 508, CSA C22-2 n° 14 ⁽¹⁾
Degree of protection	Conforming to IEC 60529	IP54
Ambient air temperature	Operation	-5 to +40 °C
Operating positions		Same as that of the contactors
Material		LF● MP: sheet steel

Starters in metal enclosures

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3		Circuit breaker adjustment range of thermal trips	Starter with extended addressing	Weight
220/230 V	400/415 V			

Non-reversing starters with rotary control knob, with black handle on blue background

kW	kW	A		kg
–	–	Without	LF3MP00EU ⁽²⁾	3.620
–	0.06	0.16...0.25	LF3MP02EU	3.900
0.06	0.09	0.25...0.40	LF3MP03EU	3.900
–	0.12	0.40...0.63	LF3MP04EU	3.900
–	0.18			
0.09	0.25	0.63...1	LF3MP05EU	3.900
0.12	–			
0.18	0.37	1...1.6	LF3MP06EU	3.950
0.25	0.55			
0.37	0.75	1.6...2.5	LF3MP07EU	3.950
0.55	1.1	2.5...4	LF3MP08EU	3.950
0.75	1.5			
1.1	2.2	4...6.3	LF3MP10EU	3.950
1.5	3	6...10	LF3MP14EU	3.950
–	4			
2.2	5.5	9...14	LF3MP16EU	3.950
3	–			

Reversing starters with rotary control knob, with black handle on blue background

kW	kW	A		kg
–	–	Without	LF4MP00EU ⁽²⁾	3.620
–	0.06	0.16...0.25	LF4MP02EU	4.150
0.06	0.09	0.25...0.40	LF4MP03EU	4.150
–	0.12	0.40...0.63	LF4MP04EU	4.150
–	0.18			
0.09	0.25	0.63...1	LF4MP05EU	4.150
0.12	–			
0.18	0.37	1...1.6	LF4MP06EU	4.200
0.25	0.55			
0.37	0.75	1.6...2.5	LF4MP07EU	4.200
0.55	1.1	2.5...4	LF4MP08EU	4.200
0.75	1.5			
1.1	2.2	4...6.3	LF4MP10EU	4.200
1.5	3	6...10	LF4MP14EU	4.200
–	4			
2.2	5.5	9...14	LF4MP16EU	4.200
3	–			

Variants (pre-assembled)

Description	For mounting on	Suffix to be added to the starter reference, before the letter U ⁽³⁾
With HARTING connectors ⁽⁴⁾	Insulated or metal enclosure	A74
With local/AS-Interface control	Insulated or metal enclosure	A79
With local/AS-Interface control and with HARTING connectors ⁽⁴⁾	Insulated or metal enclosure	A79A74

⁽¹⁾ Only for metal enclosures with letter U at the end of the reference.

⁽²⁾ Supplied without GV2 P motor circuit breaker.

⁽³⁾ Example: LF3 MP00EA79A74U.

⁽⁴⁾ Connectors to be fitted to cables (to be ordered separately, see page A1/69).



LF3 MP●●EU



LF3 MP●●A79A7AU



LF4 MP●●EU



LF4 MP●●A79A74

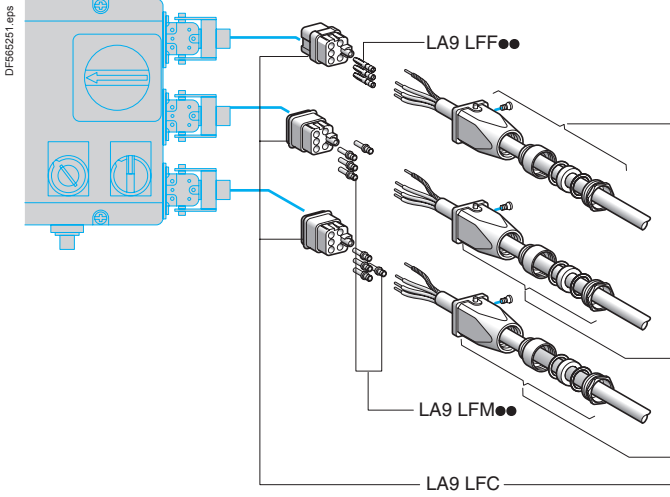
TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

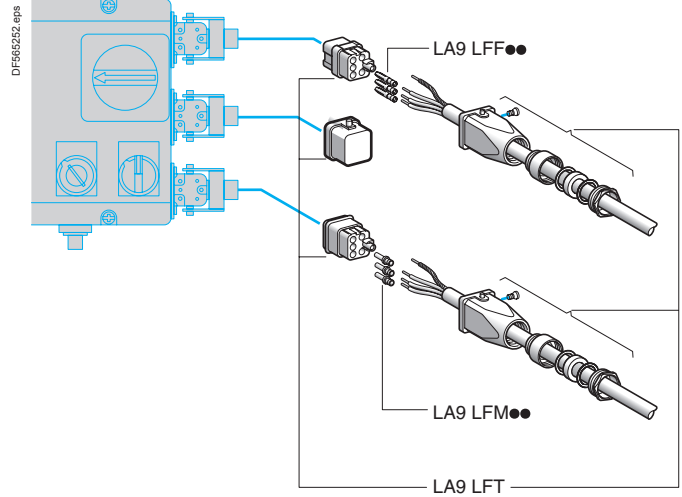
Starters for AS-interface bus

Insulated enclosures LF3 and LF4

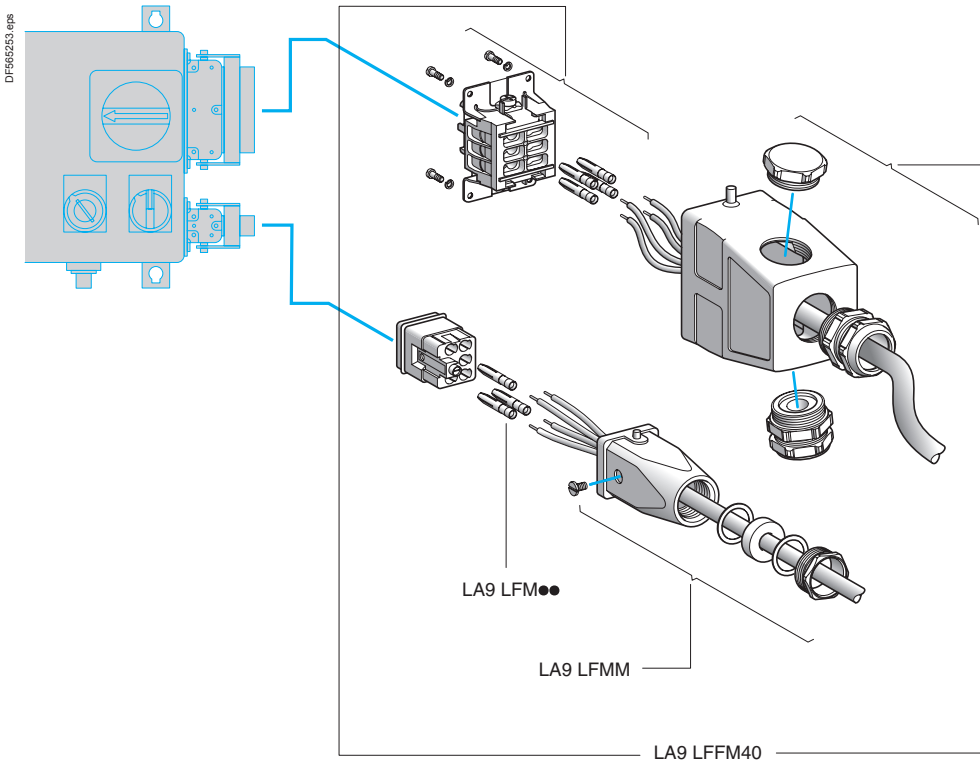
Power extension (daisy-chaining)



Terminal



Metal enclosures LF3 and LF4



TeSys enclosed starters

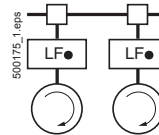
D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Accessories for insulated enclosures with variant A74

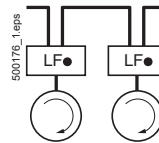
In order to reduce setting-up times and to simplify maintenance, variant A74 LF starters are fitted with Harting plug-in connectors. These starters are designed to allow 2 types of connection topology.

Connection using tap links



This configuration avoids having to switch off the power supply when replacing or adding one or more starters. Although machine availability is increased, a larger number of power connections is required: 4 per starter.

Connection using power extension (daisy-chaining)



The number of power connections per starter is halved, but continuity of service is no longer assured if any of the "upstream" starters are disconnected or removed. With this type of installation, special precautions must be taken because removal of a starter at the head of the power supply line de-energises all the remaining starters on that line. For safety reasons therefore, starters must not be removed under load (prohibited by standard EN60204 above 3kW/400V).

The 2 connection kits and accessories shown below have been designed to facilitate setting up of power extension configurations by the user.

Connection kit (depending on enclosure application)

Enclosure application	Capacity mm ²	Kit contents	For mounting on	Reference	Weight kg
Power extension (daisy-chaining)	3-pole 1.5 or 2.5	1 female connector 2 male connectors and corresponding power sockets ⁽¹⁾	Enclosures LF3 and LF4	LA9LFC	0.150
Terminal	3-pole 1.5 or 2.5	1 female connector 1 male connector 1 blanking plug and corresponding power sockets ⁽¹⁾	Enclosures LF3 and LF4	LA9LFT	0.110

Crimping contacts

Type	Capacity mm ²	Sold in lots of	Unit reference	Weight kg
Male	1.5	100	LA9LFM15	0.120
	2.5	100	LA9LFM25	0.120
Female	1.5	100	LA9LFF15	0.160
	2.5	100	LA9LFF25	0.150

Accessories for metal enclosures with variant A74

Connection kits

For connector	Kit contents	For mounting on	Reference	Weight kg
Input	1 metal cover 2 size 16 cable glands 1 blanking plug 1 female power socket (3P + earth) 4 female crimping contacts ⁽²⁾	Metal enclosures LF3, LF4	LA9LFFM40	0.260
Output to motor	1 metal cover 1 size 16 cable gland 1 female power socket (3P+ earth) ⁽¹⁾	Metal enclosures LF3, LF4	LA9LFMM	0.060

Crimping contacts

Type	Capacity mm ²	Thermal current A	Voltage V	Sold in lots of	Unit reference	Weight kg
Male	1.5	10	400	100	LA9LFM15	0.120
	2.5	10	400	100	LA9LFM25	0.120

⁽¹⁾ Crimping contacts to be ordered separately.

⁽²⁾ For flexible cable, 4 mm² maximum, lth: 16 A, Us: 400 V.

Technical Data for Designers

Contents

Switch-disconnectors	A1/36 to A1/38
Direct-on-line starters.....	A1/39 to A1/47
Star-delta starters	A1/48 to A1/49
Starters for safety applications.....	A1/50 to A1/53
Starters for AS-interface bus	A1/54 to A1/69

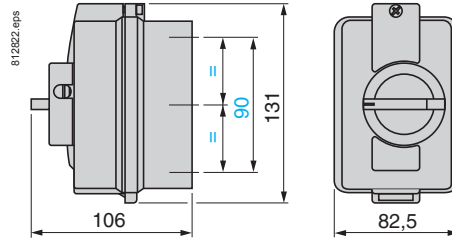
TeSys enclosed starters

VARIO enclosed switch-disconnectors

Switch-disconnectors

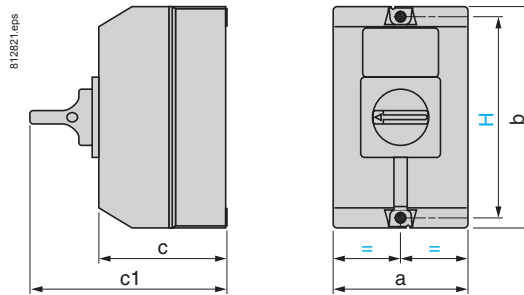
Dimensions

VCFN 12GE to VCFN 40GE



Cable glands: 2 x 16 P top and bottom.

VCF or VBF 02GE to 4GE VCFX or VBFX GE1 to GE4

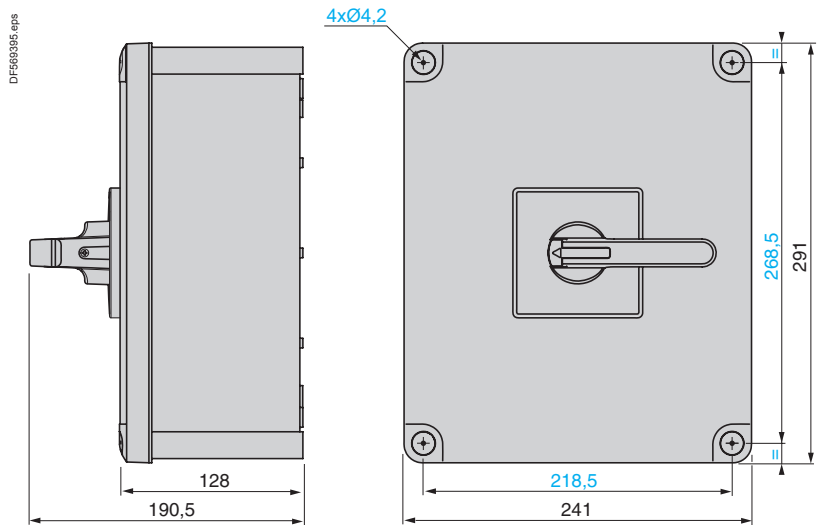


	a	b	c	c1	H
V•F 02GE to V•F 2GE, V•FX GE1 ⁽¹⁾	90	146	85	131	130
V•F 3GE and V•F 4GE ⁽²⁾	150	170	106	152	164
V•FX GE2 and V•FX GE4 ⁽²⁾	150	170	106	152	164

⁽¹⁾ Cable glands: 2 x 16 P top and bottom.

⁽²⁾ Cable glands: 2 x 16/21/29 P top and bottom.

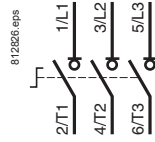
VCF or VBF 5GEN and 6GEN



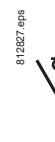
Schemes

Switch-disconnectors

Enclosed or switch bodies



Main pole module



Neutral pole module



Auxiliary contact blocks

VZ 7



VZ 20



VZN 05



VZN 06



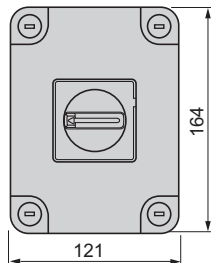
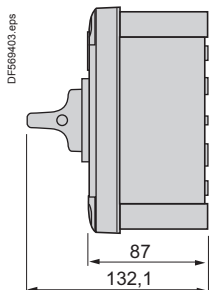
TeSys enclosed starters

VARIO enclosed switch-disconnectors
for the North American market,
conforming to UL and CSA standards

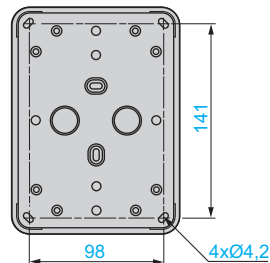
Switch-disconnectors

Dimensions

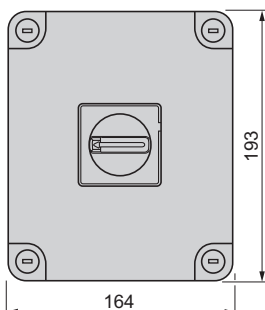
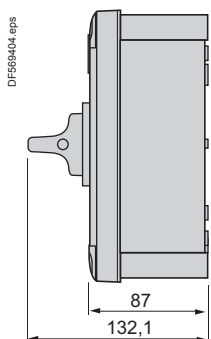
VC1 GUN and VC2 GUN



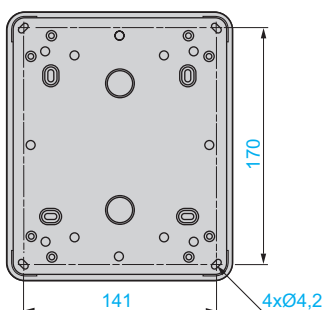
Fixing (rear view)



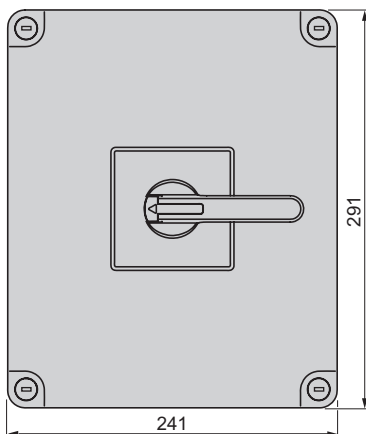
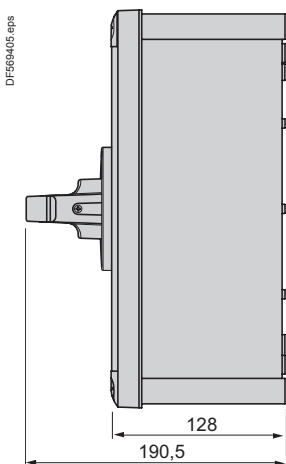
VC3 GUN and VC4 GUN



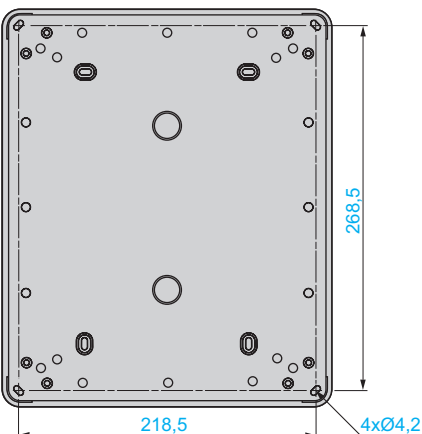
Fixing (rear view)



VC5 GUN and VC6 GUN



Fixing (rear view)



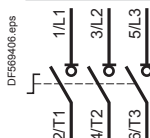
Schemes

Switch-disconnectors

Enclosed switch-disconnectors
or switch bodies

Main pole module

Neutral pole module



Auxiliary contact block modules

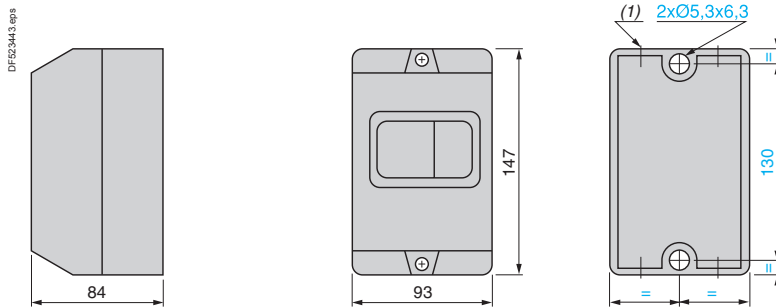
VZ 7

VZ 20



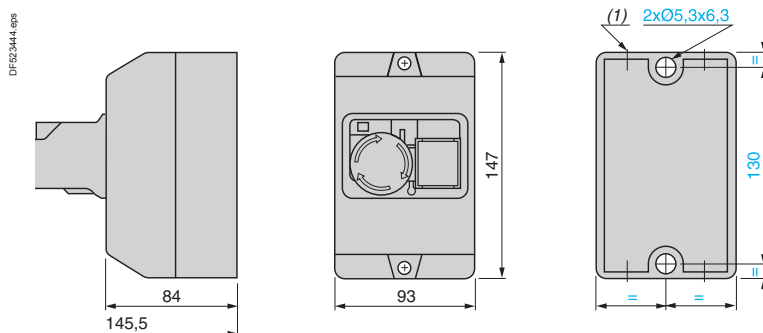
Dimensions

Surface mounting enclosure GV2 MC0●



(1) Top face: 2 knock-outs for ISO20/25 cable glands or Pg16 or 16mm conduits.
Bottom face: 2 knock-outs for ISO20/25 cable glands or Pg16 or 16mm conduits.

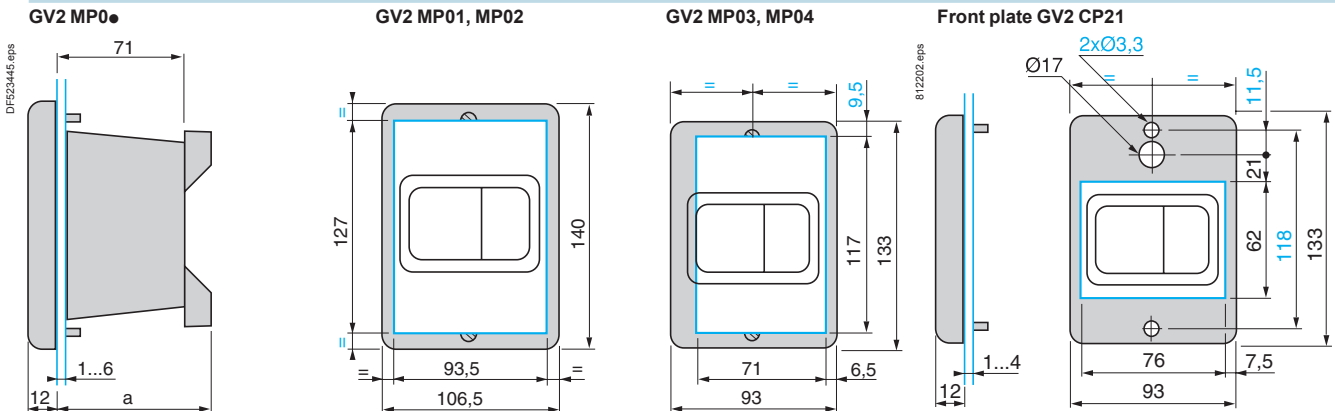
Surface mounting enclosure GV2 MCK04



(1) Top face: 2 knock-outs for ISO20/25 cable glands or Pg16 or 16mm conduits.
Bottom face: 2 knock-outs for ISO20/25 cable glands or Pg16 or 16mm conduits.

Mounting

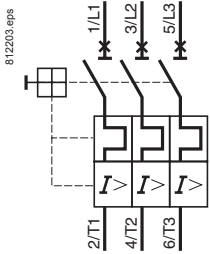
Flush mounting enclosures GV2 MP0● (panel cut-out)



GV2	a
MP01, MP02	-
MP03, MP04	86

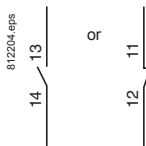
Schemes

GV2 ME●●

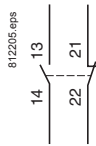


Instantaneous auxiliary contacts

GV AE1



GV AE11

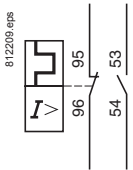


GV AE20

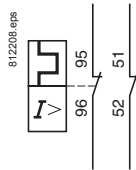


Instantaneous auxiliary contacts and fault signalling contacts

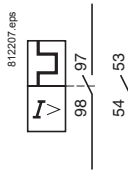
GV AD0110



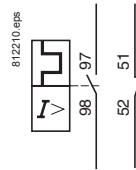
GV AD0101



GV AD1010

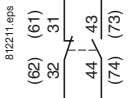


GV AD1001

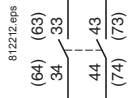


Instantaneous auxiliary contacts

GV AN11

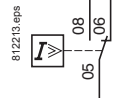


GV AN20



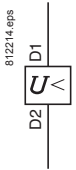
Short-circuit signalling contacts

GV AM11

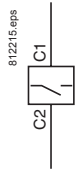


Undervoltage trips

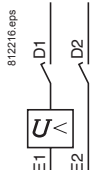
GV AU●●●



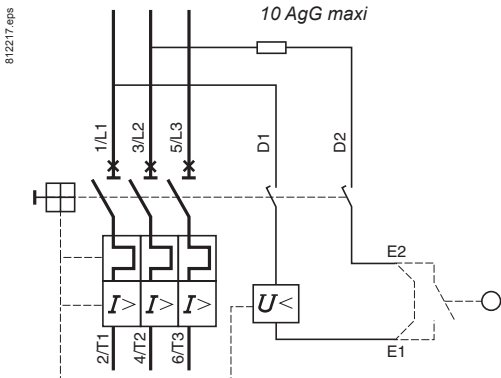
GV AS●●●



GV AX●●●

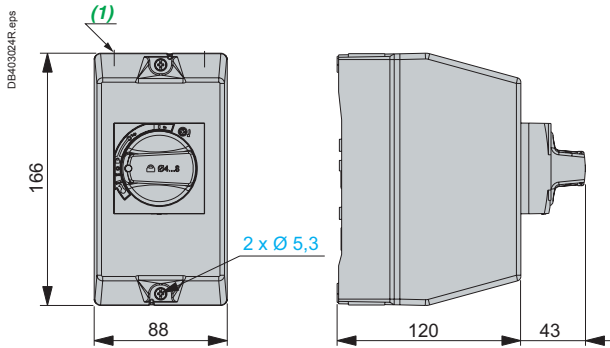


Wiring diagram for undervoltage trip used on potentially dangerous machines, conforming to INRS



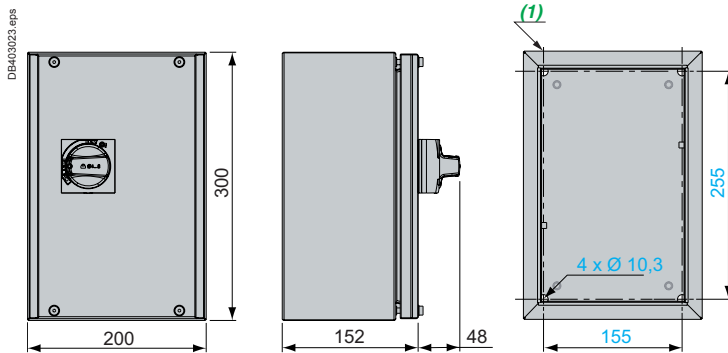
Dimensions

GV2 PC●●



(1) Top face: 2 knock-outs for ISO20 cable glands.
Bottom face: 2 knock-outs for ISO20 cable glands.

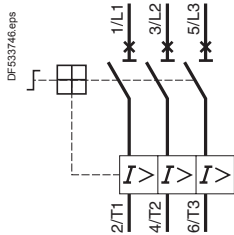
GV3 PC●●



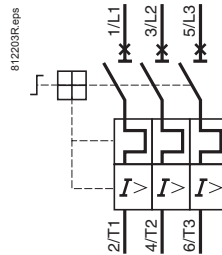
(1) Top face: 1 blanking plug for ISO32 cable gland.
Bottom face: 2 blanking plugs for ISO32 cable gland + 1 blanking plug for ISO20 cable gland.

Schemes

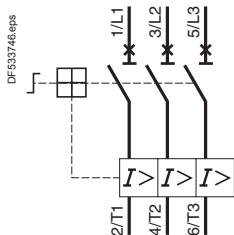
GV2 L



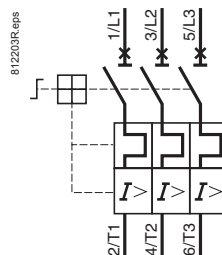
GV2 P



GV3 L

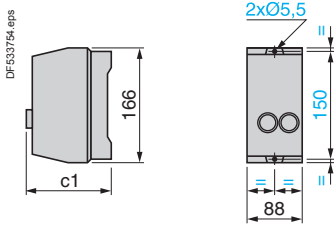


GV3 P

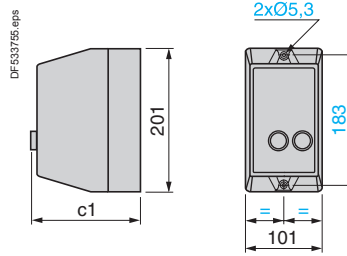


Dimensions

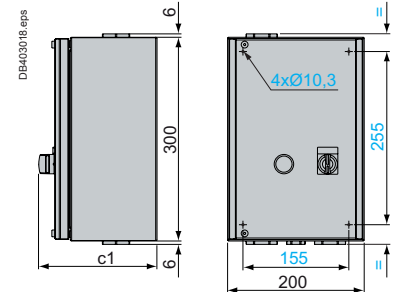
LE1 D09 and D12



LE1 D09●●T LE1 D18...D35 and LE2 D09...D35



LE1 D40A...D65A LE2 D40A...D65A

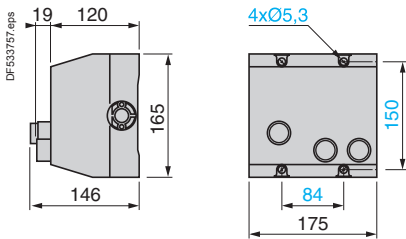


	c1
Standard version	128.5
Variant A04	120
Variant A05	128.5
Variant A09	120
Variant A13	120

	c1	
	LE1 D	LE2 D
Standard version	153.5	160
Variant A04	145	145
Variant A05	153.5	153.5
Variant A09	160	–
Variant A13	160	–

	c1	
	LE1 D	LE2 D
Standard version	158.5	174
Variant A04	150	150
Variant A05	158.5	158.5

LE2 K06 and K09

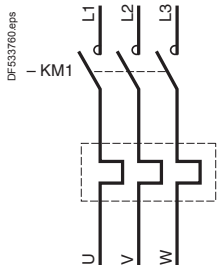


Knock-outs or blanking plugs for cable glands

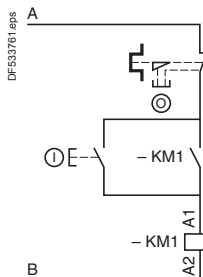
Type of enclosure	At top		At bottom	
	PG	ISO	PG	ISO
LE1 D09 and D12	–	2 x 20	–	2 x 20
LE1 D18...D35 and LE2 D09...D35	–	2 x 20 or 2 x 25	–	2 x 20 or 2 x 25
LE1 and LE2 D40A...D65A	–	1 x 32	–	1 x 20 and 2 x 32
LE2 K06 and K09	2 x 13 and 2 x 16	4 x 20	2 x 13 and 2 x 16	4 x 20

Schemes

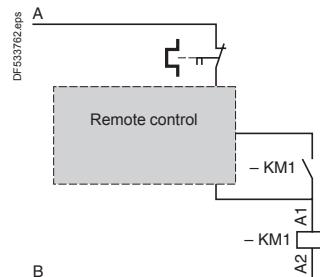
LE1 D09...D65A



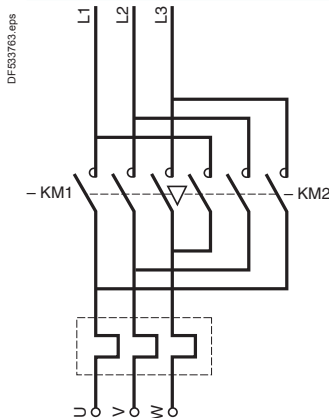
LE1 D09...D65A



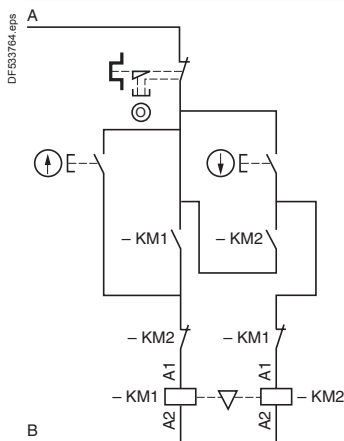
LE1 D09...D65A with variant A04 or A05



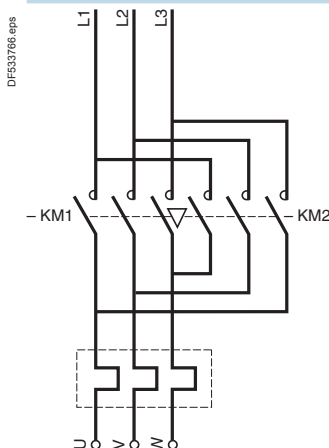
LE2 K06, K09



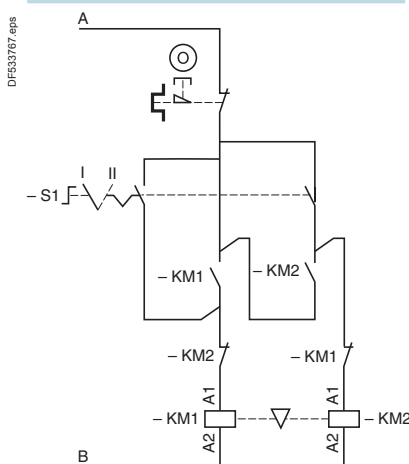
LE2 K06, K09



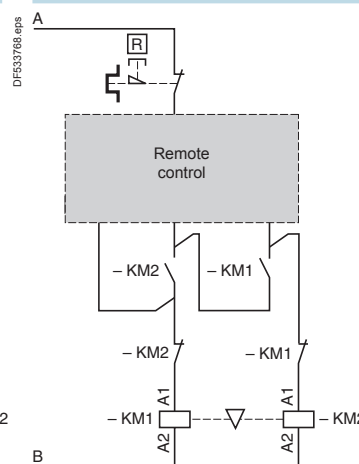
LE2 D09...D65A



LE2 D09...D65A



LE2 D40A...D65A with variants A04 or A05



LE1 D09...D65A, LE2 D09...D65A Connections

Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V, 440 V	220 V, 230 V, 240 V	L3	Neutral terminal
	380 V, 400 V, 415 V, 440 V	L3	L1
	Other voltages	Terminal 1	Terminal 2
Other voltages	Other voltages (600 V max)	For customer assembly	

LE2 K06, K09 Connections

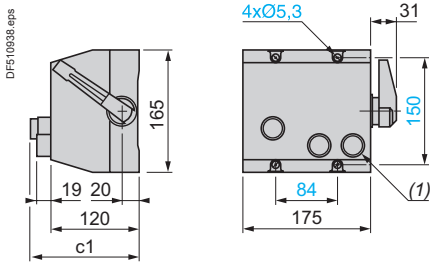
Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V	220 V, 230 V, 240 V	L3	Neutral
	380 V, 400 V, 415 V	L3	L1
Other voltages	Other voltages (440 V max)	For customer assembly	

References:
A1/10 and A1/11

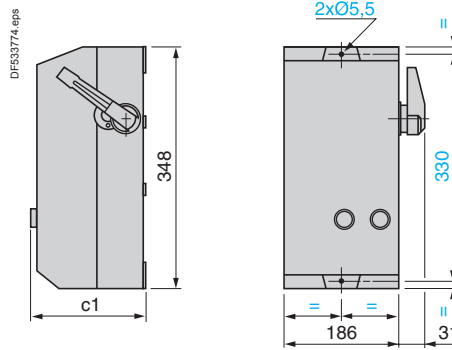
Dimensions:
A1/42

Dimensions

LE4 K06 and K09, LE8 K06 and K09



LE4 D09...D35, LE8 D09...D35



	c1	
	LE4 K	LE8 K
Standard version	146	146
Variant A05	–	139

(1) For LE8 only.

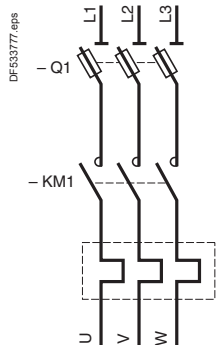
	c1	
	LE4 D	LE8 D
Standard version	175.5	182
Variant A04	167	167
Variant A05	175.5	175.5

Knock-outs or blanking plugs for cable glands

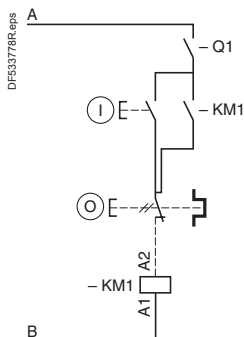
Type of enclosure	At top		At bottom	
	PG	ISO	PG	ISO
LE4 and LE8 D09...D35	–	2 x 20 or 2 x 25 or 2 x 32 or 2 x 40	–	2 x 20 or 2 x 25 or 2 x 32 or 2 x 40
LE4 and LE8 K06 and K09	2 x 13 and 2 x 16	4 x 20	2 x 13 and 2 x 16	4 x 20

Schemes

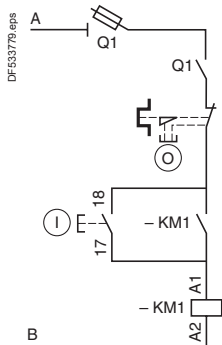
**LE4 K06, K09
LE4 D09...D35**



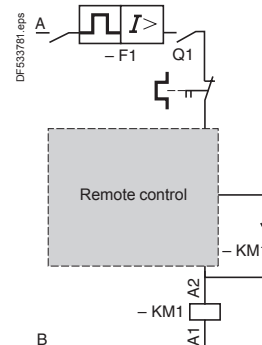
LE4 K06, K09



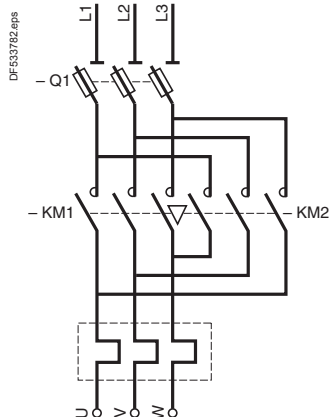
LE4 D09...D35



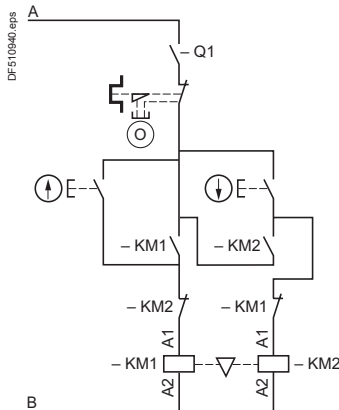
**LE4 D09...D35 with
variant A04 or A05**



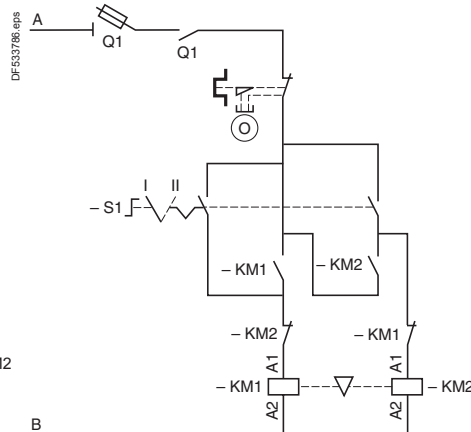
**LE8 K06, K09
LE8 D09...D35**



LE8 K06, K09



LE8 D09...D35



LE4 D09 and D12, LE8 D09 and D12 Connections

Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V, 440 V	220 V, 230 V, 240 V	L3	Neutral
	380 V, 400 V, 415 V, 440 V	L3	L1
	Other voltages	Terminal 1	Terminal 2
Other voltages	Other voltages (600 V max)	For customer assembly	

LE4 D18...D35, LE8 D18...D35 Connections

Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V, 440 V	220 V, 230 V, 240 V	L3	Neutral terminal
	380 V, 400 V, 415 V, 440 V	L3	L1
	Other voltages	Terminal 1	Terminal 2
Other voltages	Other voltages (600 V max)	For customer assembly	

LE4 K06, K09, LE8 K06, K09 Connections

Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V	220 V, 230 V, 240 V	L3	Neutral
	380 V, 400 V, 415 V	L3	L1
Other voltages	Other voltages (440 V max)	For customer assembly	

TeSys enclosed starters

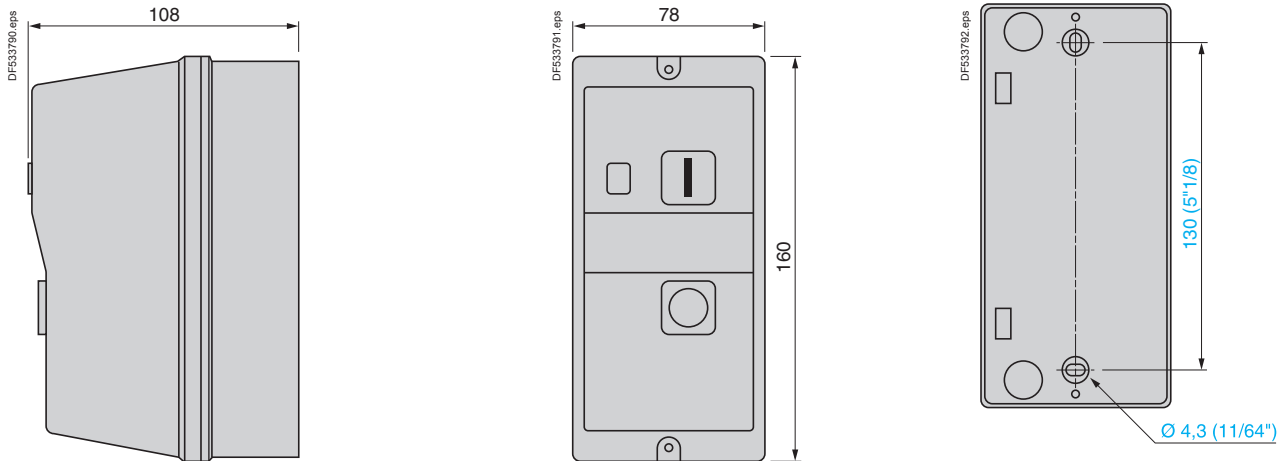
D.O.L. starters

with 3-phase thermal overload relay
with 3 protected phases

Direct-on-line

Dimensions

LE1 M35 ⁽¹⁾



Knock-outs or blanking plugs for cable glands

Enclosure type	At top		At bottom	
	PG	ISO	PG	ISO
LE1 M	2 x 13 to 2 x 21	2 x 20 or 2 x 25	2 x 13 to 2 x 21	2 x 20 or 2 x 25

⁽¹⁾ Can be mounted on machine panel or frame. Knock-outs for 4 x 13 P cable glands.

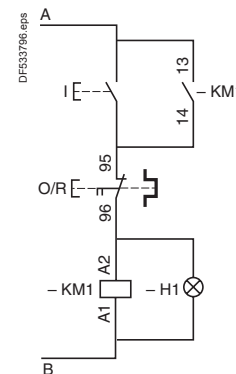
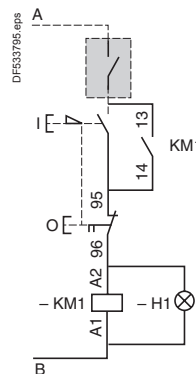
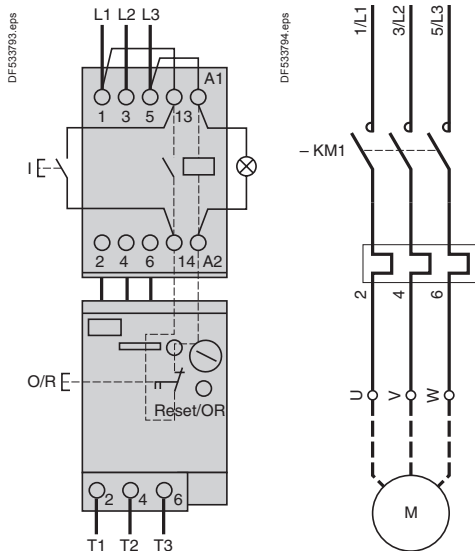
Schemes

LE1 M35

Choice of type of control built into the product

Control by latching pushbuttons

Control by spring return pushbuttons

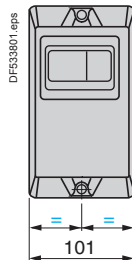
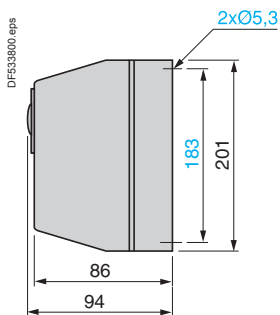


Connections

Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V, 440 V	220 V, 230 V, 240 V	L3	Neutral
	380 V, 400 V, 415 V, 440 V	L3	L1
	Other voltages	For customer assembly	
Other voltages	All voltages (440 V max)	For customer assembly	

Dimensions

LE1 GVMEK

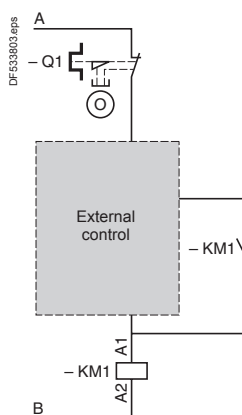
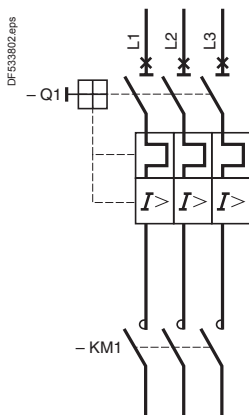


Knock-outs or blanking plugs for cable glands

Enclosure type	At top	At bottom
LE1 GV	ISO 2 x 20 or 2 x 25	ISO 2 x 20 or 2 x 25

Schemes

LE1 GVMEK

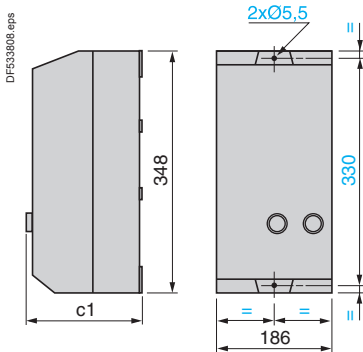


Connections

Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V, 440 V	220 V, 230 V, 240 V	L3	Neutral
	380 V, 400 V, 415 V, 440 V	L3	L1
	Other voltages	For customer assembly	
Other voltages	All voltages (440 V max)	For customer assembly	

Dimensions

LE3 D09...D35



	c1
Standard version	175.5
Variant A04	167
Variant A05	175.5

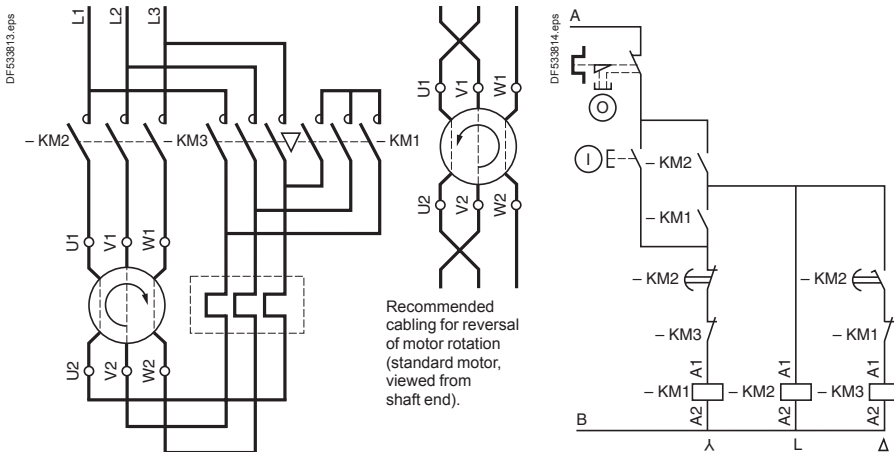
Knock-outs or blanking plugs for cable glands

Type of enclosure	At top		At bottom	
	PG	ISO	PG	ISO
LE3 D09...D35	–	2 x 20 or 2 x 25 or 2 x 32 or 2 x 40	–	2 x 20 or 2 x 25 or 2 x 32 or 2 x 40

Schemes

LE3 D09...D35

LE3 D09...D35



Note: in accordance with current installation regulations, short-circuit protection must be provided by fuses or a circuit breaker.

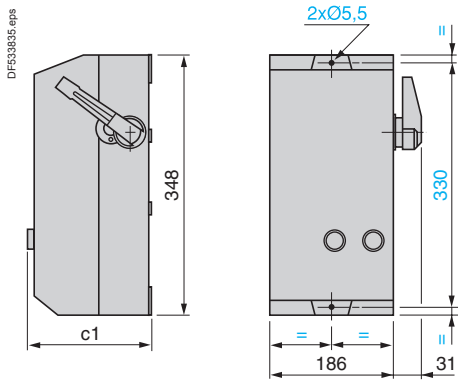
Connections

Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V, 440 V	220 V, 230 V, 240 V	L3	Neutral terminal
	380 V, 400 V, 415 V, 440 V	L3	L1
	Other voltages	Terminal 1	Terminal 2
Other voltages	All voltages (600 V max)	For customer assembly	

Star-delta

Dimensions

LE6 D09...D18



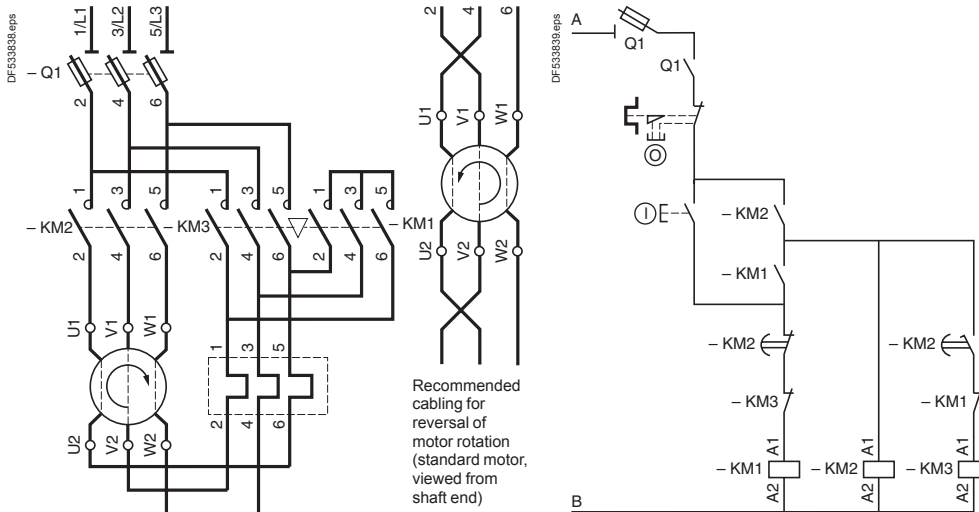
	c1
Standard version	175.5
Variant A04	167
Variant A05	175.5

Knock-outs or blanking plugs for cable glands

Type of enclosure	At top		At bottom	
	PG	ISO	PG	ISO
LE6 D09...D18	–	2 x 20 or 2 x 25 or 2 x 32 or 2 x 40	–	2 x 20 or 2 x 25 or 2 x 32 or 2 x 40

Schemes

LE6 D09...D18



Connections

Power voltage	Control circuit voltage	A	B
380 V, 400 V, 415 V, 440 V	220 V, 230 V, 240 V	L3	Neutral terminal
	380 V, 400 V, 415 V, 440 V	L3	L1
	Other voltages	Terminal 1	Terminal 2
Other voltages	All voltages (600 V max)	For customer assembly	

TeSys enclosed starters

Safety starters

Conforming to standards: IEC 60204-1

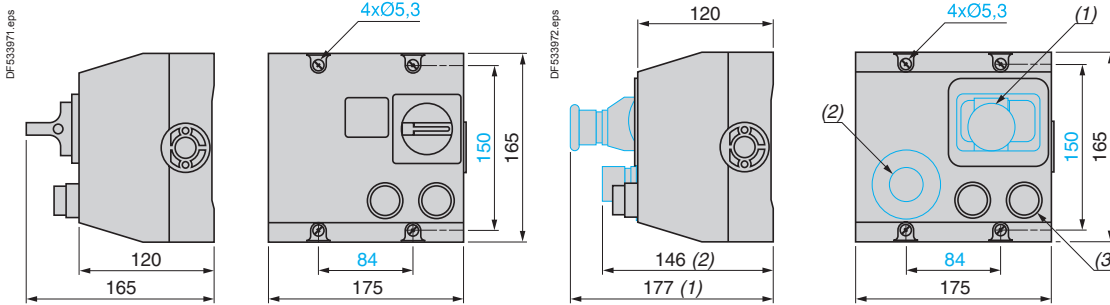
"Safety of machinery - Electrical equipment of machines"

For safety applications

Dimensions

LG1 K06, K09
LG1 D12, D18

LG7 K06, K09, D12, D18
LG8 K06, K09, K12



(1) Emergency Stop for starters LG● K06.

(2) Emergency Stop for starters LG● K09, K12, D12 et D18.

(3) Only for LG7.

Knock-outs or blanking plugs for cable glands

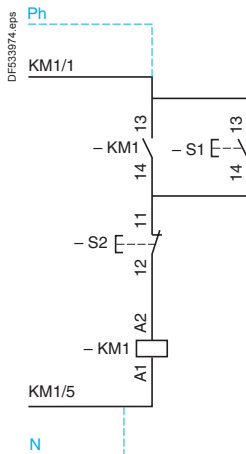
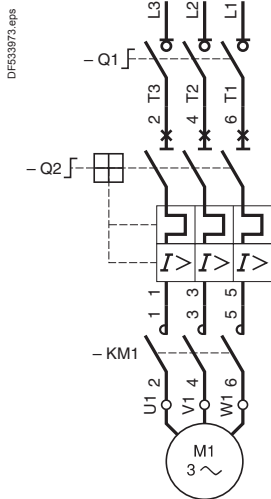
Type of enclosure	At top	At bottom
LG1 K and LG1 D	2 x 13 P and 2 x 16 P	2 x 13 P and 2 x 16 P
LG7 K and LG7 D	2 x 13 P and 2 x 16 P	2 x 13 P and 2 x 16 P
LG8 K	2 x 13 P and 2 x 16 P	2 x 13 P and 2 x 16 P

Schemes

LG1 K06, K09, D12, D18

LG1 K06, K09, D12, D18

380/400 V, code Q7 or 400/415 V, code N7
220/230 V, code M7

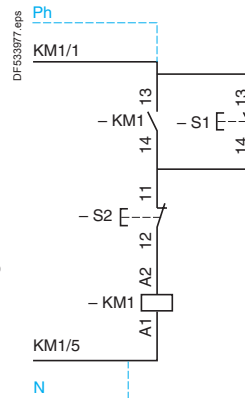
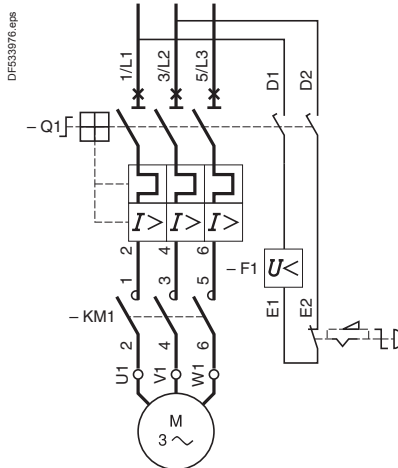
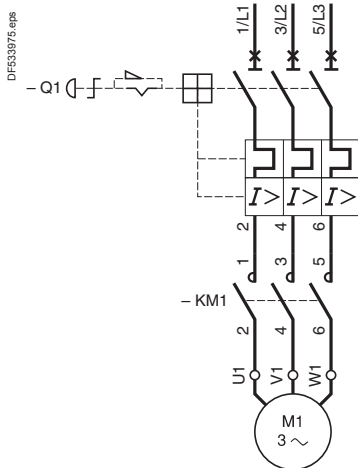


LG7 K06

LG7 K09, D12, D18

LG7 K06, K09, D12, D18

380/400 V, code Q7 or
400/415 V, code N7
220/230 V, code M7

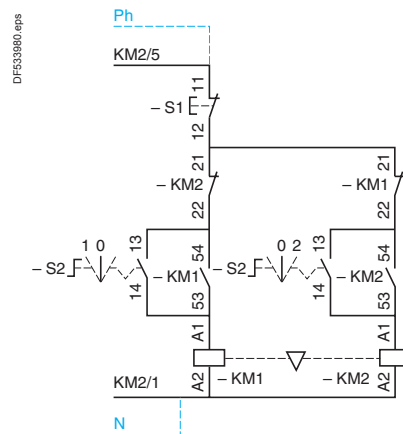
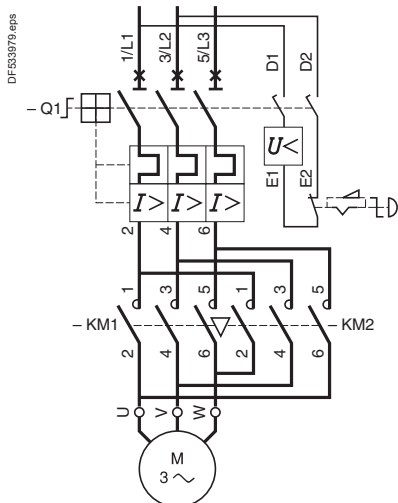
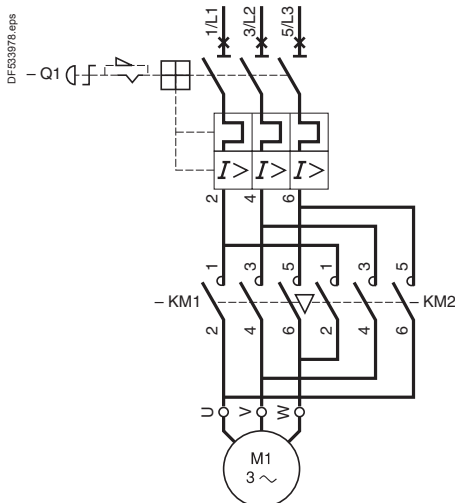


LG8 K06

LG8 K09, K12

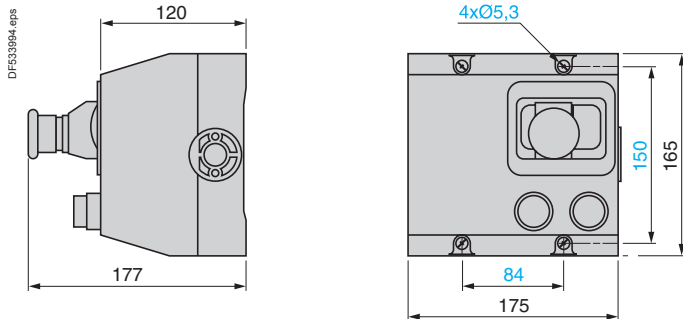
LG8 K06, K09, K12

380/400 V, code Q7 or
400/415 V, code N7
220/230 V, code M7

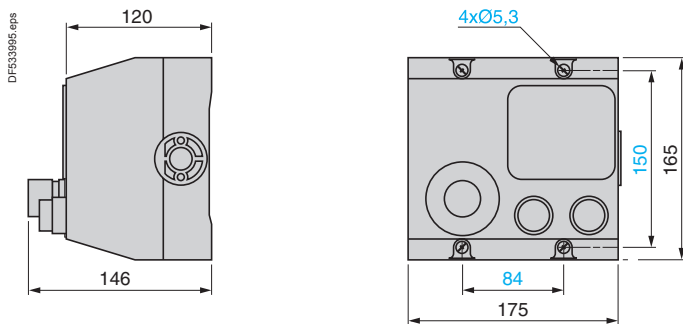


Dimensions

LJ7 K06, LJ8 K06



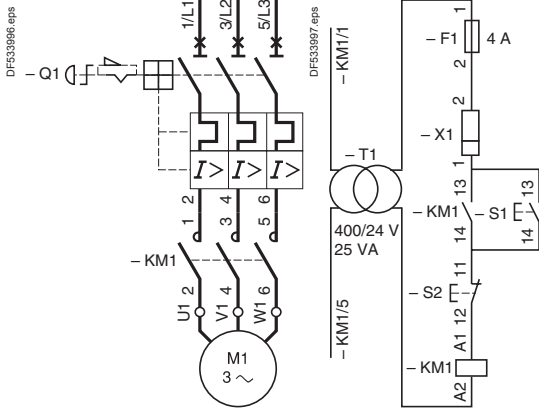
LJ7 K09, LJ8 K09



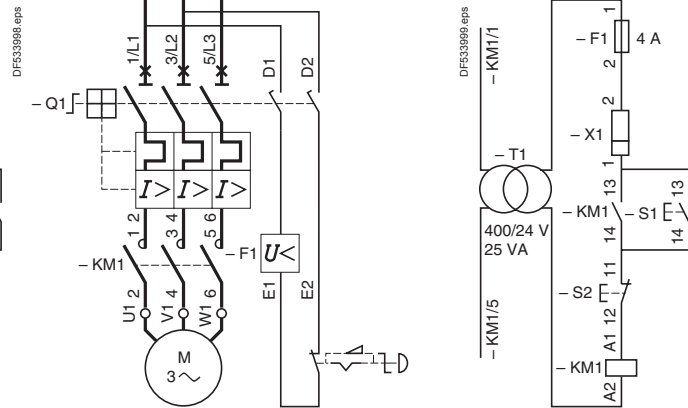
Cut-outs or blanking plugs for cable glands at the top and at the bottom 2 x 13 P and 2 x 16 P.

Schemes

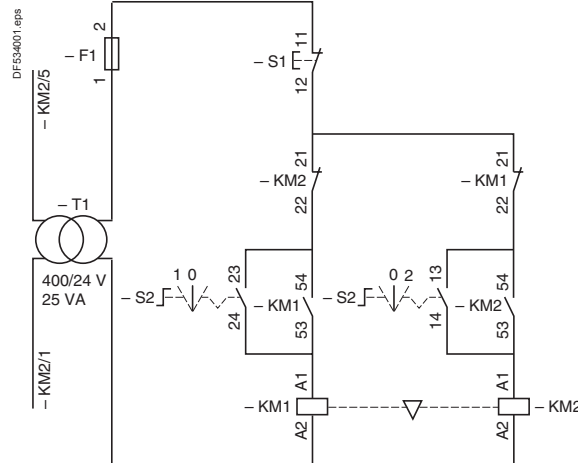
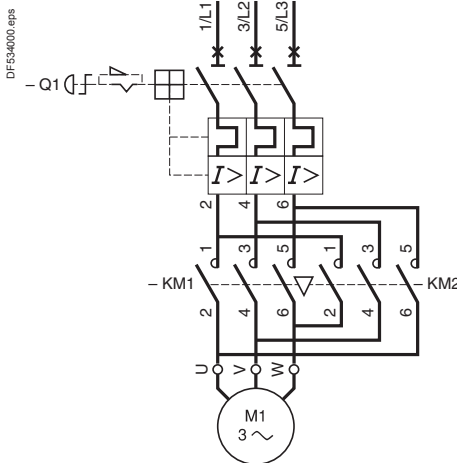
LJ7 K06



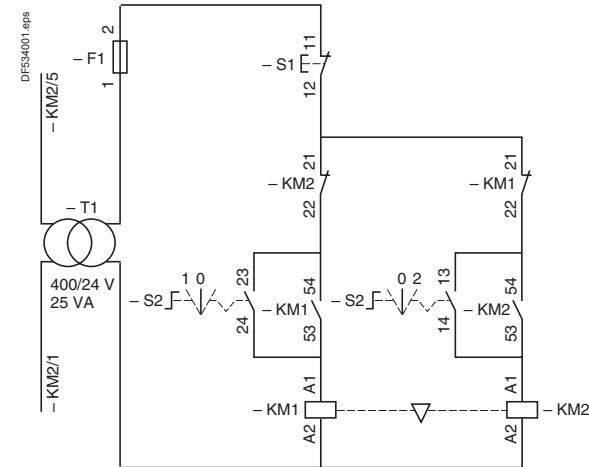
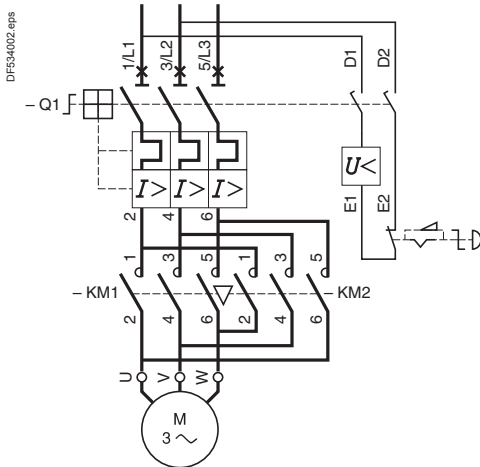
LJ7 K09



LJ8 K06



LJ8 K09



TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Presentation

Decentralised control of motors using enclosed starters which communicate on AS-Interface, drastically reduces setting-up times, thereby increasing the availability of machines.

In order to cater for different environments, these starters are sub-divided according to:

- the different power connection methods: cable gland or Harting plug-in connectors,
- the local/AS-Interface remote operating modes,
- the type of enclosure: insulated (plastic) or metal.

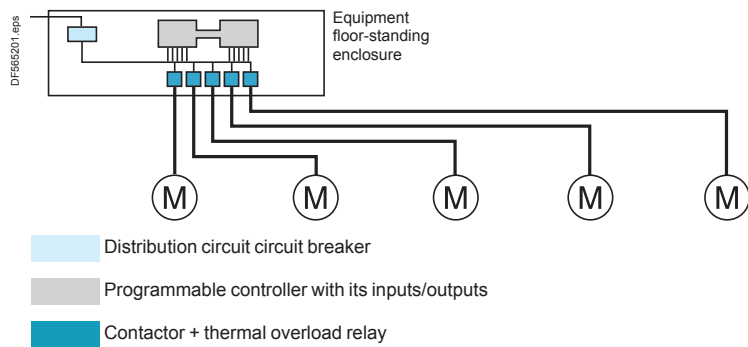
Decentralisation of machine starters

These enclosed starters which communicate on AS-Interface are pre-assembled and ready-to-use with a minimum of cabling.

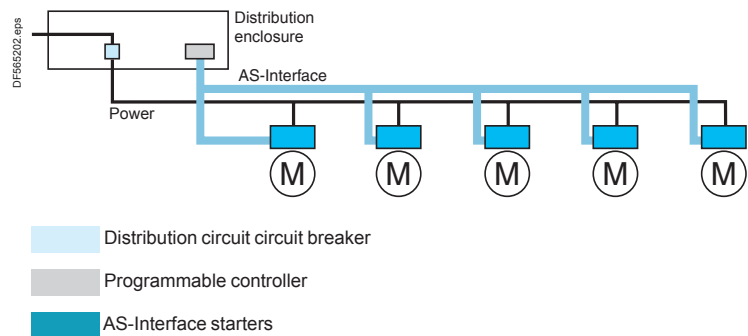
They are designed for building decentralised electrical installations:

i.e. the starters are installed as near as possible to the motors they are to control. The decentralisation of the starters provides obvious advantages regarding power distribution to machines not grouped together, for example: motors driving a conveyor system.

Traditional installation



Decentralised installation



Power is distributed either by prefabricated trunking or by cable. These starters incorporate all the functions necessary for the management of motors (control, protection, isolation, etc.), and comprise:

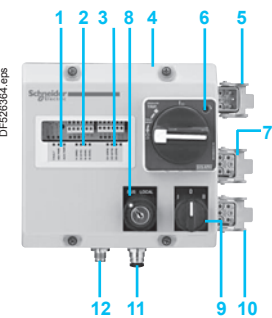
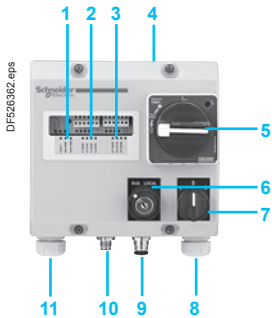
- a thermal-magnetic circuit breaker,
- a low consumption contactor (non reversing) or contactor pair (reversing),
- an I/O module ASI 20MT●●.

Designed primarily for use with 3-phase a.c. motors, they can nevertheless be used with single-phase or d.c. motors. In these applications, the 3 phases of the internal circuit breaker should be wired in series (each phase sensing the same current) in order to avoid tripping due to an assumed phase failure.

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus



Connection by cable gland

- 1 Product diagnostics via 3 LEDs.
- 2 Input state.
- 3 Output state.
- 4 Knock-out for cable gland (not included for any power extension or output control relay cabling).
- 5 Disconnect rotary control knob.
Indicates "Trip" when switch-disconnector tripped.
- 6 Local/AS-Interface key switch (variant A79).
- 7 For variant A79: 3-position, spring return to zero selector switch for reversing starter (LF4). Function:
- position 1 = forward running,
- position 0 = Stop,
- position 2 = reverse running.
Pushbutton for non-reversing starter (LF3).
Function: Pulsed operation.
- 8 Cable gland for power supply cable.
- 9 M12 female connector for cable connection to a sensor (supplied with protective cap).
- 10 M12 male connector for connection to AS-Interface ⁽¹⁾ and auxiliary supply.
- 11 Cable gland for motor cabling.

- 1 Product diagnostics via 3 LEDs.
- 2 Input state.
- 3 Output state.
- 4 Knock-out for cable gland (not included for output control starter).
- 5 Male connector for incoming power supply to motor starter ⁽²⁾.
- 6 Disconnect rotary control knob.
Indicates "Trip" when switch-disconnector tripped.
- 7 Female connector for power supply to the next motor starter ⁽²⁾.
- 8 Local/AS-Interface key switch.
- 9 For variant A79: 3-position, spring return to zero selector switch for reversing starter (LF4). Function:
- position 1 = forward running,
- position 0 = Stop,
- position 2 = reverse running.
Pushbutton: for non-reversing starters (LF3).
Function: Pulsed operation.
- 10 Female connector for power supply to motor ⁽²⁾.
- 11 M12 female connector for cable connection to a sensor (supplied with protective cap).
- 12 M12 male connector for connection to AS-Interface ⁽¹⁾ and auxiliary supply.

⁽¹⁾ Extension cables: please consult your Regional Sales Office.

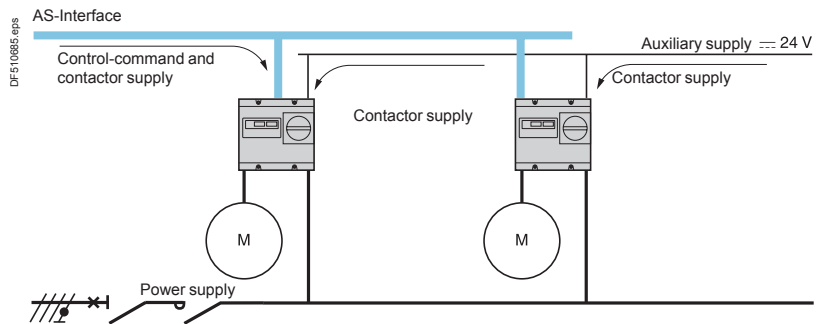
⁽²⁾ HARTING plug-in connector to be fitted to cable (not included, see page A1-51).

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Auxiliary supply



A \approx 24 V supply is necessary for LF3 and LF4 starters.

Prospective current consumptions are listed on page page A1-52.

Motor command-control

The functions provided by this range of starters are:

- motor control and status monitoring via AS-Interface,
- D.O.L. starting (non-reversing or reversing),
- overload protection of the motor,
- short-circuit protection of the motor and its power supply cabling.
- load break switch-disconnector with padlockable control knob,
- IP 54 degree of protection, double insulation.

Opening of the enclosure is mechanically inhibited whilst the starter is switched on or whilst in the off position and padlocked.

The rotary control knob has 3 positions:
 0: switch-disconnector opened manually,
 I: switch-disconnector closed,
 Trip: switch-disconnector tripped.



TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Local control

Stop and reset functions are possible from the front of the enclosure.

The stop command is achieved by actuating the internal circuit breaker, which provides the switch-disconnector function.

Stopping is controlled by a rotary control knob.

In the event of an overload, resetting of the internal thermal-magnetic circuit breaker is possible after the motor has cooled down.

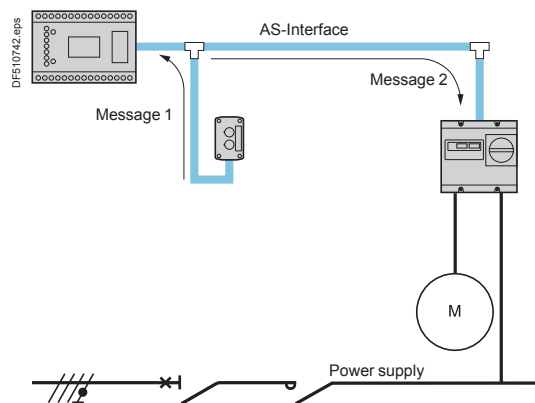
Resetting is controlled by a rotary control knob.

This starter variant is fitted with a 2-position "local/AS-Interface" switch which, depending on the position of the switch, allows the following functions:

- AS-Interface: the PLC controls the motor starter.
- Local: local Start/Stop commands override instructions from the PLC.
- 3-position, spring return to zero selector switch for reversing starter (LF4).
Function:
 - position 1 = forward running,
 - position 0 = Stop,
 - position 2 = reverse running.
- Pushbutton for non-reversing starter (LF3) .
Function:
 - Pulsed operation.



Control via a control station



It is possible to achieve manual local start control from pushbutton control stations connected to AS-Interface. Please consult your Regional Sales Office.

Actuation of a pushbutton is transmitted to the programmable controller (message 1) which passes it on to the starter (message 2).

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Local signalling

Indication of all the operating states (diagnostic, inputs and outputs) is visible without having to open the enclosure (transparent window in the enclosure cover).

Safety

The starter features continual self-checking to ensure correct operation.

External safety functions are not processed by the starter.

Emergency stop and machine safety wiring must follow standard safety practice and be hard-wired, using electromechanical devices in the approved way. These functions must not be handled by communication bus systems (EN 60204 §9.2.5.4).

Protection against unexpected restarting, after an accidental power supply failure, must be provided by a safety device separate from the starter.

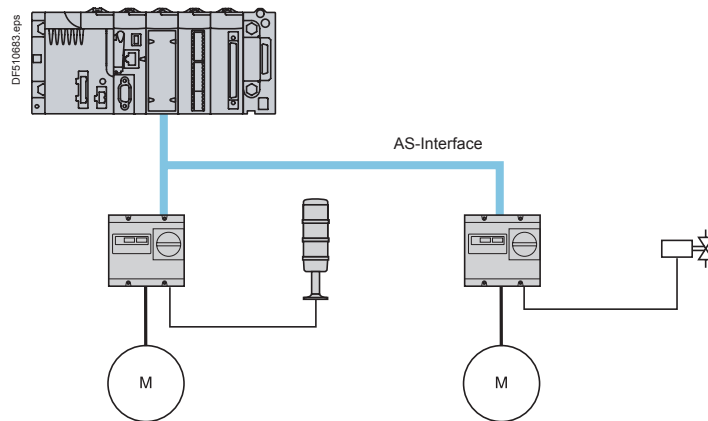
The starter control (rotary knob) does not provide the Emergency Stop function if the machine is fitted with other actuators. The control operators on the starter are therefore coloured black, in accordance with standard EN 60204 §10.2.1. Starters with rotary control knob may be padlocked in the ON position, since this control does not provide an Emergency Stop function.

Assume fallback condition

When communication is interrupted, the starter is no longer controlled by the PLC. The fallback condition of the starter is “motor stopped” (outputs at 0).

Output control relay

This relay incorporates a C/O contact, which may be used to control an indicator lamp, solenoid valve, etc. (250 V, 5 A), via AS-Interface.



TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Starters with sensors connected ⁽¹⁾

Two 3-wire PNP sensors (50 mA max) or 2-wire limit switches can be connected directly to the starter.

The information supplied by the sensor/limit switch is fed back via the AS-Interface line.

(1) For "Reflex Stop" function, please consult your Regional Sales Office.

Starters for AS-interface bus

Environment			
Starter type			LF3, LF4
Conforming to standards			IEC 60204-1, EN 60204-1, IEC 60439-1, IEC 60947-4-1, EN 60947-4-1, UL 508, CSA C22-2 n° 14 ⁽¹⁾
Product certifications			–
Protective treatment	Standard version		“TC”
Degree of protection conforming to IEC 60529			IP54
Ambient air temperature around the device conforming to IEC 60439-1	Storage	°C	-40...+80
	Operation	°C	-5...+40
Maximum operating altitude	Without derating	m	2000
Operating position without derating	In relation to normal vertical mounting plane		
Flame resistance of equipment	Conforming to IEC 60695-2-1	°C	960
Shock resistance (1/2 sine wave, 11ms) conforming to IEC 60068-2-27	Contacteur open		10 gn
	Contacteur closed		15 gn
Vibration resistance 5...150 Hz conforming to IEC 60068-2-6	Contacteur open		2 gn
	Contacteur closed		4 gn
Safe separation of circuits	Conforming to VDE 0106 and IEC 60536		SELV (Safety Extra Low Voltage), up to 400 V
Immunity to non-dissipating shock wave (Uimp)	Conforming to IEC 60947-1	kV	6: power 2.5: AS-Interface, 24 V and sensor
Material and colour of enclosure base	Insulated enclosures		Polycarbonate impregnated with 20 % glass fibre, black throughout
	Metal enclosures		Sheet steel RAL 9001
Material and colour of enclosure cover	Insulated enclosures		Polycarbonate impregnated with 20 % glass fibre, RAL 9001 throughout
	Metal enclosures		Sheet steel RAL 9001
Resistance to chemical agents	Insulated enclosures		Avoid allowing this material to come into contact with: strong bases (certain detergents), aromatic hydrocarbons, alcohol, chlorine solvents, ketones.
Electromagnetic compatibility			
Immunity to electrostatic discharge	Conforming to IEC 61000-4-2 EN 61000-4-2	kV	8: in open air (level 3) 4: in indirect mode (level 2)
Immunity to fast transient currents	Conforming to IEC 61000-4-4 EN 61000-4-4	kV	2: power, AS-Interface, 24 V and sensor (level 3)
Immunity to dissipated shock wave	Conforming to IEC 61000-4-5 EN 61000-4-5	kV	4/2: power (level 4) 2/0.5: power, AS-Interface, 24 V and sensor (level 2)
Immunity to conducted radio-frequency interference	Conforming to IEC 61000-4-6 ENV 50 141	V/m	10
Immunity to radiated radio-frequency interference	Conforming to IEC 61000-4-3 ENV 50 140 and ENV 50 204 (GSM)	V/m	10
Radio-conducted and radio-radiated rejection	ENV 55 011/CISPR11 (G1)		Class B

⁽¹⁾ Only for metal enclosures with letter **U** at the end of the reference. Certification pending.

Starters for AS-interface bus

Cabling							
Starter type			LF3		LF4		
			Min.	Max.	Min.	Max.	
Power supply cabling	Screw clamp terminals	Solid cable	mm ²	1 x 1.5	2 x 6	1 x 1.5	2 x 6
		Flexible cable without cable end	mm ²	1 x 1.5	2 x 6	1 x 1.5	2 x 6
		Flexible cable with cable end	mm ²	1 x 1.5	2 x 4	1 x 1.5	2 x 4
		Tightening torque ⁽¹⁾	N.m	1.7	1.7	1.7	1.7
	Cable Gland (Pg 16)	Clamping capacity	mm	10	15	10	15
Motor cabling	Screw clamp terminals	Solid cable	mm ²	1 x 1.5	2 x 4	1 x 1.5	1 x 4
		Flexible cable without cable end	mm ²	1 x 1.5	2 x 4	1 x 1.5	1 x 4
		Flexible cable with cable end	mm ²	1 x 1.5	1 x 1.5 + 1 x 2.5	1 x 1.5	1 x 2.5
		Tightening torque ⁽¹⁾	N.m	0.8	0.8	0.8	0.8
	Cable Gland (Pg 16)	Clamping capacity	mm	10	15	10	15
Output control relay cabling	Terminal block	Solid cable	mm ²	0.5	1.5	0.5	1.5
		Flexible cable without cable end	mm ²	0.5	1.5	0.5	1.5
		Flexible cable with cable end	mm ²	0.5	1.5	0.5	1.5
		Tightening torque ⁽²⁾	N.m	0.7	0.7	0.7	0.7
	Cable gland	Clamping capacity Pg 13 Pg 16	mm	8	13	8	13
mm			10	15	10	15	

Pole electrical characteristics			
Utilisation category	Conforming to IEC 60947-2 (circuit breaker)		A
	Conforming to 947-4-1 (motor starter)		AC-3
Rated operational voltage (Ue)	Conforming to IEC 60947	V	415
Rated insulation voltage (Ui)	Conforming to IEC 60947	V	415
Rated operational frequency	Conforming to IEC 60947	Hz	50/60
Breaking capacity (Ics and Icu)	Conforming to 230/240 V IEC 60947-2	kA	> 100
	400/415 V	kA	> 100
Sensitivity to phase failure	Conforming to IEC 60947-4-1 § 7-2-1-5-2		Yes

Circuit breaker characteristics (manual operation)			
Mechanical durability	C.O.: closing, opening	C.O.	100 000
Electrical durability	For AC-3 duty	C.O.	100 000
Duty class	Maximum operating rate	C.O./h	25

Circuit breaker characteristics (automatic operation)			
Maximum operating rate	In operating cycles per hour		3600
Mechanical durability	In millions of operating cycles		30
Electrical durability	In category AC-3 at 8.5 A		800 000

Other characteristics		
Starters with rotary control knob	Circuit breaker type GV2 P	See pages A1-57 to A1-57
Non-reversing starters	Contactors LP4 K0901BW3 ⁽³⁾	See pages A1-57 to A1-57
Reversing starters	Reversing contactors LP5 K0901BW3 ⁽⁴⁾	See pages A1-57 to A1-57

⁽¹⁾ Philips n° 2 or flat screwdriver Ø5.5.
⁽²⁾ Flat screwdriver Ø3.5.
⁽³⁾ LP4 K1201BW3 for circuit breaker ratings 00 and 16.
⁽⁴⁾ LP5 K1201BW3 for circuit breaker ratings 00 and 16.

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Sensor inputs			
Starter type			LF3, LF4
Cabling			M12
Nominal input values	Voltage	V	--- 24
	Maximum current available per sensor	mA	50
	Sensor supply (including ripple)	V	19...30
Input voltage range	At state 1	Voltage	V --- > 11
		Current	mA > 6
	At state 0	Voltage	V --- < 5
		Current	mA < 2
Maximum number of sensors			2
Proximity sensor compatibility			2-wire/3-wire
Isolation with respect to the AS-Interface line			Yes
Input type			Resistive for PNP type sensor
Output control relay			
Operating voltage limit	a.c. supply	V	250
	d.c. supply	V	30
Thermal current at 40 °C (I _{th})		A	5
Service life on an ~ 24 V load	Resistive load AC-12 Millions of operating cycles		0.1 ⁽¹⁾ in 5 A current, 1 ⁽²⁾ in 1 A current.
	Inductive load AC-14 Millions of operating cycles		0.5 ⁽²⁾ in 1 A current, 1 ⁽²⁾ in 0.5 A current, 5 ⁽³⁾ in 0.25 A current.
Service life on a --- 24 V load	Resistive load DC-12 Millions of operating cycles		0.1 ⁽¹⁾ in 5 A current, 0.2 ⁽¹⁾ in 2 A current.
	Resistive load DC-3 Millions of operating cycles		0.5 ⁽²⁾ in 1 A current, > 1 ⁽³⁾ in 0.25 A current.
Response time	Latching	ms	< 10
	Unlatching	ms	< 15
Contact type			C/O
Built-in protection	Against overload and short-circuits		None, a quick-blow fuse must be fitted
	Against a.c. or d.c. inductive overloads		Protected against overvoltages generated by switching the coils of preactuators
Isolation	rms voltage between output and earth or between output and internal logic	V	1500, 50/60 Hz for 60 s
	Insulation resistance between output terminals and AS-Interface	μΩ	> 1000

⁽¹⁾ 0.2 of an operation (C/O) per second.

⁽²⁾ 0.5 of an operation (C/O) per second.

⁽³⁾ 1 operation (C/O) per second.

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Consumption				
Starter type		Product configured for supply from an auxiliary --- 24 V supply		
		LF3	LF4	
Current consumption	From the AS-Interface line ⁽¹⁾	De-energised	20 mA	20 mA
		Inrush	20 mA	20 mA
		Sealed	20 mA	20 mA
		Per sensor	Sensor consumption (50 mA max) + 10 mA (signal = 1)	
		Relays	20 mA	
	From the auxiliary --- 24 V supply	De-energised	0	0
		Inrush	110 mA	110 mA
		Energised	30 mA	30 mA

Data exchange characteristics			
AS-Interface profile		7.D.F.F (standard addressing) 7.A.7.0 (extended addressing A/B)	
Data bits (commands)	Bit value	= 0	= 1
	Command D0 (O)	Stop - forward running	Start - forward running
	Command D1 (O)	Stop - reverse running	Start - reverse running ⁽²⁾
	Command D2 (O)	Deactivation of control relay	Activation of control relay
	Command D3 (O)	Not Used	Not Used
Data bits (status)	Bit value	= 0	= 1
	Status D0 (I)	Not ready or fault	Ready
	Status D1 (I)	Stopped	Running
	Status D2 (I)	Sensor 1 signal absent ⁽³⁾	Sensor 1 signal present ⁽³⁾
	Status D3 (I)	Sensor 2 signal absent ⁽⁴⁾	Sensor 2 signal present ⁽⁴⁾

- ⁽¹⁾ 30 mA maximum + sensor consumption.
- ⁽²⁾ Only on LF4.
- ⁽³⁾ Sensor 1 or circuit breaker fault signal, depending on configuration.
- ⁽⁴⁾ Sensor 1 or sensor 2 signal or control/local mode, depending on configuration.

TeSys enclosed starters

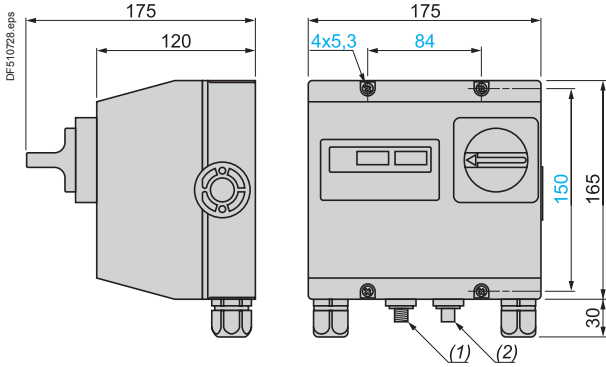
D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Non-reversing and reversing starters in insulated (plastic) enclosure

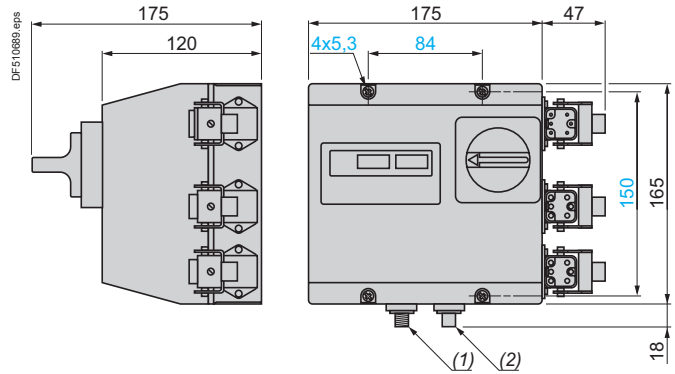
With cable glands

LF● P●●●



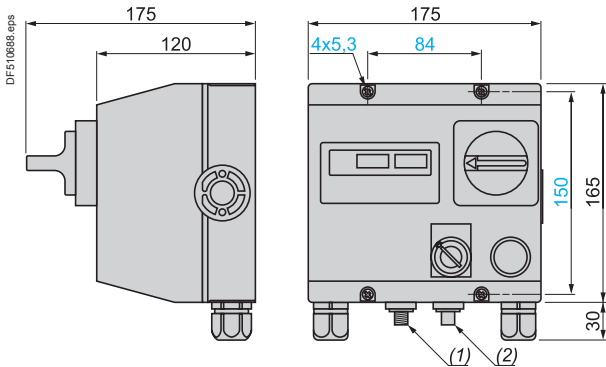
With HARTING plug-in connectors (A74)

LF● P●●●A74



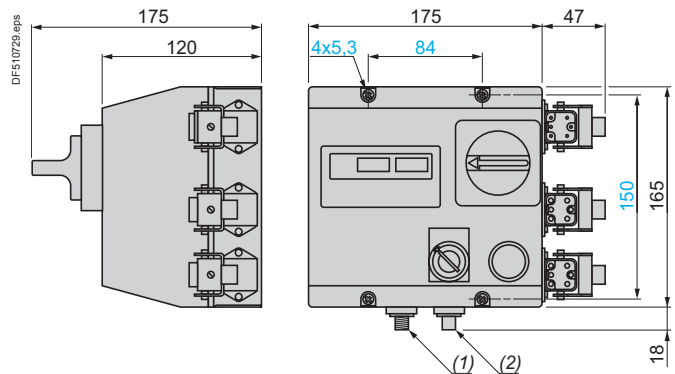
With cable glands
Incorporating sensor and local/AS-Interface control variant (A79)

LF● P●●●A79



With HARTING plug-in connectors (A74)
Incorporating sensor and local/AS-Interface control variant (A79)

LF● P●●●A79A74



Knock-outs for cable gland

- From above 2 x Pg16 and 2 x Pg13
- From below 2 x Pg16 (cable glands supplied)

- (1) M12 male connector for connection to AS-Interface and auxiliary 24 V supply.
- (2) M12 female connector for connection to sensor.

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

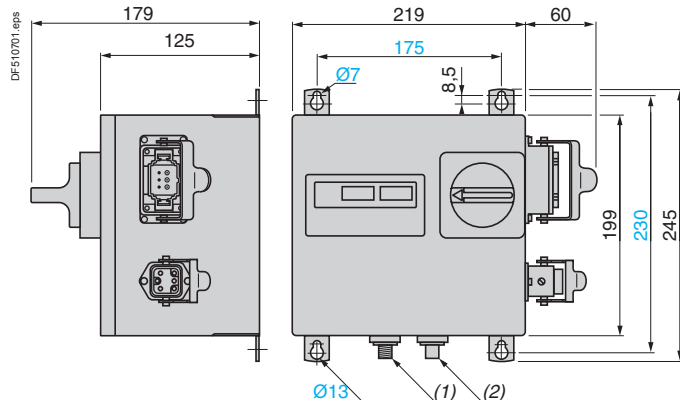
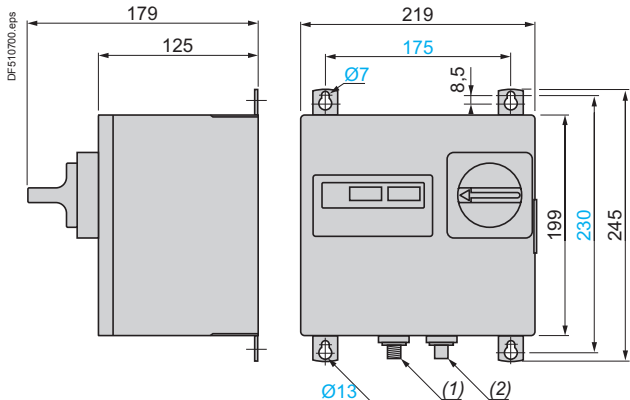
Non-reversing and reversing starters in metal enclosure

With cable glands

LF● MP●●●

With HARTING plug-in connectors (A74)

LF● MP●●●A74



With cable glands

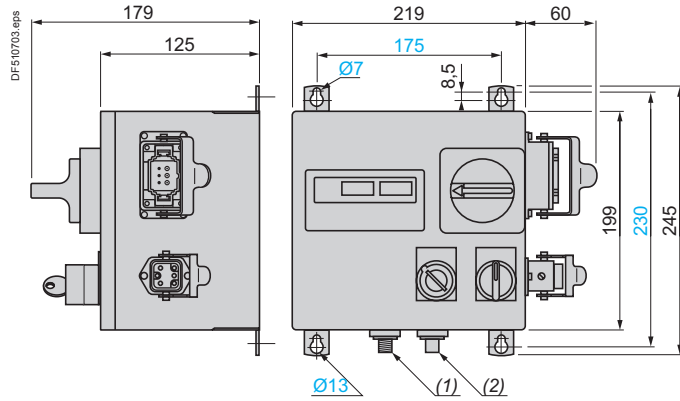
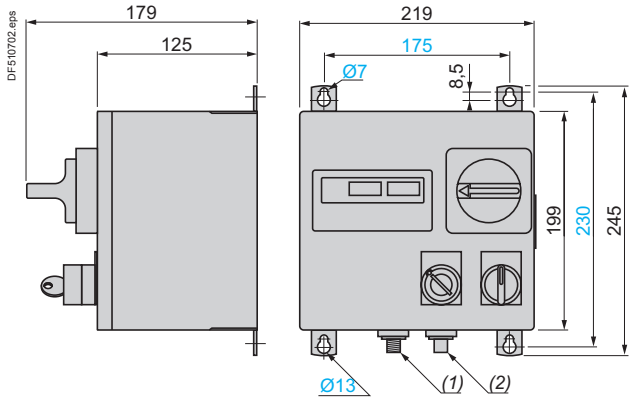
Incorporating sensor and local/AS-Interface control variant (A79)

LF● MP●●●A79

With HARTING plug-in connectors (A74)

Incorporating sensor and local/AS-Interface control variant (A79)

LF● MP●●●A79A74



Knock-outs for cable gland	Standard enclosure	Enclosure with variant A74
From above	3 x Pg16	1 x Pg16
From below	2 x Pg16	1 x Pg16

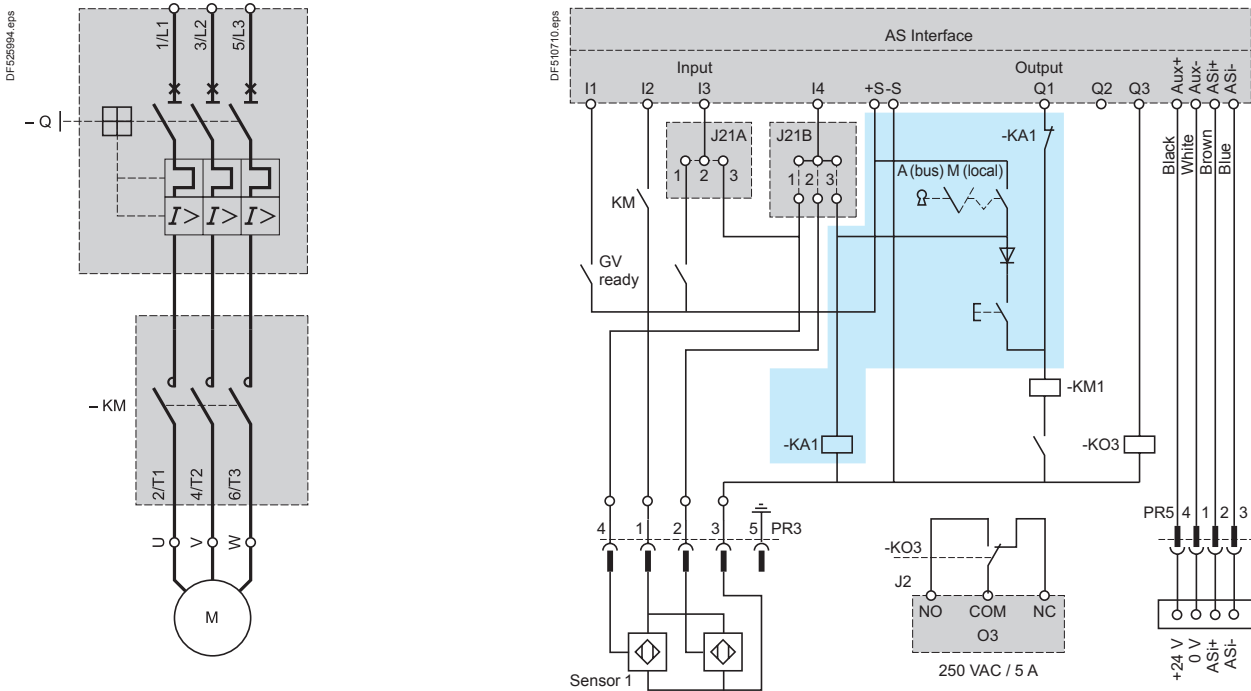
(1) M12 male connector for connection to AS-Interface and auxiliary 24 V supply.
 (2) M12 female connector for connection to sensor.

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

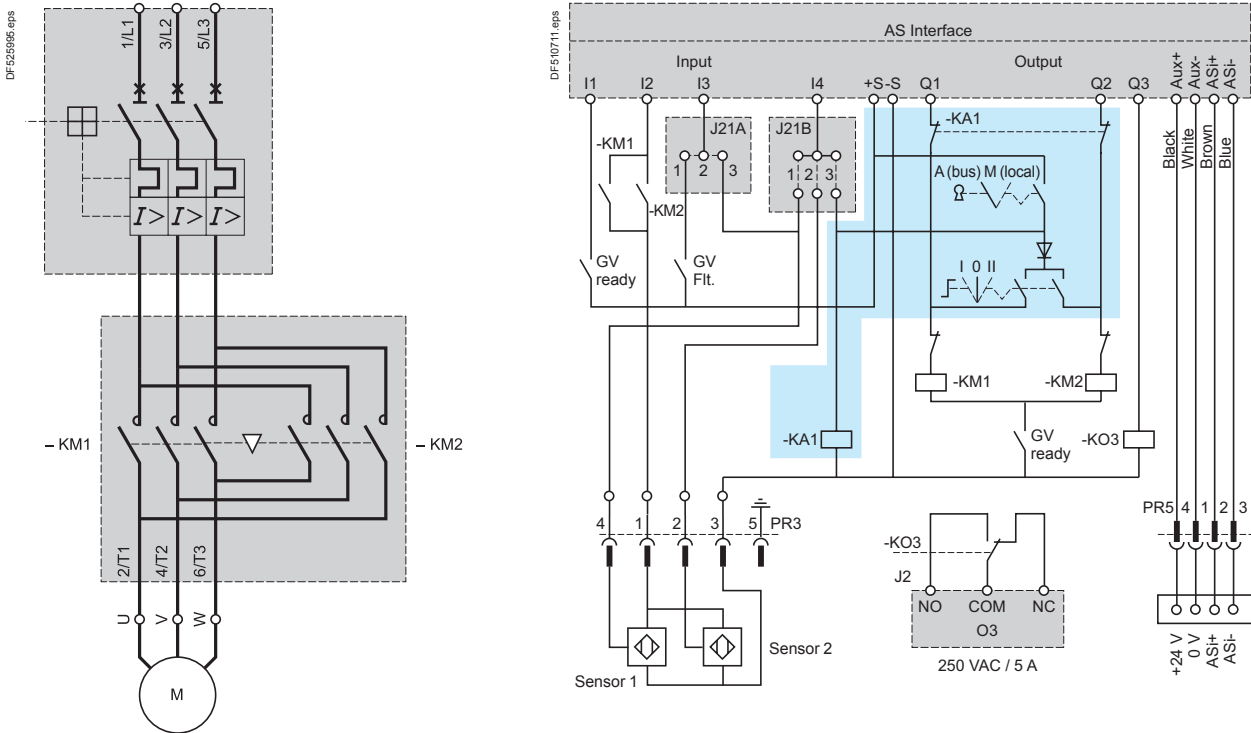
Starters for AS-interface bus

Non-reversing starters LF3



Insulated enclosure with variant A79 or metal enclosure with variant A79

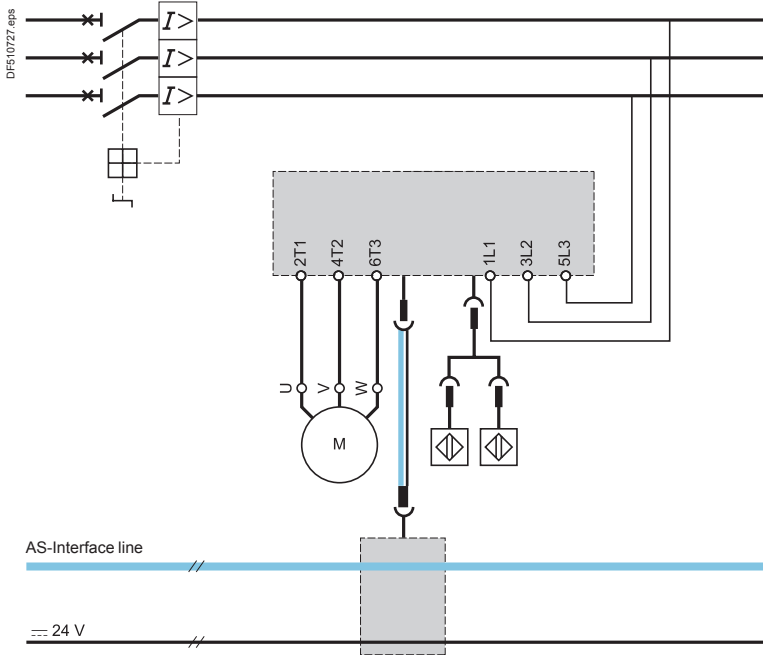
Reversing starters LF4



Insulated enclosure with variant A79 or metal enclosure with variant A79

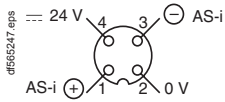
Starters for AS-interface bus

Non-reversing and reversing starters with 2 sensors, an auxiliary supply and a control relay



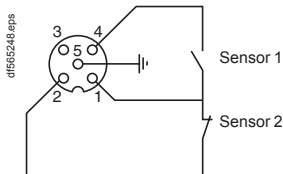
Connections on enclosure

M12 male connector for AS-Interface and 24 V auxiliary supply

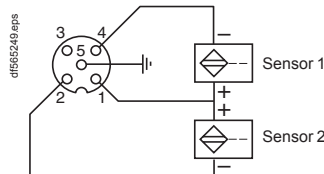


Sensor M12 female connector

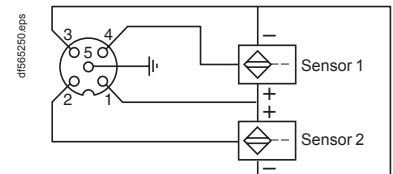
Limit switch



2-wire PNP type sensor

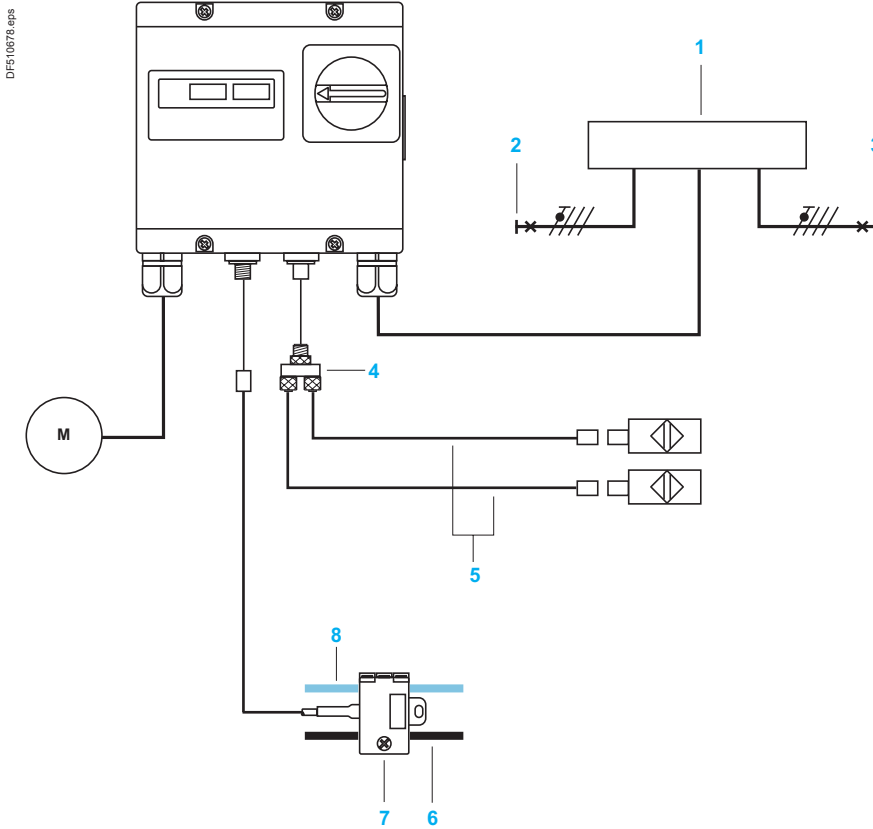


3-wire PNP type sensor



Starters for AS-interface bus

Starters in enclosures with cable glands



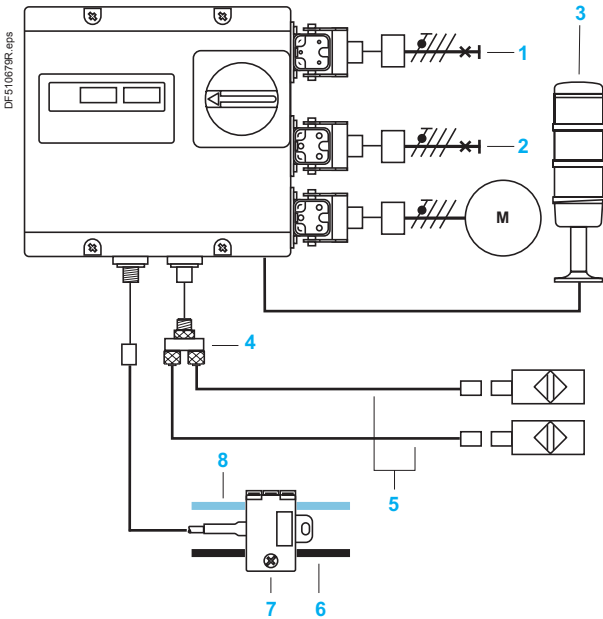
- 1 Junction box
- 2 Incoming power
- 3 Power extension
- 4 **FTX CY1212**: splitter block
- 5 **XZ CR1511040A●**: extension
- 6 **XZ CB1●●02**: flat cable (black) for auxiliary supply
- 7 **XZ CG01403D**: tap link for two cables
- 8 **XZ CB1●●01**: flat cable (yellow) for AS-Interface

TeSys enclosed starters

D.O.L. starters for AS-Interface cabling system

Starters for AS-interface bus

Starters in insulated enclosures with HARTING type plug-in power connectors

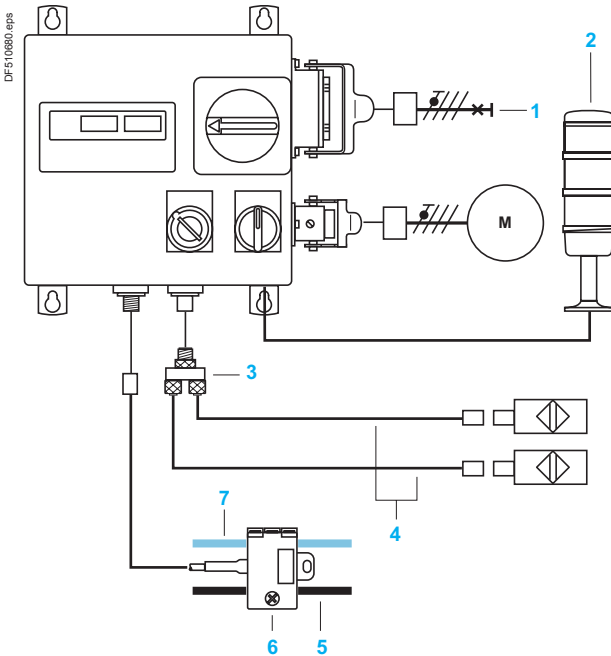


- 1 Incoming power
- 2 Power extension
- 3 Control relay (example: illuminated indicator bank)
- 4 FTX CY1212: splitter block
- 5 XZ CR1511040A: extension
- 6 XZ CB1●●02: flat cable (black) for auxiliary supply
- 7 XZ CG1403D: tap link for two cables
- 8 XZ CB1●●01: flat cable (yellow) for AS-Interface

Configuration of HARTING connectors to be fitted on cables (to be ordered separately)

	Number and HARTING reference	
	for incoming power female connector	for power extension and motor connection male connectors
Straight cover	1 x 09-20-003-0420	2 x 09-20-003-0420
Male insert 6-way, 400 V	–	2 x 09-12-005-3101
Female insert 6-way, 400 V	1 x 09-12-005-3001	–
Male contacts 2.5 mm ²	–	8 x 09-33-000-6102
Female contacts 2.5 mm ²	3 x 09-33-000-6202	–
Plug for the last socket	–	1 x 09-20-003-5408

Starters in metal enclosures with HARTING type plug-in power connectors




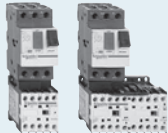
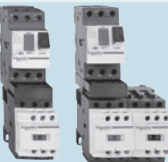




- 1 Incoming power
- 2 Control relay (example: illuminated indicator bank)
- 3 FTX CY1212: splitter block
- 4 XZ CR1511040A: extension
- 5 XZ CB1●●02: flat cable (black) for auxiliary supply
- 6 XZ CG1403D: tap link for two cables
- 7 XZ CB1●●01: flat cable (yellow) for AS-Interface

Configuration of HARTING connectors to be fitted on cables (to be ordered separately)

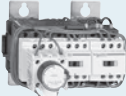
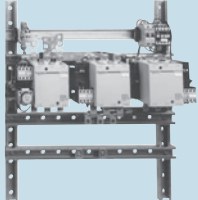
	Number and HARTING reference	
	for incoming power female connector	for power extension and motor connection male connectors
Straight cover	1 x 09-30-006-442 ⁽¹⁾ 1 x 09-30-006-443 ⁽²⁾	2 x 09-20-003-1440
Male insert 6-way, 400 V	–	2 x 09-12-005-3101
Female insert 6-way, 400 V	1 x 09-33-006-2702	–
Male contacts 2.5 mm ²	–	5 x 09-33-000-6102
Female contacts 2.5 mm ²	3 x 09-33-000-6207	–

⁽¹⁾ PG21.
⁽²⁾ PG29.

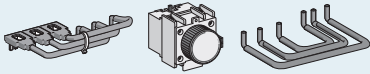
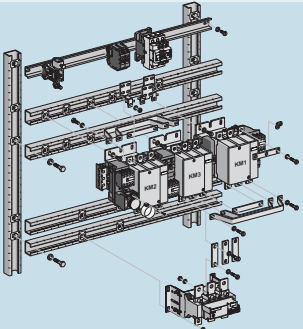
Direct-on-line and reversing starters

Composition	Range		Page
Fuse + contactor (direct-on-line)	Up to 37 kW		A2/3
Motor circuit breaker + contactor (direct-on-line) Coordination type 1	Up to 5.5 kW		A2/4
Motor circuit breaker + 2 contactors (reversing) Coordination type 1	Up to 5.5 kW		A2/5
Motor circuit breaker + contactor (direct-on-line) Coordination type 1	Up to 30 kW		A2/6
Motor circuit breaker + 2 contactors (reversing) Coordination type 1	Up to 30 kW		A2/7
Motor circuit breaker + contactor (direct-on-line) Coordination type 2	Up to 30 kW		A2/8
Motor circuit breaker + 2 contactors (reversing) Coordination type 2	Up to 30 kW		A2/9

Star-delta starters

3 contactors + 1 time delay aux. block	Up to 132 kW		A2/10
3 contactors + 1 time delay aux. block + 1 control relay	90 to 375 kW		A2/11

For customer star-delta assembly

Separated components and mounting kits for suggested motor starter components combinations - on plate or mounting rail	Up to 132 kW		A2/12
Separated components for suggested motor starter combinations - on chassis	90 to 375 kW		A2/16

Motor starters - open version

D.O.L. starters, plate mounted, for motor control 4 to 37 kW ⁽¹⁾, with isolating device, pre-assembled

Direct-on-line and reversing



LC4 D09A●●

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Open pre-cabled motor starter

References										Weight	
Utilisation category AC-3							Fuses to be fitted by the customer		Basic reference, to be completed by adding the voltage code ⁽²⁾		
Standard power ratings of 3-phase motors 50/60 Hz						Operational current	Size	Type aM			kg
220 V	380 V	230 V	400 V	415 V	440 V				500 V		
kW	kW	kW	kW	kW	kW	kW	A	A	A		
2.2	4	4	4	4	5.5	–	9	10 x 38	12	LC4D09A●●	0.870
3	5.5	5.5	5.5	5.5	7.5	–	12	10 x 38	16	LC4D12A●●	0.870
4	7.5	9	9	9	10	–	18	10 x 38	20	LC4D18A●●	1.150
5.5	11	11	11	11	15	–	25	10 x 38	25	LC4D25A●●	1.580
7.5	15	15	15	15	18.5	18.5	32	14 x 51	32	LC4D32A●●	2.630
11	18.5	22	22	22	22	30	40	14 x 51	40	LC4D40●●	2.930
15	22	25	30	30	30	33	50	22 x 58	63	LC4D50●●	3.200
18.5	30	37	37	37	37	37	65	22 x 58	80	LC4D65●●	3.340
22	37	45	45	45	55	45	80	22 x 58	80	LC4D80●●	3.650

Specifications

Pre-wired power and control circuit connections.

3-pole isolating device

⁽¹⁾ Thermal overload relay to be ordered separately (see pages B11/4 and B11/5).

⁽²⁾ Standard control circuit voltages:

Volts	24	42	48	110	220	230	240	380	400	415	440
50/60 Hz	B7	D7	E7	F7	M7	P7	U7	Q7	V7	N7	R7

For other voltages, please consult your Regional Sales Office.

Motor starters - open version

Combination automatic motor starters with overload protection built into the circuit breaker

Direct-on-line and reversing

D.O.L. starters, non-reversing, from 0.37 to 5.5 kW at 400/415 V, type 1 coordination

This pre-assembled combination comprises:

- 1 motor circuit breaker GV2 ME,
- 1 3-pole contactor LC1 K,
- 1 combination block GV2 AF01.

Characteristics

Starter type	GV2	ME06K1	ME07K1	ME08K1	ME10K1	ME14K1	ME16K1
Breaking capacity (I _q) (1)	400/415 V	kA	50	50	50	50	15
	440 V	kA	50	50	50	50	15
	500 V	kA	50	50	50	50	10 (4 kW) 6 (5.5 kW)

References



GV2 ME10K1●●

D.O.L. starters, non-reversing

Standard power ratings of 3-phase motors 50/60 Hz in AC-3			Setting range of thermal trips	Fixed magnetic tripping current 13 Irth	For customer assembly		Pre-assembled	Weight
400/415 V	440 V	500 V			Motor circuit-breaker Reference	Contactor Reference to be completed (2)		
kW	kW	kW	A	A				kg
0.37	0.37	0.37	1...1.6	22.5	GV2 ME06	LC1 K06	GV2ME06K1●●	0.460
0.55	0.55	0.55	1.6...2.5	33.5	GV2 ME07	LC1 K06	GV2ME07K1●●	0.460
–	–	0.75						
0.75	0.75	–	2.5...4	51	GV2 ME08	LC1 K06	GV2ME08K1●●	0.460
–	1.1	1.1						
1.1	–	1.5	4...6.3	78	GV2 ME10	LC1 K06	GV2ME10K1●●	0.460
1.5	1.5	2.2						
2.2	2.2	–	6...10	138	GV2 ME14	LC1 K09	GV2ME14K1●●	0.460
–	3	3						
3	–	4	9...14	170	GV2 ME16	LC1 K12	GV2ME16K1●●	0.460
4	4	5.5						
5.5	5.5	7.5						

Add-on blocks

Description	Sold in lots of	Unit reference
Combination block between circuit breaker and contactor	10	GV2AF01

(1) The breaking performance of circuit breakers GV2 ME can be increased by adding a current limiter GV1 L3, see page B6/56.

(2) Please consult your Regional Sales Office.

(3) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	110	220/230	230	230/240	380/400
~ 50/60 Hz	B7	F7	M7	P7	U7	Q7
≡ (4)	BW3	–	–	–	–	–

(4) Coil: low consumption (1.5 W), wide range (0.7...1.3 Uc) with integral suppression device as standard.

Motor starters - open version

Combination automatic motor starters with overload protection built into the circuit breaker

Direct-on-line and reversing

D.O.L. starters, reversing, from 0.37 to 5.5 kW at 400/415 V, type 1 coordination

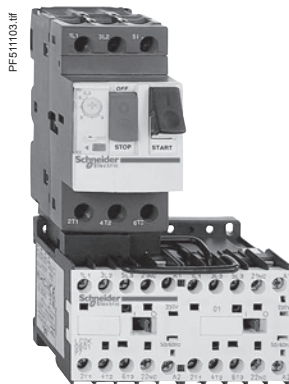
This pre-assembled combination comprises:

- 1 motor circuit breaker GV2 ME,
- 1 3-pole reversing contactor LC2 K,
- 1 combination block GV2 AF01.

Characteristics

Starter type	GV2	ME06K2	ME07K2	ME08K2	ME10K2	ME14K2	ME16K2
Breaking capacity (Iq) ⁽¹⁾ Conforming to IEC 60947-4-1	400/415 V	kA	50	50	50	50	15
	440 V	kA	50	50	50	50	15
	500 V	kA	50	50	50	50	10/4 kW 6/5.5 kW

References



GV2 ME10K2●●

D.O.L. starters, reversing

Standard power ratings of 3-phase motors 50/60 Hz in AC-3			Setting range of thermal trips	Fixed magnetic tripping current 13 Irth	For customer assembly		Pre-assembled	Weight
400/415 V	440 V	500 V			Motor circuit-breaker Reference	Contactor Reference to be completed ⁽²⁾		
kW	kW	kW	A	A				kg
0.37	0.37	0.37	1...1.6	22.5	GV2 ME06	LC2 K06	GV2ME06K2●●	0.460
0.55	0.55	0.55						
–	–	0.75						
0.75	0.75	–	1.6...2.5	33.5	GV2 ME07	LC2 K06	GV2ME07K2●●	0.460
–	1.1	1.1						
1.1	–	1.5	2.5...4	51	GV2 ME08	LC2 K06	GV2ME08K2●●	0.460
1.5	1.5	2.2						
2.2	2.2	–	4...6.3	78	GV2 ME10	LC2 K06	GV2ME10K2●●	0.460
–	3	3						
3	–	4	6...10	138	GV2 ME14	LC2 K09	GV2ME14K2●●	0.460
4	4	5.5						
5.5	5.5	7.5	9...14	170	GV2 ME16	LC2 K12	GV2ME16K2●●	0.460

Add-on blocks

Description	Sold in lots of	Unit reference
Combination block between circuit breaker and contactor	10	GV2AF01

(1) The breaking performance of circuit breakers GV2 ME can be increased by adding a current limiter GV1 L3, see page B6/56.

(2) Please consult your Regional Sales Office.

(3) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	110	220/230	230	230/240	380/400
~ 50/60 Hz	B7	F7	M7	P7	U7	Q7
--- ⁽⁴⁾	BW3	–	–	–	–	–

(4) Coil: low consumption (1.5 W), wide range (0.7...1.3 U_c) with integral suppression device as standard.

Note: The combinations are valid for IE2 motors and IE3 with maximum starting current = 7.5 x motor rating current (see page A5/4 and A5/5).

Open pre-cabled motor

Motor starters - open version

Combination automatic motor starters with overload protection built into the circuit breaker

Direct-on-line and reversing

D.O.L. starters, non-reversing, from 0.06 to 30 kW at 400/415 V, type 1 coordination

This pre-assembled combination comprises:

- 1 motor circuit breaker GV2 ME,
- 1 3-pole contactor LC1 D,
- 1 combination block GV2 AF3.

Characteristics

Starter type	GV2	DM 102 to DM 110	DM 114	DM 116	DM 120	DM 121	DM 122	DM 132		
Breaking capacity (I _q) ⁽¹⁾	Conforming to IEC 60947-4-1	400/415 V	kA	50	50	15	15	15	15	10
		440 V	kA	50	15	8	8	6	6	6
		500 V	kA	50	6	6	6	4	4	4

References



GV2 DM102●●

D.O.L. starters, non-reversing

Standard power ratings of 3-phase motors 50/60 Hz in AC-3		Setting range of thermal trips	Fixed magnetic tripping current 13 Irth	For customer assembly		Pre-assembled	Weight	
400/415 V	440 V			500 V	Motor circuit-breaker Reference			Contactor Reference to be completed ⁽²⁾
kW	kW	kW	A	A		Basic reference, to be completed by adding the voltage code ⁽²⁾	kg	
0.06	0.06	–	0.16...0.25	2.4	GV2ME02	LC1D09●●	GV2DM102●● ⁽³⁾	0.596
0.09	0.09	–	0.25...0.40	5	GV2ME03	LC1D09●●	GV2DM103●● ⁽³⁾	0.596
–	0.12	–	–	–	–	–	–	–
0.12	–	–	0.40...0.63	8	GV2ME04	LC1D09●●	GV2DM104●● ⁽³⁾	0.596
0.18	0.18	–	–	–	–	–	–	–
0.25	0.25	–	0.63...1	13	GV2ME05	LC1D09●●	GV2DM105●● ⁽³⁾	0.596
0.37	0.37	–	–	–	–	–	–	–
–	–	0.37	1...1.6	22.5	GV2ME06	LC1D09●●	GV2DM106●● ⁽³⁾	0.596
0.55	0.55	0.55	–	–	–	–	–	–
–	–	0.75	–	–	–	–	–	–
0.75	0.75	–	1.6...2.5	33.5	GV2ME07	LC1D09●●	GV2DM107●● ⁽³⁾	0.596
–	1.1	1.1	–	–	–	–	–	–
1.1	–	1.5	2.5...4	51	GV2ME08	LC1D09●●	GV2DM108●● ⁽³⁾	0.596
1.5	1.5	2.2	–	–	–	–	–	–
2.2	2.2	–	4...6.3	78	GV2ME10	LC1D09●●	GV2DM110●● ⁽³⁾	0.596
–	3	3	–	–	–	–	–	–
3	–	4	6...10	138	GV2ME14	LC1D09●●	GV2DM114●● ⁽³⁾	0.596
4	4	5.5	–	–	–	–	–	–
5.5	5.5	7.5	9...14	170	GV2ME16	LC1D12●●	GV2DM116●●	0.601
7.5	7.5	–	13...18	223	GV2ME20	LC1D18●●	GV2DM120●●	0.606
–	9	9	–	–	–	–	–	–
9	11	11	17...23	327	GV2ME21	LC1D25●●	GV2DM121●●	0.646
11	–	15	20...25	327	GV2ME22	LC1D25●●	GV2DM122●●	0.646
15	15	18.5	24...32	416	GV2ME32	LC1D32●●	GV2DM132●●	0.651

Add-on blocks

Description	Mounting of GV2	Sold in lots of	Unit reference
Combination block between circuit breaker and contactor	┌ rail	10	GV2AF3
	Mounting plate	10	GV2AF4
	LAD 311		

⁽¹⁾ The breaking performance of circuit breakers GV2 ME can be increased by adding a current limiter GV1 L3, see page B6/56.

⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	220	230
~ 50/60 Hz	B7	M7	P7
--- ⁽⁴⁾	BD	–	–

⁽³⁾ Type 2 coordination also possible, see page 24539/3.

⁽⁴⁾ Only available for GV2 DM. Coil with integral suppression device as standard.

Note: The combinations are valid for IE2 motors and IE3 with maximum starting current = 7.5 x motor rating current (see page A5/4 and A5/5).

Motor starters - open version

Combination automatic motor starters with overload protection built into the circuit breaker

Direct-on-line and reversing

D.O.L. starters, reversing, from 0.06 to 15 kW at 400/415 V, type 1 coordination

This pre-assembled combination comprises:

- 1 motor circuit breaker GV2 ME,
- 1 3-pole reversing contactor LC2 D,
- 1 combination block GV2AF3.

Characteristics

Starter type	GV2	DM202 to DM210	DM214	DM216	DM220	DM221	DM222	DM232		
Breaking capacity (I _q) ⁽¹⁾	Conforming to IEC 60947-4-1	400/415 V	kA	50	50	15	15	15	15	10
		440 V	kA	50	15	8	8	6	6	6
		500 V	kA	50	10	6	6	4	4	4

References

D.O.L. starters, reversing⁽²⁾

Standard power ratings of 3-phase motors 50/60 Hz in AC-3			Setting range of thermal trips	Fixed magnetic tripping current 13 Irth	For customer assembly		Pre-assembled	Weight
400/415 V	440 V	500 V			Motor circuit-breaker Reference	Contactor Reference to be completed ⁽³⁾		
kW	kW	kW	A	A				kg
0.06	0.06	–	0.16...0.25	2.4	GV2ME02	LC2D09●●	GV2DM202●●	0.963
0.09	0.09	–	0.25...0.40	5	GV2ME03	LC2D09●●	GV2DM203●●	0.963
–	0.12	–	–	–	–	–	–	–
0.12	–	–	0.40...0.63	8	GV2ME04	LC2D09●●	GV2DM204●●	0.963
0.18	0.18	–	–	–	–	–	–	–
0.25	0.25	–	0.63...1	13	GV2ME05	LC2D09●●	GV2DM205●●	0.963
0.37	0.37	–	–	–	–	–	–	–
–	–	0.37	1...1.6	22.5	GV2ME06	LC2D09●●	GV2DM206●●	0.963
–	–	0.55	–	–	–	–	–	–
0.55	0.55	0.55	–	–	–	–	–	–
–	–	0.75	–	–	–	–	–	–
0.75	0.75	–	1.6...2.5	33.5	GV2ME07	LC2D09●●	GV2DM207●●	0.963
–	1.1	1.1	–	–	–	–	–	–
1.1	–	1.5	2.5...4	51	GV2ME08	LC2D09●●	GV2DM208●●	0.963
1.5	1.5	2.2	–	–	–	–	–	–
2.2	2.2	–	4...6.3	78	GV2ME10	LC2D09●●	GV2DM210●●	0.963
–	3	3	–	–	–	–	–	–
3	–	4	6...10	138	GV2ME14	LC2D09●●	GV2DM214●●	0.963
4	4	5.5	–	–	–	–	–	–
5.5	5.5	7.5	9...14	170	GV2ME16	LC2D12●●	GV2DM216●●	0.973
7.5	7.5	–	13...18	223	GV2ME20	LC2D18●●	GV2DM220●●	0.983
–	9	9	–	–	–	–	–	–
9	11	11	17...23	327	GV2ME21	LC2D25●●	GV2DM221●●	1.063
11	–	15	20...25	327	GV2ME22	LC2D25●●	GV2DM222●●	1.063
15	15	18.5	24...32	416	GV2ME32	LC2D32●●	GV2DM232●●	1.073

Add-on blocks

Description	Mounting of GV2	Sold in lots of	Unit reference
Combination block between circuit breaker and contactor	□ rail	10	GV2AF3
	Mounting plate LAD 311	10	GV2AF4

(1) The breaking performance of circuit breakers GV2ME can be increased by adding a current limiter GV1L3, see page B6/56.

(2) Type 2 coordination also possible, see page A5/12.

(3) See page B8/2.

(4) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	220	230
~ 50/60 Hz	B7	M7	P7
--- ⁽⁵⁾	BD	–	–

(5) Coil with integral suppression device as standard.

Note: The combinations are valid for IE2 motors and IE3 with maximum starting current = 7.5 x motor rating current (see page A5/4 and A5/5).

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GV2 DM202●●

Open pre-cabled motor

Motor starters - open version

Combination automatic motor starters with overload protection built into the circuit breaker

Direct-on-line and reversing

D.O.L. starters, non-reversing, from 0.06 to 30 kW at 400/415 V, type 2 coordination

This pre-assembled combination comprises:

- 1 motor circuit breaker GV2 P,
- 1 3-pole contactor LC1 D,
- 1 combination block GV2 AF3.

Characteristics

Starter type	GV2	DP102 to DP110	DP114	DP116	DP120	DP121	DP122	DP132
Breaking capacity (I _q) ⁽¹⁾	Conforming to IEC 60947-4-1	400/415 V	kA	130	130	50	50	50
		440 V	kA	130	130	50	20	20
		500 V	kA	130	50	42	10	10

References



GV2 DP102●●

GV3 P651
+
LC1 D65A●●

D.O.L. starters, non-reversing

Standard power ratings of 3-phase motors 50/60 Hz in AC-3			Setting range of thermal trips	Fixed magnetic tripping current 13 Irth	For customer assembly		Pre-assembled	Weight
400/415 V	440 V	500 V			Motor circuit-breaker Reference	Contactor Reference to be completed ⁽²⁾		
kW	kW	kW	A	A				kg
0.06	0.06	–	0.16...0.25	2.4	GV2P02	LC1D09●●	GV2DP102●●	0.686
–	0.09	–	0.25...0.40	5	GV2P03	LC1D09●●	GV2DP103●●	0.686
0.09	0.12	–	–	–	–	–	–	–
0.12	–	–	0.40...0.63	8	GV2P04	LC1D09●●	GV2DP104●●	0.686
0.18	0.18	–	–	–	–	–	–	–
0.25	0.25	–	0.63...1	13	GV2P05	LC1D09●●	GV2DP105●●	0.686
0.37	0.37	–	–	–	–	–	–	–
–	–	0.37	1...1.6	22.5	GV2P06	LC1D09●●	GV2DP106●●	0.686
0.55	0.55	0.55	–	–	–	–	–	–
–	–	0.75	–	–	–	–	–	–
0.75	0.75	–	1.6...2.5	33.5	GV2P07	LC1D09●●	GV2DP107●●	0.686
–	1.1	1.1	–	–	–	–	–	–
1.1	–	1.5	2.5...4	51	GV2P08	LC1D09●●	GV2DP108●●	0.696
1.5	1.5	2.2	–	–	–	–	–	–
2.2	2.2	–	4...6.3	78	GV2P10	LC1D09●●	GV2DP110●●	0.736
–	3	3	–	–	–	–	–	–
3	–	4	6...10	138	GV2P14	LC1D09●●	GV2DP114●●	0.736
4	4	5.5	–	–	–	–	–	–
5.5	5.5	7.5	9...14	170	GV2P16	LC1D25●●	GV2DP116●●	0.741
–	7.5	9	–	–	–	–	–	–
7.5	9	–	13...18	223	GV2P20	LC1D25●●	GV2DP120●●	0.736
9	11	11	17...23	327	GV2P21	LC1D25●●	GV2DP121●●	0.741
11	–	15	20...25	327	GV2P22	LC1D25●●	GV2DP122●●	0.741
15	15	18.5	24...32	416	GV2P32	LC1D32●●	GV2DP132●●	0.741
18.5	–	–	30...40	560	GV3 P401 ⁽⁴⁾	LC1D50A●●	–	1.725
–	18.5	22	30...40	560	GV3 P401 ⁽⁴⁾	LC1D65A●●	–	1.730
22	–	–	37...50	700	GV3 P501 ⁽⁴⁾	LC1D50A●●	–	1.725
–	22	30	37...50	700	GV3 P501 ⁽⁴⁾	LC1D65A●●	–	1.730
30	37	–	48...65	910	GV3 P651 ⁽⁴⁾	LC1D65A●●	–	1.730

Add-on blocks

Description	Mounting of GV2	Sold in lots of	Unit reference
Combination block between circuit breaker and contactor	┌ rail	10	GV2AF3
	Mounting plate LAD 311	10	GV2AF4

(1) The breaking performance of circuit breakers GV2 P can be increased by adding a current limiter GV1 L3, see page B6/56.

(2) See page B8/2.

(3) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	220	230
~ 50/60 Hz	B7	M7	P7
⋮ ⁽⁵⁾	BD	–	–

(4) Circuit breaker supplied without downstream EverLink® power terminal block, which is required for vertical mounting. For side by side mounting, use a GV3 P circuit breaker with terminal blocks and the GV3S set of S-shape busbars (see page B8/21).

(5) Coil with integral suppression device as standard.

Note: The combinations are valid for IE2 motors and IE3 with maximum starting current = 7.5 x motor rating current (see page A5/4 and A5/5).

Motor starters - open version

Combination automatic motor starters with overload protection built into the circuit breaker

Direct-on-line and reversing

D.O.L. starters, reversing, from 0.06 to 30 kW at 400/415 V, type 2 coordination

This pre-assembled combination comprises:

- 1 motor circuit breaker GV2 P,
- 1 3-pole reversing contactor LC2 D,
- 1 combination block GV2 AF3.

Characteristics

Starter type		GV2		DP202 to DP210	DP214	DP216	DP220	DP221	DP222	DP232
Breaking capacity (I _q) ⁽¹⁾	Conforming to IEC 60947-4-1	400/415 V	kA	130	130	130	50	50	50	50
		440 V	kA	130	130	50	20	20	20	20
		500 V	kA	130	50	42	10	10	10	10

References

D.O.L. starters, reversing

Standard power ratings of 3-phase motors 50/60 Hz in AC-3			Setting range of thermal trips	Fixed magnetic tripping current 13 Irth	For customer assembly		Pre-assembled	Weight
400/415 V	440 V	500 V			Motor circuit-breaker Reference	Contactor Reference to be completed ⁽²⁾		
kW	kW	kW	A	A				kg
0.06	0.06	–	0.16...0.25	2.4	GV2P02	LC2D09●●	GV2DP202●●	1.053
–	0.09	–	0.25...0.40	5	GV2P03	LC2D09●●	GV2DP203●●	1.053
0.09	0.12	–	0.40...0.63	8	GV2P04	LC2D09●●	GV2DP204●●	1.053
0.18	0.18	–	–	–	–	–	–	–
0.25	0.25	–	0.63...1	13	GV2P05	LC2D09●●	GV2DP205●●	1.053
0.37	0.37	–	–	–	–	–	–	–
–	–	0.37	1...1.6	22.5	GV2P06	LC2D09●●	GV2DP206●●	1.053
0.55	0.55	0.55	–	–	–	–	–	–
–	–	0.75	–	–	–	–	–	–
0.75	0.75	–	1.6...2.5	33.5	GV2P07	LC2D09●●	GV2DP207●●	1.053
–	1.1	1.1	–	–	–	–	–	–
1.1	–	1.5	2.5...4	51	GV2P08	LC2D09●●	GV2DP208●●	1.073
1.5	1.5	2.2	–	–	–	–	–	–
2.2	2.2	–	4...6.3	78	GV2P10	LC2D09●●	GV2DP210●●	1.153
–	3	3	–	–	–	–	–	–
3	–	4	6...10	138	GV2P14	LC2D09●●	GV2DP214●●	1.153
4	4	5.5	–	–	–	–	–	–
5.5	5.5	7.5	9...14	170	GV2P16	LC2D25●●	GV2DP216●●	1.163
–	7.5	9	–	–	–	–	–	–
7.5	9	–	13...18	223	GV2P20	LC2D25●●	GV2DP220●●	1.153
9	11	11	17...23	327	GV2P21	LC2D25●●	GV2DP221●●	1.163
11	–	15	20...25	327	GV2P22	LC2D25●●	GV2DP222●●	1.163
15	15	18.5	24...32	416	GV2P32	LC2D32●●	GV2DP232●●	1.163
18.5	–	–	30...40	560	GV3 P401 ⁽⁴⁾	LC2D50A●●	–	2.750
–	18.5	22	30...40	560	GV3 P401 ⁽⁴⁾	LC2D65A●●	–	2.760
22	–	–	37...50	700	GV3 P501 ⁽⁴⁾	LC2D50A●●	–	2.750
–	22	30	37...50	700	GV3 P501 ⁽⁴⁾	LC2D65A●●	–	2.760
30	37	–	48...65	910	GV3 P651 ⁽⁴⁾	LC2D65A●●	–	2.760

Add-on blocks

Description	Mounting of GV2	Sold in lots of	Unit reference
Combination block between circuit breaker and contactor	┌ rail	10	GV2AF3
	Mounting plate LAD 311	10	GV2AF4

(1) The breaking performance of circuit breakers GV2 P can be increased by adding a current limiter GV1 L3, see page B6/56.

(2) See page B8/2.

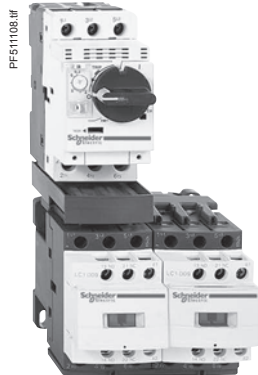
(3) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	220	230
~ 50/60 Hz	B7	M7	P7
--- ⁽⁵⁾	BD	–	–

(4) Circuit breaker supplied without downstream EverLink® power terminal block, which is required for vertical mounting. For side by side mounting, use a GV3 P circuit breaker with terminal blocks and the GV3S set of S-shape busbars (see page B8/21).

(5) Coil with integral suppression device as standard.

Note: The combinations are valid for IE2 motors and IE3 with maximum starting current = 7.5 x motor rating current (see page A5/4 and A5/5).



GV2 DP202●●



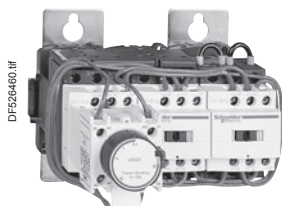
GV3 P651 + LC2 D65A●●

Open pre-cabled motor

Motor starters - open version

Star-delta starters for motor control 5.5 to 132 kW ⁽¹⁾, without isolating device, pre-assembled

Star-delta



LC3 D32A

Plate mounted starters

Maximum operating rate: 30 starts/hour. Maximum starting time: 30 seconds.

Standard power ratings of squirrel cage motors Mains voltage - delta connection				Auxiliary contacts available on each contactor						Star delta mechanical interlock	Basic reference, to be completed by adding the voltage code ⁽²⁾	Weight
220/230 V	380/400 V	415 V	440 V	line KM2	delta KM3	star KM1						
kW	kW	kW	kW									kg
4	7.5	7.5	7.5	-	-	-	- ⁽³⁾	-	1	With	LC3D09A	1.530
5.5	11	11	11	-	-	-	- ⁽³⁾	-	1	With	LC3D12A	1.530
11	18.5	22	22	-	-	-	- ⁽³⁾	-	1	With	LC3D18A	1.730
15	25	30	30	-	-	-	- ⁽³⁾	-	1	With	LC3D32A	2.030
18.5	37	37	37	-	1	1	- ⁽³⁾	-	1	Without	LC3D40	4.360
										With	LC3D40A64	4.500
30	55	59	59	-	1	1	- ⁽³⁾	-	- ⁽³⁾	Without	LC3D50	4.360
										With	LC3D50A64	4.500
37	75	75	75	-	1	1	- ⁽³⁾	-	- ⁽³⁾	Without	LC3D80	5.200
										With	LC3D80A64	5.400
63	110	110	110	-	1	1	- ⁽³⁾	-	- ⁽³⁾	Without	LC3D115 ⁽⁴⁾	11.800
										With	LC3D115A64 ⁽⁴⁾	12.100
75	132	132	147	-	1	1	- ⁽³⁾	-	1 ⁽³⁾	Without	LC3D150 ⁽⁴⁾	12.100
										With	LC3D150A64 ⁽⁴⁾	12.100

Rail mounted starters (35 mm rail)

Standard power ratings of squirrel cage motors Mains voltage - delta connection				Auxiliary contacts available on each contactor						Star delta mechanical interlock	Basic reference, to be completed by adding the voltage code ⁽²⁾	Weight
220/230 V	380/400 V	415 V	440 V	line KM2	delta KM3	star KM1						
kW	kW	kW	kW									kg
Maximum operating rate: 12 starts/hour. Maximum starting time: 30 seconds.												
3	5.5	5.5	5.5	-	-	-	-	-	1	With	LC3K06	0.740
4	7.5	7.5	7.5	-	-	-	-	-	1	With	LC3K09	0.740
Maximum operating rate: 30 starts/hour. Maximum starting time: 30 seconds												
4	7.5	7.5	7.5	-	-	-	- ⁽³⁾	-	1	With	LC3D090A	1.530
5.5	11	11	11	-	-	-	- ⁽³⁾	-	1	With	LC3D120A	1.530
11	18.5	22	22	-	-	-	- ⁽³⁾	-	1	With	LC3D180A	1.730
15	25	30	30	-	-	-	- ⁽³⁾	-	1	With	LC3D320A	2.030

⁽¹⁾ Protection must be provided by the addition of a thermal overload relay, to be ordered separately. Select appropriate overload relay for setting at 0.58 of the full load rated motor current (see pages B11/4 and B11/5).

⁽²⁾ Standard control circuit voltages:

Volts ~ 50/60 Hz	24	36	42	48	110	220	230	240	380	400	415	440
Star-delta starters LC3 K06 and K09												
Code	B7	C7	D7	E7	F7	M7	P7	U7	-	-	-	-
Star-delta starters LC3 D09A...D150, LC3 D090A...D320A												
Code	B7	-	D7	E7	F7	M7	P7	U7	Q7	V7	N7	R7

For other voltages, please consult your Regional Sales Office.

⁽³⁾ One auxiliary contact block type LAD N can also be fitted, see page B8/36.

⁽⁴⁾ These starters consist of contactors LC1 D115 or D150 without connectors.

Motor starters - open version

Star-delta starters for motor control, 90 to 375 kW ⁽¹⁾, without isolating device, pre-assembled

Star-delta

Pre-assembled starters

Maximum operating rate: 12 starts/hour.

Maximum starting time:

LC3 F●●●●●: 20 seconds,

LC3 F●●●●●A64: 30 seconds (3 identical contactors).

Composition of starters without mechanical interlock, see pages 25018/3 and 25018/5.

Star-delta starters

Standard power ratings of squirrel cage motors				Auxiliary contacts available on each contactor						Star delta mechanical interlock	Basic reference, to be completed by adding the voltage code ⁽²⁾	Weight
Mains voltage - delta connection				line		delta		star				
220/230 V	380/400 V	415 V	440 V	KM2	KM3	KM3	KM3	KM1	KM1			
90	160	160	185	1	2	2	1	1	1	Without	LC3F185●●	16.500
										With	LC3F185●●A64	16.625
100	200	200	220	1	2	2	1	1	1	Without	LC3F225●●	16.500
										With	LC3F225●●A64	16.625
110	220	220	250	1	2	2	1	1	1	Without	LC3F265●●	27.300
										With	LC3F265●●A64	27.425
160	280	280	315	1	2	2	1	1	1	Without	LC3F330●●	37.000
										With	LC3F330●●A64	37.125
185	315	355	375	1	2	2	1	1	1	Without	LC3F400●●	37.000
										With	LC3F400●●A64	37.125

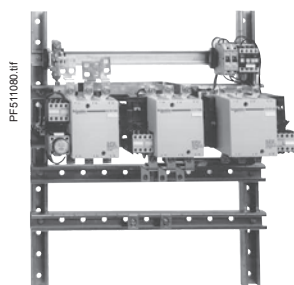
⁽¹⁾ Protection must be provided by the addition of a thermal overload relay, to be ordered separately. Select appropriate overload relay for setting at 0.58 of the full load rated motor current, see pages B11/10 and B11/11.

⁽²⁾ Standard control circuit voltages:

Volts ~ 50/60 Hz	48	110	115	220/230	230	240	380/400	400	415
Code	E7	F7	FE7	M7	P7	U7	Q7	V7	N7

For other voltages, please consult your Regional Sales Office.

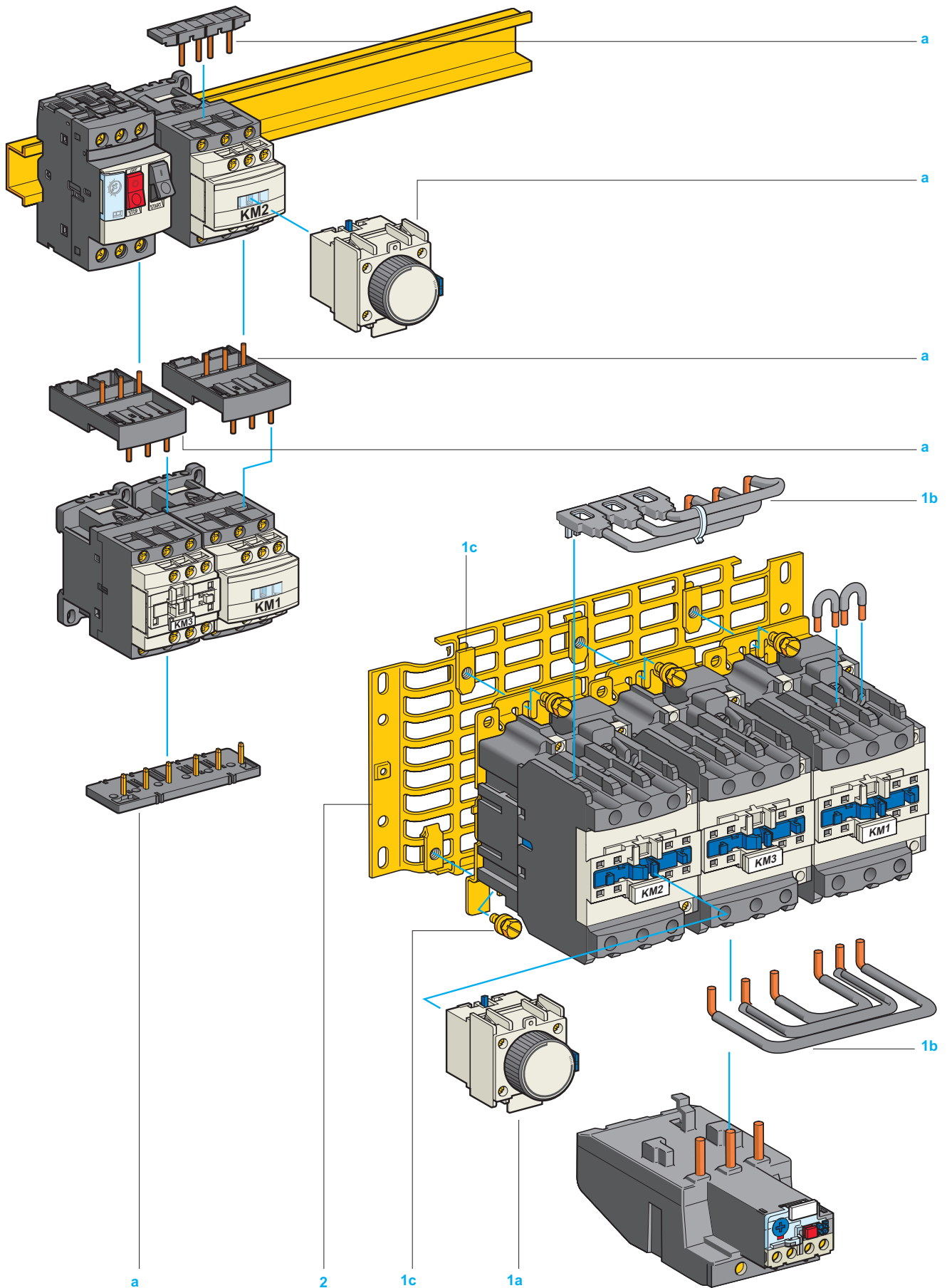
⁽³⁾ One auxiliary contact block type LAD N can be fitted.



LC3 F●●●●●A64

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Open pre-cabled motor starter



Motor starters - open version

Star-delta starters, for motor control, 7.5 to 132 kW ⁽¹⁾, without mechanical interlock, for customer assembly (on plate or on mounting rail) ⁽²⁾

Starters for direct combination with a circuit breaker

Maximum operating rate: 30 starts/hour. Maximum starting time: 30 seconds

Standard power ratings of squirrel cage motors ⁽³⁾ Mains voltage - delta connection		Thermal-magnetic motor circuit breaker	Contactors (basic references, to be completed by adding the voltage code) ⁽⁴⁾		
400/415 V	440 V		line	delta	star
kW	kW		KM2	KM3	KM1
7.5	7.5	GV2ME20	LC1D09●●	LC1D09●●	LC1D09●●
–	9	GV2ME20	LC1D12●●	LC1D12●●	LC1D09●●
9	11	GV2ME21	LC1D12●●	LC1D12●●	LC1D09●●
11	–	GV2ME22	LC1D12●●	LC1D12●●	LC1D09●●
15	15	GV2ME32	LC1D18●●	LC1D18●●	LC1D09●●

Separate component

Description	Illustration item no.	Reference
Mounting kit comprising: power circuit connections and 1 time delay contact block LAD S2	a	LAD912GV

Starters for mounting separately from upstream protection

Maximum operating rate: 30 starts/hour. Maximum starting time: 30 seconds.

Standard power ratings of squirrel cage motors ⁽³⁾ Mains voltage - delta connection				Contactors (basic references, to be completed by adding the voltage code) ⁽⁴⁾			Separate components (see below)
220/230 V	380/400 V	415 V	440 V	line	delta	star	Component types
kW	kW	kW	kW	KM2	KM3	KM1	
4	7.5	7.5	7.5	LC1D09●●	LC1D09●●	LC1D09●●	D09
5.5	11	11	11	LC1D18●● ⁽⁶⁾	LC1D12●●	LC1D09●●	D12
11	18.5	22	22	LC1D25●● ⁽⁷⁾	LC1D25●● ⁽⁷⁾	LC1D09●●	D18
15	25	30	30	LC1D32●●	LC1D32●●	LC1D18●●	D32
18.5	37	37	37	LC1D40●●	LC1D40●●	LC1D40●●	D40
30	55	59	59	LC1D50●●	LC1D50●●	LC1D40●●	D50
37	75	75	75	LC1D80●●	LC1D80●●	LC1D50●●	D80
63	110	110	110	LC1D115●●	LC1D115●●	LC1D80●●	D115 ⁽⁵⁾
75	132	132	147	LC1D150●●	LC1D150●●	LC1D115●●	D150 ⁽⁵⁾

Separate components

Description	Illustration item no.	For components type ⁽⁵⁾	Reference
Mounting kit comprising: - 1 time delay contact block LAD S2 (D09...D80) ⁽³⁾ , - power circuit connections (D09...D80), - screws and clamps for fixing contactors to the plate (D40...D80).	1 a	D09 and D12	LAD91217
	1 b	D18 and D32	LAD93217
	1 c	D40 and D50	LA9D5017
		D80	LA9D8017
Equipment mounting plates	2	D09, D12, D18	LA9D12974
		D32	LA9D32974
		D40 and D50	LA9D40973
		D80	LA9D80973

⁽¹⁾ Protection must be provided by the addition of a thermal overload relay, to be ordered separately.

Select appropriate overload relay for setting at 0.58 of the full load rated motor current, see pages B11/4 and B11/5.

⁽²⁾ For mounting, assembly and cabling: please refer to installation instructions supplied with the equipment.

⁽³⁾ See comments on page A2/27.

⁽⁴⁾ See page B8/2.

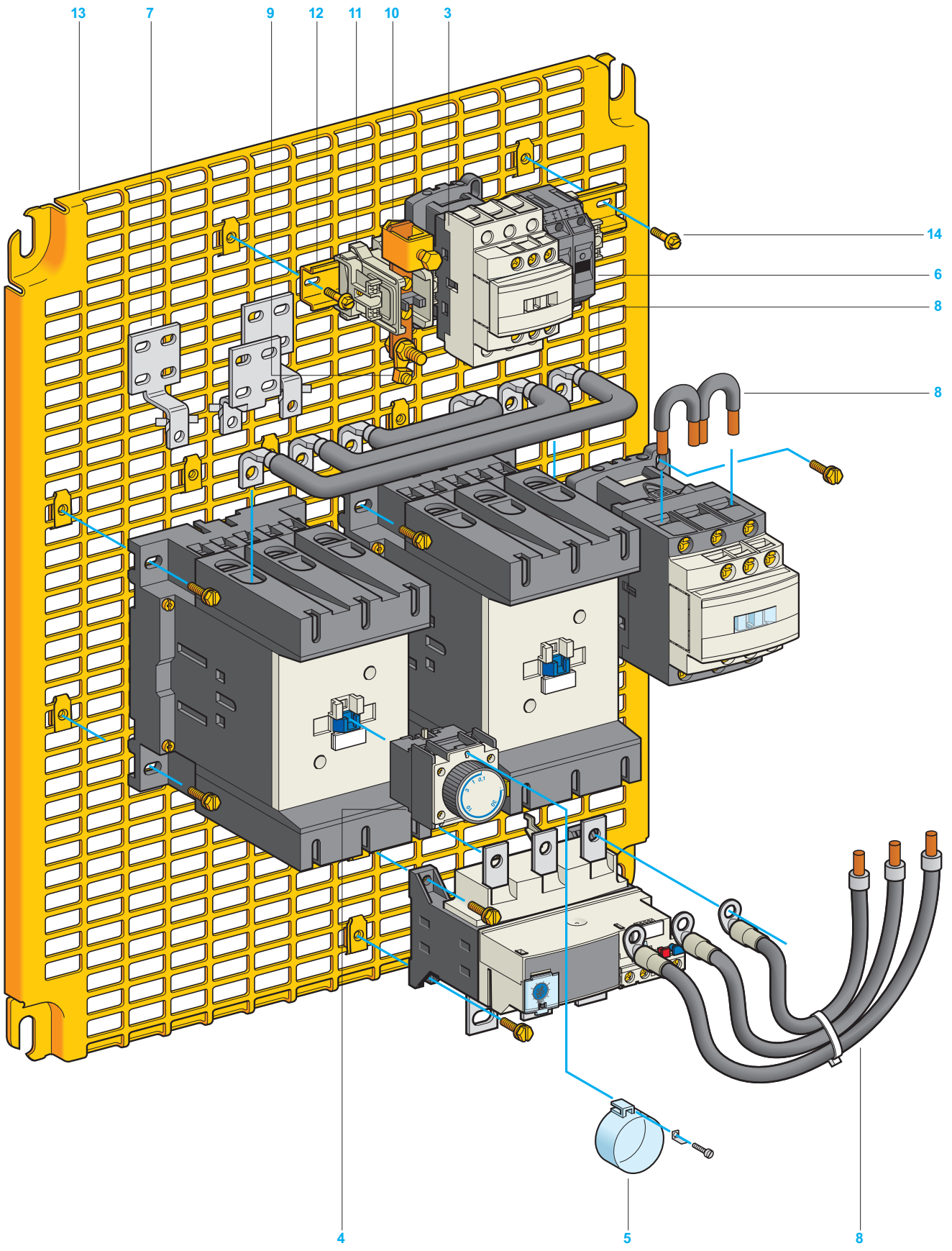
⁽⁵⁾ For D115 and D150 components, see illustration and separate parts on pages A2/14 and A2/15.

⁽⁶⁾ A D12 component is adequate for the application, but use of a D18 is recommended.

(connection capacity, correct use of power connection kit and connections).

⁽⁷⁾ A D18 component is adequate for the application, but use of a D25 is recommended.

(connection capacity, correct use of power connection kit and connections).



Motor starters - open version

Star-delta starters, for motor control, 7.5 to 132 kW ⁽¹⁾, without mechanical interlock, for customer assembly (on plate or on mounting rail) ⁽²⁾

Starters for mounting separately from upstream protection

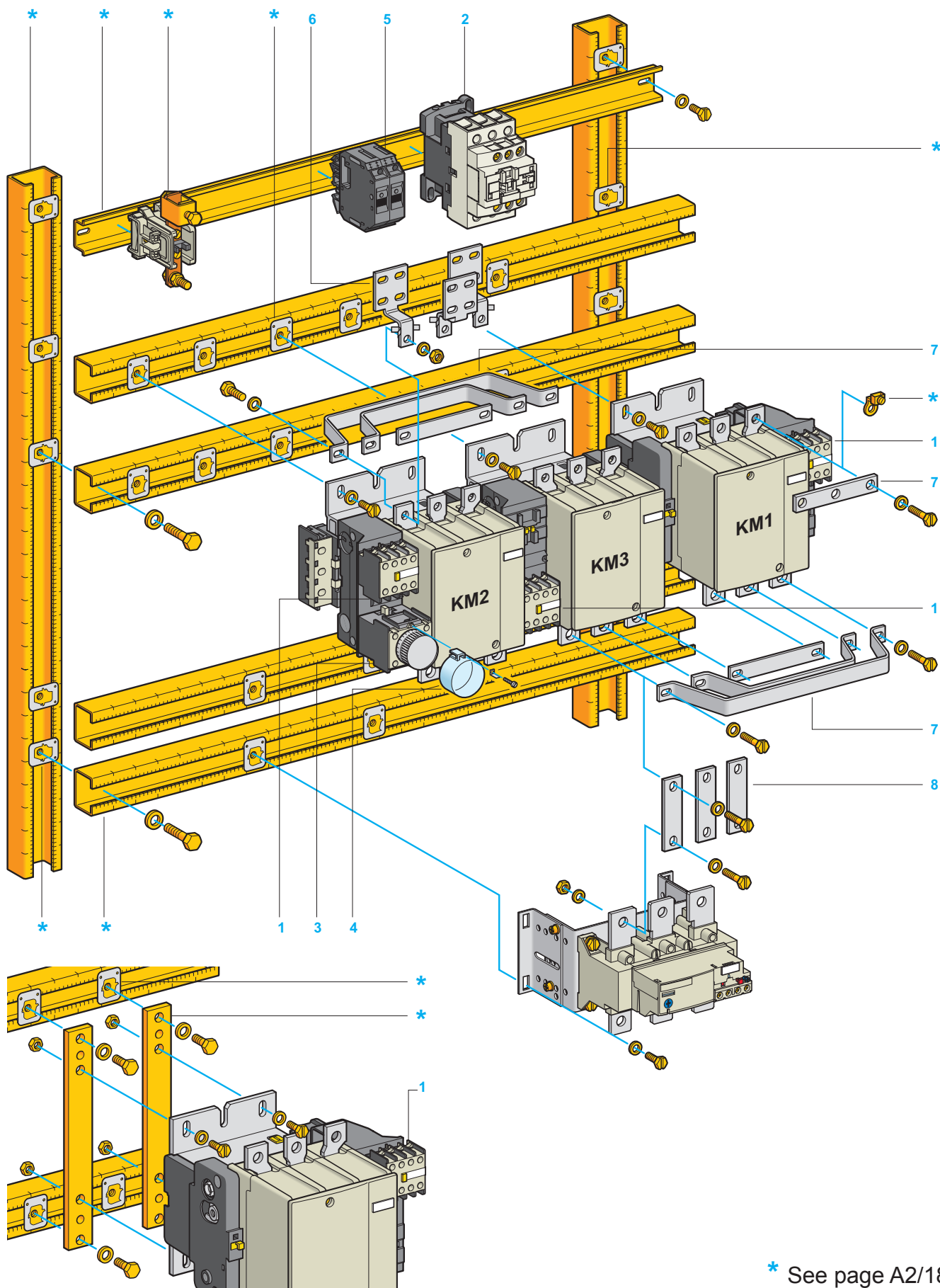
Separate components (continued)

Description	Illustration item no.	For use on	No.	Sold in lots of	Unit reference	Weight kg
Instantaneous auxiliary contact blocks 1 N/O	1	D115 (star)	1	1	LADN10	0.020
Control relay	3	D115, D150	1	1	CAD32 ⁽³⁾	0.320
Time delay auxiliary contact blocks	4	D115, D150	1	1	LADT2	0.060
Lead sealing kit for time delay auxiliary contact blocks	5	D115, D150	1	1	LA9D901	0.005
Thermal magnetic circuit breaker for control circuit (200...415 V)	6	D115, D150	2	6	GB2CB05	0.060
Set of 3 connectors for wider terminations (optional)	7	D115, D150	1	1	LA9FG980	0.200
Set of power connections with fixing accessories	8	D115	1	1	LA9D11517	0.800
		D150	1	1	LA9D15017	1.050
Spare volt free terminals	9	D115, D150	1	10	DZ3HA3	0.007
			2	10	DZ3GA3	0.006
Lug-connector terminal block	10	D115, D150	1	10	AB1BC9535	0.236
End stop	11	D115, D150	3	100	AB1AB8M35	0.005
Mounting rail 35 mm	12	D115, D150	1	10	AM1ED021	0.210
Pre-slotted mounting plate	13	D115, D150	1	1	AM3PA65	1.950
Screw with captive washer	14	D115, D150	12	100	AF1VA618	0.006
			2	100	AF1VA410	0.002

(1) Protection must be provided by the addition of a thermal overload relay, to be ordered separately. Select appropriate overload relay for setting at 0.58 of the full load rated motor current, see pages B11/4 and B11/5.

(2) For mounting, assembly and cabling: please refer to installation instructions supplied with the equipment.

Open pre-cabled motor starters



* See page A2/18

Motor starters - open version

Star-delta starters for motor control, 90 to 375 kW ⁽¹⁾, for customer assembly (on chassis)

Contactors							
Maximum operating rate: 12 starts/hour. Maximum starting time: 20 seconds ⁽³⁾							
Standard power ratings of squirrel cage motors				Contactors ⁽²⁾			Separate components (see below)
220/230V	380/400V	415V	440V	line	delta	star	
kW	kW	kW	kW	KM2	KM3	KM1	Component types
90	160	160	185	LC1F185●●	LC1F185●●	LC1D150●●	F185
100	200	200	220	LC1F225●●	LC1F225●●	LC1F185●●	F225
110	220	220	250	LC1F265●●	LC1F265●●	LC1F185●●	F265
160	280	280	315	LC1F330●●	LC1F330●●	LC1F265●●	F330
185	315	355	375	LC1F400●●	LC1F400●●	LC1F265●●	F400

Separate components ⁽⁴⁾						
Description	Illustration item no.	For use on	No.	Sold in lots of	Unit reference	Weight kg
Instantaneous auxiliary contact blocks 2 N/O + 2 N/C	1	F185 to F400	3	1	LADN22	0.050
Control relay	2	F185 to F400	1	1	CAD32	0.580
Time delay auxiliary contact blocks	3	F185 to F400	1	1	LADT2	0.060
Sealing cover	4	F185 to F400	1	1	LA9D901	0.005
Thermal magnetic circuit breaker for 5 A control circuit	5	F185 to F400	2	6	GB2CB10	0.050
Sets of 3 connectors for wider terminations (optional)	6	F185	1	1	LA9FG980	0.200
		F225 to F400	1	1	LA9FJ980	0.490
Sets of power connections	7	F185	1	1	LA9F18517	0.800
		F225	1	1	LA9F22510	1.400
		F265	1	1	LA9FH610	1.400
		F330 and F400	1	1	LA9FJ610	1.500
Set of 3 busbars for thermal overload connections	8	F185 to F400	1	1	LA7F●●● (Selected according to size of thermal overload relay) see pages B11/10 and B11/11.	

⁽¹⁾ Protection must be provided by the addition of a thermal overload relay, to be ordered separately. Select appropriate overload relay for setting at 0.58 of the full load rated motor current, see pages B11/10 and B11/11.

⁽²⁾ Contactors supplied with coil. Complete the reference by adding the control circuit voltage code. Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

LC1D150	48	110	115	120	220	230	240	380	400	415
Volts										
50/60 Hz	E7	F7	FE7	G7	M7	P7	U7	Q7	V7	N7

LC1F185 and F225	48	110	115	120	220	230	240	380	400	415
Volts										
50 Hz (coil LX1)	E5	F5	FE5	–	M5	P5	U5	Q5	V5	N5
60 Hz (coil LX1)	E6	F6	–	G6	M6	–	U6	Q6	–	–

LC1F185 to F400	48	110	115	120	220	230	240	380	400	415
Volts										
40... 400 Hz ⁽⁵⁾	E7 ⁽⁶⁾	F7	FE7	G7	M7	P7	U7	Q7	V7	N7

Standard voltages, see page B9/2.

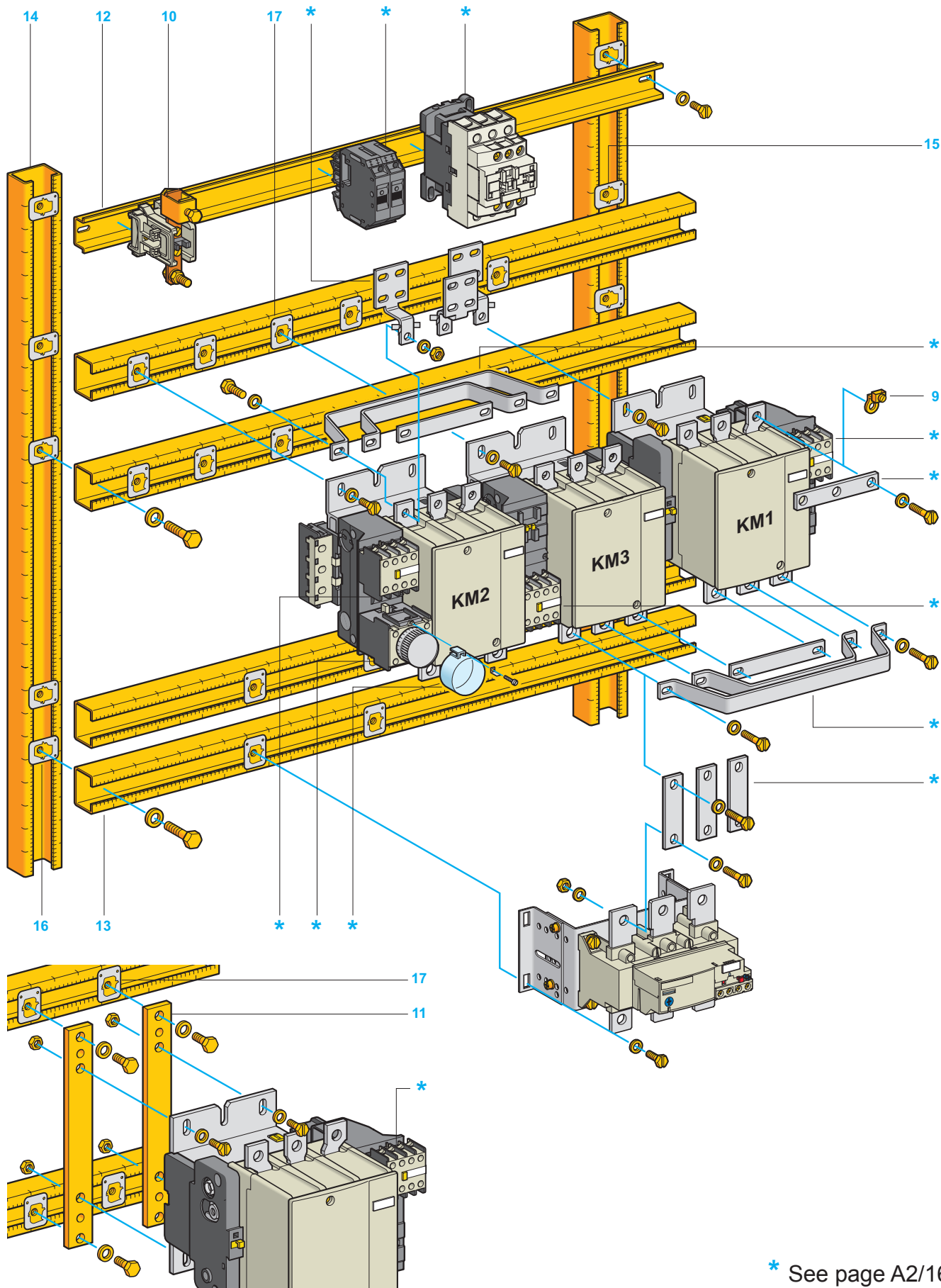
For other voltages between 24 and 660 V, see pages B9/32 to B9/41.

⁽³⁾ For longer starting times, please consult your Regional Sales Office.

⁽⁴⁾ Other separate components, see page A2/19.

⁽⁵⁾ Coil LX1: LC1F265, F330 and F400. Coil LX9: LC1F185 and F225.

⁽⁶⁾ Except for LC1F400.



* See page A2/16

Motor starters - open version

Star-delta starters for motor control, 90 to 375 kW ⁽¹⁾, for customer assembly (on chassis)

Separate components (continued from page A2/17)						
Description	Illustration item no.	For use on	No.	Sold in lots of	Unit reference	Weight kg
Spare volt free terminals	9	F185	3	10	DZ3GA3	0.006
		F225...F400	3	10	DZ3HA3	0.007
Neutral terminals with stop and spare volt free terminal (for control circuit)	10	F185	1	10	AB1BC9535	0.236
			2	100	AB1AB8P35	0.006
			1	10	DZ3HA3	0.007
		F225 and F265	1	10	AB1BC15035	0.277
			2	100	AB1AB8M35	0.007
			1	10	DZ3JA3	0.010
		F330 and F400	1	10	AB1BC24035	0.287
			2	100	AB1AB8M35	0.007
			1	10	DZ3JA3	0.010
Reducer bracket	11	F400	2	1	LA9F100	0.100
Mounting rails ⁽²⁾	12	F185...F400	1	10	AM1DE200	0.900
		F185...F400	1	4	AM1EC200	2.980
Uprights ⁽²⁾	14	F115...F400	2	4	AM1EC200	2.980
1/4 turn sliding clip nuts and corresponding bolts for rails AM1 DE	15	F185...F400	2	10	AF1CD061	0.020
				100	AF1VA618	0.006
1/4 turn sliding clip nuts and corresponding bolts for rails AM1 DE	16	F185...F400	8	10	AF1CD081	0.020
				10	AF1VC820	0.024
1/4 turn sliding clip nuts and corresponding bolts for equipment fixing	17	F185...F330	15	10	AF1CD061	0.020
				100	AF1VA618	0.006
				F400	8	10
		10	AF1CD081	0.020		
		100	AF1VA618	0.006		
		10	AF1VC820	0.024		
			4	–	25 x H6 screws with washers	
Enclosures: metal, grey RAL 7032	–	F185...F225	1	1	ACMGV763	19.090
		F265	1	1	ACMGV973	33.310
		F330 and F400	1	1	ACMGV1084	54.000
Fixing lugs adjustable for enclosure ACM	–	–	4	4	AE3FX122	0.080

(1) Protection must be provided by the addition of a thermal overload relay, to be ordered separately. Select appropriate overload relay for setting at 0.58 of the full load rated motor current, see pages B11/10 and B11/11.

(2) Supplied in 2 m lengths. See page A2/30 for cutting to length.

Technical Data for Designers

Contents

Direct-on-line / Reversing starters.....	A2/22 to A2/26
Star-delta starters	A2/27 to A2/31

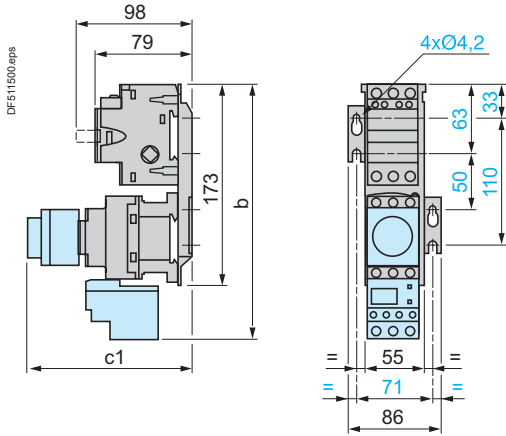
Motor starters - open version

D.O.L. starters, plate mounted, for motor control 4 to 37 kW, with isolating device, pre-assembled

Dimensions

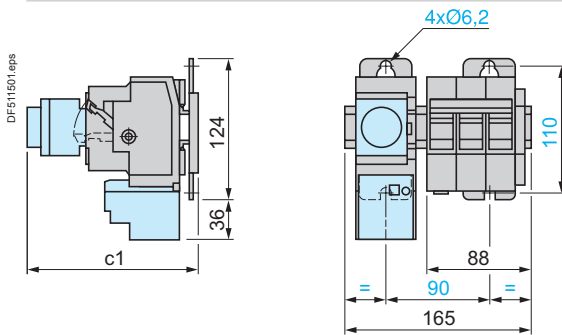
D.O.L. starters, plate mounted, pre-assembled

LC4 D09A...D25A



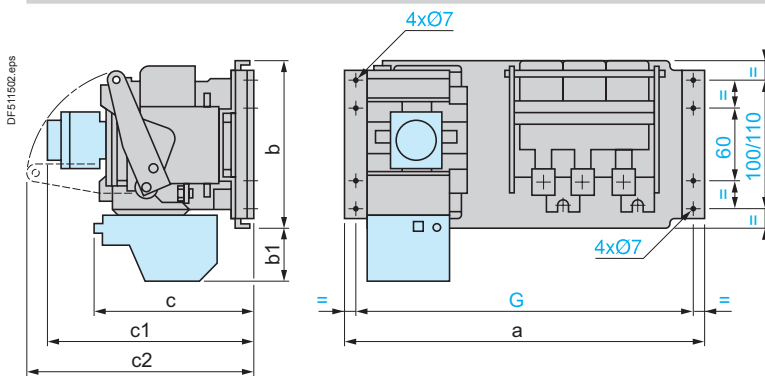
LC4	D09A...D18A	D25A
b	218	221
c1	without cover or add-on blocks	100
	with cover, without add-on blocks	96
	with LAD N or C (2 or 4 contacts)	127
	with LA6 DK10	139
	with LAD T, R, S	147
	with LAD T, R, S and sealing cover	151
		157

LC4 D32A



LC4	D32A
c1	without cover or add-on blocks
	with cover, without add-on blocks
	with LAD N or C (2 or 4 contacts)
	with LA6 DK10
	with LAD T, R, S
	with LAD T, R, S and sealing cover

LC4 D40...D80

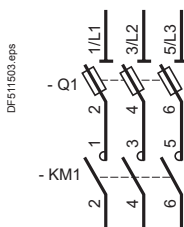


LC4	D40...D65	D80
a	281	311
b	143	143
b1	45	48
c	130	140
c1	without cover or add-on blocks	124
	with cover, without add-on blocks	129
	with LA1 DN (1 contact)	149
	with LAD N or C (2 or 4 contacts)	157
	with LA6 DK	169
	with LAD T, R, S	177
	with LAD T, R, S and sealing cover	181
c2	100	178
G	263	293

Scheme

D.O.L. starters

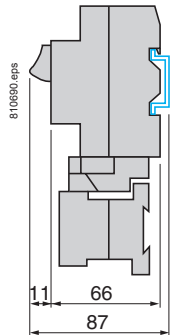
LC4 D09A to D80



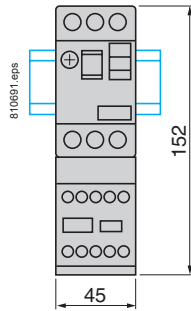
Direct-on-line and reversing

GV2 ME●●K●●●

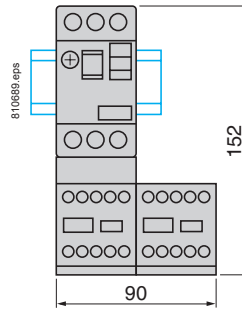
On mounting rail AM1 DE200



GV2 ME●●K1●●

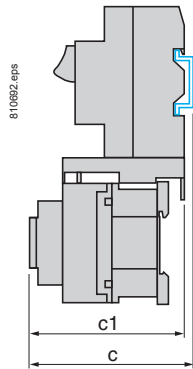


GV2 ME●●K2●●

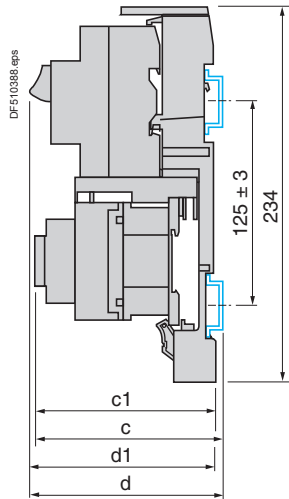


GV2 DM●●●●●

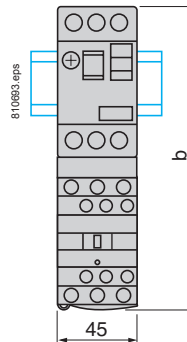
On mounting rail AM1 DE200



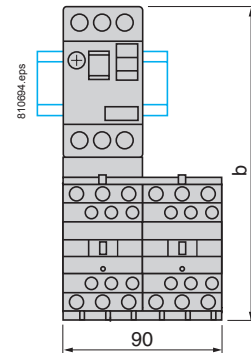
With adapter plate LAD 311



GV2 DM1●●●●



GV2 DM2●●●●

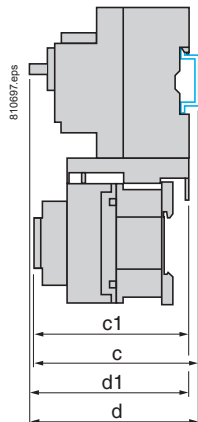


GV2	DM●02●● to DM●20●●	DM●21●● to DM●32●●
b	176.4	186.8
c	99.6	105.9
c1	94.1	100.4

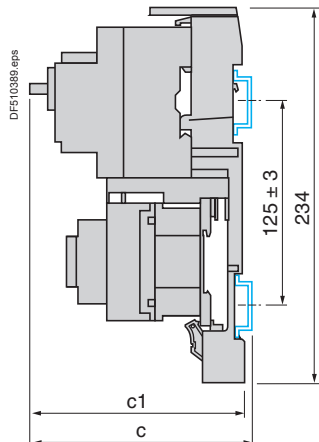
GV2	DM●02●● to DM●20●●	DM●21●● to DM●32●●
c	135.6	141.9
c1	130.1	136.4
d	112.5	112.5
d1	107	107

GV2 DP●●●●●

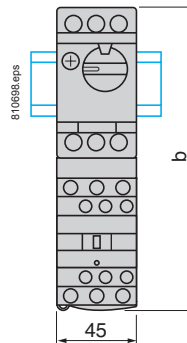
On mounting rail AM1 DE200



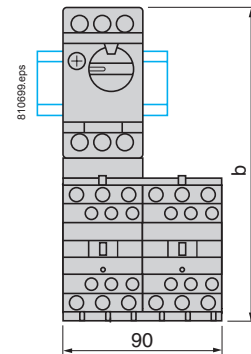
With adapter plate LAD 311



GV2 DP1●●●●



GV2 DP2●●●●



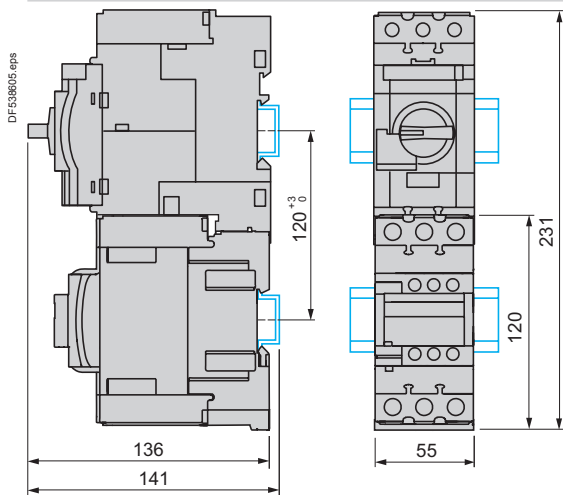
GV2	DP●02●● to DP●08●●	DP●10●● to DP●32●●
b	176.4	186.8
c	105.6	111.9
c1	100.1	106.4
d	100.5	100.5
d1	95	95

GV2	DP●02●● to DP●08●●	DP●10●● to DP●32●●
c	141.6	147.9
c1	136.5	142.4

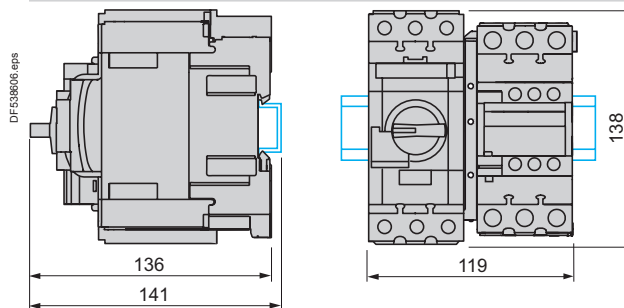
Direct-on-line and reversing

GV3 P●●1 + LC1 D40A...D65A (for customer assembly)

Vertical mounting ⁽¹⁾

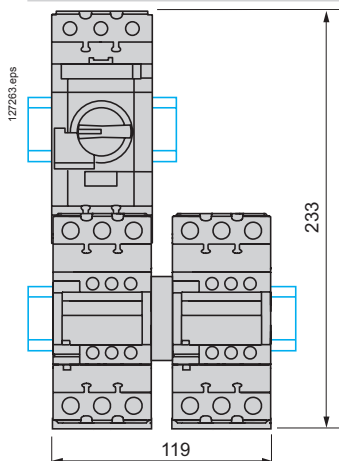


Side by side mounting with S-shape busbar system GV3 S ⁽²⁾

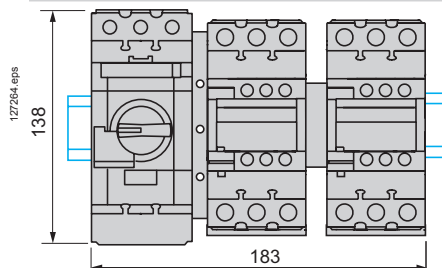


GV3 P●●1 + LC2 D40A...D65A (for customer assembly)

Vertical mounting ⁽¹⁾



Side by side mounting with S-shape busbar system GV3 S ⁽²⁾

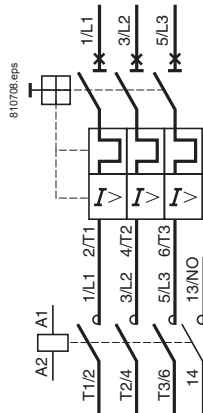


(1) For several side-by-side motor starters, the maximum current allowed is equal to the nominal current under 400 V.
Example: 55 A for a 30 kW motor under 400 V, for a GV3 P65 circuit breaker and a LC1 D65A contactor association.

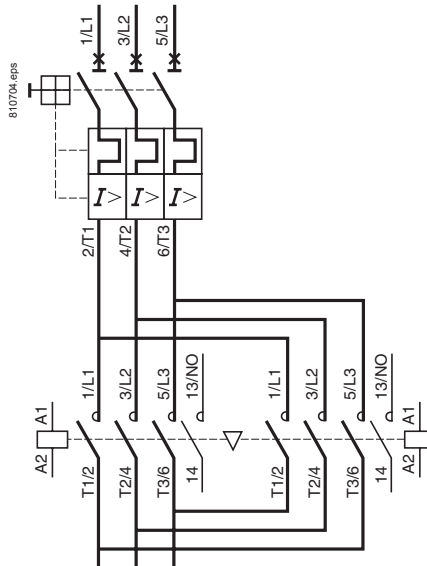
(2) The maximum current allowed is equal to 90 % of maximum current. Example: 45 A for a LC1 D50A contactor.

Direct-on-line and reversing

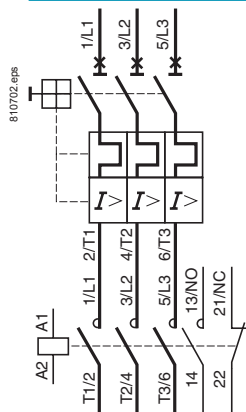
GV2 ME●●K1●●



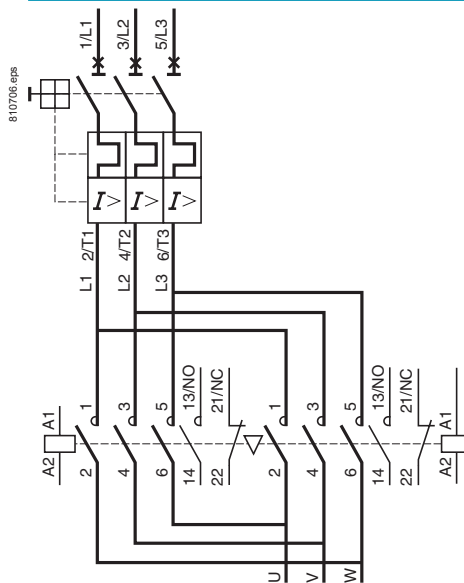
GV2 ME●●K2●●



GV2 DM1●●●●



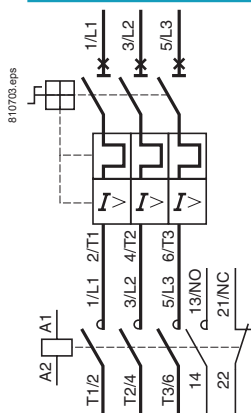
GV2 DM2●●●●



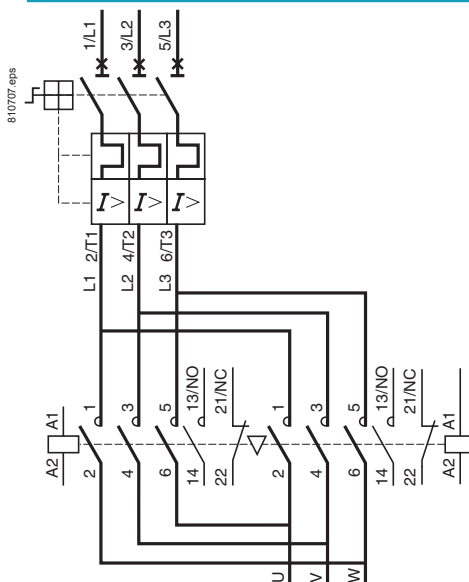
Open pre-cabled motor

Direct-on-line and reversing

GV2 DP1

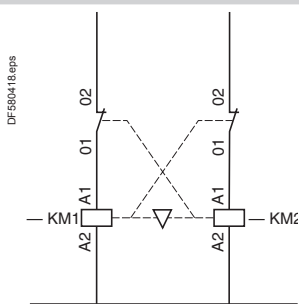
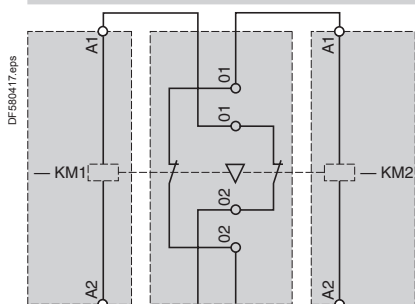


GV2 DP2

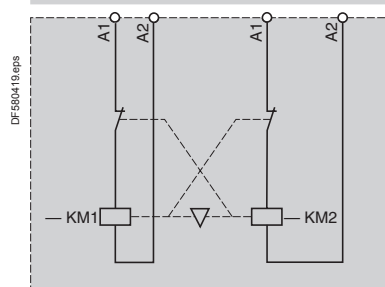


Mechanical interlock with integral electrical contacts

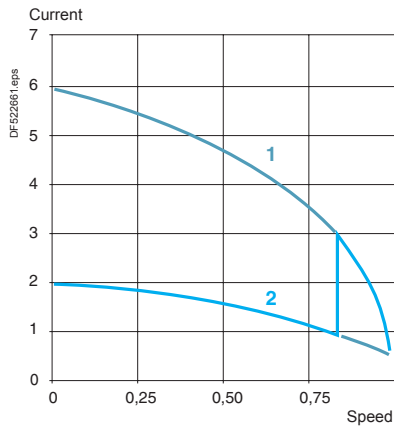
Control circuit ~



Control circuit ⋮



Star-delta starting

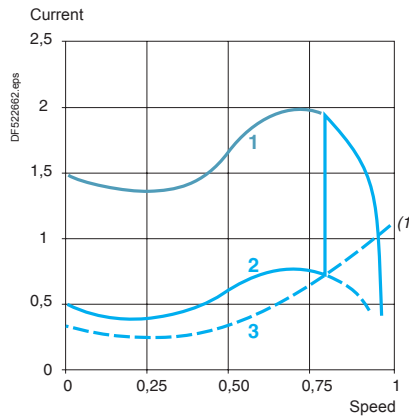


- 1 Starting in direct delta connection
- 2 Starting in star connection

This method of starting is applicable to motors on which all 6 stator terminals are accessible and whose delta connection voltage corresponds to the mains voltage.

Star-delta starting should be used for motors starting on no-load or having a low load torque and gradual build-up:

- the starting torque in star connection is reduced to one third of the direct starting torque, i.e. about 50 % of the rated torque.
- the starting current in star connection is about 1.8 to 2.6 times the rated current.



- 1 Starting in direct delta connection
- 2 Starting in star connection
- 3 Resistive torque of the machine

The transition from star to delta connection must occur when the machine has run up to speed. A too rapid build-up in load torque would cause the stabilised run-up speed to be too low and would therefore eliminate any advantage in this method of starting: this is the case with certain machines whose load torque depends on the machine speed (a characteristic of centrifugal machines, for example).

All star-delta starters are supplied with a special LAD S2 or LA2 KT2 time delay relay which imposes a delay on the delta contactor during the transition period in order to allow the star contactor sufficient breaking time.

For ratings D115 and D150, this function is performed by a time delay auxiliary contact block LAD T2 and a control relay.

(1) Motor manufacturers generally specify machine load torques.
 Example: maximum resistive torque on completion of star-delta start (expressed as a proportion of the rated torque).

Open pre-cabled motor

Star-delta

Dimensions

Star-delta starters

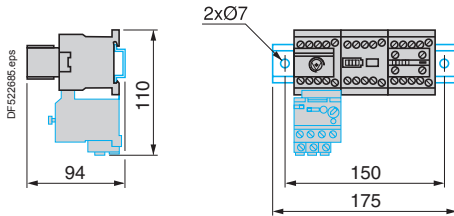
Plate mounted, pre-assembled

LC3 K

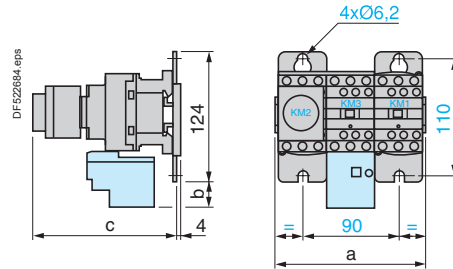
Pre-assembled:

LC3 D09A...D32A

For customer assembly: 3 x LC1 D with components D09 to D32



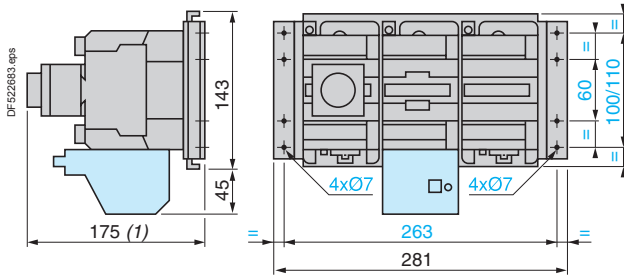
On starters LC3 D09A to D18A, a connection block is mounted on the upper part of contactor KM2, increasing the overall height of the product by 6.5 mm.



LC3	D09A	D12A	D18A	D32A
a	143	143	144	165
b	26.5	26.5	26.5	32.5
c	with LAD S	139	139	145
	with LAD S and sealing cover	143	143	149

Pre-assembled: LC3 D40, D50

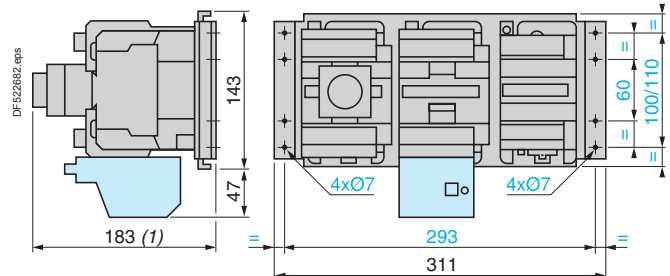
For customer assembly: 3 x LC1 D with components D09 or D50



(1) +4 mm with sealing cover

Pre-assembled: LC3 D80

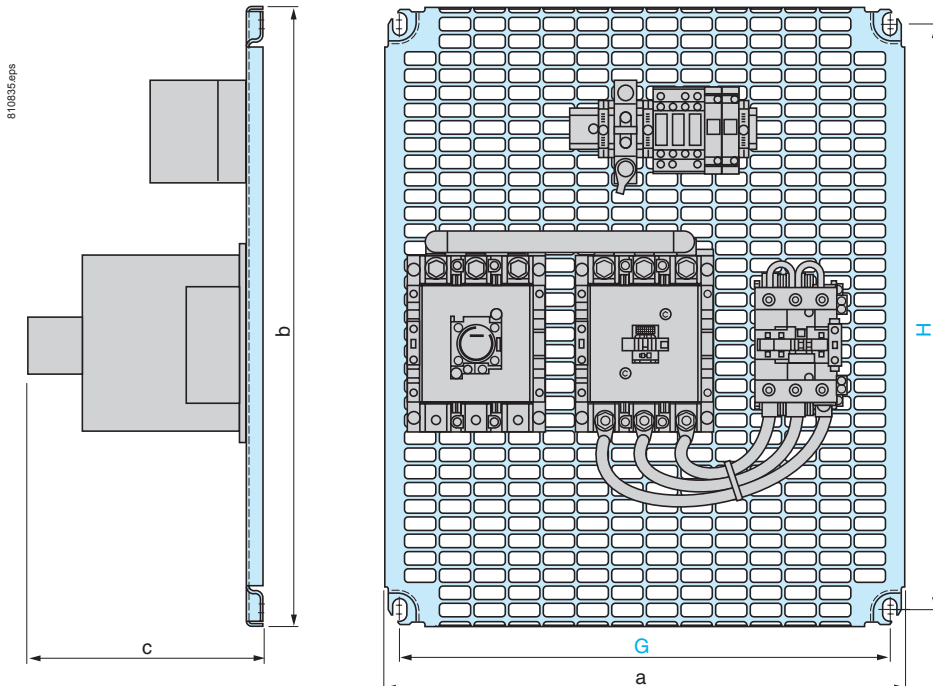
For customer assembly: 3 x LC1 D with components D80



(1) +4 mm with sealing cover

Pre-assembled: LC3 D115, D150

For customer assembly: 3 x LC1 D with components D115 or D150



	a	b	c	G	H	
LC3 D115 or 3 x LC1 D with components	D115	450	555	205	425	525
LC3 D150 or 3 x LC1 D with components	D150	450	555	205	425	525

References: pages A2/10 to A2/15

Schemes: page A2/29

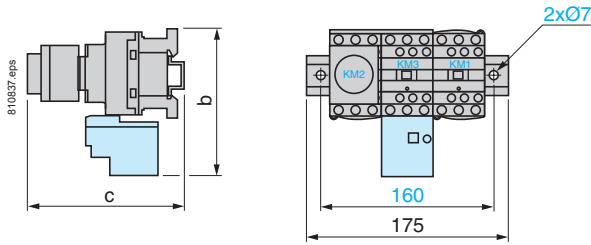
Star-delta

Dimensions

Star-delta starters

On mounting rail AM1 DP, pre-assembled

LC3 D090A à D320A



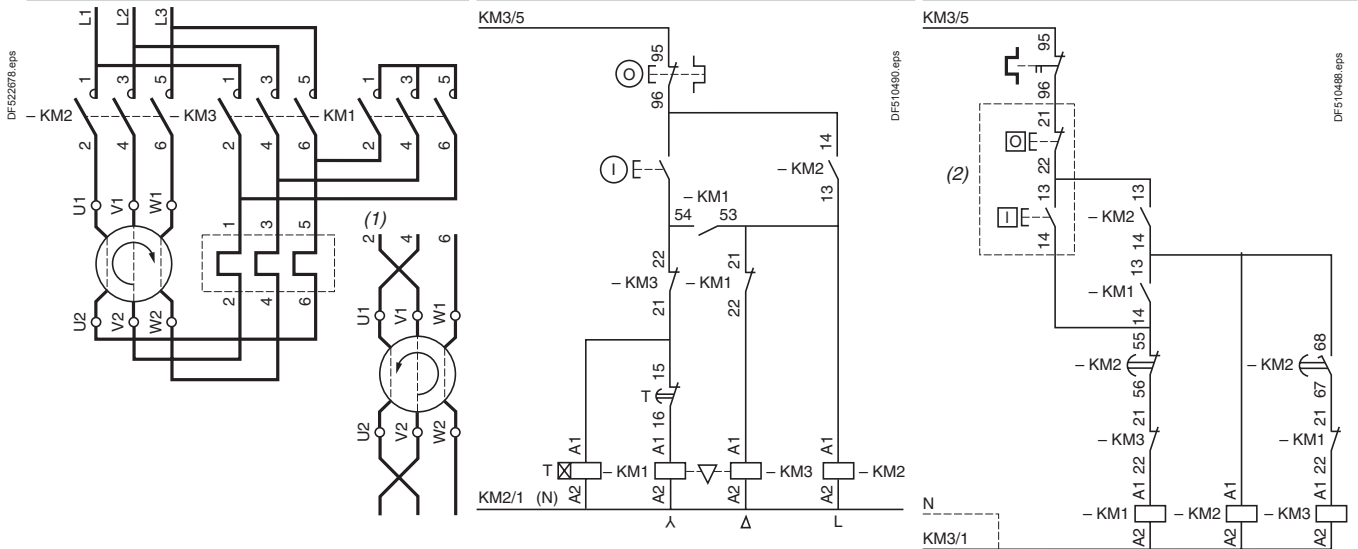
LC3	D090A à D180A	D320A
b	153	137
c	with LAD S	145
	with LAD S and sealing cover	149

Schemes

LC3 K, LC3 D09A to D80
LC3 D090A to D320A

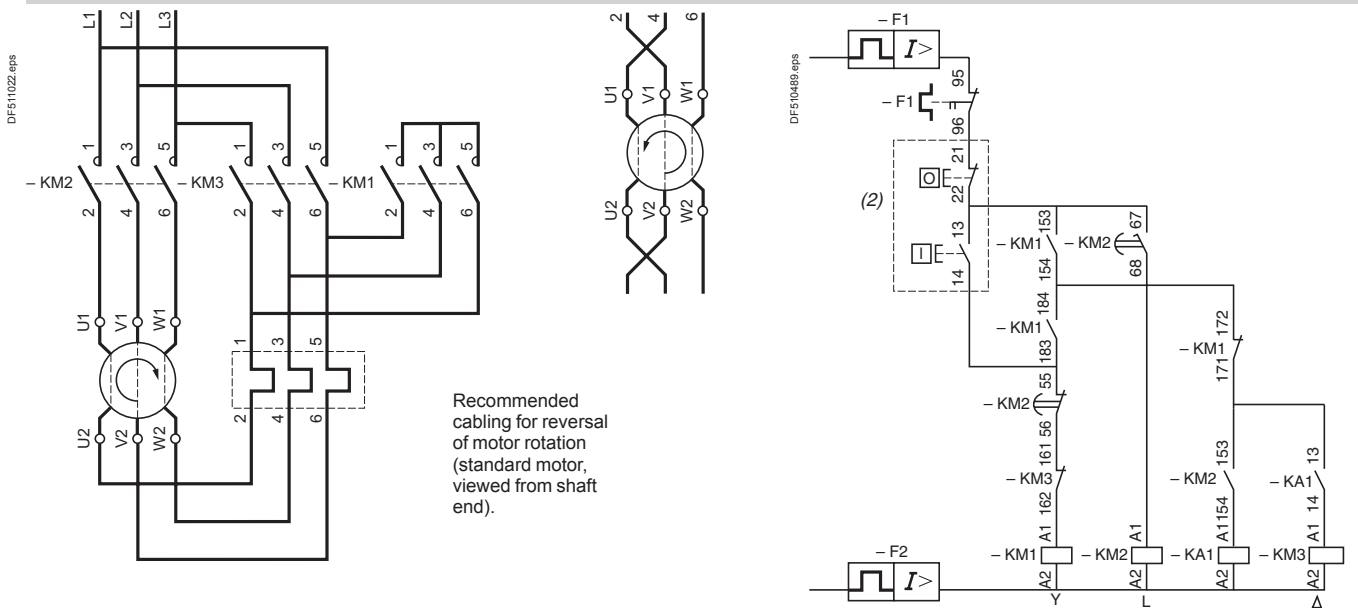
LC3 K

LC3 D



Note: LC3 D09A to D18A: Mechanical interlock between KM3 and KM1.

LC3 D115 and D150



Recommended cabling for reversal of motor rotation (standard motor, viewed from shaft end).

(1) Recommended cabling for reversal of motor rotation (standard motor, viewed from shaft end).

(2) Remote control.

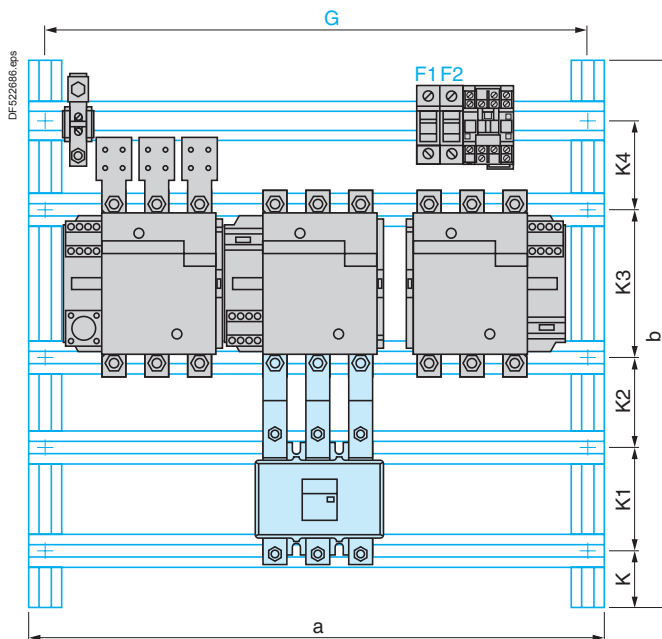
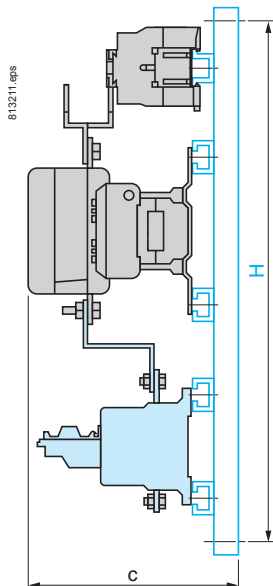
Star-delta

Dimensions

Chassis mounted starters

Pre-assembled: LC3 F185 to LC3 F400

For customer assembly: 2 x LC1 F●●● and 1 x LC1 D150 or 3 x LC1 F●●●



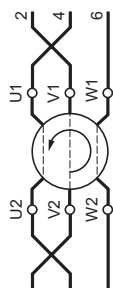
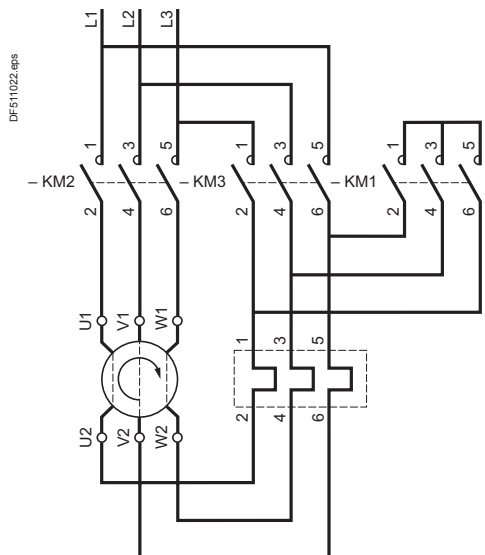
	a	b	c	G	H	K	K1	K2	K3	K4
LC3 F185 or 2 x LC1 F●●● + 1 x LC1 D with components F185	565	675	235	525	625	160	110	80	110	80
LC3 F225 or 3 x LC1 F●●● with components F225	565	675	235	525	625	160	110	80	110	80
LC3 F265 or 3 x LC1 F●●● with components F265	665	775	266	625	725	165	110	100	110	110
LC3 F330 or 3 x LC1 F●●● with components F330	765	975	276	725	825	195	140	100	110	180
LC3 F400 or 3 x LC1 F●●● with components F400	765	975	276	725	925	195	140	100	180	110

Star-delta

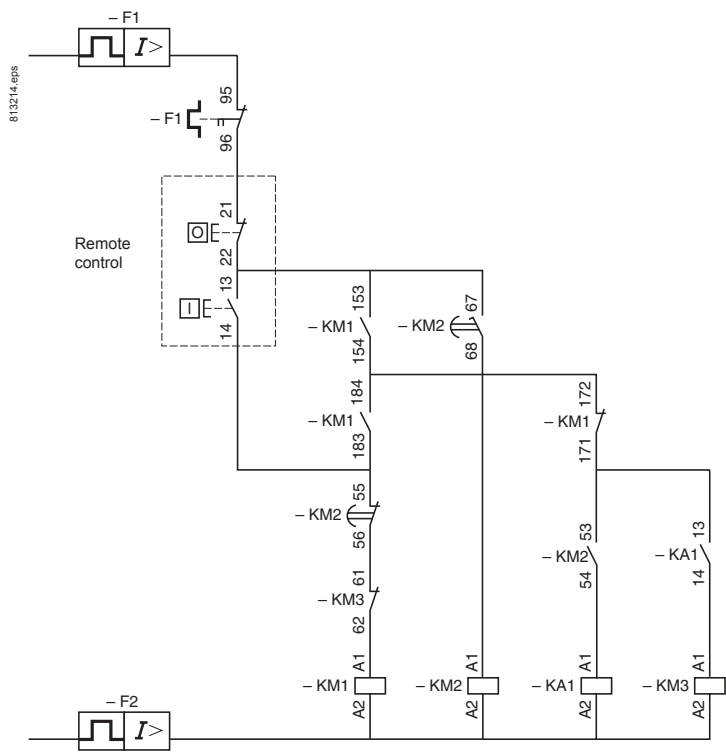
Schemes

Star-delta starters

LC3 F185 to F400



Recommended cabling for reversal of motor rotation (standard motor, viewed from shaft end).



Open pre-cabled motor starters

Presentation

A3/2

Power bases, control modules, connectors

Type of product

Range

Page

Standard power base,
basic control functionalities
Direct and reversing

Up to 15 kW



A3/10

Advance power base, control, alarm
and communication possibilities
Direct and reversing

Up to 15 kW

A3/12

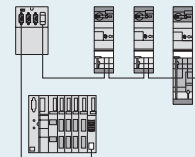
Communication components

Parallel type cabling system
Principle and components



A3/18

Bus type cabling systems
Principle, panorama and components



A3/23

LUFZ communication gateway



A3/32

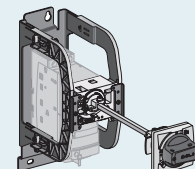
Accessories

Short circuit current limiter



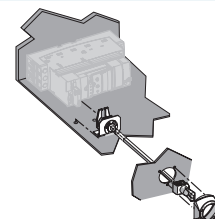
A3/33

Handles and accessories
for rotary control



A3/34

Handles and accessories
for integration into a MCC drawer

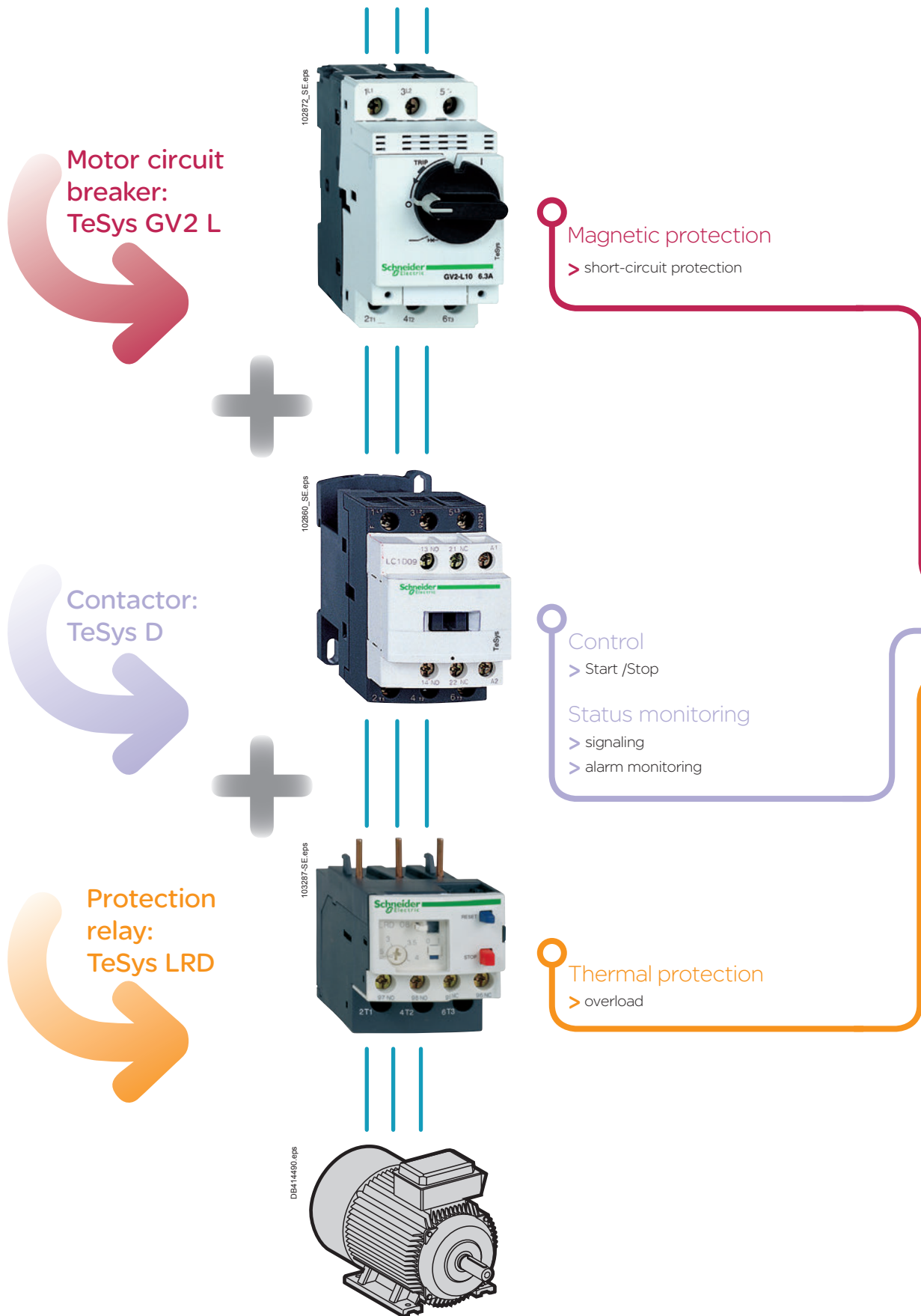


A3/35

Technical Data for Designers

A3/37

From traditional solution to ...

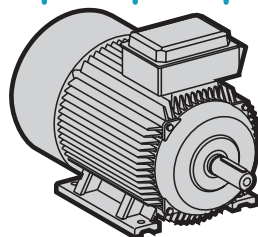


...TeSys U starter-controller



PB103607.eps

DB414480.eps



TeSys U starter-controller

> All basic or advanced protection and control functions in one block

and more...

- > Overload indication and alarm
- > Status report, remote control via communication bus



TeSys U

can be used in

80 %

of motor protection and control applications.



1 All in one

- Optimising space in enclosures.
- Total coordination (No contact welding on short circuit).
- Reduces installation times.

2 Simplicity of choice

- Controlled power.
- Protection functions ensured.
- Signaling functions, communication with PLC ensured.

3 Universal mounting

- On DIN rail or grid.

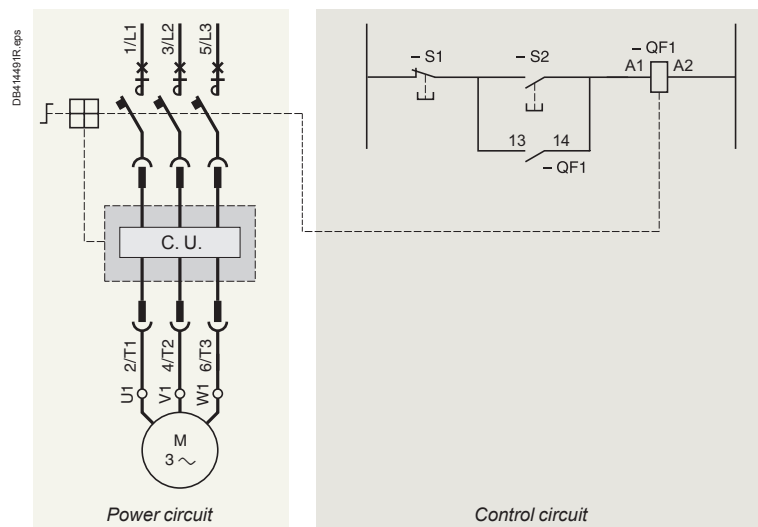
4 Conventional projet design

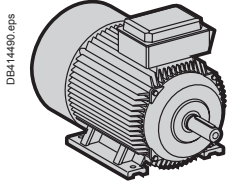
- Conventional control scheme with start , stop push buttons.

5 Electricly simple

Basic scheme of a TeSys U starter-controller

- Protection and power control functions acting on a single set of contact (QF1).
- The control unit (CU) monitors the voltage and current. In case of fault, it releases the coil, causing tripping.
- The coil is controlled by manual orders from an operator. Automatic control from a PLC is achieved with other diagrams.





Motor up to

- 7.5 kW / 1-phase 230 V / 50-60 Hz.
- 15 kW / 3-phase 400-440 V / 50-60 Hz.
- 15 kW / 3-phase 500 V / 50-60 Hz.
- 18.5 kW / 3-phase 690 V / 50-60 Hz.
- Non-reversing or reversing.

Short-circuit protection

- I_{sc}:
 - 50 kA at ≤ 400 V
 - 10 kA at 500 V
 - 4 kA at 690 V.
- Up to 690 V AC.

Overload protection

- From 0.15 to 32 A, 6 setting ranges (tripping 14.2 x I setting).
- Test button.
- Adjustment lock.
- Coil choice: 24 V, 48...72 V, 110...240 V DC/AC.

3 power contacts

- For non-reversing (reversing with reverser block).
- I_{max}, for 12 A power base (direct - reversing):
 - 12 A at up to 500 V / 50 Hz
 - 9 A > 500 V, up to 690 V.
- I_{max}, for 32 A power base (direct - reversing):
 - 32 A at up to 500 V / 50 Hz
 - 21 A > 500 V, up to 690 V.

1 NO contact

1 NC contact

- 5 A / max. 690 V AC or 250 V CC.

Other monitoring contacts

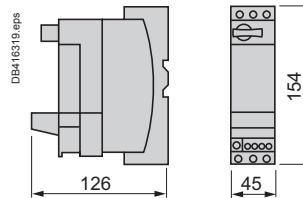
- 5 A / max. 690 V AC or 250 V DC.

Communication modules

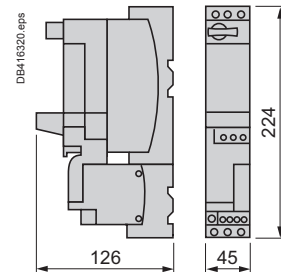
- Modbus,
- Ethernet,
- CANopen,
- DeviceNet,
- Advantys stb,
- Profibus DP,
- Beckhoff,
- AS-interface.

Dimensions

■ Base:

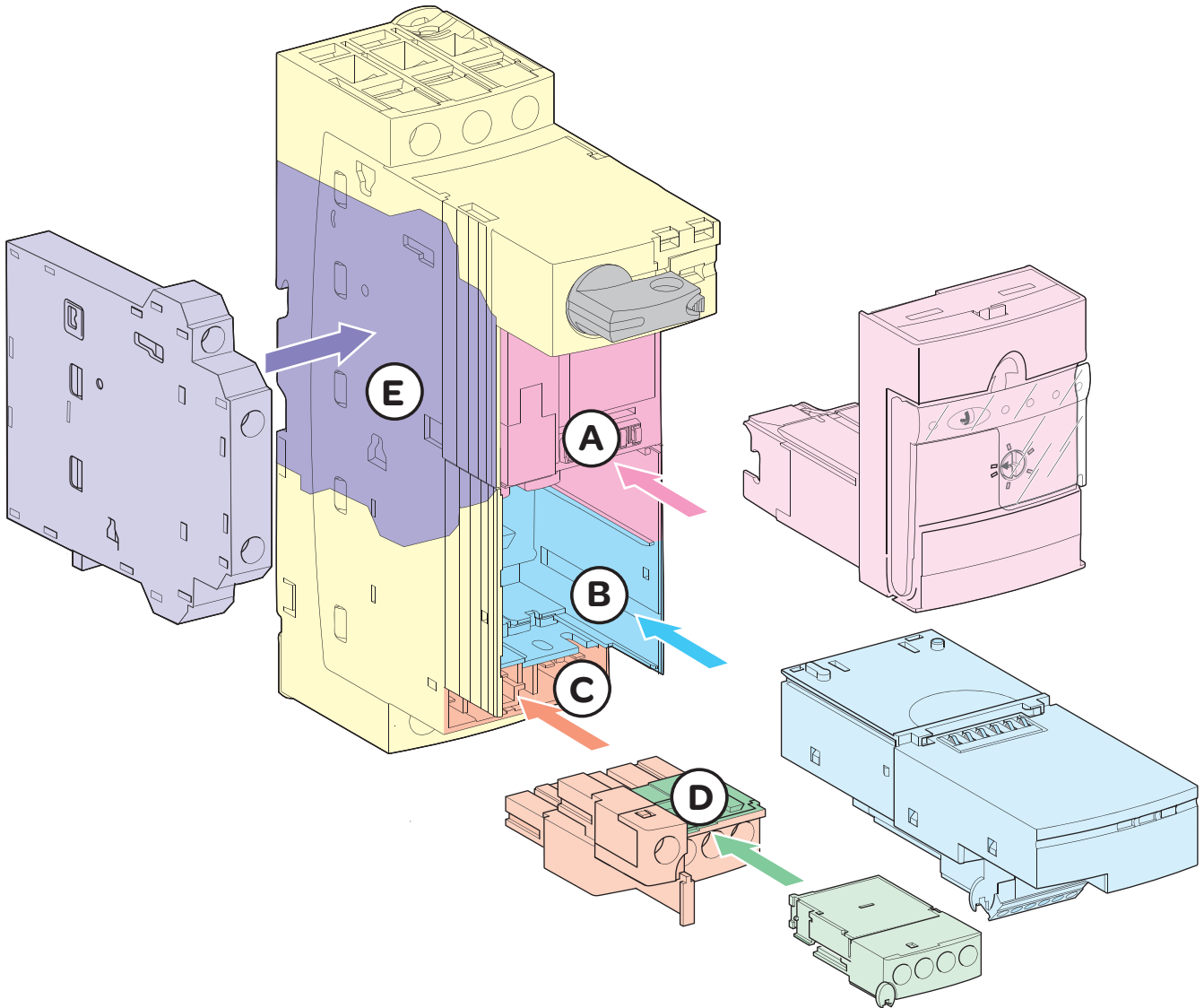


■ Base + reverser block:



The modularity principle

DB-14493-eps



- Power base
- A Cavity for control unit
- B Cavity for auxiliary module
- C Cavity for control terminal block
- D Cavity for additional contact block or shutter
- E Space for additional block fastening

Power Base

This is the basic constituent of the motor starter, it is composed of the power contacts, the control coil, the opening / closing mechanism of the protection device and the control pad.

Additional lateral block

Composed of the protection device signaling contacts.

Control unit

Composed of the power base management processor and setting knobs.

Auxiliary module

Depending on its type, it integrates load status contacts or a communication processor or an alarm processor.

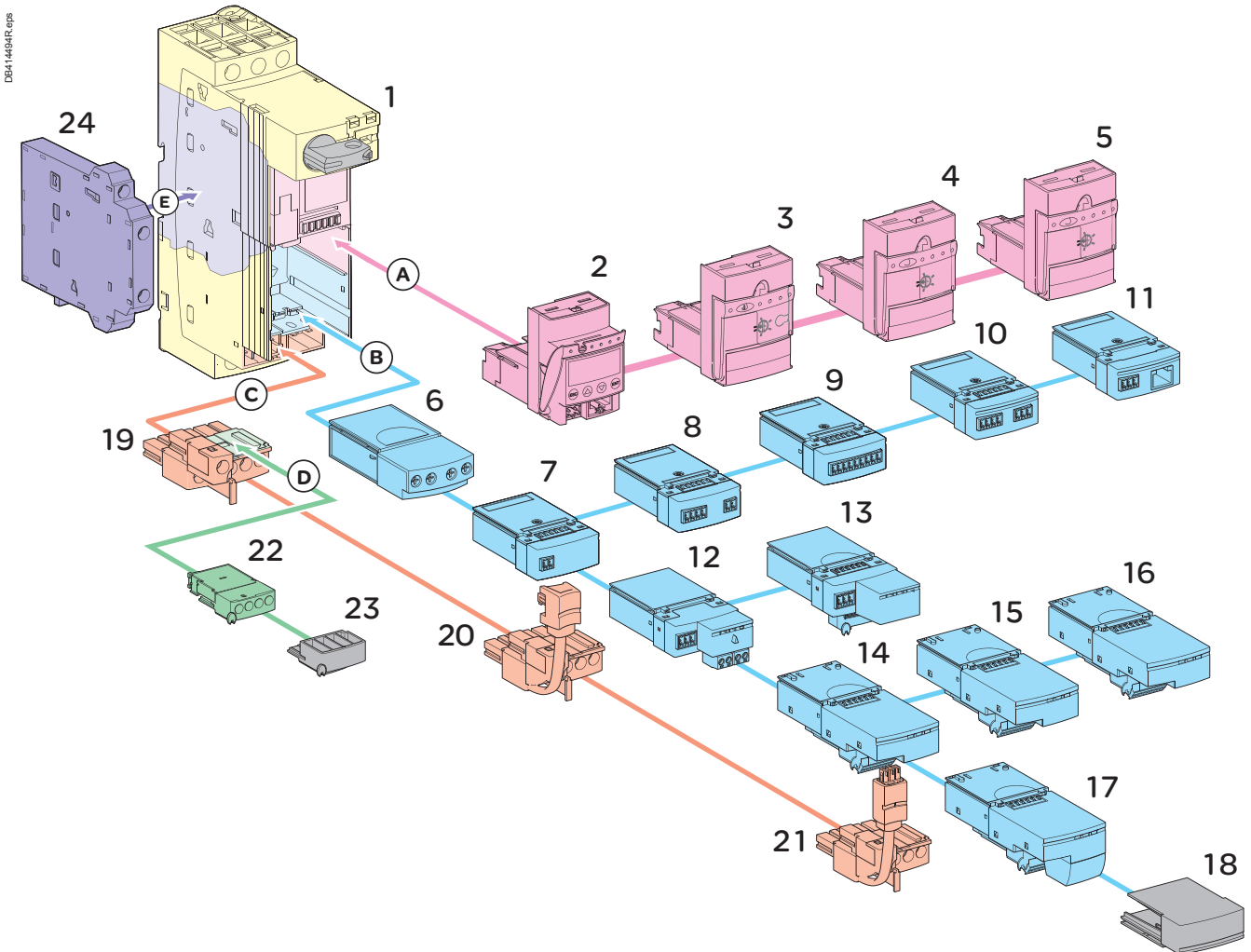
Control terminal block

It is composed of two terminals "coil control", 1 NO auxiliary contact, 1 NC auxiliary contact. It can be eventually connected to an auxiliary communication module via a dedicated cable.

Additional block

It includes protection device additional signaling contacts. By default, this is a simple shutter.

Components overview



Power base
1- LUB
 Non reversing power base - 1 rotation direction

Control units
2- LUCM
 Multifunctional control unit
3- LUCB/LUCC/LUCD
 Advanced control units
4- LUCA
 Standard control unit
5- LUCL
 Magnetic protection control unit

Auxiliary module
6- LUFN
 Auxiliary contacts module

Load monitoring auxiliary modules
7- LUFW10
 Overload alarm module
8- LUFDH11
 Overload alarm module with manual reset
9- LUFV2
 Motor load indication module
10- LUFDA01/LUFAD10
 Overload alarm module with automatic reset/remote reset

Communication auxiliary modules
11- LUFC00
 Telefast parallel liaison module, with RJ45 connector
12- ASILUFC5/ASILUFC51
 AS-Interface c. m.
13- LULC031/LULC033
 Modbus c. m.
14- LULC07 Profibus DP c. m.
15- LULC08 CANopen c. m.
16- LULC09 DeviceNET c. m.
17- LULC15 Advantys STB c. m.

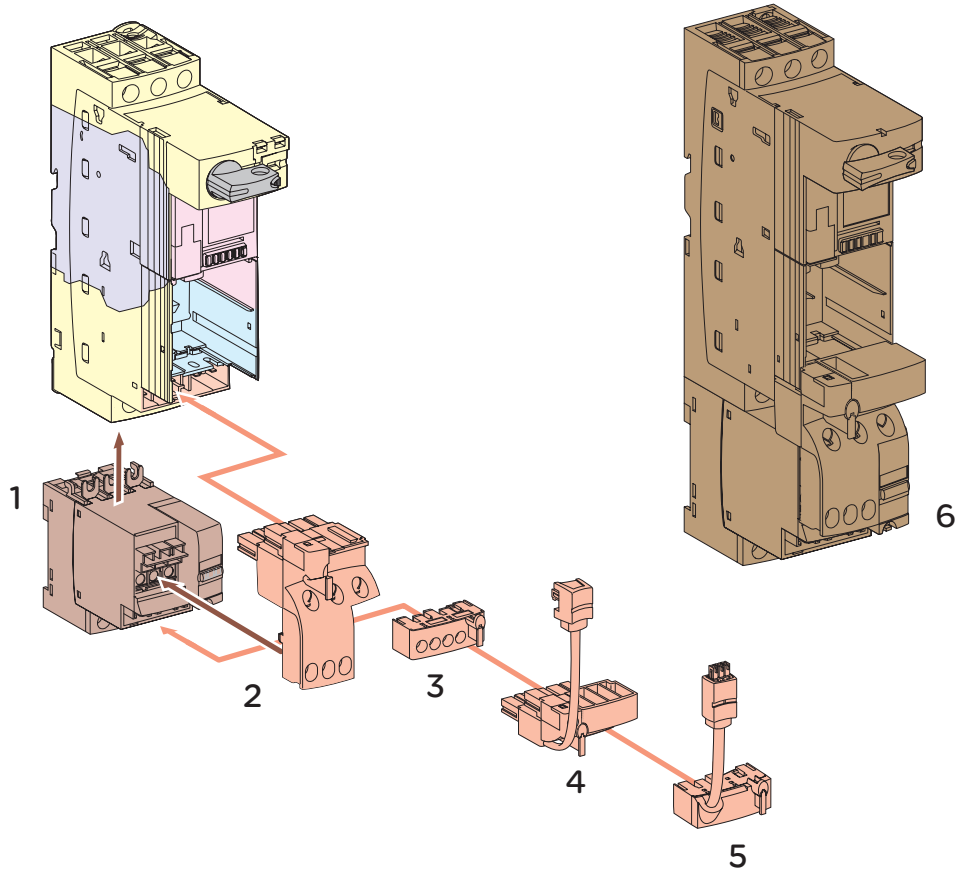
Shutters
18- LU9C 1
 Shutter for module cavity
23- Shutter for contacts additional block cavity

Control terminal blocks
19- LU9BN11
 Terminal block for imbedded auxiliary contacts
20- LU9BN11C
 Coil terminal block with its connecting cable
21- LU9BN11L
 Coil terminal block with its connecting cable

Additional contacts blocks
22- LUA1
 Additional contacts
24- LUA8
 side-mounting additional contacts

Additional components overview

DB41445R.eps



Reverser block

1- LU2M B0●●
vertical-mounting reverser block

Evolving reversing power base

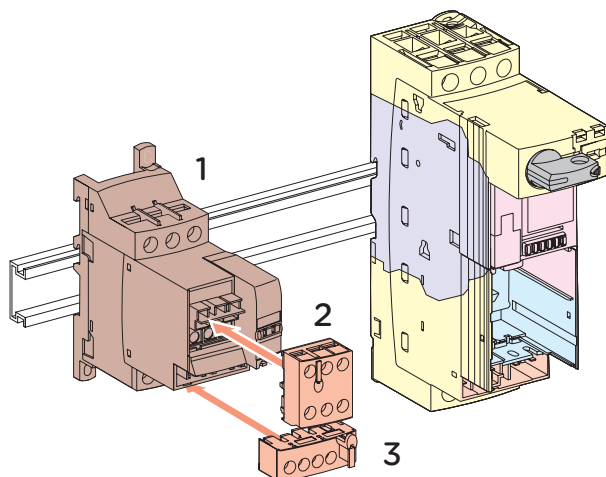
6- Pre-assembled reversing power base LU2B12

Control terminal blocks

- 2- LU9MR1C**
Base/block assembling connector, with terminal block for imbedded auxiliary contacts
- 3- LU9M1**
Coil terminal block for wired control
- 4- LUMRC**
Coil terminal block with its connecting cable for communicating control (only compatible with a selection of com. modules).
- 5- LUMRL**
Coil terminal block with its connecting cable for communicating control (only compatible with a selection of com. modules).

Additional components overview

DB414497.eps



Reverser block

1- LU6M B0●●

Side-mounting reverser block

Terminal blocks for electrical remote control

2- LU9M1

Terminal block for power base coil interlocking.
With direction of rotation monitoring contacts

3- LU9MR1





Terminal block for 2 direction control (pulse or maintained control)

TeSys U

Components for "standard control"

- Rotation control: 1 direction - 2 directions.
- Protection: overload + short circuits + main power fault.
- Monitoring: by dry contacts.

1- selection of the standard power base

				
Rating / Ue AC	12 A / 400 V 12 A / 500 V 9A / 690 V		32 A / 400 V 23 A / 500 V 21 A / 690 V	
	1 direction	2 directions	1 direction	2 directions
Cial. ref.: replace dots by the coil code	Standard power base LUB12	Standard reversing power base LU2B12●●	Standard power base LUB32	Standard reversing power base LU2B32●●

2- selection of the control unit for standard power bases

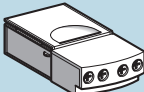
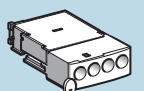
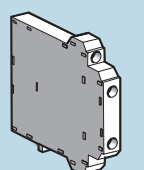
Maximum standardized power ratings of 3 phases motors 50/60 Hz

400/440 V kW	500 V kW	600 V kW	Setting range A	Lip_in mounting on the power base - Rating A	Protection type	
0.09	-	-	0.15...0,6	12 and 32	Thermal + magnetic LUCA	Magnetic LUCL
0.25	-	-	0.35...1,4	12 and 32	LUCAX6●●	LUCLX6●●
1.5	2.2	3	1.25...5	12 and 32	LUCA1X●●	LUCL1X●●
5.5	5.5	9	3...12	12 and 32	LUCA05●●	LUCL05●●
7.5	9	15	4.5...18	32	LUCA12●●	LUCL12●●
15	15	18.5	8...32	32	LUCA18●●	LUCL18●●
					LUCA32●●	LUCL32●●

Cial. ref. of the control unit: dots to be replaced by the coil code (see below).

Coil voltage (V)	24~	24~	48...72 ~ and 48~	110...220 ~ and 110...240~
Coil code	BL	B	ES	FU

3- Selection of the modules ⁽¹⁾ and signaling blocks (optional)

	Auxiliary signaling contacts module	Function	Indicates the ON/OFF running status of the motor, whatever the direction of rotation		
		Output	Change of the state of 2 contacts: 1NO + 1NC	Opening of 2 NC contacts	Closing of 2 NO contacts
		Cial. reference	LUFN11	LUFN02	LUFN20
	Auxiliary signaling contacts block	Function	Indicates the open/ closed status of the protection: by NO/NC contact Protection standby/tripped: by SD contact To be inserted below the auxiliary module cavity (B)		
		Output	OF and SD contacts: NO type	OF contact: NC type	SD contact: NO type
		Cial. reference	LUA1C20	LUA1C11	
	Auxiliary signaling contacts block	Function	Indicates the open/closed status of the protection To be clamped on the left side of the power base.		
		Output	2 OF contacts: NO type		
		Cial. reference	LUA8E20		

The power bases are delivered with the following items

> **LUB12, LUB32**

12 or 32 A power base with imbedded control terminal block and 3 blanking shutters

> **LU2B12, LU2B32**

12 A (LUB120) or 32 A (LUB320 ⁽¹⁾) power base without imbedded control terminal block

+ 1 assembling connector **LU9MR1C**

+ 1 reverser block - vertical mounting **LU2MB0●●**

+ 1 control terminal block **LU9M1**

(1) see description next page.

Control terminal blocks - Characteristics

> **LU9BN1**

2 terminals → for coil

2 terminals → NO contact (24 ... 250 V DC/AC, 5 A max)

2 terminals → NC contact (24 ... 250 V DC/AC, 5 A max)

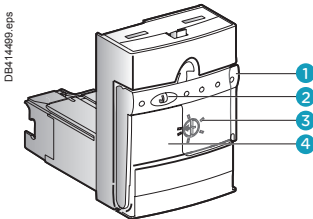
> **LU9M1**

1 terminal → common

1 terminal → S1 coil

1 terminal → S2 coil

2 terminals → contact NF (24 ... 250 V DC/AC, 5 A max)



LUCA ●●●●

- 1 Extraction and locking handle.
- 2 Sealing of locking handle.
- 3 Ir adjustment dial.
- 4 Locking of settings by sealing the transparent cover.

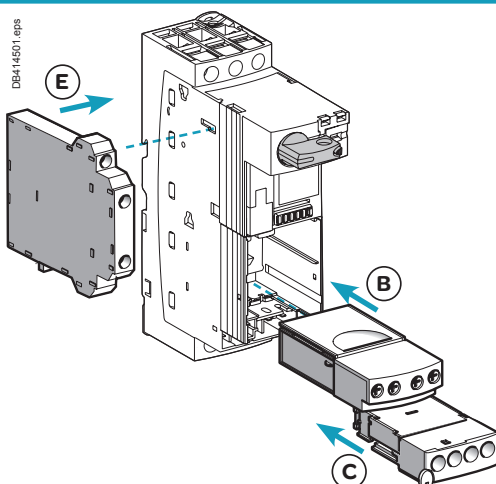
They provide the electrical protection settings

LUCA - standard units

- Protection against overload: 14.2 x Intensity setting.
- Protection against short circuit: 14.2 x I max.
- Protection against missing or unbalanced phases.
- Protection against insulation fault (protection of equipment only).
- Class 10 tripping.
- Frequency 50...60 Hz.

LUCL - magnetic units

- Protection against short circuits.
- To be used when a standard power base is connected to a motor drive or a soft starter, as they provide the overload protection.



Modules and blocks are compatible with all standard and standard inverting power bases

Common electrical characteristics


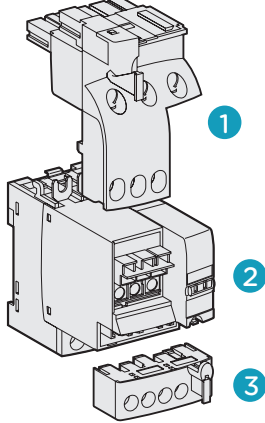
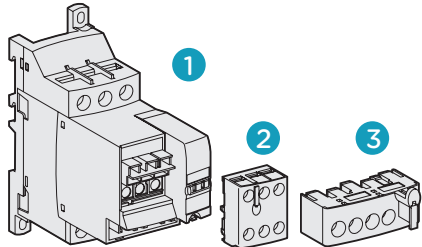
- Standard operating voltage: 24...250 V AC/DC.
- Maximum current: 5 A.

References

- Rotation control: 1 direction - 2 directions.
- Protection: overload + short circuit + main power fault.
- Signaling: by dry contacts.
- Digital display of electrical values.
- Overload alarms.
- Network/bus communication.

Components for "advanced control"

1- Selection of the advanced power base and reverser block

		
Advanced power base	Reverser block - vertical mounting	Reverser block - side mounting
Rating / Ue AC		
12 A / 400 et 500 V 9 A / 690 V	-	-
32 A / 400 V 23 A / 500 V 21 A / 690 V	<ol style="list-style-type: none"> 1 LU9MR1C 2 LU2MB0●●⁽¹⁾ 3 LU9M1 	<ol style="list-style-type: none"> 1 LU6MB0●●⁽¹⁾ 2 LU9MR1 3 LU9M1

⁽¹⁾ Terminal coil control A1-A2 and aux. NO + NC.

2- selection of the control unit

Maximum standardized power ratings of 3 phases motors 50/60 Hz

400/440 V		500 V		600 V	Setting range A	Lip_in mounting on the power base - Rating A	Protection type: - overload - short-circuit - Main power fault - alarm			Multifunctional
kW 1P	kW 3P	kW 3P	kW 3P	A			Class 10 3P	Class 20 3P	Class 10 1P	
-	0.09	-	-	0.15...0,6	12 and 32	LUCB6●●	LUCC6●●	LUCDX6●●	LUCM6BL	
0.09	0.25	-	-	0.35...1,4	12 and 32	LUCB1X●●	LUCC1X●●	LUCD1X●●	LUCM1XBL	
0.55	1.5	2.2	3	1.25...5	12 and 32	LUCB05●●	LUCC05●●	LUCD05●●	LUCM05BL	
2.2	5.5	5.5	9	3...12	12 and 32	LUCB12●●	LUCC12●●	LUCD12●●	LUCM12BL	
4	7.5	9	15	4.5...18	32	LUCB18●●	LUCC18●●	LUCD18●●	LUCM18BL	
7.5	15	15	18.5	8...32	32	LUCB32●●	LUCC32●●	LUCD32●●	LUCM32BL	

Cial. ref. of the control unit: replace dots by the coil code.

Coil voltage (V)	24~	24~	48...72 ~ and 48~	110...220 ~ and 110...240~
Coil code	BL	B	ES	FU

> Selection of the modules and signaling blocks: see page A3/14

Magelis XBT NU HMI terminal (optional)



XBT NU400

Provides display and modification of the LUCM multifunctional controller settings. Ready to ensure dialogue with up to 8 TeSys U starter-controller (Modbus protocol - Pre-loaded application and alarm pages).

Main characteristics

- Multi-language: French, English, German, Spanish, Italian.
- Display: 4 lines of 20 characters.
- Width 132 mm, height 74mm, depth 43 mm.
- Supply voltage 24 V DC.

Designation	Reference
Magelis TeSys U terminal	XBTNU400
Connecting cable XBTNU400 to LUCM ●●BL, L = 2,50 m ⁽¹⁾	XBTZ938

⁽¹⁾ A Modbus hub or - junction must be used when connecting several TeSys U.

LUB120, LUB320 - 12 or 32 A advanced power base equipped with:

One NO latching contact + one NC contact
 Operation voltage 24 ... 250V AC/DC - I max 5 A
 + 2 blanking shutters

The cavity C is empty, ready for insertion of a terminal block:

- > for local control **LU9BN11**
- > for centralized control **LU9BN11C, LU9BN11L**
- > or insertion of an assembling connector **LU9MR1C**, for reverser block - vertical mounting

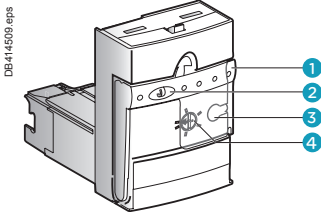
Inverter block: its maximum controlled power might be limited by the power base capacity

Power base interlocking control:

- > vertical mounting: by the assembling connector **LU9MR1C**
- > side mounting: by a **LU9MR1** terminal block (to be linked to a **LU9B N11** terminal block in the advanced power base).

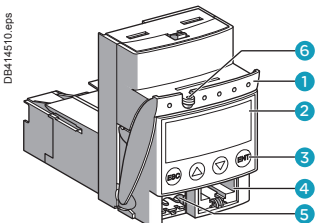
Reverse control:

- > Local control, to be wired on a **LU9M1** terminal block
- > centralized control, by a **LU9MRC** or **LU9MRL** terminal block; its connector must be plugged in a communication module, in the advanced power base.



LUCB ●●●●, LUCC ●●●●, LUCD ●●●● control units

- 1 Extraction and locking handle.
- 2 Sealing of locking handle.
- 3 Ir adjustment dial.
- 4 Test push button.



LUCM ●●BL control unit

- 1 Extraction and locking handle.
- 2 Built-in LCD display (2 lines, 12 characters).
- 3 4 button keyboard.
- 4 RS485 Modbus communication port, with RJ45 connector.
- 5 Connector for external 24 V DC power supply.
- 6 Sealing of locking handle.

LUCB, LUCC, LUCD control and diagnostic units

- Motor protection, fault diagnostic.
- Protection against
 - overload: 14.2 x Intensity setting.
 - Simulation of an overload by depressing the test push button.
 - short circuit: 14.2 x I_{max}.
 - missing or unbalanced phases.
 - insulation fault (protection of equipment only).
- Overload alarm management:
 - locally: with one of the LUF family module
 - Remotely: with LULC031, LULC033, LULC07, LULC08, LULC09 or LULC15 (thermal alarm only) communication module.
- Reset:
 - manual
 - automatic, with a communication module.

LUCM multifunctional control unit

- Motor protection, operational values display and diagnostic.
- To be associated with 24 V DC coil only.
- LUCM ●●BL: tripping class 5 to 30, single phase, three phase
- Same functions as LUCB ●●●● with complementary functions:
 - in working mode: display of electrical values, setting parameters and events
 - in configuration mode: display of protection and alarm settings.
- These functions are available for local display on a display panel, and for remote display via a RJ45 Modbus connector.
- The Modbus - RS485 compatibility is ensured by the Magelis XBT display terminal or a PC with the PowerSuite software.

Note: a 24 V DC power supply is required during the configuration process.

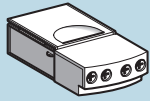
References

- Rotation control: 1 direction - 2 directions.
- Protection: overload + short circuits + main power fault.
- Signaling: by dry contacts.
- Digital display of electrical values.
- Overload alarms.
- Network/bus communication.

Components for "advanced control" (continued)

3a- Selection of the modules and signaling blocks (optional)

DB414505 eps

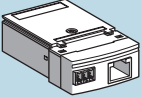
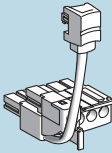
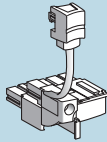


Function	Indicates the ON/OFF running status of the motor, whatever the direction of rotation		
Output	Change of the state of 2 contacts: 1NO + 1NC 5 A/ 24 ... 250V AC/DC	Opening of 2 NC contacts 5 A/ 24 ... 250V AC/DC	Closing of 2 NO contacts 5 A/ 24 ... 250V AC/DC
Cial. reference	LUFN11	LUFN02	LUFN20

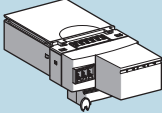
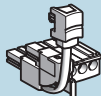


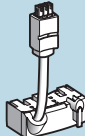
3b - Selection of additional function module (optional)

Function	Measure of average current in each phase	Alarm if average current in the phases = 105% of In	Indicates the overload tripping - manual reset	Indicates the overload tripping - reset with the power base control pad or remote reset	
Output	4-20 mA signal, image of the pourcentage of In	Closing of a NO contact	Change of state of 2 contacts: 1 NO + 1 NC	Opening of a NC contact	Closing of a NO contact
Référence	LUFV2	LUFW10	LUFDH11	LUFDA01	LUFDA10

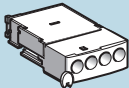
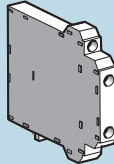
4a- Selection of the auxiliary module and terminal block for Modicon Telefast system

	Telefast system Module	Terminal block / control cable 1 direction of rotation	2 directions of rotation
	 DB414505 eps	 DB414506 eps	 DB414507 eps
Cial. reference	LUFC00	LU9BN11C	LU9MRC

4b- Selection of the communication auxiliary module

	Communication module	Terminal block / control cable for LUB●● power base, 1 direction of rotation	Terminal blocks / control cables for LU2B●● ou LUB●● + LU2MB0●● power base, 2 directions of rotation	
	 DB414508 eps	 DB414524 eps LU9B N11C	 DB414525 eps LU9B N11L	 DB414526 eps LU9M RC
				 DB414527 eps LU9 MRL
Modbus	LUL C033	LU9BN11C	LU9MRC	
Ethernet	LUL C033 + TeSys port			
AS-Interface	ASILUF C51			
Profibus DP	LUL C07	LU9BN11L	LU9MRL	
CANopen	LUL C08			
DeviceNet	LUL C09			
Advantys stb	LUL C15			
Beckhoff	LUL C14	contact us		

5- Selection of additional block signaling of protection status

	Auxiliary signaling contacts block	Auxiliary signaling contacts block
	 DB124030 eps	 DB414500 eps
Function	Indicates the open/ closed status of the protection: by NO/NC contact Protection standby/tripped: by SD contact To be inserted below the auxiliary module cavity (B)	Indicates the open/closed status of the protection
Output	OF and SD contacts: NO type	2 OF contacts: NO type
Cial. reference	LUA1C20	LUA1C11
		LUA8E20

- The signaling modules with dry contacts are directly wired on indicators and electrical warning devices.
- Contacts rating: 5 A / 24...250 V AC/DC.
- The **LUF V2** module is connected to a datalogger or any other indication device providing a 4-20 mA analog input.

- **Module LUF C00:**
 - indicates the position of the control pad and the state of the poles,
 - collects the FWD, REV commands from an automation process.
- **Inputs:** P24 V power base coil control, from a 24 V DC PLC output
- **Outputs:** OF / SD contacts from protection device, OF contact from the poles (to a 24 V PLC input)
- RJ45 connector for Telefast PLC pre-wiring system:
 - Modicon TM3 (map I/O controllers for RJ45 M221, M241, M25)
 - Modicon STB modules (I/O for automation island)
 - Modicon Telefast (interfaces RJ45/HE10).
- Must be connected to a **LU9 G02** or **LU9 G03** Telefast distribution box
- **Compatible exclusively with LUC●●● control unit with coil code B**
- The terminal blocks + control cables provide the connection to the coil of the power base and the signal contacts.

- **Communication modules:**
 - indicates the position of the control pad and the state of the poles,
 - collects the FWD, REV commands from an automation process.
- The states and the control orders are coded according to the selected communication protocol.
- Screw clamp terminals to the bus cable.
- The terminal blocks + control cables provide the connection to the coil of the power base and the signal contacts.

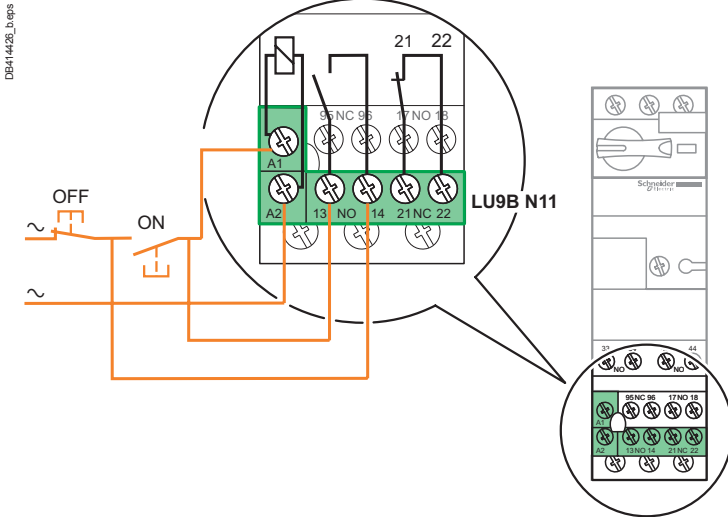
- **Additional blocks:**
 - used for wiring indicator lights or controllers.
- **Advantage:**
 - the locations for these blocks are always available, regardless of the configuration of the power base.
- **Contact rating:** 5 A / 24...250 V AC/DC.

Note: the indication the direction of rotation is available on the reverser block unit:
 - On a LU9M R1C assembling connector
 - On a LU9M R1 terminal block.

Standard or advanced power base

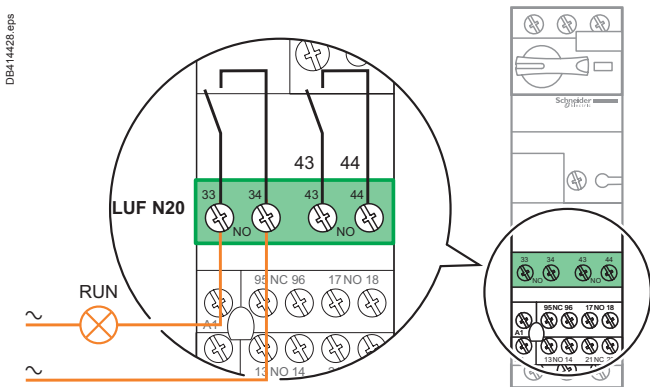
ON/OFF control (1 direction of rotation)

Push buttons wiring

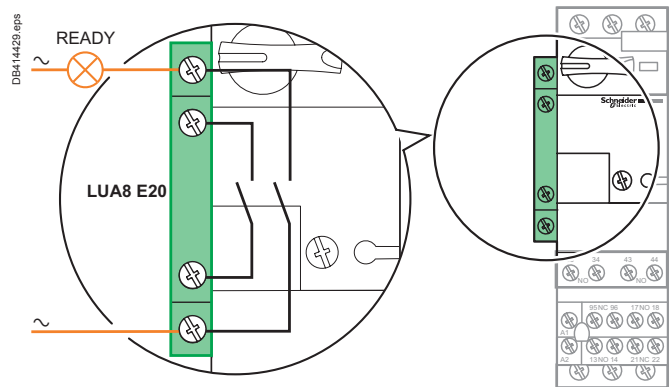


ON indication

"Motor RUN" indicator wiring

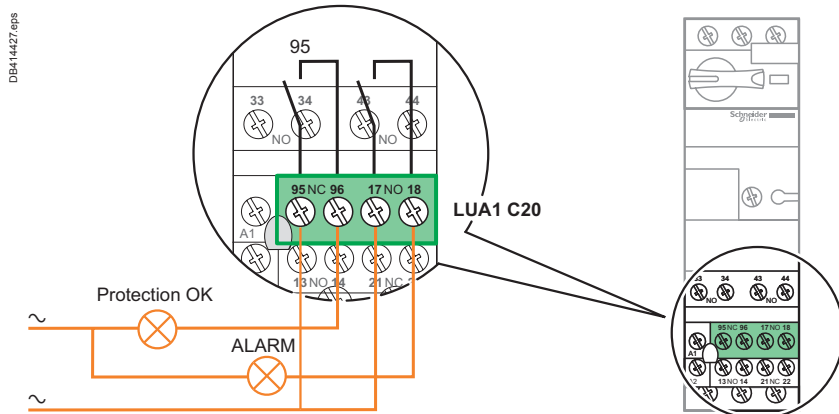


"Motor starter READY" indicator wiring



ALARM indication

Protection device status indicator wiring



Typical wiring diagrams and contacts status

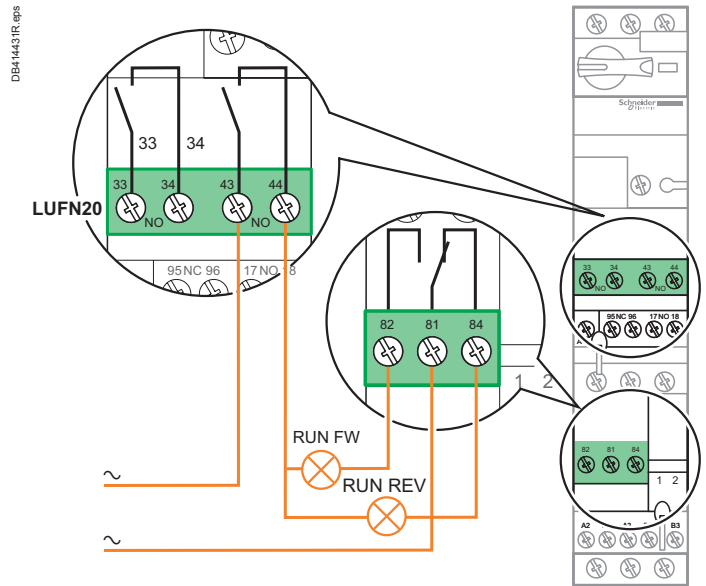
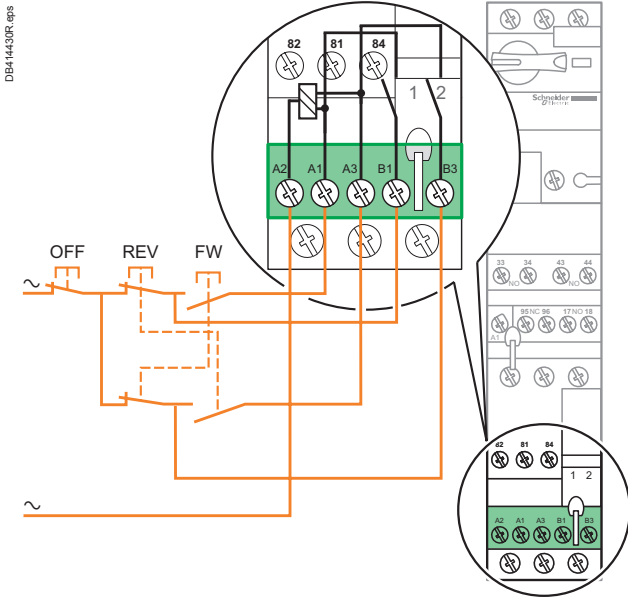
Power base with vertical mounting reverser block

FW/REV/OFF control (2 directions of rotation)

Push buttons wiring

FW/REV control

FW, REV indicators wiring



Contact states depending on the product status

	Position of rotary knob	Indication on front panel	N/O pole contact	N/C pole contact	N/O contact any fault	N/C contact any fault	N/O contact product ready	N/C contact Rotary knob on OFF position
References of add-on contact blocks and auxiliary contact modules Terminal referencing	–	–	–	LUF N11 31-32	LUA1 C20 97-98	LUA1 C11 95-96	LUA1 C20 17-18	–
	or	–	–	LUF N02 31-32 41-42	LUA1 C200 No terminal block	LUA1 C110 No terminal block	LUA1 C200 No terminal block	LUA8 E20 57/58 67/68
	or	–	LUF N20 33-34 43-44	LUB9 N11 21-22	–	–	LUA1 C11 17-18	–
	or	–	–	LUF N11 43-44	–	–	LUA1 C110 No terminal block	–
	or	–	–	LUB9 N11 13-14	–	–	–	–
Off	OFF	0						
Ready to operate		0						
Start		1						
Tripped on short-circuit	TRIP	I>>						
Tripped on thermal overload	Manual reset mode	TRIP						
	Automatic reset on thermal overload fault mode							
	Remote reset mode		0					

N/O contact in closed position.

N/C contact in open position.

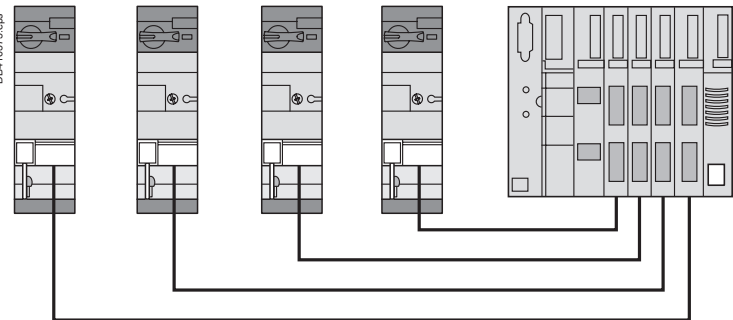
Parallel-type cabling systems

Principle

PB 105098 eps



Point-to-point wiring

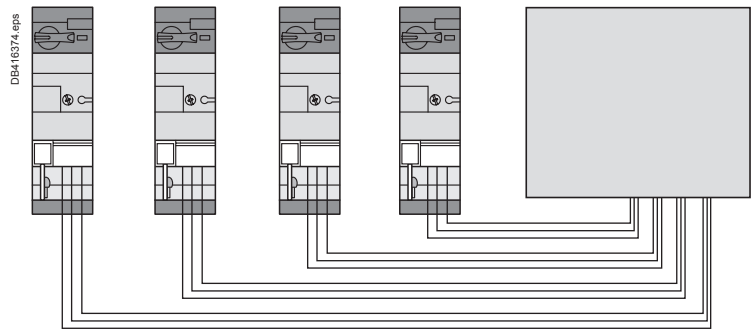


- The control inputs and signaling outputs of the starter are grouped in a single socket, usually RJ45. They are individually connected to PLC outputs and inputs.
- The wires run in parallel in a multicore cable equipped with a multipin connectors, RJ45 in the case of Telefast type system.
- 3 parallel wiring systems are available:
 - Modicon TM3, based on a RJ45 I/O module for M221, M241, M25 PLC
 - Modicon STB, based on I/O modules for automation island
 - Modicon Telefast: RJ45 / HE10 interfaces.
- Simple way of proximity wiring. Quick cabling. It is suitable for machine control panels when a large number of TeSys U starter-controller are installed.

informations

- The control and signaling terminals of the starters are connected to the output and input terminals of a PLC. No specific connectors or cables are required.
- Conventional wiring mode, without optimization of the cabling time. May be suitable when a very small number of starters is used, with a very small number of links.

Parallel cabling systems



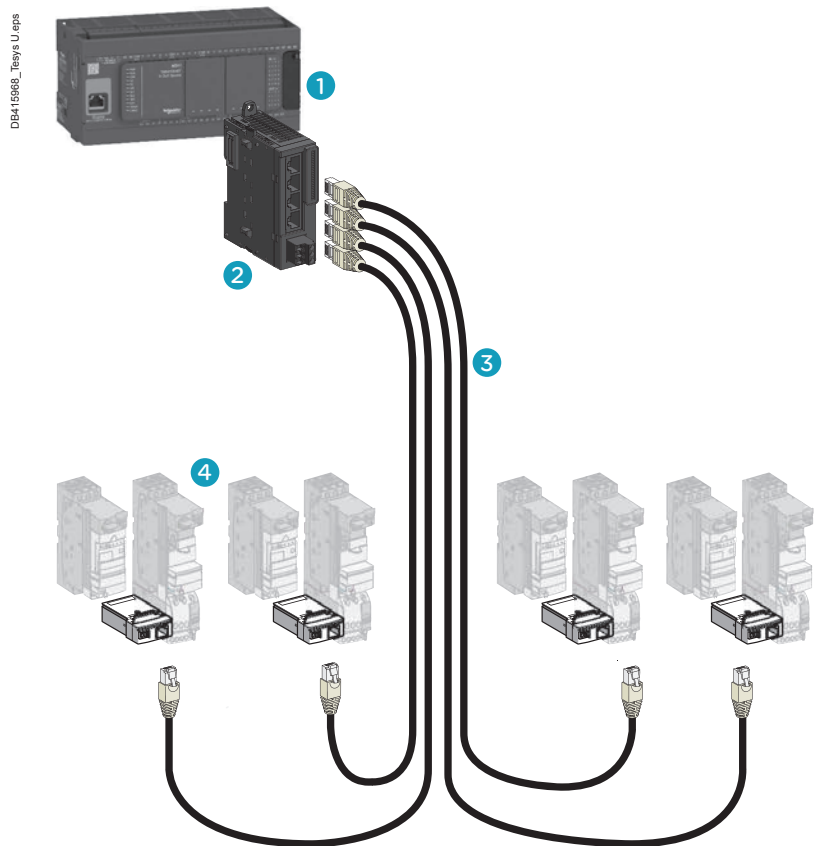
Parallel-type cabling systems

Modicon TM3

Integration in the Modicon TM3 wiring system

The TeSys U starter-controller are directly connected to a I/O module equipped with RJ45 connectors.

- 1 Modicon M221, M241, M251 PLC's
- 2 TM3XTY I/O module for 4 starters
- 3 LU9R●● cables with RJ45 connectors,
- 4 LUFC00 module for TeSys parallel connection (1 or 2 direction of rotation).



Parallel-type cabling systems

Modicon Advantys STB

Integration in the Modicon Advantys STB system

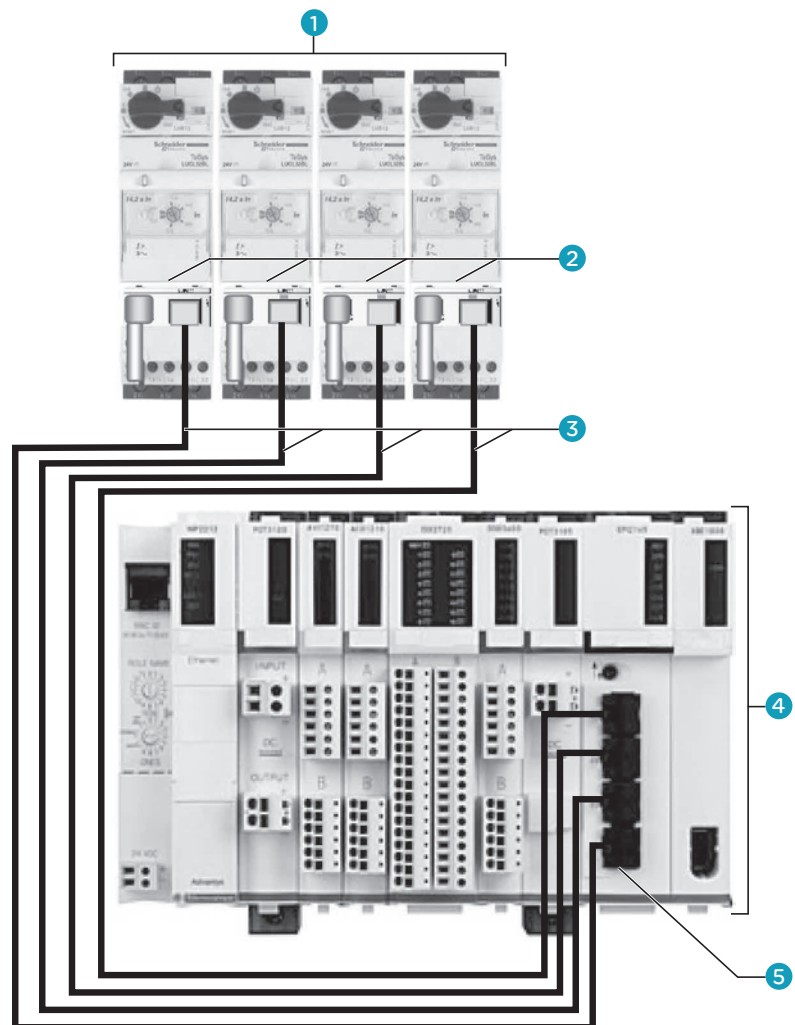
Advantys STB is a solution for remote I/O modules.

These communicate with the Modicon PLCs range thanks to a serial liaison, using the Advantys STB protocol.

In this example an Advantys I/O module is used to facilitate wiring.

Each of its four terminals receives a preassembled RJ45 cable connected to a TeSys U starter-controller.

- 1 TeSys U starter-controller (equipped with 24 V DC LUC ●●●● BL control modules)
- 2 TeSys module for parallel RJ45 wiring: LUFC00 + LU9B N11C (one direction) or LU9MRC (2 directions)
- 3 RJ45 cables (2 connectors):
 ≤ 3 m: LU9 R●●
 > 3 m: 490 NTW 000●● (5, 12, 40 or 80 m)
- 4 PLC: Modicon range
- 5 I/O Modicon Advantys module: STB EPI 2145K



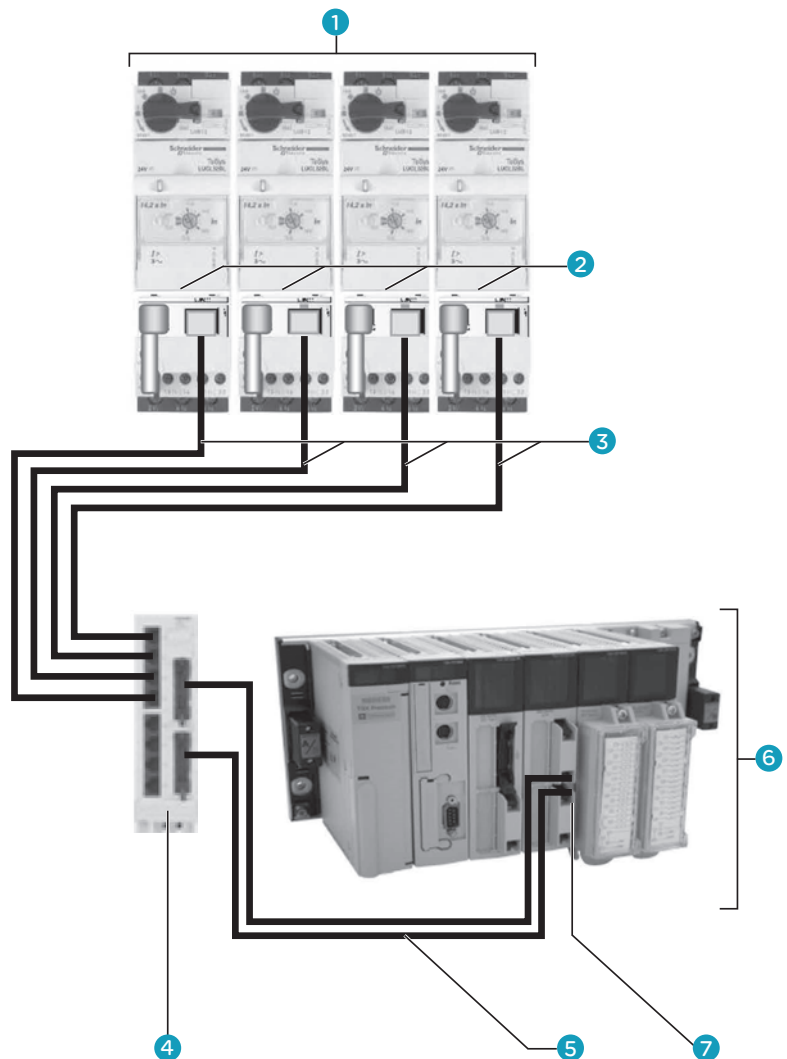
Parallel-type cabling systems

Modicon Telefast

Integration in the Modicon Telefast system

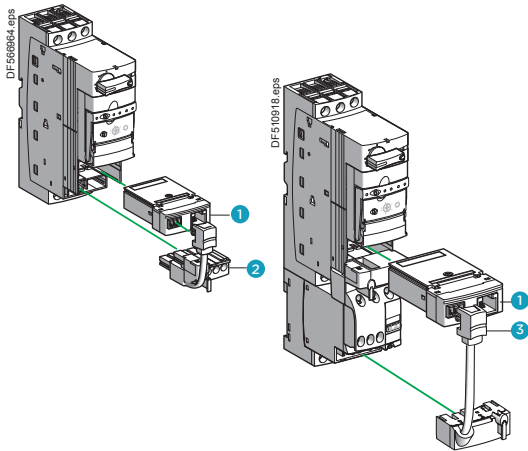
The wiring hubb **LU9G0●** facilitates the connection to Modicon Premium PLCs. It adapts RJ45 connectors to HE10 available on the Telefast I/O modules. Connection: up to 8 TeSys U per hubb.

- 1 TeSys U starter-controllers (equipped with 24 V DC LUC ●●●●BL control units)
- 2 TeSys Module for parallel wiring RJ45: LUF C00 + LU9B N11C (one direction) or LU9MRC (2 directions)
- 3 RJ45 cables (2 connectors):
 ≤ 3 m: LU9R●●
 > 3 m: 490 NTW 000●● (5, 12, 40 or 80 m)
- 4 Telefast RJ45 / HE10 splitter box: LU9G02 or LU9G03 (different TeSys U connection capacities)
- 5 HE10 cables (2 connectors): TSX CDP ●●●
- 6 PLC: Modicon Premium range
- 7 I/O module: TSX DMY 28FK



Parallel-type cabling systems

Components TeSys U



Components for connection of a starter - 1 direction of rotation	
Designation	Reference
1 Parallel connection module, RJ45 output 2 coil control inputs, 3 signal outputs	LUFC00
2 Pre wired connector, one direction of rotation, for coil connection and one contact for emergency stop	LU9BN11C

Components for connection of a starter - 2 directions of rotation	
Designation	Reference
1 Parallel connection module, RJ45 output	LUFC00
3 Pre wired connector, 2 directions of rotation, for coil connection and one contact for emergency stop	LU9MRC

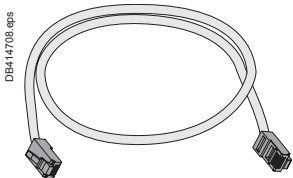


LU9 G02

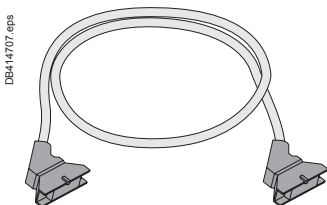


LU9 G03

Telefast RJ45/ HE10 splitter box	
Designation	Reference
Splitter box Connection to TeSys U: 4 RJ45 connectors: for 1 to 4 TeSys U, 1 or 2 directions 4 RJ45 connectors: for 1 to 4 TeSys U, 1 direction Connection to PLC: 1 x HE10 connector - 20 channels, for pole status, alarms 1 x HE10 connector - 20 channels, for control. 24 V DC auxiliary power supply required	LU9G02
Splitter box Connection to TeSys U: 8 RJ45 connectors: for 1 to 8 TeSys U, 1 or 2 directions Connection to PLC: 1 x HE10 connector - 20 channels, for pole status, alarms 1 x HE10 connector - 20 channels, for control. 24 V DC auxiliary power supply required.	LU9G03



RJ45 cables.



HE10 cables.

RJ45 connection cables, with 2 RJ45 connectors	
0.3 m	LU9R03
1 m	LU9R10
3 m	LU9R30

HE10 connection cables, with 2 HE10/20 way connectors	
Section: AWG 22 / 0.324 mm ²	
0.5 m	TSXCDP053
1 m	TSXCDP103
2 m	TSXCDP203
3 m	TSXCDP303
5 m	TSXCDP503
Section: AWG 28 / 0.080 mm ² (flat cable)	
1 m	ABFH20H100
2 m	ABFH20H200
3 m	ABFH20H300

HE10 connection cables, with 1 x HE10/40 way connector (PLC side) and 1x HE10/20 way connector (Splitter box side)	
Section: 0.324 mm ²	
0,5 m	BMXFCC053
1 m	BMXFCC103
2 m	BMXFCC203
3 m	BMXFCC303
5 m	BMXFCC503
10 m	BMXFCC1003

Cable with stripped wires (PLC side) 1 x HE10/20 ways connector (Splitter box side)	
Section: AWG 22 / 0.324 mm ²	
3 m	TSXCDP301
5 m	TSXCDP501

Bus-type cabling systems

Principle

PB105392.eps



Application functionality, topology

1 Geographically expanded process

Many motors are scattered on the site, the process control requires individual control to ensure safety and proper operation. TeSys U is a suitable communicating actuator. The integration of a bus communication module in the starter-controller saves space in the control board and simplifies wiring, compared to solutions based on conventional components (circuit breaker + contactor).

2 Application: automatic motor control / monitoring

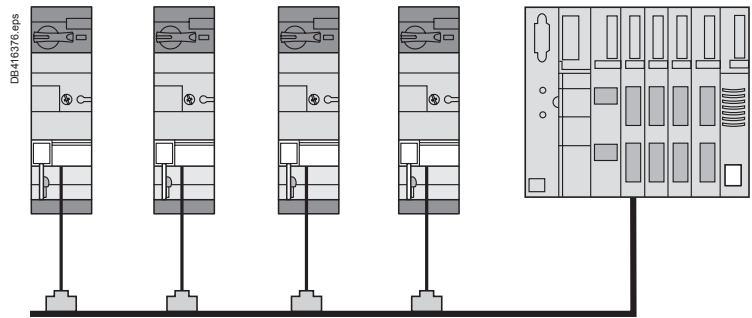
Thanks to a communication bus, starter-controllers are part of an automation system controlled by a PLC and (or) various communicating controllers. These equipment can then share the status and alarm information related to each motor control and perform specific treatments.

3 Bus-type connection

This type of connection allows different topologies (star, ring ...) and supports various protocols dialogue. It is therefore recommended for geographically expanded process, in order to to simplify wiring and ensure multiple-controller management.

TeSys U

- The bus wiring interconnects TeSys U starters controllers and components of the installation via a single the cable.
- Commands and status are coded according to the selected protocol and transmitted on the communication bus.
- This wiring is simple, usually a shielded (or not) pair of wires, suitable for monitored automation, regardless of the number of TeSys U and their locations.

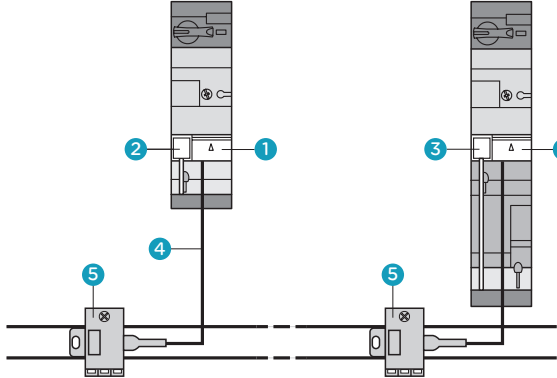
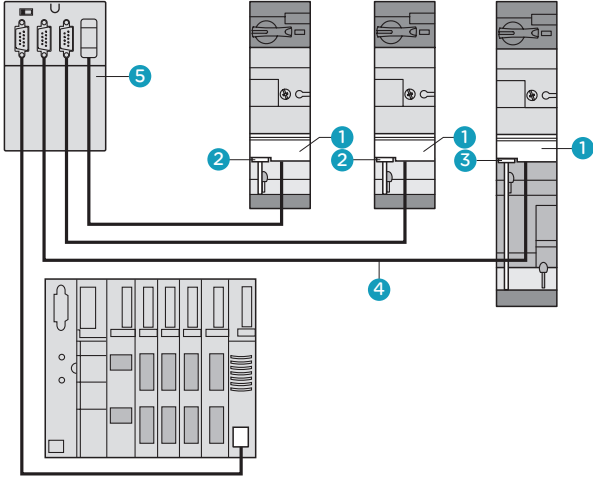
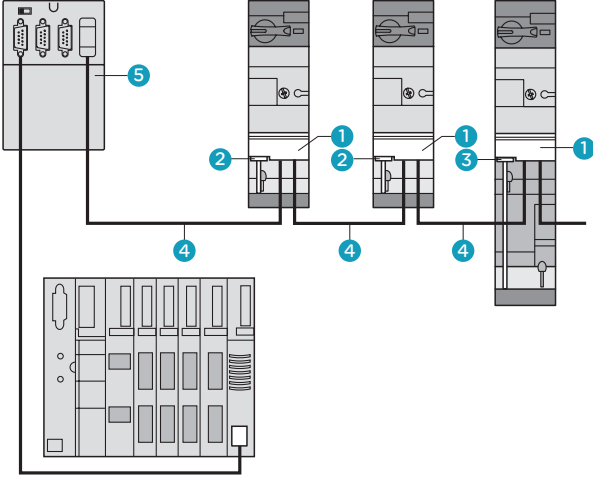


Available TeSys U status and controls via a communication module

Control unit	LUCA	LUCB LUCC LUCD	LUCM
Starter status (ready, running, fault)	■	■	■
Start and Stop commands	■	■	■
Thermal overload alarm		■	■
Remote reset via the bus		■	■
Indication of motor load		■	■
Fault signalling and differentiation		■	■
Remote programming and monitoring of all functions			■
"Log" function			■
"Monitoring" function			■
Alarms (overcurrent, ...)			■

Bus-type cabling systems

View

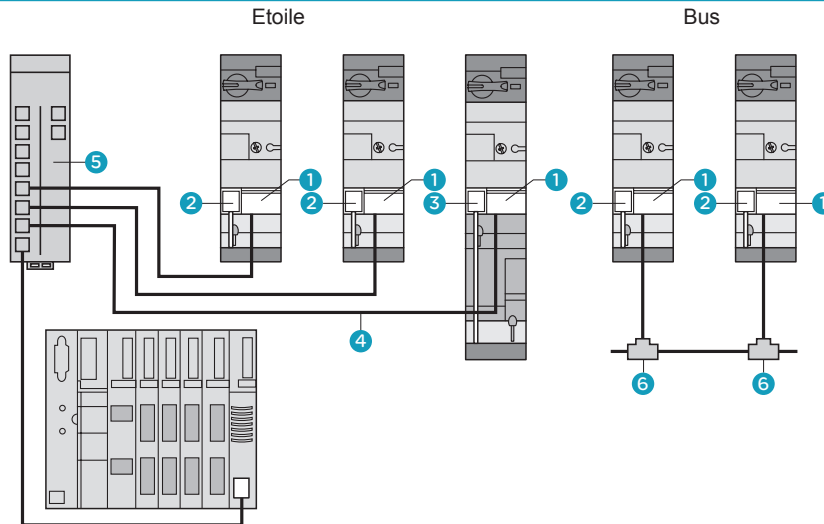
Network	Architecture	Component references
<p>AS Interface</p> <p>Cabling system for rapidly connecting sensors and actuators to the controller. A single cable provides both data transmission and power to sensors.</p> <p>Details page A3/26</p>		<ul style="list-style-type: none"> 1 ASI LUF C5 or ASI LUF C51 2 LU9B N11C 3 LU9M RC 4 XZ CG0142 5 TC SAT V01 N2
<p>CANopen</p> <p>Etoile</p>		<ul style="list-style-type: none"> 1 LUL C08 2 LU9B N11C 3 LU9M RC 4 TSX CAN C●●● 5 TSX CAN TDM4 6 TSX CPP 110
<p>Bus</p> <p>Details page A3/27</p>		<ul style="list-style-type: none"> 1 LUL C08 2 LU9B N11C 3 LU9M RC 4 TSX CAN C●●● 5 TSX CAN TDM4 6 TSX CPP 110

Network

Architecture

Component references

Modbus

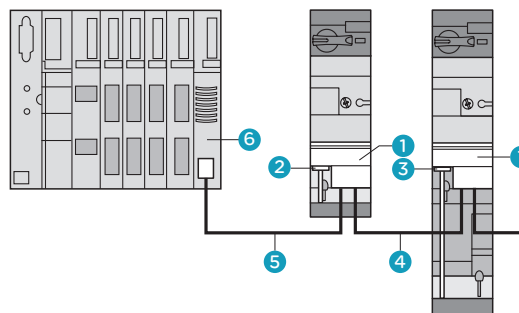


- 1 LUL C031 or LUL C033
- 2 LU9B N11C
- 3 LU9M RC
- 4 VW3 A8 306R...
- 5 LU9 GC3
- 6 VW3 A8 306TF

Details page [A3/28](#)

Advantys STB

Starter-controllers communicate using ADVANTYS STB protocol to fit into a remote I/O architecture.

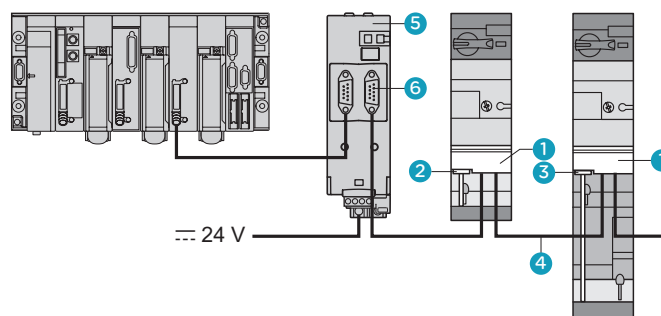


- 1 LUL C15
- 2 LU9B N11C
- 3 LU9M RC
- 4 LU9 RDD...
- 5 LU9 RCD
- 6 STB XBE1100

Details page [A3/29](#)

Profibus-DP (Decentralized Peripherals)

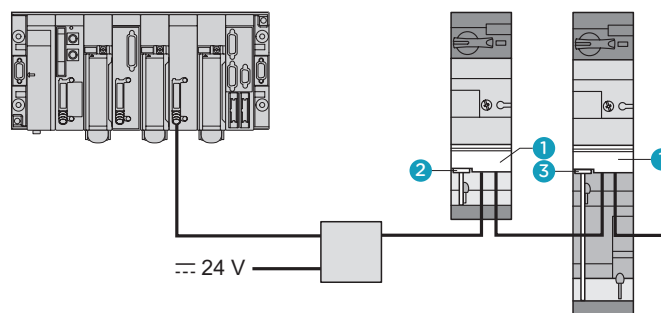
is used for connecting actuators and sensors to a central controller for applications in industrial production. The standard bus provides a number of diagnostic means



- 1 LUL C07
- 2 LU9B N11C
- 3 LU9M RC
- 4 LU9 RPB010
LU9 RPB100
LU9 RPB400
- 5 LU9 AD7
- 6 LU9 GC7

Details page [A3/30](#)

DeviceNet

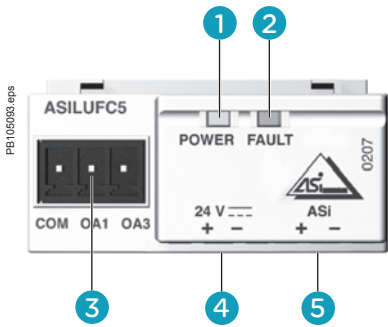


- 1 LUL C09
- 2 LU9B N11C
- 3 LU9M RC

Details page [A3/31](#)

Bus-type cabling systems

TeSys U components for AS-Interface bus



- 1 Green LED: AS-Interface voltage present
- 2 Red LED: AS-Interface or module fault
- 3 Outputs for starter commands
- 4 Black connector for connection to 24 V auxiliary power supply
- 5 Yellow connector for connection to the AS-Interface system

The LULC09 communication module, combined with the power base and control unit is used to control TeSys U starters-controllers via DeviceNet bus. The LULC09 communication module is slave type.

Module Specifications

I/O terminal block

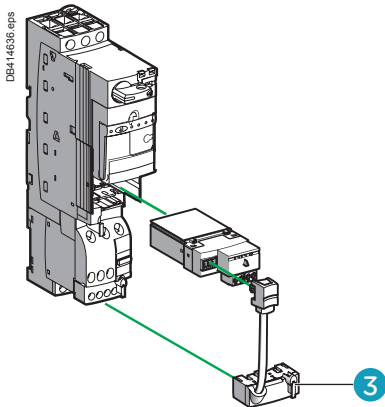
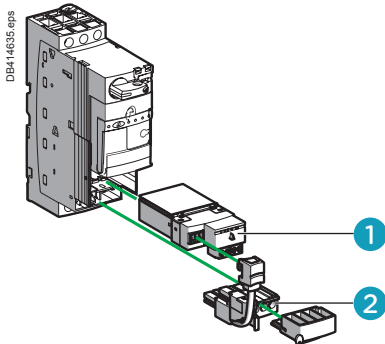
- Powered by external 24 V DC (power supply not included):
 - 2 x configurable inputs for binary sensors
 - 1 x 24 V DC output - 0.5 A local auxiliary command.

Connectors

- For TeSys U 24 V DC coil (common, direction 1, direction 2).
- For AS-Interface bus.

Signaling

- Module Status - Error - 24 V, by LED.



Tesys components

Description	Mark	Max number of slaves	References
AS-Interface communication module	1	31	ASILUFC5
		62	ASILUFC51
Pre-wired connector: coil - LUB powerbase	2	-	LU9BN11C
Pre-wired connector: coil - LUB2B powerbase	3	-	LU9MRC

Connection of the communication module

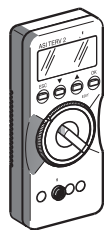
By a "Y" cable with:

- TeSys U side, 2 connectors (bus + power),
- Bus side, one connector to be connected to the AS-Interface TCSATV01N2 tap-off.

Description	References
AS-Interface / TeSys U branch cable, L = 2 m	XZCG0142
AS-Interface Tap-off	TCSATV01N2



XZ MC11



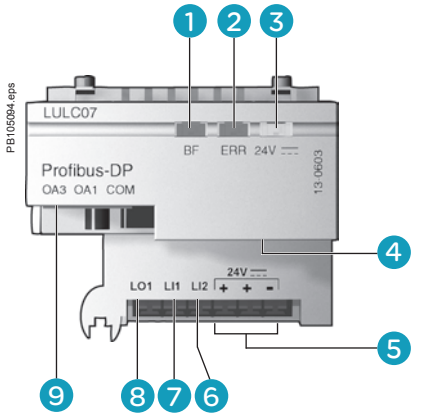
ASI TERV2

Consoles and cable adapter

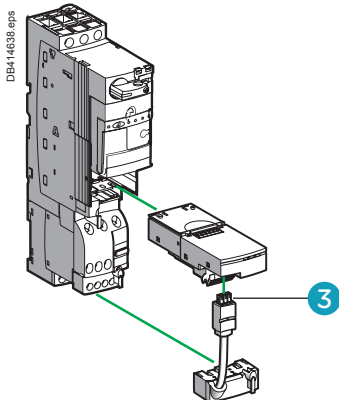
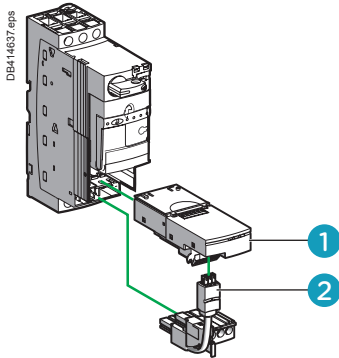
Designation	References
Addressing terminal Battery operated. Battery charger supplied AS-Interface V.1 and V.2.1 compatible	XZMC11
Adjustment and diagnostics console Runs on LR6 batteries Allows addressing of AS-Interface V.2.1 slaves and diagnostics	ASITERV2
Cable adapter For console XZ MC11	XZMG12

Bus-type cabling systems

TeSys U components for CANopen bus



- 1 LED indicating module status
- 2 Fault signalling LED
- 3 LED indicating 24 V supply ON for outputs OA1, OA3 and LO1
- 4 SUB-D connector for bus link
- 5 24 V supply connection
- 6 Discrete input
- 7 Discrete input
- 8 Discrete output
- 9 Outputs for starter commands



The LUL C08 communication module, combined with the power base and control unit is used to control TeSys U starters-controllers via CANopen bus. The LULC09 communication module is slave type.

Module Specifications

I/O terminal block

- Powered by external 24 V DC (power supply not included):
 - 2 x configurable inputs for binary sensors
 - 1 x 24 V DC output - 0.5 A local auxiliary command.

Connectors

- For TeSys U 24 V DC coil (common, direction 1, direction 2).
- For CANopen bus.

Signaling

- Module Status - Error - 24 V, by LED.

Tesys components

Description	Item	References
CANopen communication module	1	LULC08
Pre-wired connector: coil - LUB powerbase	2	LU9BN11L
Pre-wired connector: coil - LUB2B powerbase	3	LU9MRL

Compatibility of CANopen communication module with control units

LUCA ●●BL / B ●●BL / C ●●BL / D ●●BL	All versions marketed after 2T0481 ⁽¹⁾
LUC M●●BL	All versions ≥ V3.2
LUC MT1BL	All versions ≥ V3.2

(1) This "date code" is made up as follows:
 2T or 2C: factory code.
 04, 05, 06 and so on: year of manufacture.
 08: week.
 1: 1st day of the week.

How to get information on the design of a CANopen architecture and the choice of network accessories

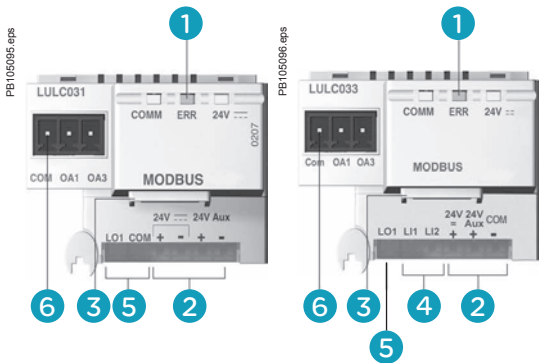
Consult the library of downloadable documents on schneider-electric.com by searching on the name of the communication protocol.

Bus-type cabling systems

TeSys U components for Modbus bus

LUL C031

LUL C033



- 1 Module status signalling LED
- 2 24 V supply connection
- 3 RJ45 connector for RS485 Modbus link
- 4 2 discrete inputs
- 5 1 discrete output
- 6 Outputs for starter commands

The LULC031 and LULC032 communication modules, combined with the power base and control unit is used to control TeSys U starters-controllers via Modbus.

Module Specifications

I/O terminal block

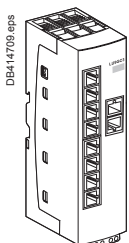
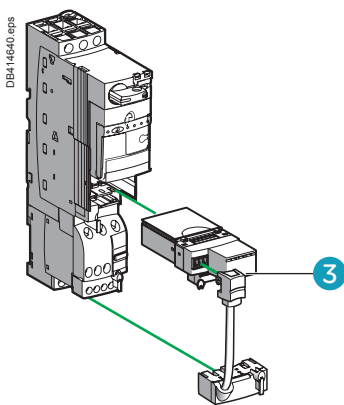
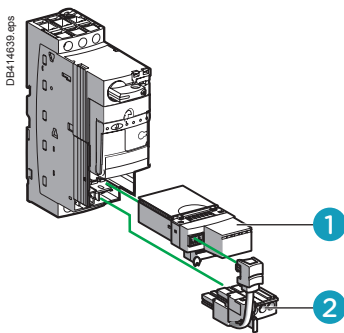
- Powered by external 24 V DC (power supply not included):
 - 2 x configurable inputs for binary sensors (on LULC033 only)
 - 1 x 24 V DC output - 0.5 A local auxiliary command.

Connectors

- For TeSys U 24 V DC coil (common, direction 1, direction 2).
- RJ45, For Modbus line.

Signaling

- Module Status - Error - 24 V, by LED.



Tesys components

Description	Item	Bin. input	References
Modbus communication module	1	0	LULC031
		2	LULC033
Pre-wired connector: coil - LUB powerbase	2	-	LU9BN11C
Pre-wired connector: coil - LUB2B powerbase	3	-	LU9MRC

Modbus hub

Description	Length (m)	References
Modbus communication distributor	-	LU9GC3
Cables fitted with 2 x RJ45 connectors	0.3	VW3A8306R03
	1	VW3A8306R10
	3	VW3A8306R30
Tees derivations	0.3	VW3A8306TF03
	1	VW3A8306TF10

Description	References
RS 485 line terminator	VW3A8306R

Compatibility of Modbus communication modules

Communication modules (software version)		LUCL C031 from V2.3	LUCL C033 from V2.1	LUCL C033 from V2.2
Power base	LUB ●● / LU2B ●2	■	■	■
	LUTM ●●BL		■	■
Control unit	LUCA ●●BL	■		■
	LUCB ●●BL	■		■
	LUCB ●●BL			■
	LUCB ●●BL			■
	LUCB ●●BL			■
	LUCB ●●BL			■
	LUCB ●●BL			■
Control unit	LUCM ●●BL	■		■ ⁽¹⁾
	LUCBT ●●BL		■	
	LUCDT ●●BL			■
	LUCMT ●●BL		■	

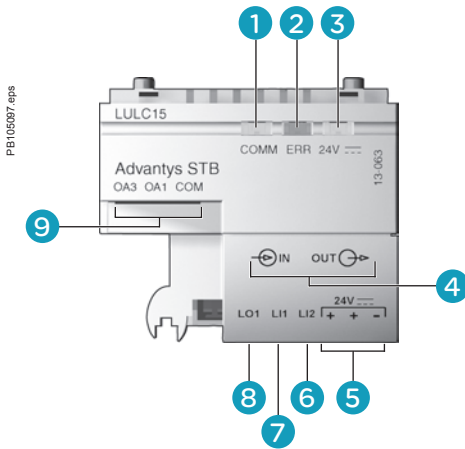
(1) Except LUCM ●●BL V1.04 and V1.06.

How to get information on the design of a Modbus architecture and the choice of network accessories

Consult the library of downloadable documents on schneider-electric.com by searching on the name of the communication protocol.

Bus-type cabling systems

TeSys U components for Advantys STB bus



- 1 Two-colour LED indicating module status
- 2 Fault signalling LED
- 3 LED indicating that 24 V supply is ON
- 4 Bus connectors
- 5 24 V supply connection
- 6 Discrete input
- 7 Discrete input
- 8 Discrete output
- 9 Outputs for starter commands

Communication module LUL C15 allows direct connection of TeSys U starter-controllers and controllers on an Advantys STB island, between two segments or at the end of a segment. The starter-controller will then be able to make use of the services provided by Advantys STB: self-addressing, autobaud, fallback positions.

Module Specifications

I/O terminal block

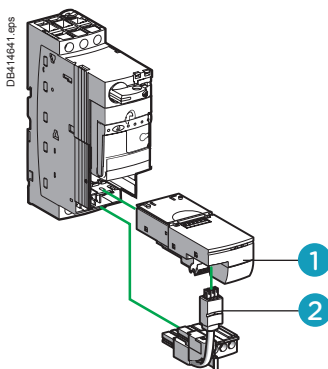
- Powered by external 24 V DC (power supply not included):
- 2 x configurable inputs for binary sensors (on LULC033 only)
- 1 x 24 V DC output - 0.5 A local auxiliary command.

Connectors

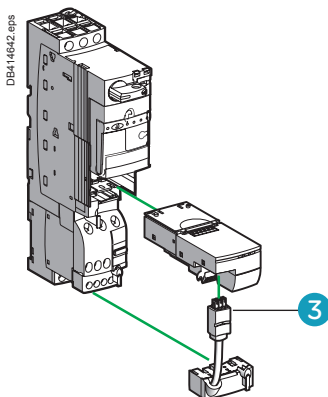
- For TeSys U 24 V DC coil (common, direction 1, direction 2).
- For Advantys STB bus.

Signaling

- Com - Error - 24 V, by LED.



LUB + LUL C15 + LU9B N11L



LU2B + LUL C15 + LU9M RL

Tesys components

Description	Item	References
Advantys STB communication module	1	LULC15
Pre-wired connector: coil - LUB powerbase	2	LU9BN11L
Pre-wired connector: coil - LUB2B powerbase	3	LU9MRL

Cables

Description	Length (m)	References
Cables fitted with connectors, one straight and one elbowed	0.3	LU9RCD03
	1	LU9RCD10
	3	LU9RCD30
	5	LU9RCD50
Cables fitted with two straight connectors	0.3	LU9RDD03
	1	LU9RDD10
	3	LU9RDD30

Compatibility of Advantys STB communication module with control units

LUCA ●●BL / B ●●BL / C ●●BL / D ●●BL	All versions marketed after 2T0481 ⁽¹⁾
LUCM ●●BL	All versions ≥ V3.2
LUCM T1BL	All versions ≥ V3.2

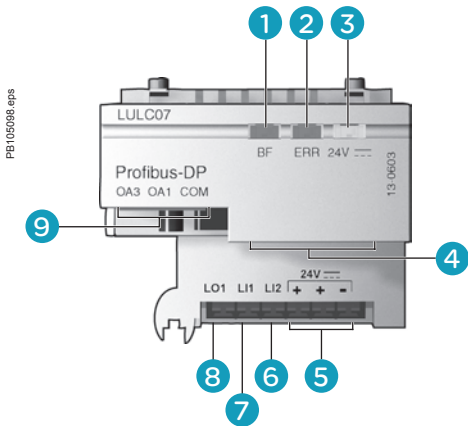
(1) This "date code" is made up as follows:
 2T or 2C: factory code.
 04, 05, 06 and so on: year of manufacture.
 08: week.
 1: 1st day of the week.

How to get information on the design of a Advantys STB architecture and the choice of network accessories

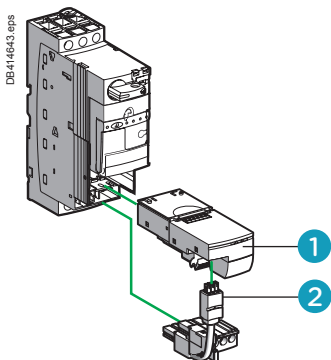
Consulter la librairie des documents téléchargeables sur le site schneider-electric.com en faisant une recherche sur le nom du protocole de transmission.

Bus-type cabling systems

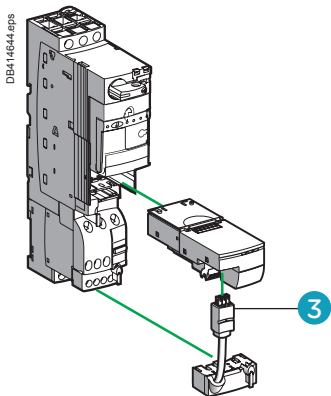
TeSys U components for Profibus DP bus



- 1 Two-colour LED indicating module status
- 2 Fault signalling LED
- 3 LED indicating 24 V supply ON for outputs OA1, OA3 and LO1
- 4 SUB-D connector for bus link
- 5 24 V supply connection
- 6 Discrete input
- 7 Discrete input
- 8 Discrete output
- 9 Outputs for starter-controller commands (non-reversing and reversing)



LUB + LUC ●●●BL + LUL C07 + LU9B N11L



LU2B + LUC ●●●BL + LUL C07 + LU9 MRL

When used in conjunction with the power base and control unit, communication module LULC07 allows TeSys U starter-controllers to be controlled via Profibus DP (Deported Periphery) bus. Communication module LULC07 is of the slave type.

Module Specifications

I/O terminal block

- Powered by external 24 V DC (power supply not included):
- 2 x configurable inputs for binary sensors
- 1 x 24 V DC output - 0.5 A local auxiliary command.

Connectors

- For TeSys U 24 V DC coil (common, direction 1, direction 2).
- For Profibus DP bus.

Signaling

- Com - Error - 24 V, by LED.

TeSys components

Description	Item	References
Profibus DP communication module	1	LULC07
Pre-wired connector: coil - LUB powerbase	2	LU9BN11L
Pre-wired connector: coil - LUB2B powerbase	3	LU9MRL

Components for connection to the bus and to the installation

The 24 V DC -Aux supply to Profibus DP modules LUL C07 must pass through power supply module LU9 GC7. LUL C07 modules must be connected to the LU9 GC7 splitter box in order to be powered. The number of TeSys U starter-controllers that can be powered by an LU9 GC7 module is limited by the maximum current (1.5 A) which it can deliver. The 24 V supply for the inputs/outputs must be provided separately..

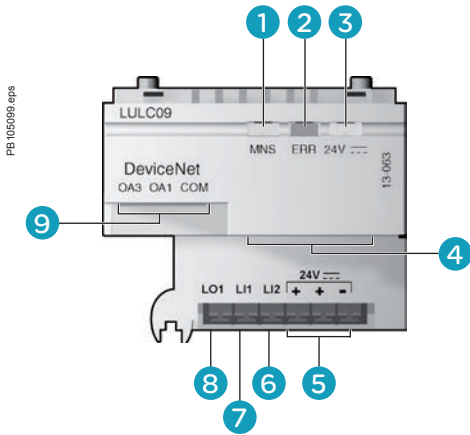
Description	Length (m)	References
Profibus DP power supply module	-	LU9GC7
Profibus DP connector	-	LU9AD7
Profibus DP cables 2-wire	100	TSXPBSCA100
	400	TSXPBSCA400
Profibus DP cables 4-wire	10	LU9RPB010
	100	LU9RPB100
	400	LU9RPB400

How to get information on the design of a Profibus DP architecture and the choice of network accessories

Consult the library of downloadable documents on schneider-electric.com by searching on the name of the communication protocol.

Bus-type cabling systems

TeSys U components for DeviceNet bus



FB 105099 eps

- 1 LED indicating module status
- 2 Fault signalling LED
- 3 LED indicating 24 V supply ON for outputs OA1, OA3 and LO1 and 24 V bus
- 4 DeviceNet connector for bus link
- 5 24 V supply connection
- 6 Discrete input
- 7 Discrete input
- 8 Discrete output
- 9 Outputs for starter-controller commands (non-reversing and reversing)

When used in conjunction with the power base and control unit, communication module LULC09 allows TeSys U starter-controllers to be controlled via DeviceNet bus. Communication module LUL C09 is of the slave type.

Module Specifications

I/O terminal block

- Powered by external 24 V DC (power supply not included):
- 2 x configurable inputs for binary sensors
- 1 x 24 V DC output - 0.5 A local auxiliary command.

Connectors

- For TeSys U 24 V DC coil (common, direction 1, direction 2).
- For DeviceNet bus.

Signaling

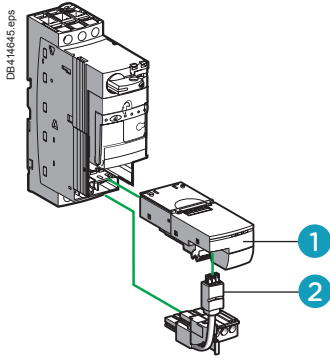
- Com - Error - 24 V , by LED.

Tesys components

Description	Item	References
DeviceNet communication module	1	LULC09
Pre-wired connector: coil - LUB powerbase	2	LU9BN11L
Pre-wired connector: coil - LUB2B powerbase	3	LU9MRL

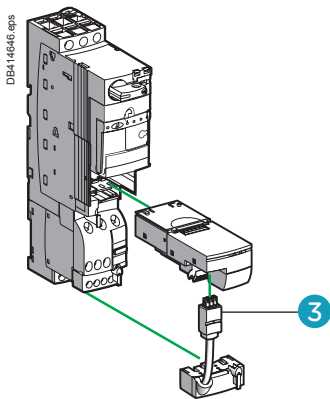
How to get information on the design of a DeviceNet architecture and the choice of network accessories

Consult the library of downloadable documents on schneider-electric.com by searching on the name of the communication protocol.



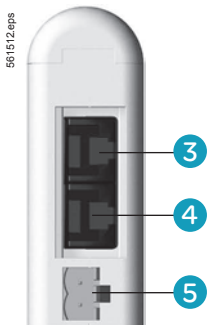
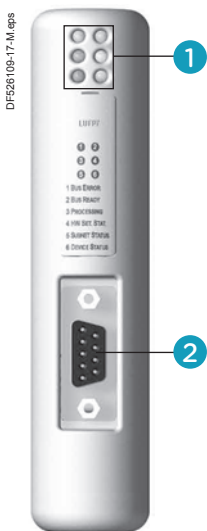
DB4 14645 eps

LUB + LUC ●●●BL + LUL C07 + LU9B N11L



DB4 14646 eps

LU2B + LUC ●●●BL + LUL C07 + LU9 MRL



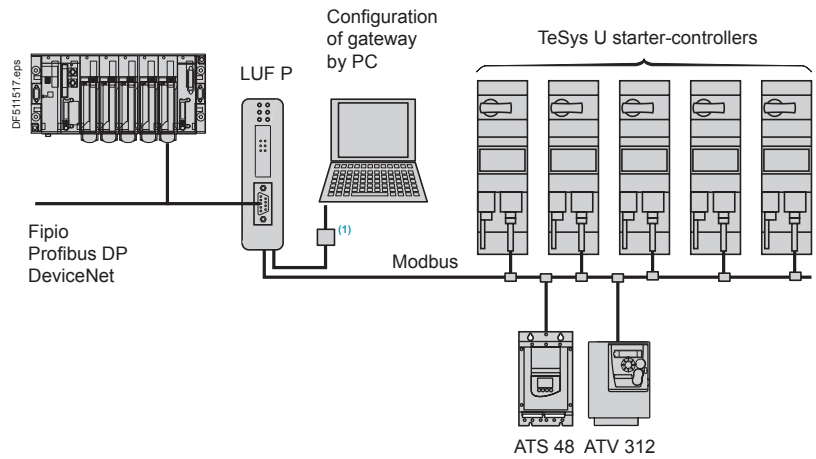
Presentation

Communication gateways LUF P allow connection between the Modbus serial link and Fipio, Profibus DP or DeviceNet field buses.

After configuration, these gateways manage information which can be accessed by the Modbus serial link and make this information available for read/write functions (command, monitoring, configuration and adjustment) on the field buses.

An LUF P communication gateway consists of a box which can be clipped onto a 35 mm omega rail, allowing connection of up to 8 Slaves connected on the Modbus serial link.

Example of architecture



Communication gateway LUF P

Description	Reference
Fipio / Modbus gateway	LUF P1
Profibus DP / Modbus gateway	LUF P7
DeviceNet / Modbus gateway	LUF P9

Description

Front panel of the product

- ① LED indicating :
 - communication status of the Modbus serial links,
 - gateway status,
 - communication status of the Fipio, Profibus DP or DeviceNet bus.
- ② Connectors for connection to Fipio, Profibus DP or DeviceNet buses.

Underside of product

- ③ RJ45 connector for connection of the Modbus serial link
- ④ RJ45 connector for link to a PC
- ⑤ ⎓ 24 V power supply

Software set-up

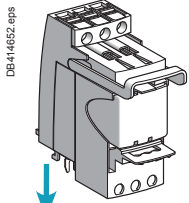
For the Fipio bus, software set-up of the gateway is performed using either PL7 Micro/Junior/Pro software or ABC Configurator software.

For the Profibus DP and DeviceNet buses, software set-up is performed using ABC Configurator.

This software is included in the TeSys U user's manual.

(1) Connection kit for PowerSuite software workshop.

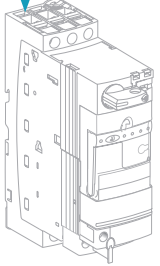
Current limiter blocks and accessories



PB113546.eps

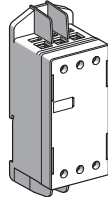


LUA LF1

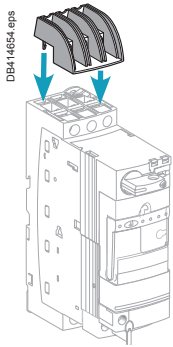


LUA LB1

DB414653.eps



LUA LB920



LUA LB920

Short-circuit current limiter block

To be connected in series and upstream of a TeSys U starter-controller . It increases its ability to withstand the short circuit current from 50 kA to 100 or 130 kA under 400 V.

Principle: under the action of a short-circuit, the opening of two contacts of each phase of the limiter creates a resistive arc. The current then decreases to a value tolerable by a TeSys U power base.

Limiter blocks and accessories

Description	Breaking capacity Iq (kA)		Mounting	Unit reference
	≤ 440 V	690 V		
Limiter-disconnector (1 x LUAFL1 cartridge supplied)	130	70	Direct on power base	LUALB1 ⁽¹⁾
Limiter	100	35	Separate	LA9LB920 ⁽²⁾
limiter cartridge for LUALB1	130	70	Limiter-disconnector	LUALF1

⁽¹⁾ Must be connected to one power base only.

⁽²⁾ Can be connected to multiple power bases in parallel, max total current 63 A.

Phase barrier

Ensures a complementary electrical insulation between phases.

690 V AC network: compulsory.

440 V AC network: compulsory when assembling a UL508 type E compliant motor starter (Self Protected Starter).

Description	Use	Mounting	Reference
Phase separator	LUB or LU2B 12 or 120 LUB or LUB2B 32 or 320 LUA LB1	Live terminals L1, L2, L3	LU9SP0

Clip-in labels

Can be clipped on any TeSys U power base, on LU6M B0●● inverter block, and Linergy HK busbar system.

Marking accessory

Description	Sold by lot of	Reference per unit
Clip-in label 8 x 18 mm	100	LAD90



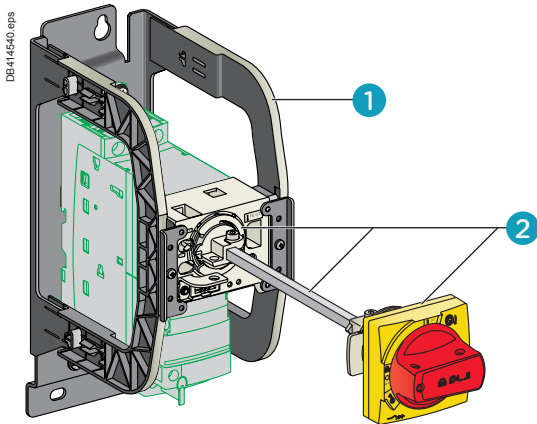
LU9ET1S

Safety-chain identification - Red label

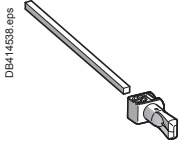
The red sticker is dedicated to TeSys U LUCA, LUCB, LUCC, LUCD and LUCL control units.

Description	Reference per unit
Retrofit safety-chain identification sticker	LU9ET1S

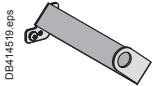
Handles and components for rotary control



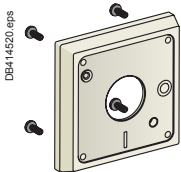
LUA PN21 mounting kit



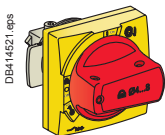
GVA PA1 long shaft



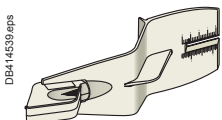
GVA PK12 shaft support plate for deep enclosure



GVAPP1 spacer base (retrofit accessory)



GVA PR54 red handle, IP 54



GVAPL01 "Laser square" plotting tool

Extended rotary handle

Allows a circuit breaker or a TeSys U starter-controller installed in back of an enclosure to be operated from the front panel.

The rotary handle can be black or red/yellow, IP54 or IP65. It includes a function for locking the circuit breaker or the starter in the O (OFF) or I (ON) position (depending on the type of rotary handle) by means of up to 3 padlocks with a shank diameter of 4 to 8 mm.

The extension shaft must be adjusted to the depth of the enclosure.

The IP54 rotary handle is fixed with a nut (Ø22) to make it easier to assemble.

Mounting kit

① TeSys U Power base bracket; its horseshoe shaped sides hold the rotary mechanism facing the original handle.

② Mechanism, shaft and handle; the shaft enters the handle attached to the door during closing.

Long shaft

■ to be cut to the required length. Equipped with a connection endpiece.

Shaft support plate for deep enclosure

■ Provides horizontal guiding of the shaft, when the door is open.

Spacer base (retrofit accessory)

■ Fixed on a side of the box, for heightening an GVA P●●● handle.

Handle

■ Delivered as a single unit, to be fitted on a side of the enclosure.

Note: references below are suitable for TeSys U power bases after 2004.

"Laser Square" Tool

■ On the principle of an angle extended with a laser beam, the "Laser Square" facilitates tracing the piercing marks on the door or the sides of an enclosure.

"Safety" stickers

■ Marking: Electrical hazard, etc.

Description	Tripping indication	Reference
Mounting kit	Black handle, with error status, IP54	● LU9APN21
	Red handle, with error status, IP54	● LU9APN22
	Red handle, without error status, IP65	- LU9APN24
Separate elements	Long shaft = 315 mm	- GVAPA1
	Shaft (≥ 300 mm) support plate for deep enclosure	- GVAPK12
	Spacer base	- GVAPP1
	Black handle, IP54	● GVAPB54
	Red handle, IP54	● GVAPR54
	Red handle, IP65	● GVAPB65
Tool	"Laser square" plotting tool	GVAPL01
"Safety" stickers	French (x10)	GVAPSFR
	English (x10)	GVAPSEN
	German (x10)	GVAPSDE
	Spanish (x10)	GVAPSES
	Chinese (x10)	GVAPSCN
	Portuguese (x10)	GVAPSPT
	Russian (x10)	GVAPSRU
	Italian (x10)	GVAP SIT

Handles and components for MCC control drawers

PB11807_104.eps



MCC drawers (Motor Control Center)

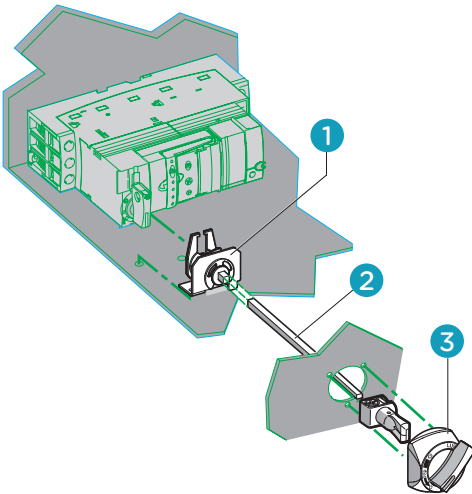
The drawers are composed of:

- a fixed part, in the frame of the panel,
- a fully withdrawable part, integrating the protection, control and automation components.

With a height of 3/4/6/8/12/18/24/36 modules, they allow the assembling of motor protection/control feeders:

- Direct, one direction of rotation
- Direct, 2 directions of rotation
- Star-delta
- Dahlander (2 speeds)
- 2-speed, separate winding
- Motor drives from 0 to 500 kW
- Soft starters of 0 to 75 kW.

DB123404.eps



Mounting kit and handle for MCC drawer

Together, this provides manual control of a TeSys U starter-controller from the front face of the drawer.

As the clamping part on top of TeSys U control pad is open, the kit may be used on TeSys U power bases before 2005.

Mounting kit + small handle

Description	Item	Reference
Handle with mounting kit for MCC drawer	1 + 2 + 3	LU9AP20

Technical Data for Designers

Contents

Characteristics	A3/38 to A3/45
Curves	A3/46 to A3/49
Selection	A3/50 to A3/51
Dimensions	A3/52 to A3/53
Schemes	A3/54 to A3/65
TeSys U and Altistart	A3/66 to A3/81

TeSys motor starters open version TeSys U starter-controllers

TeSys U

Environment			
Product certifications			UL, CSA, CCC, GOST, ASEFA. ABS, BV, DNV, GL, LROS. ATEX.
Conforming to standards			IEC/EN 60947-6-2, CSA C22-2 N° 14, Type E UL 508 type E: with phase barrier LU9 SP0
Rated insulation voltage (Ui)	Conforming to IEC/EN 60947-1, overvoltage category III, degree of pollution: 3 Conforming to UL508, CSA C22-2 n°14	V	690
		V	600
Rated impulse withstand voltage (Uimp)	Conforming to IEC/EN 60947-6-2	kV	6
Safety separation of circuits SELV	Conforming to IEC/EN 60947-1 appendix N	V	Between the control or auxiliary circuit and the main circuit: 400 Between the control and auxiliary circuits: 400
Degree of protection Conforming to IEC/EN 60947-1 (protection against direct finger contact)	Front panel outside connection zone		IP 40
	Front panel and wired terminals		IP 20
	Other faces		IP 20
Protective treatment	Conforming to IEC/EN 60068		"TH"
	Conforming to IEC/EN 60068-2-30	Cycles	12
	Conforming to IEC/EN 60068-2-11	h	48
Ambient air temperature around the device	Storage	°C	-40...+85
	Operation	°C	Power bases and standard and advanced control units: -25... +70. (At temperatures above 60°C and up to 70°C, for starter-controller LUB32, leave a minimum gap of 9 mm between products). Power bases and multifunction control units: -25...+60. (At temperatures above 45 °C, leave a minimum gap of 9 mm between products. At temperatures above 55 °C and up to 60 °C, leave a gap of 20 mm between products.)
Maximum operating altitude		m	2000
Operating positions	In relation to normal vertical mounting plane		
Flame resistance	Conforming to UL 94		V2
	Conforming to IEC/EN 60695-2-12	°C	960 (parts supporting live components) °C 650
Environmental restrictions			Cadmium and silicone-free, recyclable
Shock resistance 1/2 sine wave = 11 ms	Conforming to IEC/EN 60068-2-27 ⁽¹⁾		Power poles open: 10 gn Power poles closed: 15 gn
Vibration resistance 5...300 Hz	Conforming to IEC/EN 60068-2-6 ⁽¹⁾		Power poles open: 2 gn Power poles closed: 4 gn ⁽²⁾
Resistance to electrostatic discharge	Conforming to IEC/EN 61000-4-2	kV	In open air: 8 - Level 3
		kV	On contact: 8 - Level 4
Immunity to radiated high-frequency disturbance	Conforming to IEC/EN 61000-4-3	V/m	10 - Level 3
Immunity to fast transient currents	Conforming to IEC/EN 61000-4-4	kV	All circuits except for serial link: 4 - Level 4
		kV	Serial link: 2 - Level 3
Immunity to dissipated shock waves	Conforming to IEC/EN 60947-6-2 Uc ~ 24...240 V, Uc --- 48...220 V Uc = 24 V ---	kV	Common mode Serial mode
		kV	2 1
Immunity to conducted high-frequency disturbance	Conforming to IEC/EN 61000-4-6	V	Not applicable 10
Radiated emission and conducted	Conforming to CISPR 11 and EN 55011		Class A

⁽¹⁾ Without modifying the contact states, in the most unfavourable direction.

⁽²⁾ 2 gn with Advantys STB or CANopen communication modules.

Power circuit connection characteristics

Connection to Ø4 mm screw clamp terminals			LUB 12 + LUCA or LUCB or LUCC or LUCD	LUB 32 + LUCA or LUCB or LUCC or LUCD	LUB 12 + LUCM	LUB 32 + LUCM	LU2M LU6M
Power base, control unit or reverser block type							
Flexible cable without cable end	1 conductor	mm ²	2.5...10	2.5...10	2.5...10	2.5...10	2.5...10
	2 conductors	mm ²	1.5...6	1.5...6	1.5...6	1.5...6	1.5...6
Flexible cable with cable end	1 conductor	mm ²	1...6	1...6	1...6	1...6	1...6
	2 conductors	mm ²	1...6	1...6	1...6	1...6	1...6
Solid cable without cable end	1 conductor	mm ²	1...10	1...10	1...10	1...10	1...10
	2 conductors	mm ²	1...6	1...6	1...6	1...6	1...6
Screwdriver			Philips n° 2 or flat screwdriver: Ø6 mm				
Tightening torque			N.m	1.9...2.5	1.9...2.5	1.9...2.5	1.9...2.5

Control circuit connection characteristics

Connection to Ø3 mm screw clamp terminals			LUB 12 + LUCA or LUCB or LUCC or LUCD	LUB 32 + LUCA or LUCB or LUCC or LUCD	LUB 12 + LUCM	LUB 32 + LUCM	LU2M LU6M
Flexible cable without cable end	1 conductor	mm ²	0.75...1.5	0.75...1.5	0.75...1.5	0.75...1.5	0.75...1.5
	2 conductors	mm ²	0.75...1.5	0.75...1.5	0.75...1.5	0.75...1.5	0.75...1.5
Flexible cable with cable end	1 conductor	mm ²	0.34...1.5	0.34...1.5	0.34...1.5	0.34...1.5	0.34...1.5
	2 conductors	mm ²	0.34...1.5	0.34...1.5	0.34...1.5	0.34...1.5	0.34...1.5
Solid cable without cable end	1 conductor	mm ²	0.75...1.5	0.75...1.5	0.75...1.5	0.75...1.5	0.75...1.5
	2 conductors	mm ²	0.75...1.5	0.75...1.5	0.75...1.5	0.75...1.5	0.75...1.5
Screwdriver			Philips n° 1 or flat screwdriver: Ø5 mm				
Tightening torque			N.m	0.8...1.2	0.8...1.2	0.8...1.2	0.8...1.2

Control circuit characteristics

Rated voltage of control circuit	~ 50/60 Hz	V	24...240	24...240	–	–	–
	–	V	24...220	24...220	24	24	–
Voltage limits	– 24 V ⁽¹⁾	V	20...27	20...27	20...28	20...28	–
	Operation	V	20...26.5	20...26.5	–	–	–
Drop-out	~ 24 V	V	~ 38.5...72	~ 38.5...93	–	–	–
	~ or – 48...72 V	V	~ 88...264	~ 88...264	–	–	–
	~ 110...240 V	V	– 88...242	– 88...242	–	–	–
	– 110...220 V	V	– 88...242	– 88...242	–	–	–
	– 24 V	V	14.5	14.5	14.5	14.5	–
	~ 24 V	V	14.5	14.5	–	–	–
Typical consumption	~ or – 48...72 V	V	29	29	–	–	–
	~ 110...240 V, – 110...220 V	V	55	55	–	–	–
	– 24 V	mA	130	220	150	200	120
	I max while closing	mA	140	220	–	–	2360
	~ or – 48...72 V	mA	280	280	–	–	2300
	~ 110...240 V, – 110...220 V	mA	280	280	–	–	1000
I rms sealed	– 24 V	mA	60	80	70	75	120
	~ 24 V	mA	70	90	–	–	⁽²⁾
	~ or – 48...72 V	mA	35	45	–	–	⁽²⁾
	~ 110...240 V, – 110...220 V	mA	35	25	–	–	⁽²⁾
Heat dissipation		W	2	3	1.7	1.8	–
Operating time	Closing	ms	24 V: 70; 48 V: 60; ≥ 72 V: 50		75	65	–
	Opening	ms	35	35	35	35	–
Resistance to micro-breaks		ms	3	3	3	3	–
Resistance to voltage dips		IEC/EN 61000-4-11		At least 70 % of U _c for 500 ms			
Mechanical durability		In millions of operating cycles		15	15	15	15
Maximum operating rate		In operating cycles per hour		3600	3600	3600	3600

Main pole characteristics

Number of poles			3	3	3	3	–
Isolation conforming to IEC/EN 60947-1	Possible		Yes	Yes	Yes	Yes	–
	Padlocking		1 padlock with Ø6.9 mm shank				–
Rated thermal current		A	12	32	12	32	–
Rated operational current (U _e ≤ 440V)	To IEC/ EN 60947-6-2	Category AC-41	θ ≤ 70°C: 12A	θ ≤ 70°C: 32A	θ ≤ 55°C: 12A	θ ≤ 55°C: 32A	–
	Category AC-43	θ ≤ 70°C: 12A	θ ≤ 70°C: 32A	θ ≤ 55°C: 12A	θ ≤ 55°C: 32A	–	
Rated operational voltage		V	690 ⁽³⁾	690 ⁽³⁾	690 ⁽³⁾	690 ⁽³⁾	–
Frequency limits		Hz	40...60	40...60	40...60	40...60	–
Power dissipated in the power circuits	Operational current	A	3 6 9 12	18 25 32	–	–	–
	Power dissipated in all three poles	W	0.1 0.3 0.6 1.1	2.4 4.6 7.5	–	–	–
Rated breaking capacity on short-circuit	V	230	440	500	690	–	
	kA	50	50	10	4	–	
Total breaking time		ms	2	2	–	–	
Thermal limit		With I _{sc} max on 440 V	kA ² s	90	120	90	120

(1) Voltage with maximum ripple of ±10 %.

(2) No consumption sealed.

(3) For 690 V, use phase barrier LU9 SP0.

TeSys motor starters open version

TeSys U starter-controllers

Reversing power bases and auxiliary contacts

TeSys U

Specific characteristics of power bases LU2B and reverser blocks LU2M or LU6M

Duration of inrush phase	~ 50/60 Hz	ms	25
	---	ms	15
Maximum operating time	Without change of direction	ms	75
	With change of direction	ms	150

General characteristics of auxiliary contacts

Conventional thermal current (Ith)	For ambient temperature $\vartheta < 70\text{ }^\circ\text{C}$	A	5
Frequency of the operational current		Hz	Up to 400
Minimum switching capacity $\lambda = 10^{-8}$	U min	V	17
	I min	mA	5
Short-circuit protection	Conforming to IEC/EN 60947-5-1	A	gG fuse: 4
Short-time rating	Permissible for	1 s	A 30
		500 ms	A 40
		100 ms	A 50
Insulation resistance		m Ω	10
Non-overlap time	Guaranteed between N/C and N/O contacts	ms	2 (on energisation and on de-energisation)

Specific characteristics of auxiliary contacts built-into the power base

Linked contacts	Conforming to IEC/EN 60947-4-1		Each power base has 1 N/O contact and 1 N/C contact which are mechanically linked
Mirror contact	Conforming to IEC/EN 60947-1		The N/C contact fitted in each power base reliably represents the state of the power contacts (safety scheme)
Rated operational voltage (Ue)		V	Up to ~ 690; --- 250
Rated insulation voltage (Ui)	Conforming to IEC/EN 60947-5-1	V	690
	Conforming to UL, CSA	V	600

Specific characteristics of auxiliary contacts in modules LUF N, of auxiliary contacts LUA1 and of reverser blocks LU2M and LU6M

Rated operational voltage (Ue)		V	Up to ~ 250; --- 250
Rated insulation voltage (Ui)	Conforming to IEC/EN 60947-5-1	V	250
	Conforming to UL, CSA	V	250

Rated operational power of contacts

Conforming to IEC/EN 60947-5-1

a.c. supply, categories AC-14 and AC-15

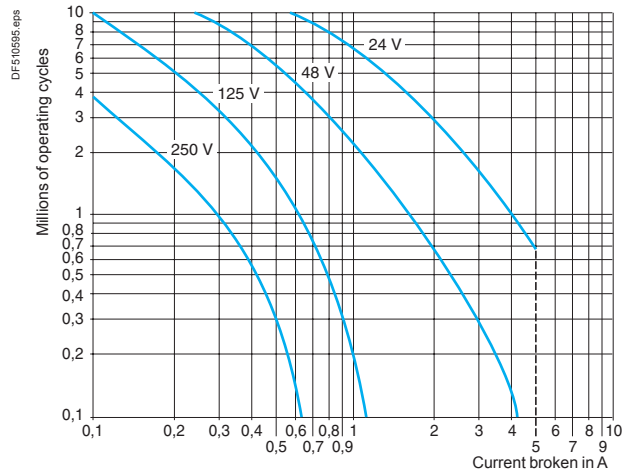
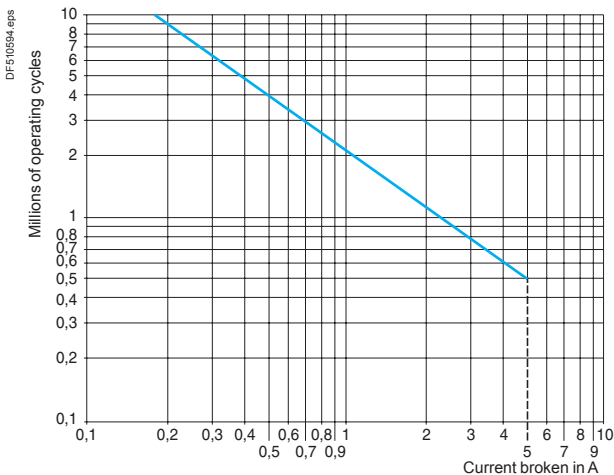
Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \varphi = 0.7$) = 10 times the power broken ($\cos \varphi = 0.4$)

	V	24	48	115	230	400	440	600
1 million operating cycles	VA	60	120	280	560	960	1050	1440
3 million operating cycles	VA	16	32	80	160	280	300	420
10 million operating cycles	VA	4	8	20	40	70	80	100

d.c. supply, category DC-13

Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

	V	24	48	125	250
W		120	90	75	68
W		70	50	38	33
W		25	18	14	12



Characteristics of standard control units LUCA

Protection	Motor type		3-phase
	Conforming to standard		IEC/EN 60947-6-2, UL 508, CSA C22-2 n°14
Overload protection	Tripping class conforming to UL 508, IEC/EN 60947-6-2		10
	Frequency limits of the operational current	Hz	40...60
	Temperature compensation	°C	-25...+70
	Protection against phase imbalance		Yes
Short-circuit protection	Tripping threshold		14.2 x I _r (setting current)
	Tripping tolerance		±20 %

Characteristics of advanced control units LUCB, LUCC and LUCD

Control unit type		LUCB	LUCC	LUCD
Protection	Motor type	3-phase	Single-phase	3-phase
	Conforming to standard	IEC/EN 60947-6-2, UL 508, CSA C22-2 n°14	IEC/EN 60947-6-2, UL 508, CSA C22-2 n°14	IEC/EN 60947-6-2, UL 508, CSA C22-2 n°14
Overload protection	Tripping class conforming to UL 508, IEC/EN 60947-6-2	10	10	20
	Frequency limits of the operational current	Hz	40...60	40...60
	Temperature compensation	°C	-25...+70	-25...+55
	Protection against phase imbalance		Yes	–
Short-circuit protection	Tripping threshold	14.2 x I _r max.	14.2 x I _r max.	14.2 x I _r max.
	Tripping tolerance	±20 %	±20 %	±20 %

Characteristics of multifunction control units LUCM

Protection	Motor type		Parameters can be set: single-phase or 3-phase
	Conforming to standard		IEC/EN 60947-6-2, UL 508
Overload protection	Tripping class conforming to UL 508, IEC/EN 60947-6-2		5, 10, 15, 20, 25, 30 (selectable)
	Frequency limits of the operational current	Hz	50...60
	Temperature compensation	°C	-25...+55
Communication interface for terminal on enclosure door	Physical interface		RS 485 multi-drop
	Connections		RJ45 on front panel
	Protocol		Modbus RTU
	Maximum transmission speed	bit/s	19 200 (self-configuration up to this value)
	Maximum return time	ms	200
Display	Type		LCD, 2 lines of 12 characters
	Language version		Multilanguage (English, French, German, Italian, Spanish)
	Precision		±5 %
	Resolution		1 % of I _r
Auxiliary supply	External type	V	~ 24, with maximum ripple of ±10 %.
	Heat dissipation	W	0.8

Configuration table for protection devices and alarms on multifunction control units LUCM

	Tripping	Alarm	Adjustment of tripping threshold		Adjustment of time before tripping		Adjustment of alarm threshold	
	Factory setting	Factory setting	Range	Default value	Range	Default value	Range	Default value
Overcurrent	Activated ⁽¹⁾	–	3...17 I _r	14.2	–	–	–	–
Overload	Activated ⁽¹⁾	Activated	0.5...32 A ⁽²⁾	I _r min	Class: 5...30	5	10...100% of the thermal state	85 %
Earth fault	Activated	Activated	0.2...5 I _r min	0.3 I _r min	0.1...1.2 s	0.1 s	0.2...5 I _r min	0.3 I _r min
Phase imbalance	Activated	Activated	10...30 %	10 %	0.2...20 s	5 s	10...30 %	10 %
Torque limitation	Deactivated	Deactivated	1...8 I _r	2 I _r	1...30 s	5 s	1...8 I _r	2 I _r
No-load running	Deactivated	Deactivated	0.3...1 I _r	0.5 I _r	1...200 s	10 s	0.3...1 I _r	0.5 I _r
Long starting time	Deactivated	Deactivated	1...8 I _r	I _r	1...200 s	10 s	1...8 I _r	I _r

Configuration of additional functions on multifunction control units LUCM

	Factory setting	Setting range
Reset	Manual	Manual, automatic or remote
Time before reset	120 s	1...1000 s
Type of load	3-phase motor	3-phase motor, single-phase motor
	Self-cooled	Self-cooled, force cooled
Language	English	English, French, German, Italian, Spanish
Display	Average current	Average current, thermal state of motor, current in phase 1 / 2 / 3, earth leakage current, phase imbalance, cause of last 5 faults

(1) This function cannot be deactivated.

(2) The setting range depends on the rating of the control unit used.

Characteristics of limiter-disconnector LUA LB1

Rated insulation voltage (Ui) conforming to standard IEC/EN 60947-1	V	690
Conventional thermal current (Ith) conforming to standard IEC/EN 60947-1	A	32
Operating threshold I rms	kA	50
Breaking capacity	V	440 690
	kA	130 70
Mounting		Directly on the upstream terminals of the starter-controller
Cabling		
Solid cable	1 conductor	mm ² 1.5...10
	2 conductors	mm ² 1.5...6
Flexible cable without cable end	1 conductor	mm ² 1...10
	2 conductors	mm ² 1...6
Flexible cable with cable end	1 conductor	mm ² 1...6
	2 conductors	mm ² 1...6
Screwdriver		Phillips n°2 or flat screwdriver Ø6 mm
Tightening torque	N.m	1.9...2.5

Characteristics of current limiter LA9 LB920

Rated insulation voltage (Ui) conforming to standard IEC/EN 60947-1	V	690
Conventional thermal current (Ith) conforming to standard IEC/EN 60947-1	A	63
Operating threshold I rms	A	1000
Breaking capacity	V	440 690
	kA	100 35
Mounting		Separate
Cabling		
Solid cable	1 conductor	mm ² 1.5...25
	2 conductors	mm ² 1.5...10
Flexible cable without cable end	1 conductor	mm ² 1.5...25
	2 conductors	mm ² 2.5...10
Flexible cable with cable end	1 conductor	mm ² 1.5...16
	2 conductors	mm ² 1.5...4
Screwdriver		Phillips n°2 or flat screwdriver Ø6 mm
Tightening torque	N.m	2.2

Characteristics of thermal overload alarm function modules LUF W10

Activation threshold		Fixed at 88 % of the thermal tripping state
Hysteresis between activation and switching off		5 %
Display		By LED on front panel
Supply		Powered by the control unit
Discrete output characteristics	Type	N/O contact
	AC-15	230 V max; 400 VA 100 000 operating cycles
	DC-13	24 V; 50 W 100 000 operating cycles
Conventional thermal current (Ith)	For ambient temperature $\theta < 70\text{ }^{\circ}\text{C}$	A 2
Short-circuit protection	Conforming to IEC/EN 60947-5-1	A gG fuse: 2

Characteristics of thermal overload fault signalling and reset modules

Module type		LUF DH11	LUF DA01	LUF DA10
Fault signalling		By LED on front panel		
External power supply	V	~/- 24... 240		
Module consumption	mA	7 at ~ 24		
		1.1 at ~ 240		
Discrete outputs	Type	1 N/C+ 1 N/O	1 N/C	1 N/O
	AC-15	230 V max; 400 VA 100 000 operating cycles		
	DC-13	24 V; 50 W 100 000 operating cycles		
Conventional thermal current (Ith)	For ambient temperature $\theta < 70\text{ }^{\circ}\text{C}$	A	2	
Short-circuit protection	Conforming to IEC/EN 60947-5-1	A	gG fuse: 2	
Reset input	Conductor c.s.a.	mm ²	0.2 min	
	Length	m	500 (R = 50 Ω , L = 52.8 mH, Cp = 93 pF)	

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TeSys U starter-controllers

Function modules and communication modules

Characteristics of motor load indication function module LUF V2

Analogue output			4 - 20 mA
Signal delivered			Value of I average/I _r ratio within the range of 0 to 2 for LUCB and LUCD Value of I average/I _r ratio within the range of 0 to 3 for LUC C
Load impedance	Minimum	kΩ	–
	Maximum	Ω	500
	Typical	Ω	100
Signal characteristics with advanced control unit	Precision		±6 %
Signal characteristics with multifunction control unit	Precision		±10 %
	Resolution		1 % of I _r
Supply			External --- 24 V

Characteristics of AS-Interface communication modules ASILUF C5 and ASILUF C51

Module type		ASILUF C5	ASILUF C51
Product certification		AS-Interface V2.1 n° 52901	AS-Interface V2.1 n° 52303
AS-Interface profile		7.D.F.0	7.A.7.E
Ambient air temperature	°C	Operation -25...+70	
Cycle time	ms	5	10
Addressing		31 slaves	62 slaves
AS-Interface supply	V	29.5...31.5	
Current consumption	On the AS-Interface bus	mA	Normal operation: 25
		mA	Fault condition: 30
	On 24 V supply for the outputs	mA	200
Auxiliary supply	V	--- 24 ±30 %	
Number of outputs		2 dedicated to starter-controller coil operation	
Switching capacity of the solid state outputs		0.5 A/24 V (outputs protected against short-circuits)	
Indication/diagnostics		By 2 LEDs on front panel	

Characteristics of Modbus communication module LUL C03

Module type		LUL C031	LUL C033
Physical interface		RS 485 multi-drop	
Connections		RJ45 on front panel	
Protocol		Modbus RTU	
Maximum transmission speed	bit/s	19 200 (self-configuration up to this value)	
Maximum return time	ms	30	
Addressing		By switches: from 0...31	
Ambient air temperature	°C	Operation -25...+55	
Discrete inputs	Number	–	2 (to be assigned according to the configuration)
	Supply	V	--- 24
	Input current	mA	–
Nominal input values	Voltage	V	--- 24 (positive logic)
	Current	mA	7
Response time	Change to state 1	ms	10 (±30 %)
	Change to state 0	ms	10 (±30 %)
Input type		Resistive	
Solid state outputs	Number		3, of which 2 dedicated to starter-controller coil operation
	Supply	V	--- 24
	Max. current	mA	500
Protection	gl fuse	A	1
Switching capacity			0.5 A/24 V
Indication/diagnostics		By 3 LEDs on front panel	

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Function modules and communication modules

Characteristics of CANopen, Profibus DP and DeviceNet communication modules					
Communication module			Profibus DP LUL C07	CANopen LUL C08	DeviceNet LUL C09
Services	Conformity class		NA	S 20 (Schneider Electric)	NA
	Standard		Profibus DP	CIADS-301 V4.02 DR 303-2	IEC 62026-1, overvoltage category III, degree of pollution: 3
	Profile		LVSG V1.0 MS (Motor Starter) and MMS (Motor Management Starter)	–	ODVA (Open DeviceNet Vendor Association) MS (Motor Starter)
	Protocol		Profibus DP	CAN 2.0A (2B passive)	CAN 2.0A (2B passive)
	Address		1...125	0...127 (by switches)	0...63
Structure	Physical interface		9-way SUB-D male	9-way SUB-D female	"Open Style" connector
	Binary rate		9600 Kbits/s...12 Mbits/s	10, 20, 50, 125, 250, 500 and 1000 Kbits/s (by switches)	125...500 kbaud
	Cables		2 shielded twisted pairs		
Supply for the discrete outputs and control	--- 24 V	V	20...28		
	Current consumption	A	1.5 (max)		
	Protection by gl fuse	A	2		
Ambient air temperature		°C	Operation -25...+55		
Logic inputs	Number		2 (to be assigned according to the configuration)		
	Supply		V	--- 24	
	Input current		mA	7	
	Nominal input values	Voltage	V	--- 24 (positive logic)	
		Current	mA	7	
	Response time	Change to state 1	ms	10 (±30 %)	
		Change to state 0	ms	10 (±30 %)	
Input type			Resistive		
Discrete outputs	Number		3, of which 2 dedicated to starter-controller coil operation		
	Max. current		mA	500	
	Short-circuit protection			Yes	
	Switching capacity			0.5 A / --- 24 V	
Indication/diagnostics			By 3 LEDs on front panel		
Characteristics of Advantys STB communication module LUL C15					
Physical interface			CAN		
Connections			Fire Wire		
Protocol			CAN 2.0 and CAN 2.B (passive mode)		
Transmission speed		kbit/s	800		
Addressing			Self-addressing		
Supply for the discrete outputs and control	--- 24 V	V	20...28		
	Current consumption	A	1.5 (max)		
	Protection by gl fuse	A	2		
Ambient air temperature		°C	Operation -25...+55		
Discrete inputs	Number		2 (to be assigned according to configuration)		
	Supply		V	--- 24	
	Input current		mA	7	
	Nominal input values	Voltage	V	--- 24 (positive logic)	
		Current	mA	7	
	Response time	Change to state 1	ms	10 (± 30 %)	
		Change to state 0	ms	10 (± 30 %)	
Input type			Resistive		
Discrete outputs	Number		3, of which 2 dedicated to starter-controller coil operation		
	Max. current		mA	500	
	Short-circuit protection			Yes	
	Switching capacity			0.5 A / --- 24 V	
Indication/diagnostics			By 3 LEDs on front panel		

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TeSys U starter-controllers

Function modules and communication modules

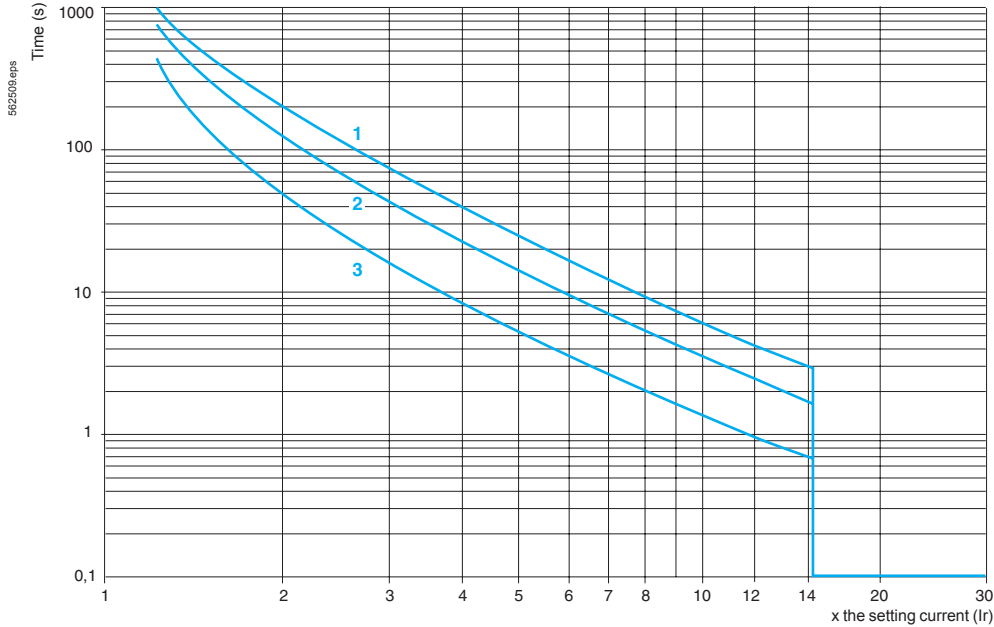
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Connection characteristics						
Module type			LUF W10, LUF DH11, LUF DA01 and LUF DA10	LUF V2	ASILUF C5 and ASILUF C51	
					Inputs and 24 V auxiliary supply	Outputs
Connectors	Pitch		5.08	3.81	5.08	3.81
Flexible cable without cable end	1 conductor	mm ²	0.2...1.5	0.14...1	0.2...1.5	0.14...1
	2 identical conductors	mm ²	0.2...1	0.14...0.75	0.2...1	0.14...0.75
Flexible cable with cable end	Without insulated ferrule	1 conductor	mm ²	0.25...1.5	0.25...1	0.25...1.5
		2 identical conductors	mm ²	0.25...1	0.25...0.34	0.25...1
	With insulated ferrule	1 conductor	mm ²	0.25...1.5	0.25...0.5	0.25...1.5
		2 identical conductors (Use a double cable end)	mm ²	0.5...1	0.5	0.5...1
Solid cable without cable end	1 conductor	mm ²	0.2...1.5	0.14...1	0.2...1.5	0.14...1
	2 identical conductors	mm ²	0.2...1	0.14...0.5	0.2...1	0.14...0.5
Conductor size	1 conductor		AWG 24... AWG 16	AWG 26... AWG 16	AWG 24... AWG 16	AWG 26... AWG 16
Tightening torque		N.m	0.5...0.6	0.20...0.25	0.5...0.6	0.20...0.25
Flat screwdriver		mm	3.5	2.5	3.5	2.5
Module type			LUL C031, LUL C033, LUL C08 and LUL C15	LUFC 00	LUL C09	
					Inputs and 24 V auxiliary supply	Connection on the bus
Connectors	Pitch		3.81	3.81	3.81	5 (Open Style) DeviceNet
Flexible cable without cable end	1 conductor	mm ²	0.14...1	0.14...1	0.14...1	0.2...2.5
	2 identical conductors	mm ²	0.14...0.75	0.14...0.75	0.14...0.75	0.5...1.5
Flexible cable with cable end	Without insulated ferrule	1 conductor	mm ²	0.25...1	0.25...1	0.25...2.5
		2 identical conductors	mm ²	0.25...0.34	0.25...0.34	0.25...1
	With insulated ferrule	1 conductor	mm ²	0.25...0.5	0.25...0.5	0.25...0.5
		2 identical conductors (Use a double cable end)	mm ²	0.5	0.5	0.75
Solid cable without cable end	1 conductor	mm ²	0.14...1	0.14...1	0.14...1	0.2...2.5
	2 identical conductors	mm ²	0.14...0.5	0.14...0.5	0.14...0.5	0.14...0.5
Conductor size	1 conductor		AWG 26... AWG 16	AWG 26... AWG 16	AWG 26... AWG 16	AWG 24... AWG 16
Tightening torque		N.m	0.20...0.25	0.20...0.25	0.20...0.25	0.5...0.6
Flat screwdriver		mm	2.5	2.5	2.5	3.5

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Tripping curves for control units LUCA, LUCB, LUCD

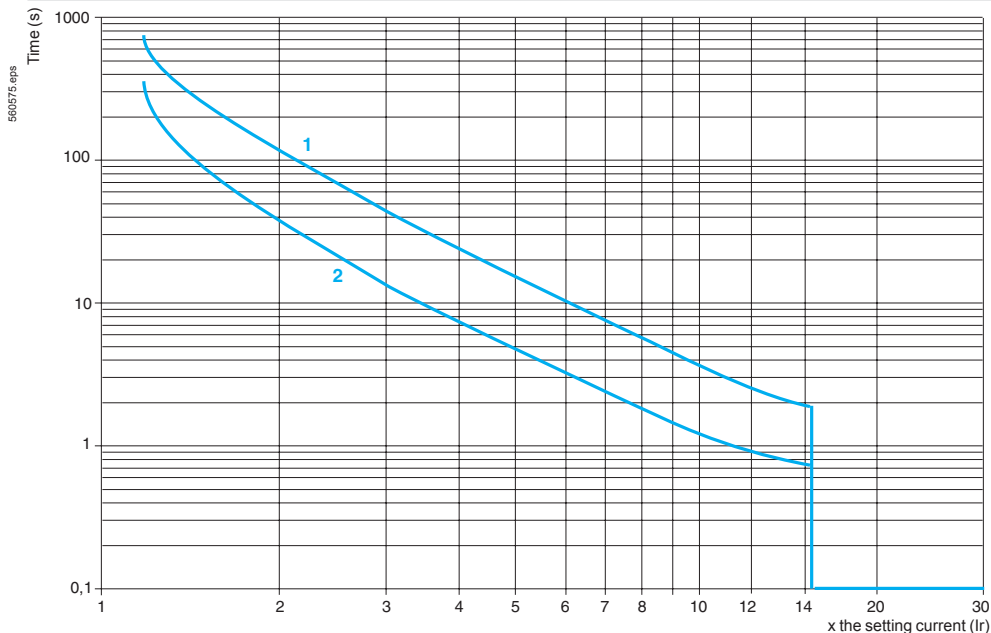
Average operating times at 20 °C according to multiples of the setting current, tolerance : $\pm 20\%$.



- 1 LUCD, 3 poles from cold state, class 20.
- 2 LUCA, LUCB, 3 poles from cold state, class 10.
- 3 LUCA, LUCB, LUCD, 3 poles from hot state.

Tripping curves for control units LUCC

Average operating times at 20 °C according to multiples of the setting current, tolerance : $\pm 20\%$.



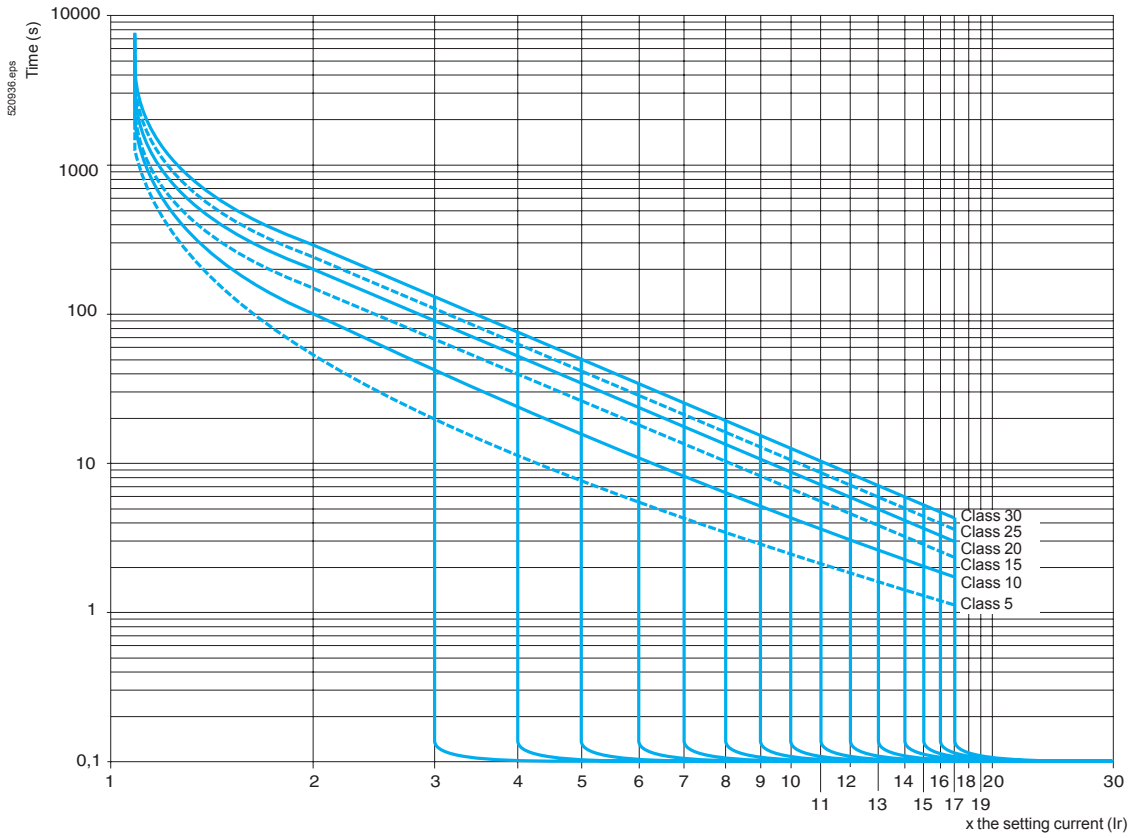
- 1 LUCC, single-phase, cold state.
- 2 LUCC, single-phase, hot state.

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Tripping curves for control units LUCM

Cold state curves

Average operating times at 20 °C according to multiples of the setting current, tolerance : ± 20 %.

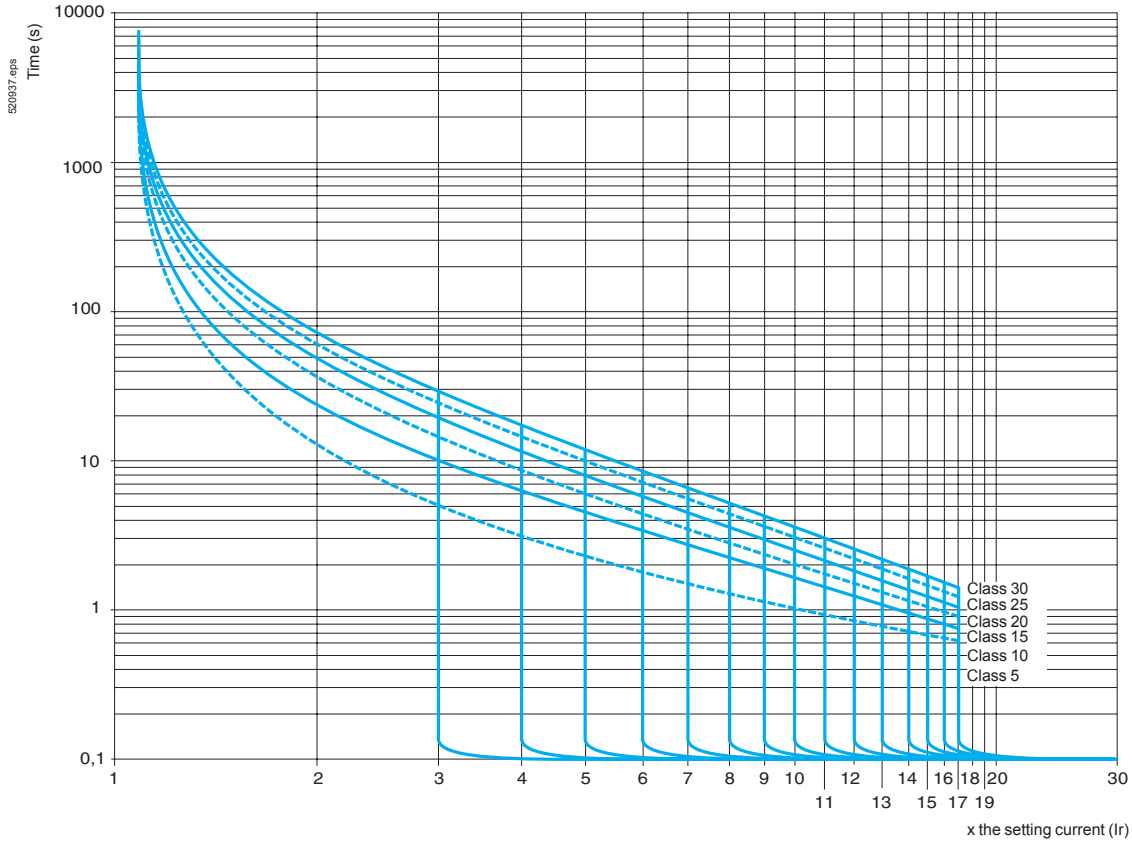


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Tripping curves for control units LUCM

Hot state curves

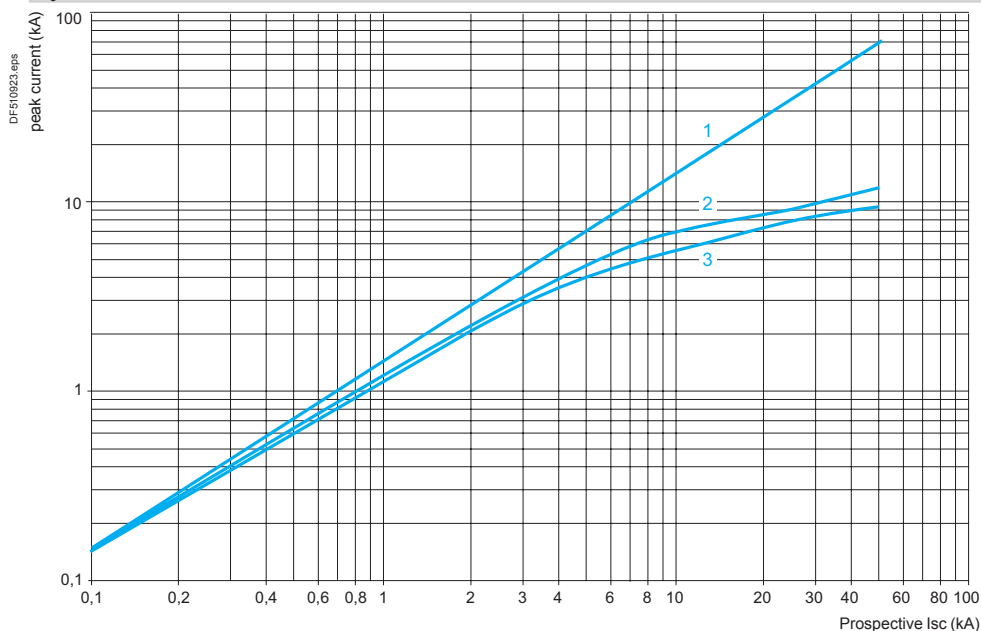
Average operating times at 20 °C according to multiples of the setting current, tolerance : ± 20 %



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Current limitation on short-circuit

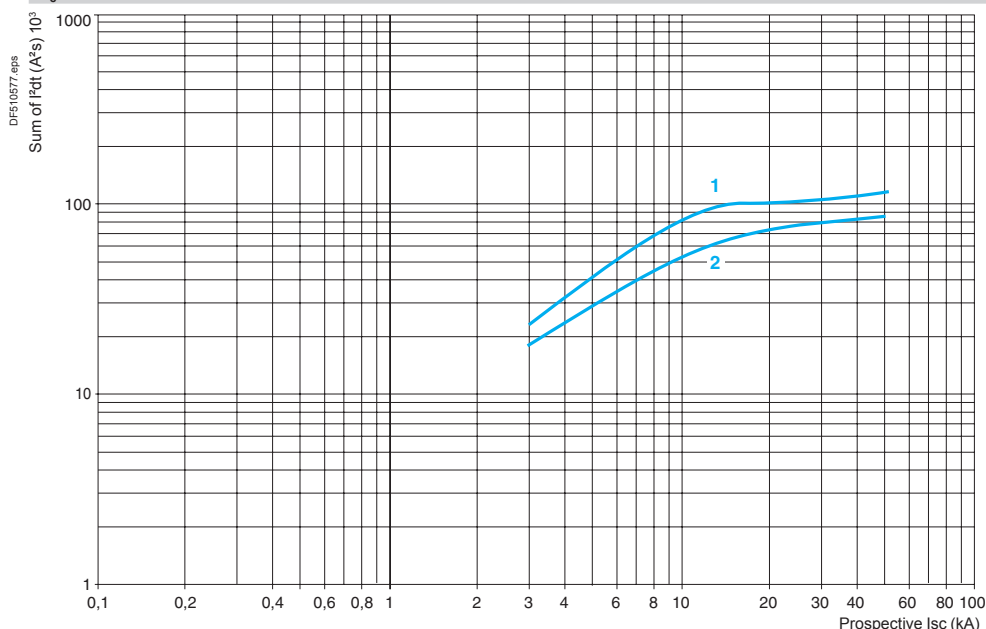
$U_e = 460\text{ V}$



- 1 Maximum peak current
- 2 32 A power base
- 3 12 A power base

Thermal limit on short-circuit

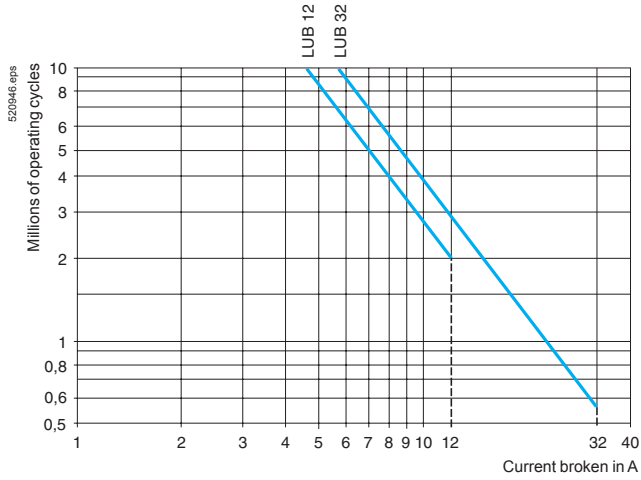
$U_e = 460\text{ V}$



- 1 32 A power base
- 2 12 A power base

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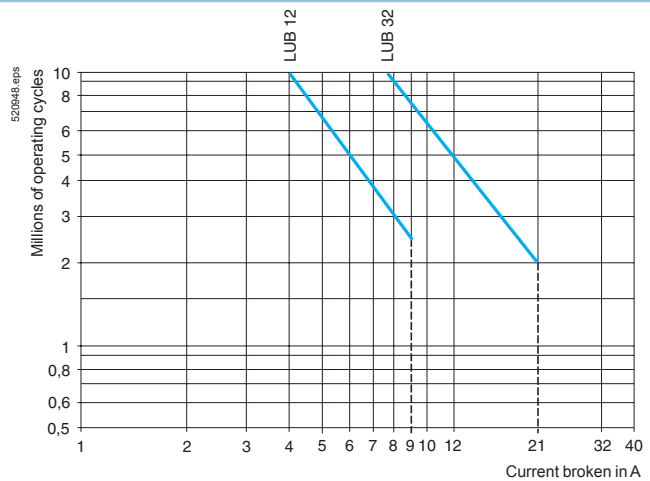
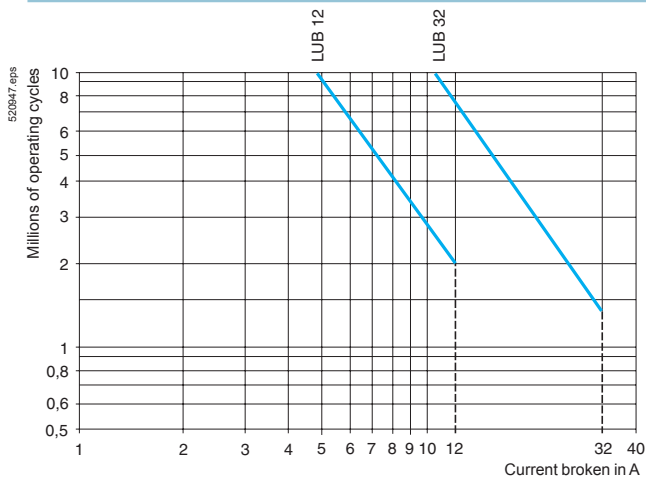
Use in category AC-41



Use in category AC-43

Ue ≤ 440 V

Ue = 690 V

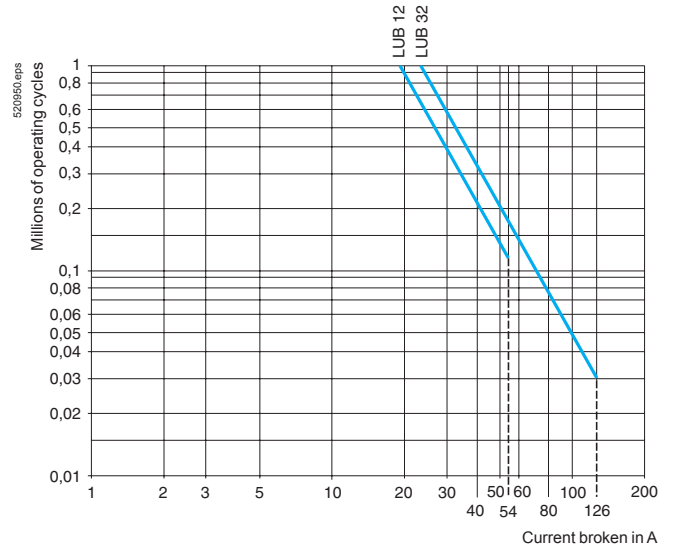
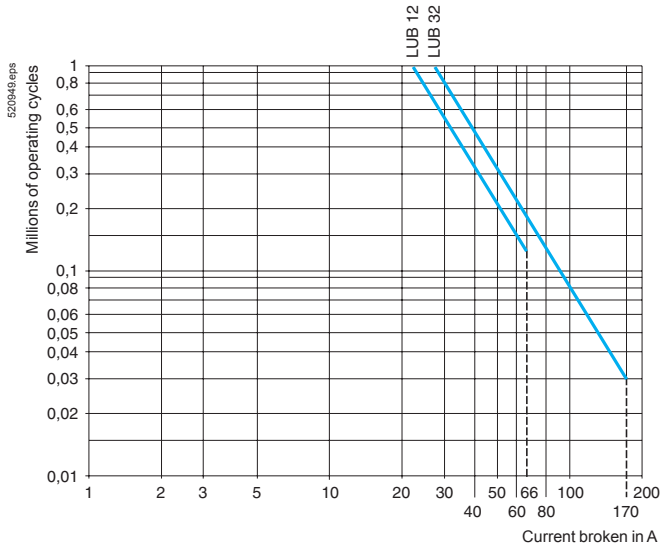


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Use in category AC-44

Ue ≤ 440 V

Ue = 690 V



TeSys U

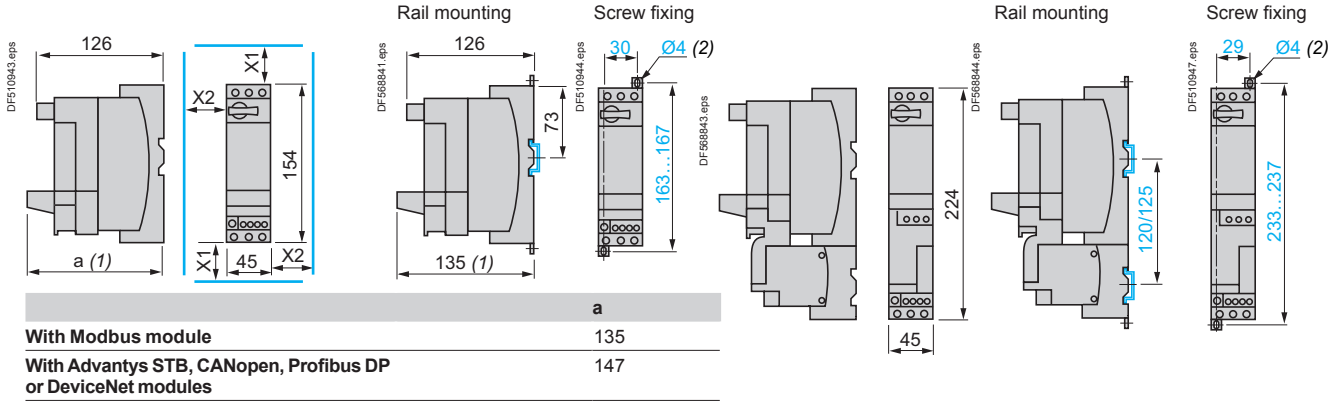
TeSys U

Dimensions

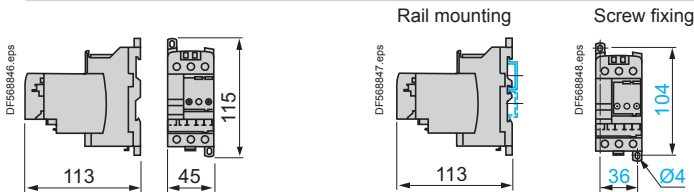
Starter-controllers

LUB: non-reversing

LU2B: reversing



Reverser block for mounting separately from power base

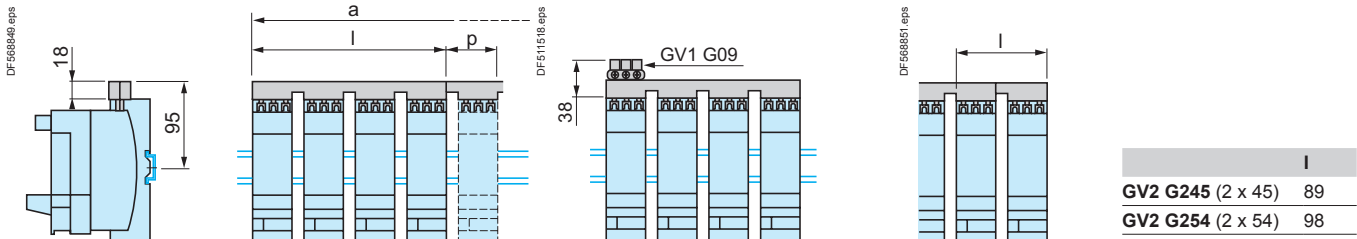


Sets of busbars and plug-in power sockets

GV2 G445 and GV2 G454

GV2 G●●● with terminal block GV1 G09

GV2 G245 and G254

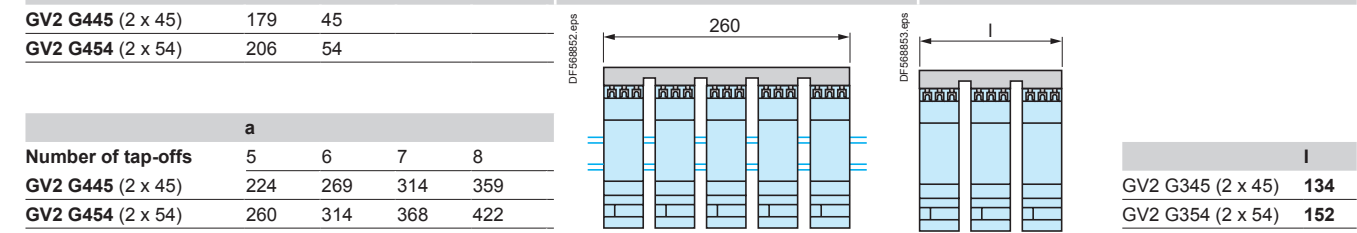


GV2 G445 (2 x 45)

GV2 G454 (2 x 54)

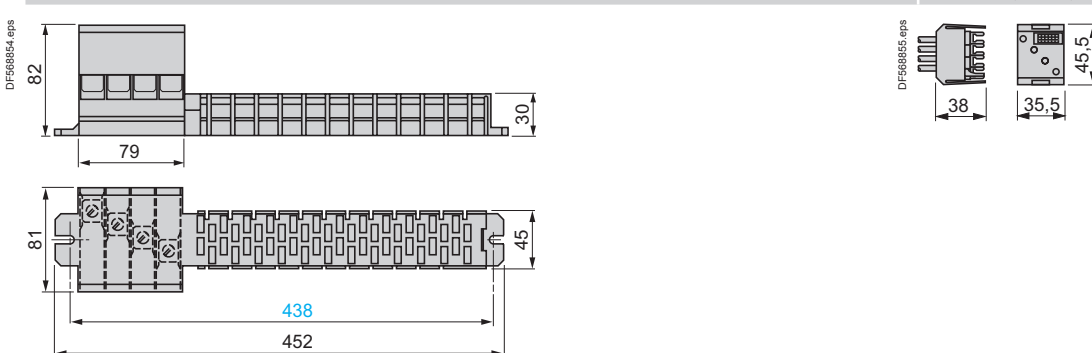
GV2 G554

GV2 G345 et G354



AK5 JB144

AK5 PC13, PC33, PC33L



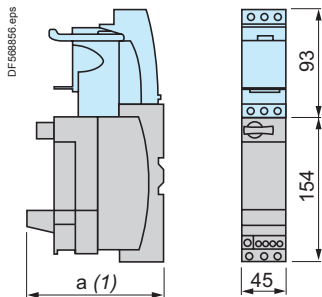
(1) Depth with communication module.

(2) Retractable fixing lugs.

TeSys U

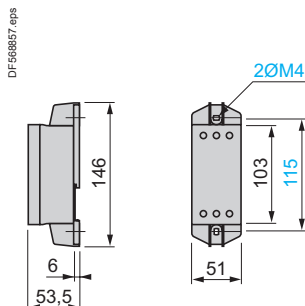
Dimensions, mounting

Limiter-disconnector LUA LB1
Disconnector LUA LB10



a	
With Modbus module	135
With Advantys STB, CANopen, Profibus DP or DeviceNet modules	147

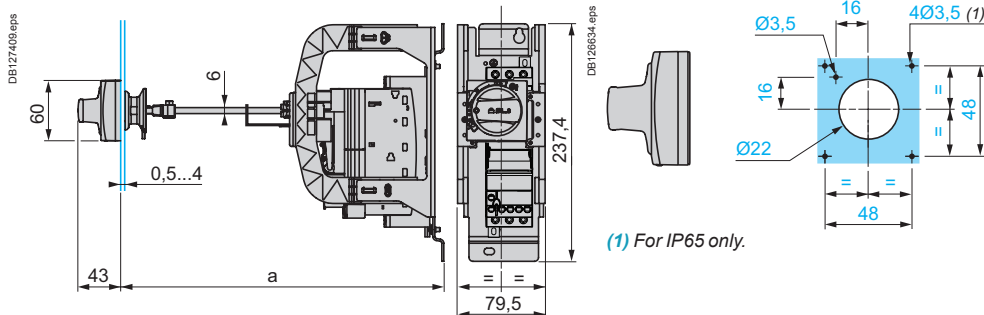
Current limiter LA9 LB920



Door interlock mechanisms

LU9 APN21, LU9 APN22, LU9 APN24

Door cut-out

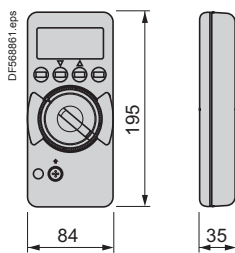
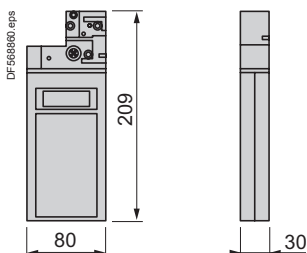


	a	
	Mini	Maxi
LU9 APN●●	191	300
LU9 APN●● + GV APK12	300	483

Addressing consoles

XZ MC11

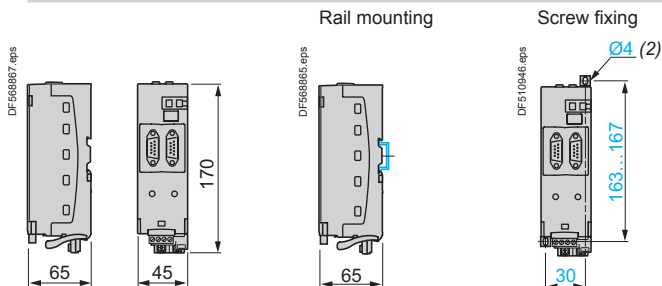
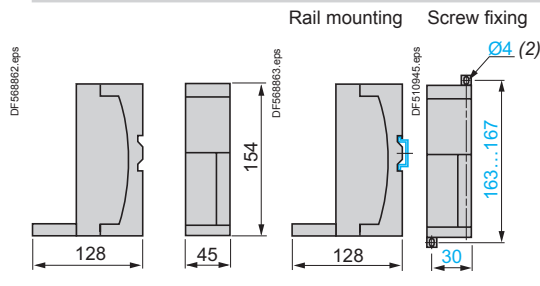
ASI TERV2



Splitter boxes

LU9 GC3 (Modbus) LU9 G02 and LU9 G03

LU9 GC7 (Profibus DP)



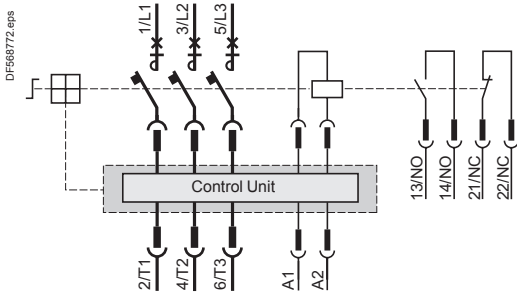
(1) Depth with communication module.
(2) Retractable fixing lugs.

TeSys U

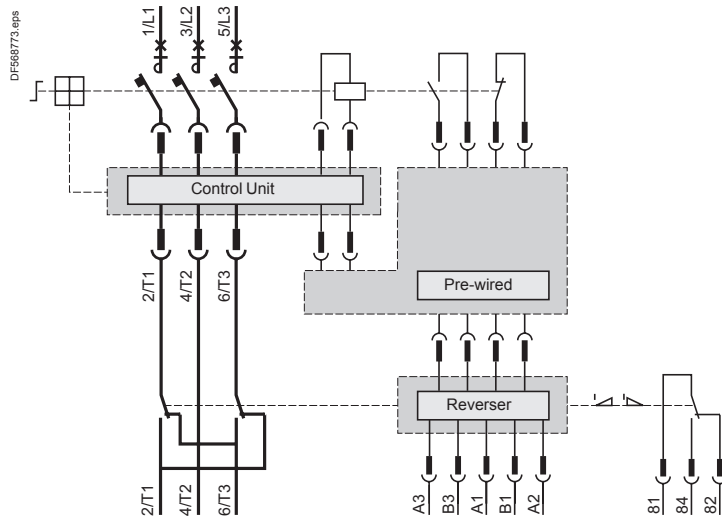
Starter-controllers, 12 or 32 A

With standard, advanced or multifunction control unit

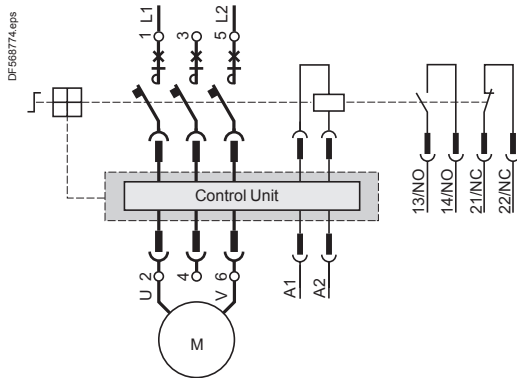
Non-reversing



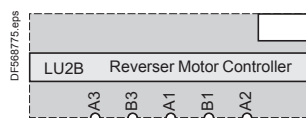
Non-reversing



With control unit LUCC or LUCM
Connection of a single-phase motor

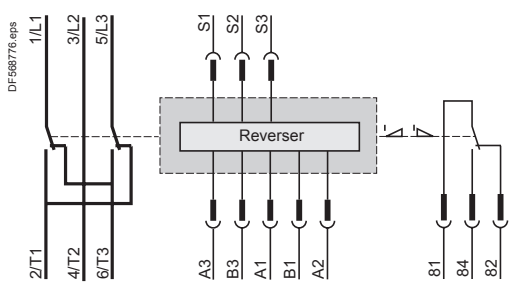


Control terminal block

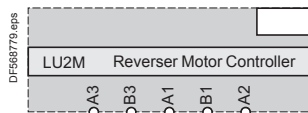


Reverser blocks

LU2M

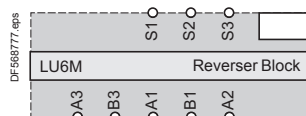


Control terminal block

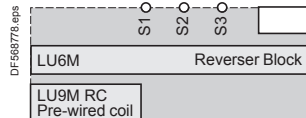


LU6M

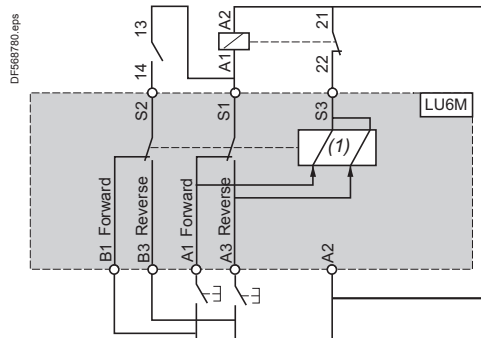
Control terminal blocks



With pre-wired connector LU9 MRC



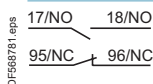
Basic scheme



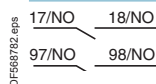
- S1 Start next stage
- S2 Electrical interlocking
- S3 Maintaining contact
- B1 Maintain forward running
- B3 Maintain reverse running
- A1 Pulse forward running
- A2 Common
- A3 Pulse reverse running
- (1) Electronically operated bistable electromagnet.

Add-on contact blocks

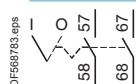
LUA1 C11



LUA1 C20

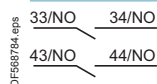


LUA8 E20

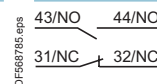


Add-on contact modules

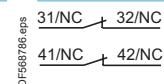
LUFN 20



LUFN 11



LUFN 02

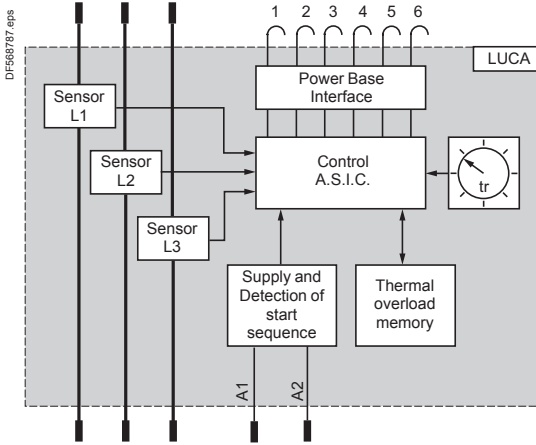


TeSys U

Control units

Standard control units LUCA

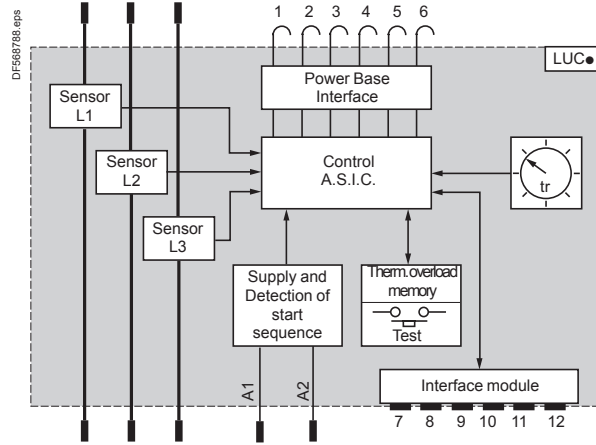
Basic scheme



- 1 and 2 Trips
- 3 and 4 Electromagnet
- 5 Power base rating
- 6 N/C

Advanced control units LUCB, LUCC, LUCD

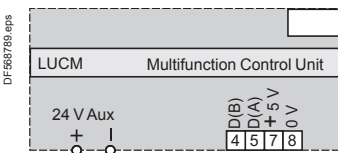
Basic schemehd



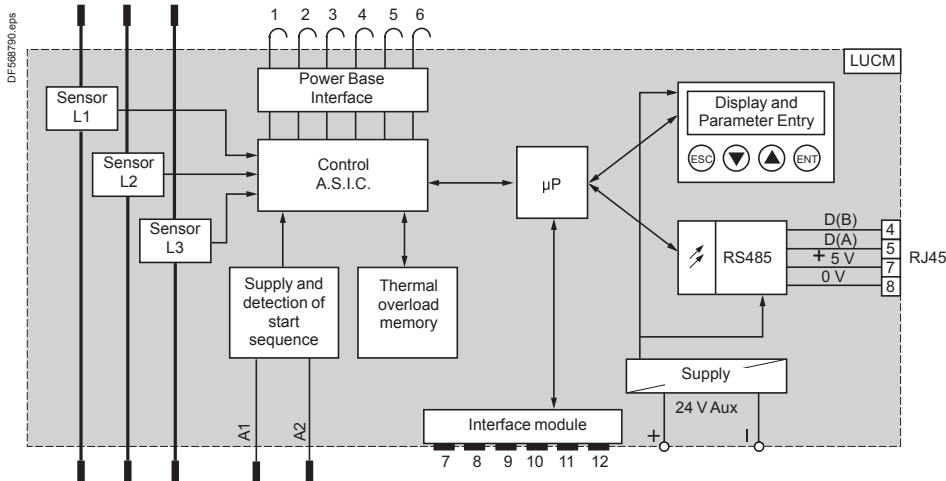
- 1 and 2 Trips
- 3 and 4 Electromagnet
- 5 Power base rating
- 6 N/C
- 7 Earth
- 8 Thermal status/Set
- 9 Reset mode/Reset
- 10 (Im/Ir)
- 11 Vc2
- 12 Vc1

Multifunction control units LUCM

Control terminal block



Basic scheme

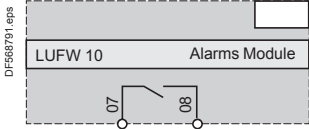


- 1 and 2 Trips
- 3 and 4 Electromagnet
- 5 Power base rating
- 6 N/C
- 7 Earth
- 8 N/C
- 9 Earth
- 10 (Im/Ir)
- 11 Rx/Tx
- 12 Vc1

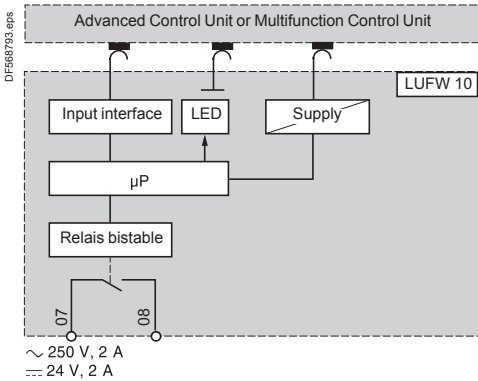
TeSys U

Function modules

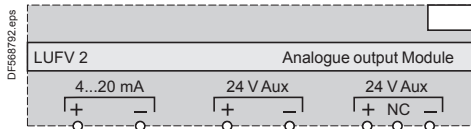
Alarm LUF W10



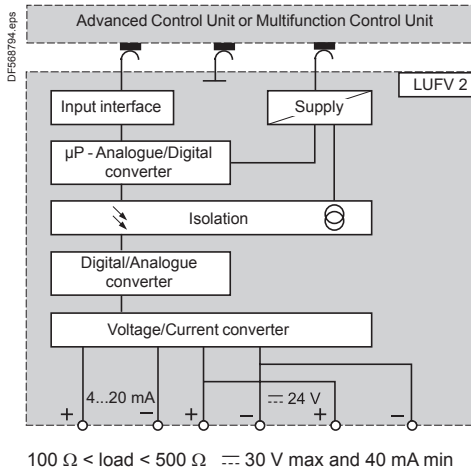
Basic scheme



Indication of motor load LUF V2 4-20 mA output



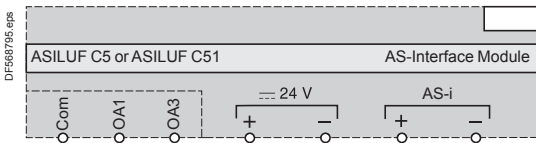
Basic scheme



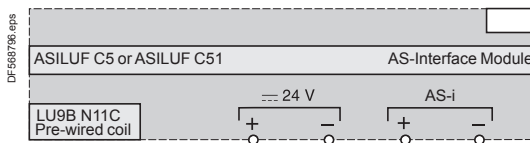
Communication modules

Communication modules ASILUF C5 and ASILUF C51

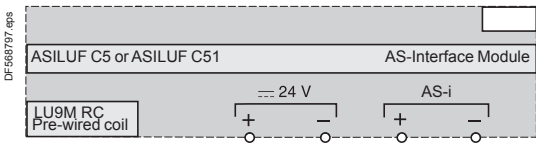
Without pre-wired coil connection



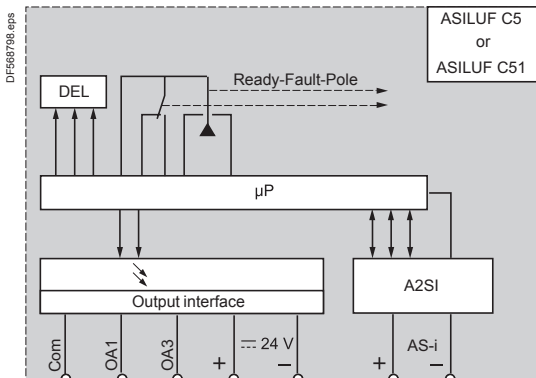
With pre-wired coil connection LU9B N11C



With pre-wired coil connection LU9M RC



Basic scheme

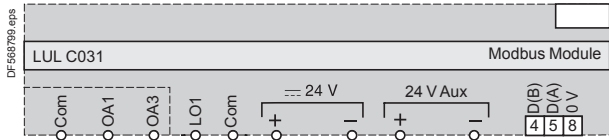


TeSys U

Communication modules (continued)

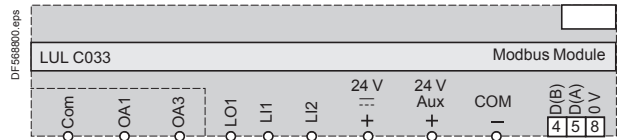
Modbus communication module LUL C031

Without pre-wired coil connection

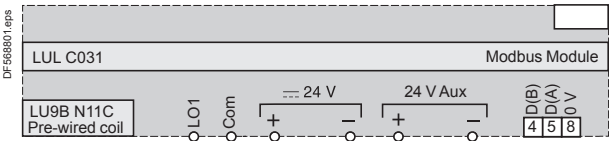


Modbus communication module LUL C033

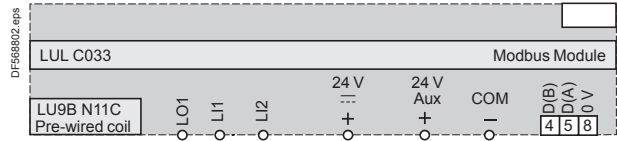
Without pre-wired coil connection



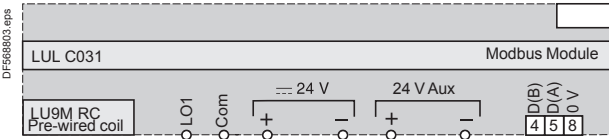
With pre-wired coil connection LU9B N11C



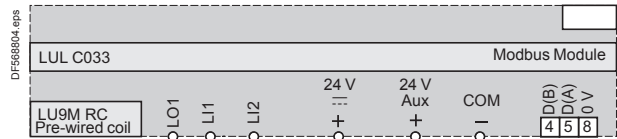
With pre-wired coil connection LU9B N11C



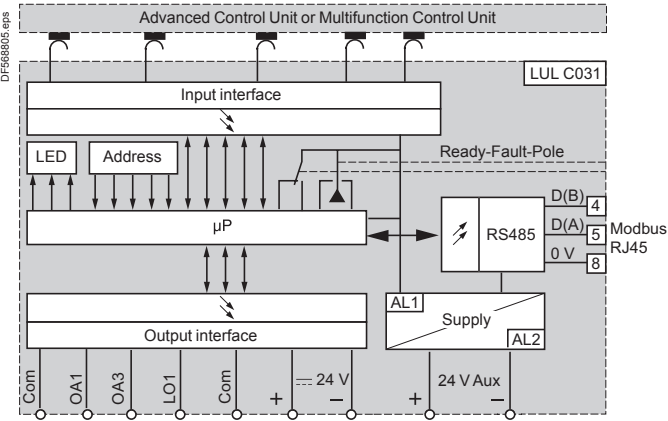
With pre-wired coil connection LU9M RC



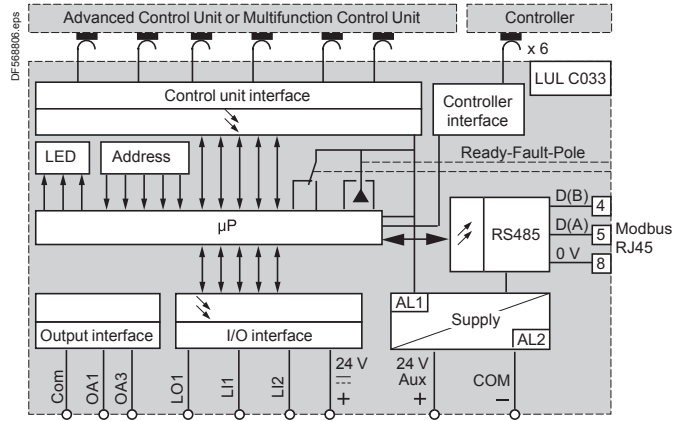
With pre-wired coil connection LU9M RC



Basic scheme



Basic scheme

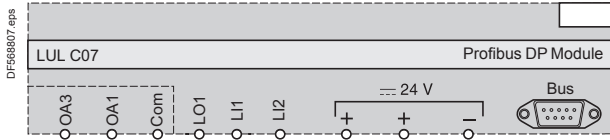


TeSys U

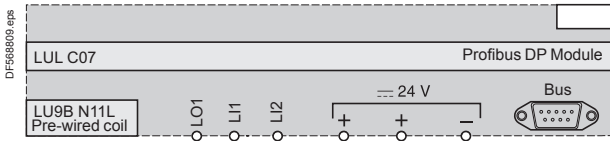
Communication modules (continued)

Profibus DP communication module LUL C07

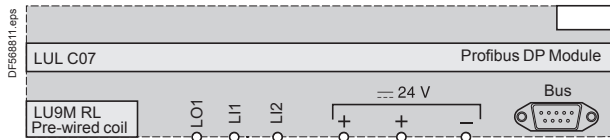
Without pre-wired coil connection



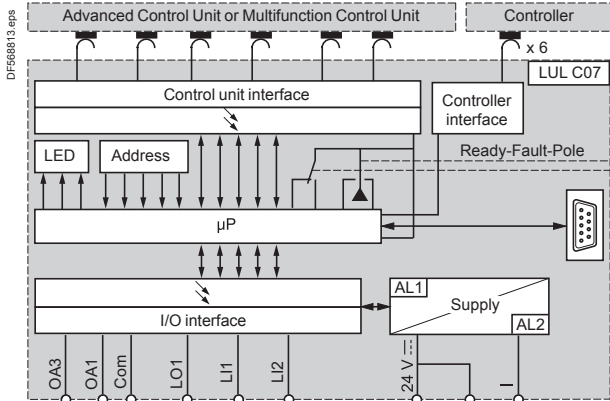
With pre-wired coil connection LU9B N11LC



With pre-wired coil connection LU9M RC

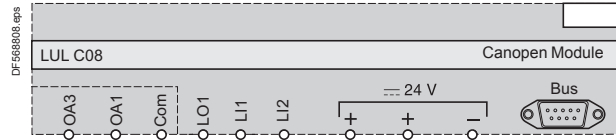


Basic scheme

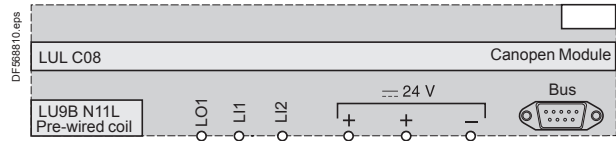


CANopen communication module LUL C08

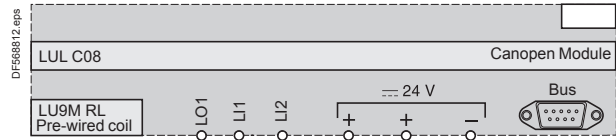
Without pre-wired coil connection



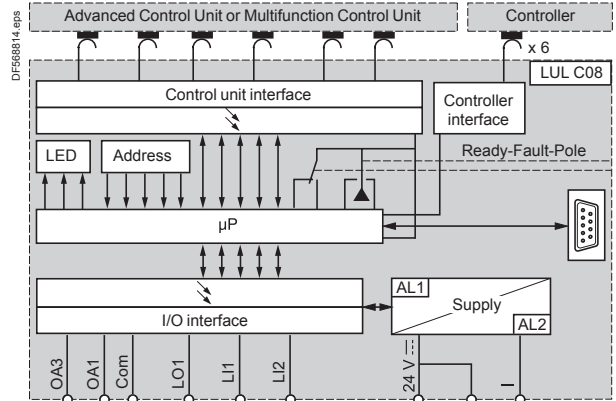
With pre-wired coil connection LU9B N11LC



With pre-wired coil connection LU9M RC

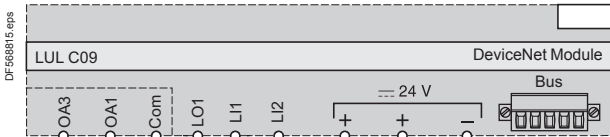


Basic scheme

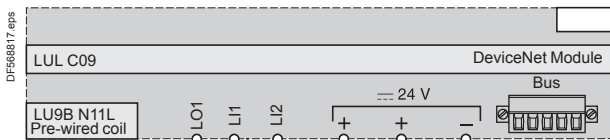


DeviceNet communication module LUL C09

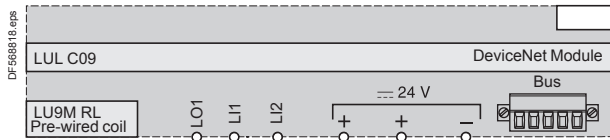
Without pre-wired coil connection



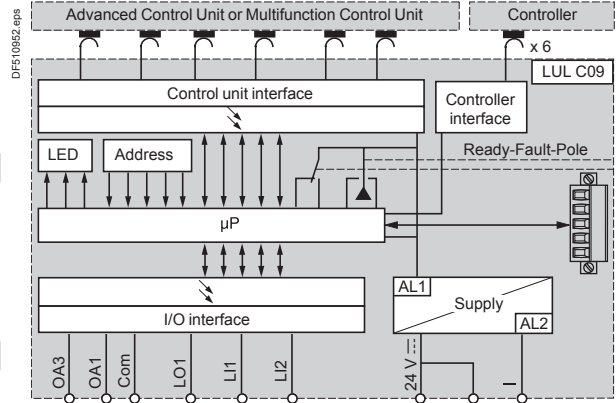
With pre-wired coil connection LU9B N11LC



With pre-wired coil connection LU9M RL



Basic scheme

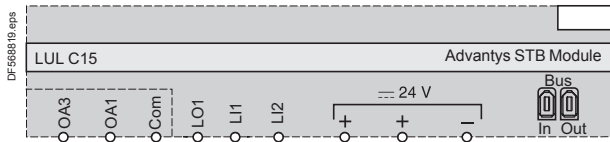


TeSys U

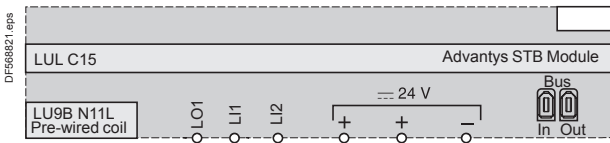
Communication modules (continued)

Advantys STB communication module LUL C15

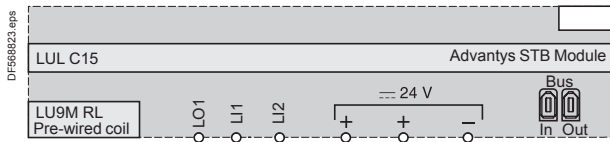
Without pre-wired coil connection



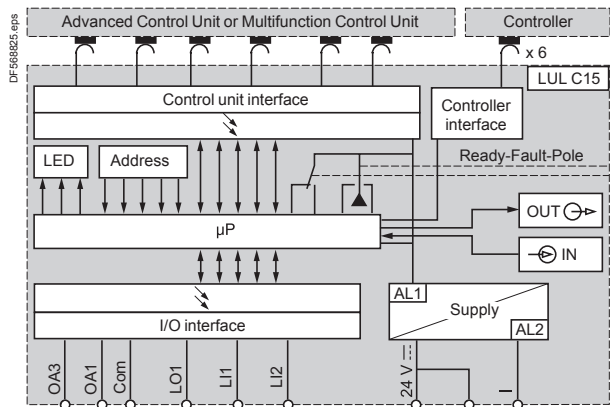
With pre-wired coil connection LU9B N11LC



With pre-wired coil connection LU9M RC

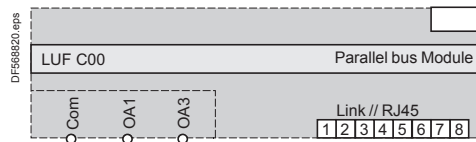


Basic scheme



Parallel wiring modules

Without pre-wired coil connection



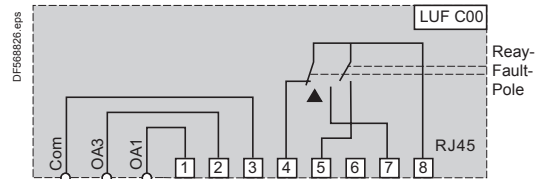
With pre-wired coil connection LU9B N11LC



With pre-wired coil connection LU9M RC

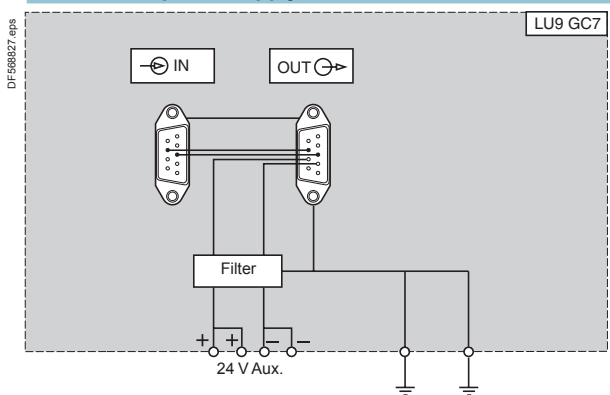


Basic scheme



- 1 Forward running
- 2 Reverse running
- 3 Output common
- 4 Selector in position
- 5 Pole state
- 6 Reserved
- 7 Fault
- 8 Input common

Profibus DP power supply module LU9 GC7



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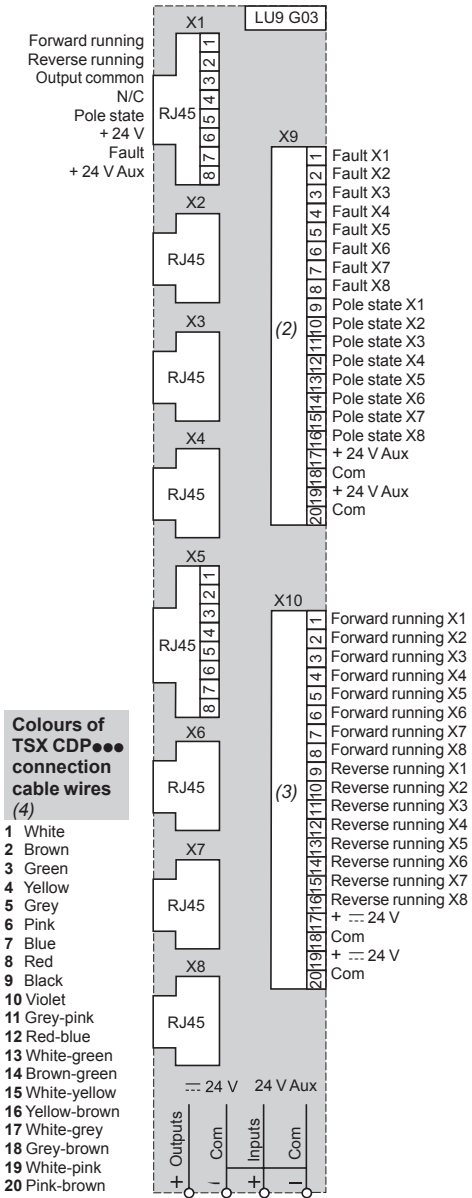
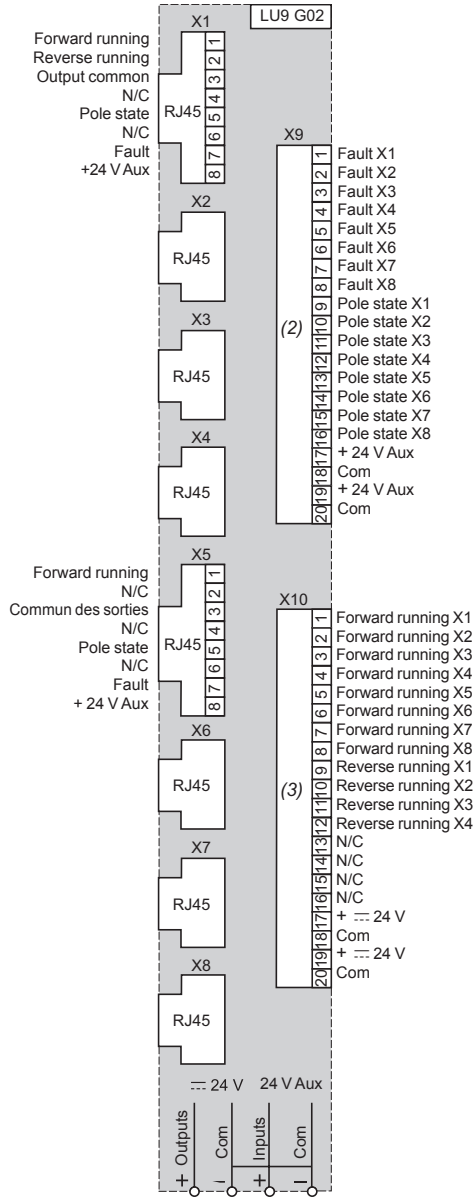
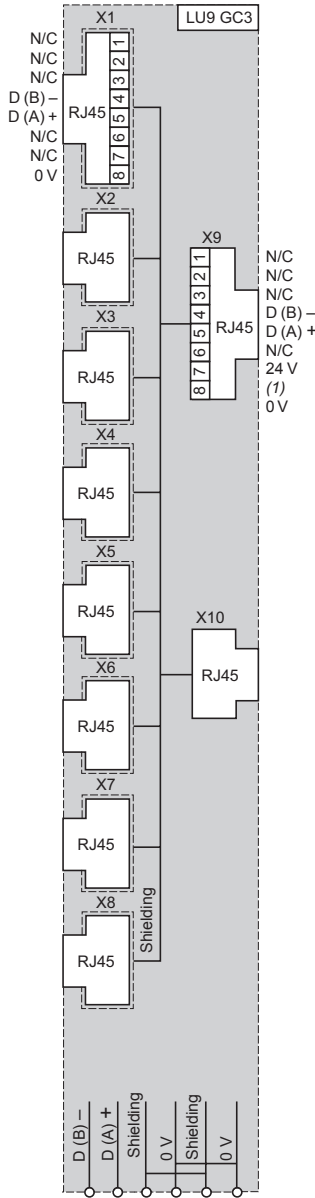
Communication modules (continued)

Wiring hub and splitter boxes

Modbus hub LU9GC3

Parallel wiring splitter box LU9 G02

Parallel wiring splitter box LU9 G03



- Colours of TSX CDP... connection cable wires (4)**
- 1 White
 - 2 Brown
 - 3 Green
 - 4 Yellow
 - 5 Grey
 - 6 Pink
 - 7 Blue
 - 8 Red
 - 9 Black
 - 10 Violet
 - 11 Grey-pink
 - 12 Red-blue
 - 13 White-green
 - 14 Brown-green
 - 15 White-yellow
 - 16 Yellow-brown
 - 17 White-grey
 - 18 Grey-brown
 - 19 White-pink
 - 20 Pink-brown

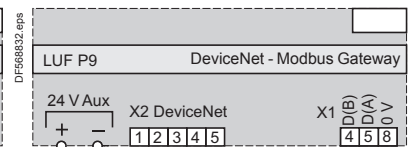
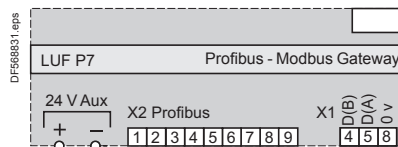
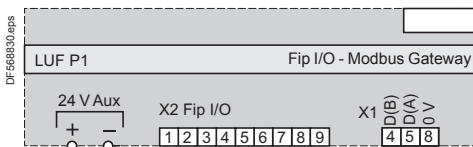
(1) Not connected on connectors X1 to X8. Only present on RJ45 IN and OUT connectors.
 (2) 20-way HE10 input connector.
 (3) 20-way HE10 output connector.
 (4) Wire colours and corresponding HE10 connector pin numbers.

Gateways

LUF P1

LUF P7

LUF P9



TeSys U

Data profile under AS-Interface				Standard LUCA	Advanced LUCB, CC, CD	Multifunction LUCM
Control unit present in the product						
Status		D0	Ready (available)			
		D1	Poles closed (running)			
Commands		D0	Start - forward running			
		D1	Start - reverse running			

Main registers accessible with Modbus, CANopen, Advantys STB, Profibus DP and DeviceNet communication modules.						
For other registers and for further information, please consult the User's Manual <i>Communication variables</i> on the website www.schneider-electric.com						
Control unit present in the product				Standard	Advanced	Multifunction
Marking	Register 0...Register 99	Words...Bits	Commercial reference, serial number, software version			
Log	Register 100...Register 450	Words...Bits	Fault log, Operating log, Log of last 5 trips			
Status	Register 451...Register 464	Words...Bits	Alarm signalling (bits), Fault signalling (bits)			
Values	Register 465...Register 473	Words	Irms phase 1, phase 2, phase 3. Motor load, thermal status Earth leakage current. Phase imbalance and phase failure			
	Register 474...Register 599	Words...Bits	Reserved			
Configuration	Register 600...Register 699	Words...Bits	Protection and alarm thresholds, fallback mode and reset mode			
Commands	Register 700...Register 714	Words...Bits	Commands			

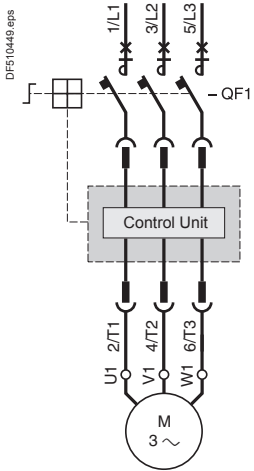
Status and values	Register 452	Bit 0	Short-circuit fault			
		Bit 1	Overcurrent fault			
		Bit 2	Thermal overload fault			
	Register 455	Bit 0	Ready (available)			
		Bit 1	Poles closed			
		Bit 2	Fault			
		Bit 3	Alarms			
		Bit 4	Tripped ("TRIP" position)			
		Bit 5	Fault acknowledgement allowed			
		Bit 6	Reserved			
		Bit 7	Motor running			
		Bit 8	Motor current % (bit 0)			
		Bit 9	Motor current % (bit 1)			
		Bit 10	Motor current % (bit 2)			
		Bit 11	Motor current % (bit 3)			
		Bit 12	Motor current % (bit 4)			
		Bit 13	Motor current % (bit 5)			
		Bit 14	Reserved			
	Bit 15	Motor starting				
	Register 461	Bit 3	Thermal overload alarm			
Register 465	Word	Thermal status value				
Register 466	Word	Motor load value (Im/Ir)				

Configuration	Register 602	Bit 0	Manual reset on thermal overload fault			
		Bit 1	Remote reset on thermal overload fault			
		Bit 2	Automatic reset on thermal overload fault			
	Register 682	Value 0	Fallback mode validation			
		Value 1	Outputs OA1 and OA3 unchanged			
		Value 2	Outputs OA1 and OA3 forced to 0			
		Value 3	Outputs OA1 and OA3 unchanged, signalling existence of communication failure			
		Value 4	Outputs OA1 forced to 1 and OA3 unchanged			
	Value 5	Outputs OA3 forced to 1 and OA1 unchanged				

Commands	Register 700	Bit 0	LO1 output command			
	Register 704	Bit 0	OA1 output command			
		Bit 1	OA3 output command			
		Bit 2	Reserved			
		Bit 3	Fault acknowledgement			
		Bit 4	Reserved			
		Bit 5	Trip test			
Bit 6...15	Reserved					

Data accessible

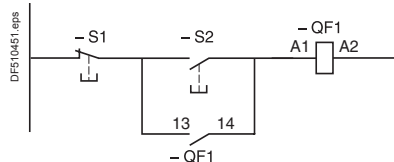
Non-reversing starter-controllers LUB



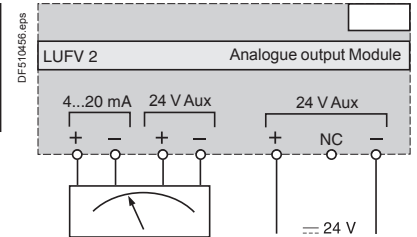
2-wire control via 2-position switch



3-wire control, pulsed start with maintaining contact

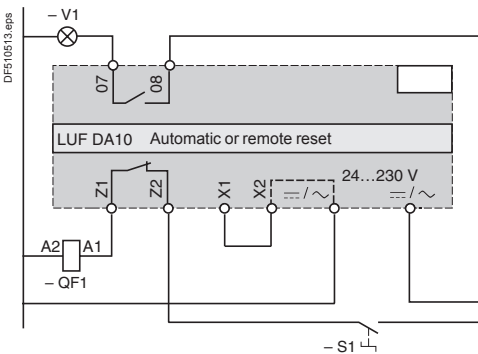


Connection of a motor load indicator module LUFV 2

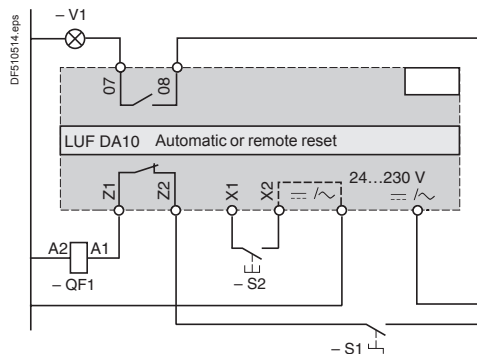


Connection of thermal overload fault signalling modules LUF DA10

Automatic reset

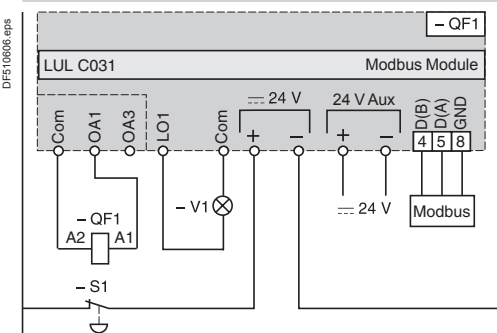


Remote reset



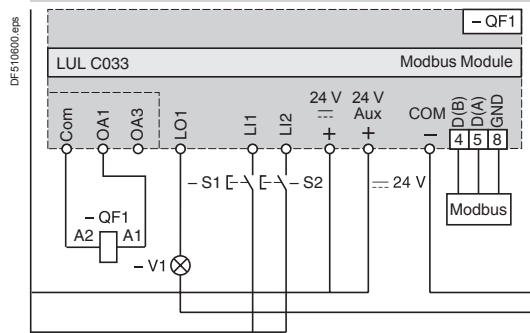
Control via Modbus communication module LUL C031

Without pre-wired coil connection



Control via Modbus communication module LUL C033

Without pre-wired coil connection

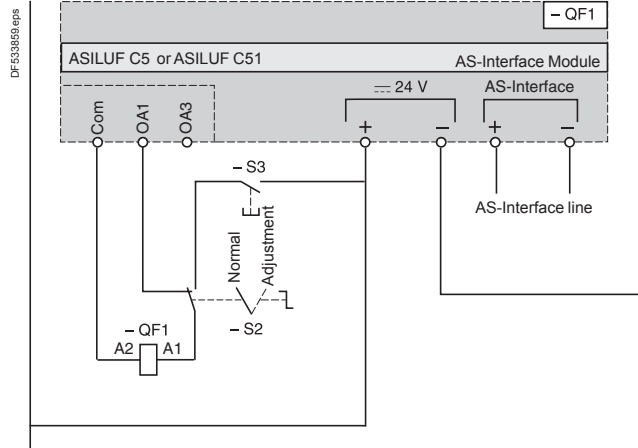
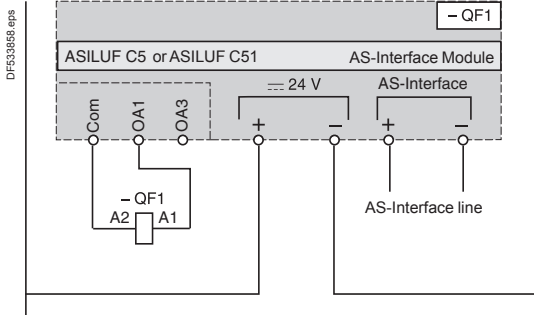


Non-reversing starter controllers LUB (continued)

Control by communication modules ASILUF C5 and ASILUF C51

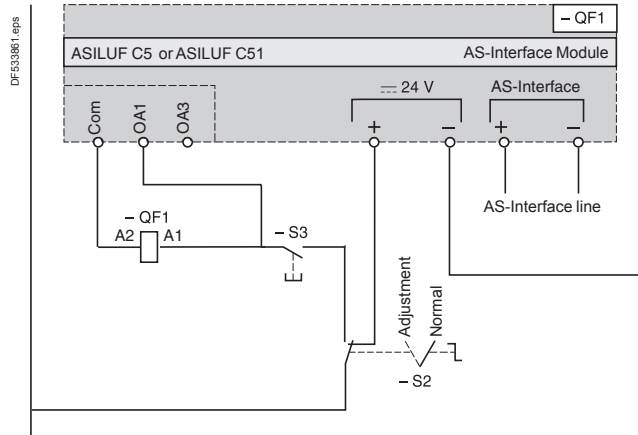
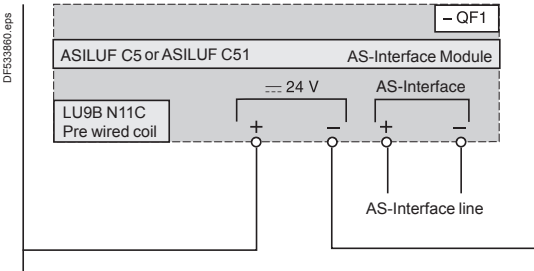
Without pre-wired coil connection

**Without pre-wired coil connection
With local control**

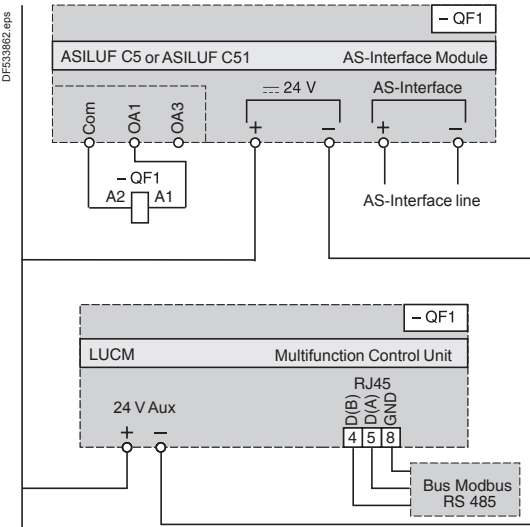


With pre-wired coil connection LU9B N11C

**Without pre-wired coil connection
With local control**

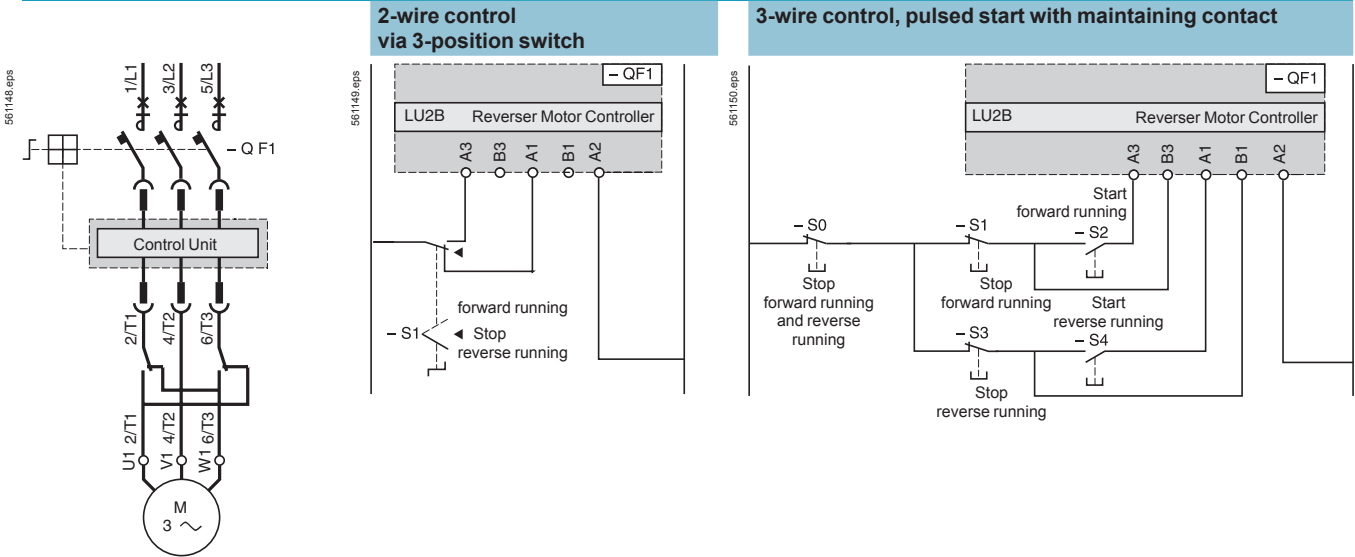


**Without pre-wired coil connection
With multifunction control unit LUCM**



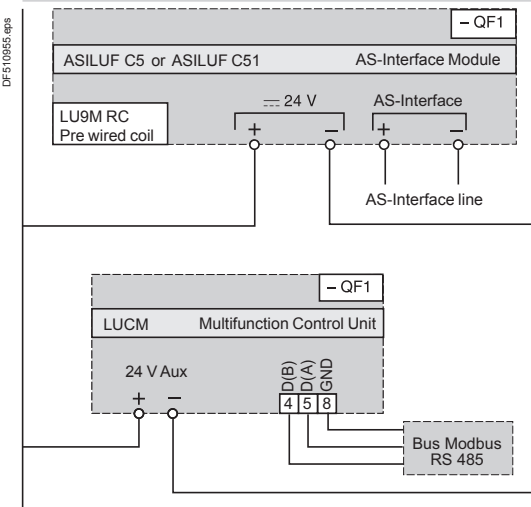
TeSys U

Reversing starter-controllers LUB

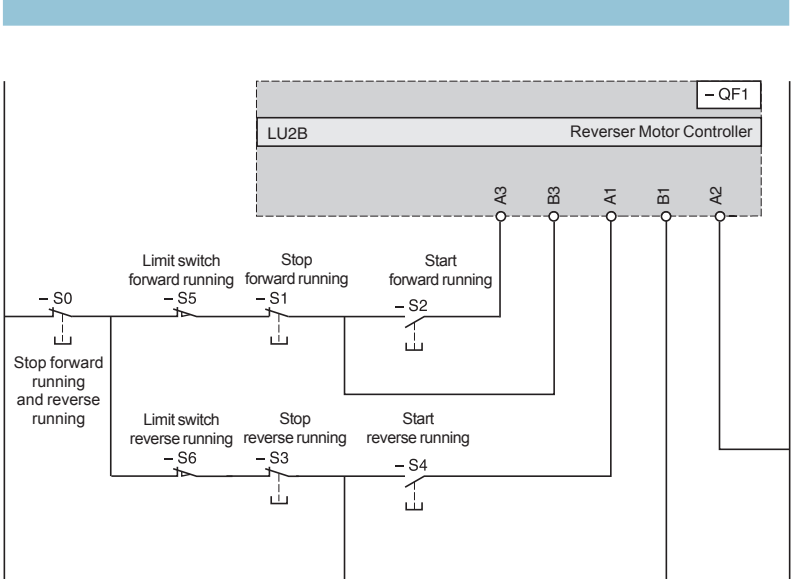


Control by communication modules ASILUF C5 and ASILUF C51

With pre-wired coil connection LU9M RC
With multifunction control unit LUCM

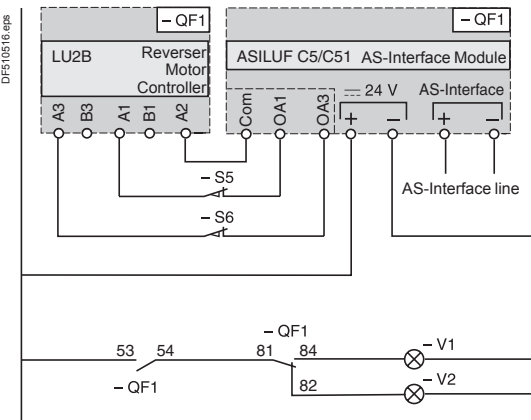


3-wire control, pulsed start with maintaining contact and limit switches



Control by communication modules ASILUF C5 and ASILUF C51

Without pre-wired coil connection
With running direction pilot lights and limit switches

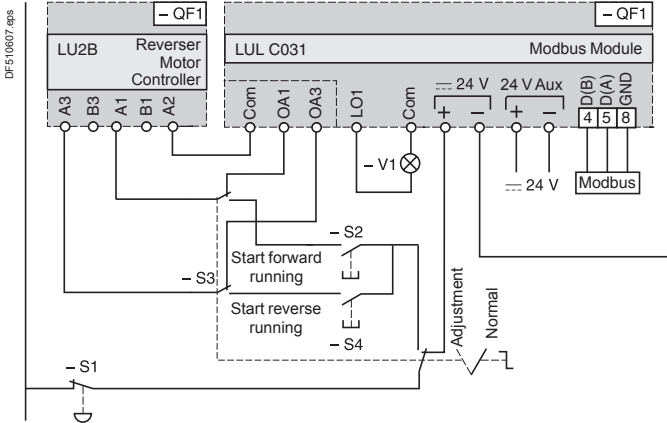


TeSys U

Reversing starter controllers LU2B (continued)

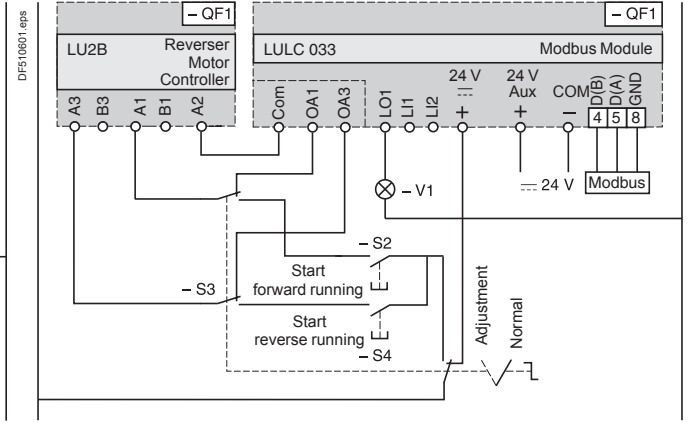
Control via Modbus communication module LUL C031

Without pre-wired coil connection. With local control

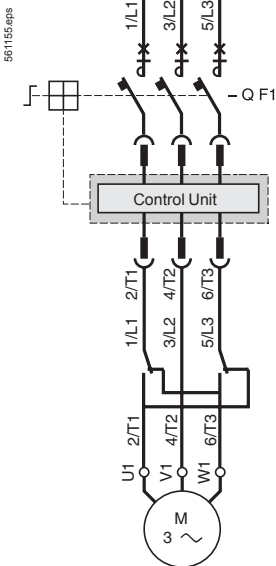


Control via Modbus communication module LUL C033

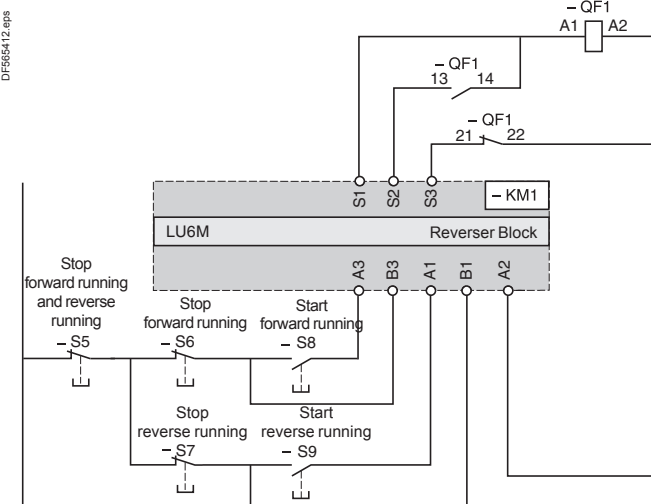
Without pre-wired coil connection. With local control



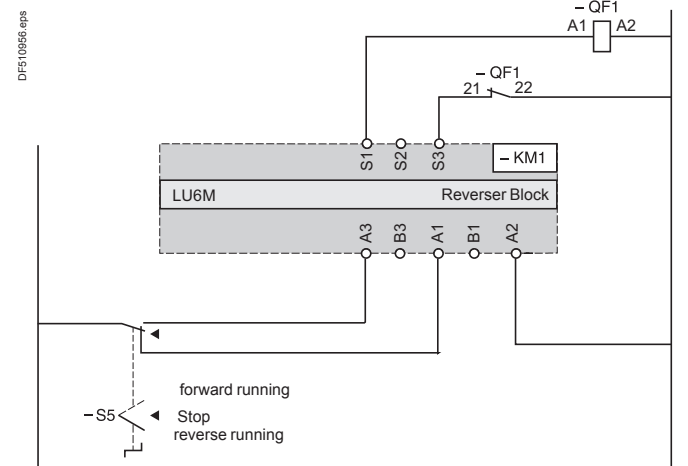
Reversing starter-controllers LUB + LU6M



3-wire control, pulsed start with maintaining contact



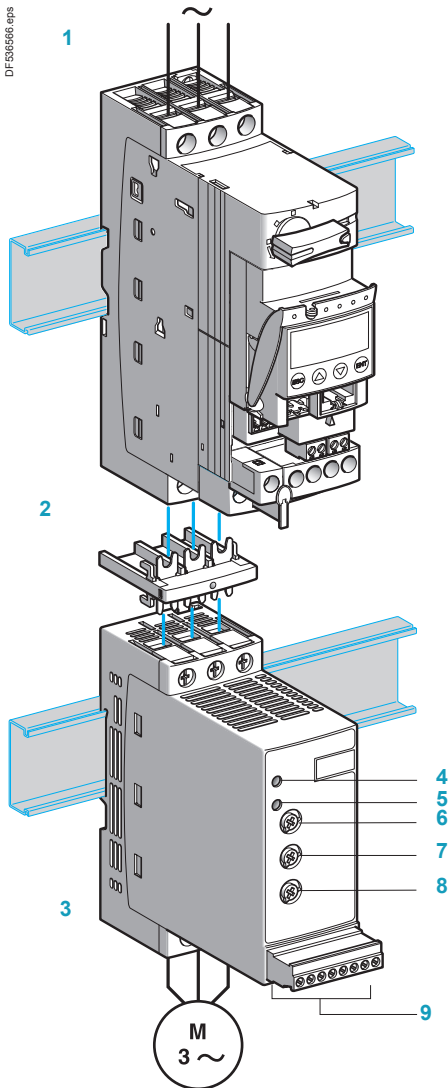
2-wire control via 3-position switch



Soft starters for asynchronous motors

Altistart U01 and TeSys U

TeSys U



The Altistart U01 is a soft start/soft stop unit for asynchronous motors. It is designed primarily for combinations with **TeSys U** controller-starters.

When combined with a **TeSys U 1** controller by means of a connector **2**, the Altistart U01 **3** is a power option which provides the “Soft start/soft stop” function. The result is a unique, innovative motor starter.

Using the Altistart U01 starter enhances the starting performance of asynchronous motors by allowing them to start gradually, smoothly and in a controlled manner. It prevents mechanical shocks, which lead to wear and tear, and limits the amount of maintenance work and production downtime.

The Altistart U01 limits the starting torque and current peaks on starting, on machines which do not require a high starting torque.

The Altistart U01 is designed for the following simple applications:

- Conveyors
- Conveyor belts
- Pumps
- Fans
- Compressors
- Automatic doors and gates
- Small cranes
- Belt-driven machines, etc.

The Altistart U01 is compact and easy to install. It complies with standards IEC/EN 60947-4-2, carries UL, CSA, C-Tick, CCC certifications and CE marking.

■ ATSU 01N2●●LT soft start/soft stop units

- Control two phases of the motor power supply to limit the starting current and for deceleration
 - Internal bypass relay
 - Motor power ratings ranging from 0.75 kW to 15 kW
 - Motor supply voltages ranging from 200 V to 480 V, 50/60 Hz.
- An external power supply is required for controlling the starter.

Description

- Altistart U01 soft start/soft stop units are equipped with:
 - A potentiometer for setting the starting time **6**
 - A potentiometer for setting the deceleration time **8**
 - A potentiometer for adjusting the start voltage threshold according to the motor load **7**
 - 1 green LED **4** to indicate that the unit is switched on
 - 1 yellow LED **5** to indicate that the motor is powered at nominal voltage, if it is connected to the starter
 - A connector **9**:
 - 2 logic inputs for Run/Stop commands
 - 1 logic input for the BOOST function
 - 1 logic output to indicate the end of starting
 - 1 relay output to indicate the starter has a power supply fault or the motor has reached a standstill at the end of the deceleration stage

Soft starters for asynchronous motors

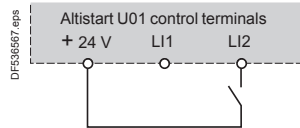
Altistart U01 and TeSys U

TeSys U

Please consult the “TeSys U starters - open version” catalogue.

■ 2-wire control

The run and stop commands are controlled by a single logic input. State 1 of logic input LI2 controls starting and state 0 controls stopping.



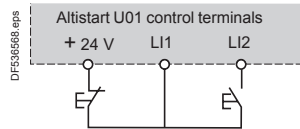
Wiring diagram for 2-wire control

■ 3-wire control

The run and stop commands are controlled by 2 different logic inputs.

Stopping is achieved when logic input LI1 opens (state 0).

The pulse on input LI2 is stored until input LI1 opens.



Wiring diagram for 3-wire control

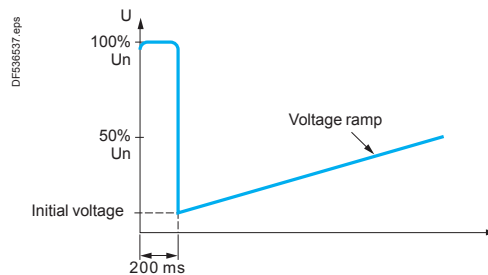
■ Starting time

Controlling the starting time means that the time of the voltage ramp applied to the motor can be adjusted to obtain a gradual starting time, dependent on the motor load.

■ Voltage boost function via logic input

Activating the BOOST logic input enables the function for supplying a starting overtorque capable of overcoming any mechanical friction.

When the input is at state 1, the function is active (input connected to the + 24 V) and the starter applies a fixed voltage to the motor for a limited time before starting.



Application of a voltage boost equal to 100% of the nominal motor voltage

■ End of starting

□ application function for logic output LO1

ATSU 01N2●LT soft start/soft stop units are equipped with an open collector logic output LO, which indicates the end of starting when the motor has reached nominal speed.

Soft starters for asynchronous motors

Altistart U01 and TeSys U

TeSys U

Environmental characteristics		ATSU 01N2●●LT	
Type of starter			
Conformity to standards		Altistart U01 electronic starters have been developed to conform to the strictest international standards and the recommendations relating to electrical industrial control devices (IEC, EN), in particular standard IEC/EN 60947-4-2.	
Electromagnetic compatibility EMC			
	Conducted and radiated emissions	CISPR 11 level B, IEC 60947-4-2, level B	
	Harmonics	IEC 1000-3-2, IEC 1000-3-4	
	EMC immunity	EN 50082-2, EN 50082-1	
	Electrostatic discharge	IEC 61000-4-2 level 3	
	Immunity to radiated radio-electrical interference	IEC 61000-4-3 level 3	
	Immunity to electrical transients	IEC 61000-4-4 level 4	
	Voltage/current impulse	IEC 61000-4-5 level 3	
	Conducted and radiated emissions	IEC 61000-4-6 level 3	
	Immunity to conducted interference caused by radio-electrical fields	IEC 61000-4-11	
	Damped oscillating waves	IEC 61000-4-12 level 3	
CE marking		The starters carry CE marking in accordance with the European low voltage directives IEC/EN 60947-4-2.	
Product certifications		UL, CSA, C-Tick and CCC	
Degree of protection		IP 20	
Degree of pollution		2 conforming to IEC/EN 60947-4-2	
Vibration resistance		1.5 mm peak to peak from 3 to 13 Hz, 1 gn from 13 to 150 Hz, conforming to IEC/EN 60068-2-6	
Shock resistance		15 gn for 11 ms conforming to IEC/EN 60068-2-27	
Relative humidity		5...95 % without condensation or dripping water conforming to IEC 60068-2-3	
Ambient temperature around the unit	Storage	°C	-25...+70 conforming to IEC/EN 60947-4-2
	Operation	°C	-10...+40 without derating, up to 50°C with current derating of 2 % per °C above 40°C
Maximum operating altitude		m	1000 without derating (above this, derate the current by 2.2 % per additional 100 m)
Operating position			
Maximum permanent angle in relation to the normal vertical mounting position			

Electrical characteristics		ATSU 01N2●●LT						
Type of starter								
Category of use	Conforming to IEC 60947-4-2	Ac-53b						
Rated operating voltage	3-phase ~ voltage	V	200 - 10 % to 480 + 10 %					
Frequency		Hz	50 - 5 % to 60 + 5 %					
Output voltage		Maximum 3-phase voltage equal to line supply voltage						
Control supply voltage		24 V ~, 100 mA ±10 %						
Rated operating current		A	6...32					
Adjustable starting time		s	1...10					
Adjustable deceleration time		s	1...10					
Starting torque		%	30... 80 % of DOL motor starting torque					
Type of starter		ATSU	01N206LT	01N209LT	01N212LT	01N222LT	01N232LT	
Control power supply consumption			24 V ~, 65 mA			24 V ~, 100 mA		
Power dissipated	At full load at end of starting	W	1.5	1.5	1.5	2.5	2.5	
	In transient state at 5 times the rated operating current	W	61.5	91.5	121.5	222.5	322.5	
Type of starter		ATSU 01N206LT to ATSU 01N222LT			ATSU 01N232LT			
Use								
	Starting time	s	1	5	10	1	5	10
	Maximum number of cycles per hour		100	20	10	50	10	5

Soft starters for asynchronous motors

Altistart U01 and TeSys U

TeSys U

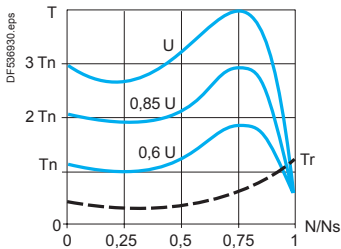
Electrical characteristics (continued)

Logic input power supply (electrically isolated between power and control) + 24 V, COM		24 V ±10 % Isolated Max. current 100 mA
Logic inputs LI1, LI2, BOOST Stop, run and boost on start-up functions		Logic inputs with impedance 27 kΩ; 24 V power supply (U max 40 V) Max. current 8 mA State 0 if U < 5 V and I < 0.2 mA State 1 if U > 13 V and I > 0.5 mA
Logic output LO1 End of starting signal		Open collector logic output: External 24 V power supply (minimum 6 V, maximum 30 V) Max. current 200 mA
Relay output R1AR1C		Normally open (N/O) contact Minimum switching capacity: 10 mA for 6 V ~ Maximum switching capacity on inductive load (cos φ = 0.5 and L/R = 20 ms): 2 A for 250 V ~ or 30 V ~ (AC-15) Maximum operating voltage 440 V
LED signalling	Green LED Yellow LED	Starter powered up Nominal voltage reached

Connections (maximum connection capacity and tightening torque)

Power circuit			Connection to Ø4 mm screw clamps	
Flexible wire without cable end	1 conductor	mm ²	1.5...10	8 AWG
	2 conductors	mm ²	1.5...6	10 AWG
Flexible wire with cable end	1 conductor	mm ²	1...6	10 AWG
	2 conductors	mm ²	1...6	10 AWG
Rigid wire	1 conductor	mm ²	1...10	8 AWG
	2 conductors	mm ²	1...6	10 AWG
Tightening torque		N.m	1.9...2.5	
Control circuit			Screw connector	
Flexible wire without cable end	1 conductor	mm ²	0.5...2.5	14 AWG
	2 conductors	mm ²	0.5...1.5	16 AWG
Flexible wire with cable end	1 conductor	mm ²	0.5...1.5	16 AWG
	2 conductors	mm ²	0.5...1.5	16 AWG
Rigid wire	1 conductor	mm ²	0.5...2.5	14 AWG
	2 conductors	mm ²	0.5...1	17 AWG
Tightening torque		N.m	0.5	

Torque characteristics (typical curves)



The diagram opposite shows the torque/speed characteristic of a cage motor in relation to the supply voltage. The torque varies in line with the square of the voltage at a fixed frequency. The gradual increase in the voltage prevents the instantaneous current peak on power-up.

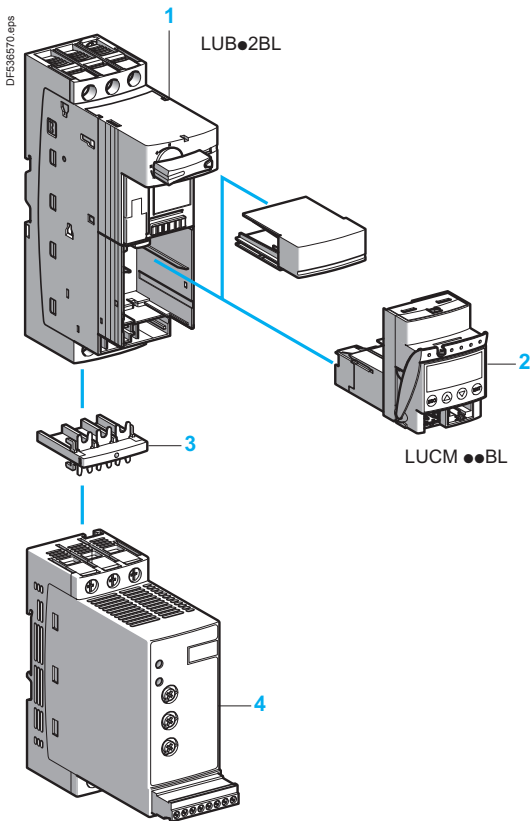
Soft starters for asynchronous motors

Altistart U01 and TeSys U

TeSys U



ATSU 01N222LT



ATSU 01N2●●LT

Soft start/soft stop units for 0.75 to 15 kW motors (can be combined with the TeSys U starter)

Motor				Starter	
Motor power ⁽¹⁾				Nominal current	Reference
230 V		400 V	460 V	A	
kW	HP	kW	HP		
3-phase supply voltage: 200...480 V 50/60 Hz					
0.75	1	1.5	2	6	ATSU01N206LT
1.1	1.5	2.2	3		
		3			
1.5	2	–	5	9	ATSU01N209LT
–	–	4	–		
2.2	3	5.5	7.5	12	ATSU01N212LT
3	–	–	–		
4	5	7.5	10	22	ATSU01N222LT
5.5	7.5	11	15		
7.5	10	15	20	32	ATSU01N232LT

Accessorie

Description	Used for starter	Reference
Power connector between ATSU 01N2●●LT and TeSys U	ATSU 01N2●●LT	VW3G4104

TeSys U starter and soft start unit combinations

Numerous possibilities for combinations and options are offered. Please consult the "TeSys U Starters-open version" specialist catalogue.

Motor power			Soft starter	TeSys U	
230 V	400 V	460 V		Power base	Control unit ⁽²⁾
kW/HP	kW	HP			
0.75/1	1.5	2	ATSU 01N206LT	LUB 12	LUC● 05BL
1.1/1.5	2.2/3	3	ATSU 01N206LT	LUB 12	LUC● 12BL
1.5/2	–	–	ATSU 01N209LT	LUB 12	LUC● 12BL
–	4	5	ATSU 01N209LT	LUB 12	LUC● 12BL
2.2/3	–	–	ATSU 01N212LT	LUB 12	LUC● 12BL
3/–	5.5	7.5	ATSU 01N212LT	LUB 32	LUC● 18BL
4/5	7.5	10	ATSU 01N222LT	LUB 32	LUC● 18BL
5.5/7.5	11	15	ATSU 01N222LT	LUB 32	LUC● 32BL
7.5/10	15	20	ATSU 01N232LT	LUB 32	LUC● 32BL

Example of a starter-motor combination with:

- 1 non-reversing power base for DOL starting (LUB●2BL)
- 2 control unit (LUCM●●BL)
- 3 power connector (VW3 G4104)
- 4 Altistart U01 soft start/soft stop unit (ATSU 01N2●●LT)

(1) Standard motor power ratings, HP power ratings indicated according to standard UL 508.
(2) Depending on the configuration of the chosen TeSys U starter, replace the ● with A for standard, B for expandable, and M for multifunction.

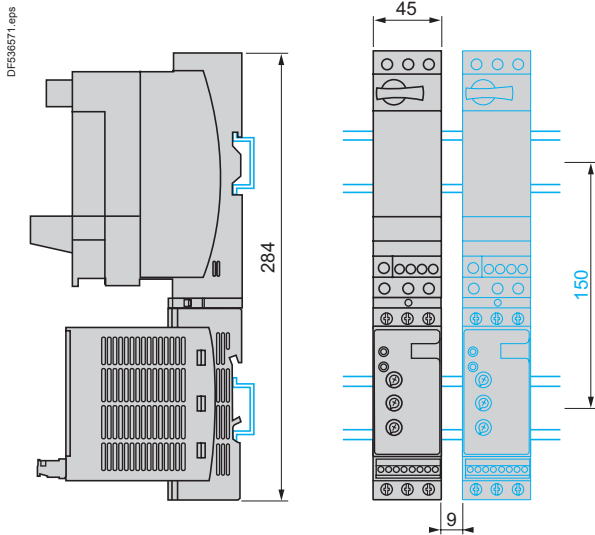
Soft starters for asynchronous motors

Altistart U01 and TeSys U

TeSys U

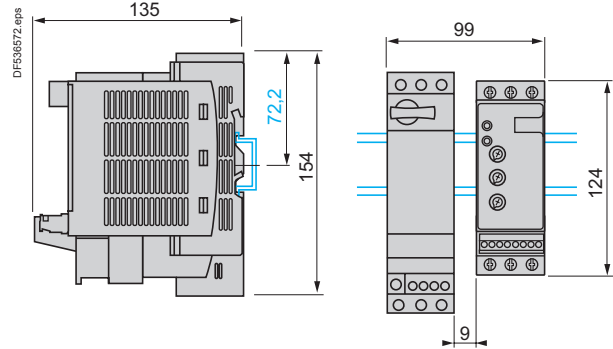
**TeSys U combination (non-reversing power base) and
ATSU 01N206LT to ATSU 01N212LT**

Mounting on \perp (35 mm) rail with VW3 G4104 connector



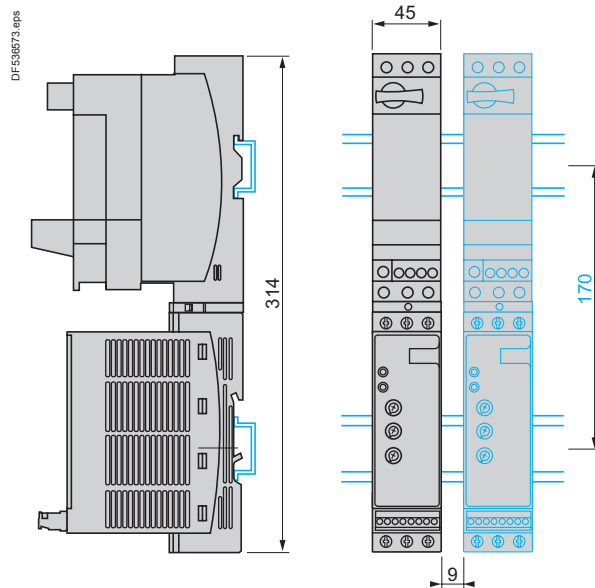
**TeSys U combination (non-reversing or reversing power base)
and ATSU 01N206LT to ATSU 01N212LT**

Side by side mounting



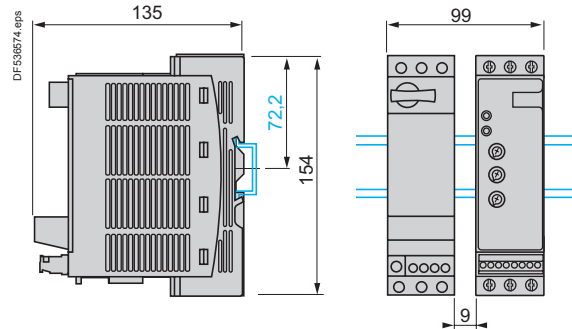
**TeSys U combination (non-reversing power base) and
ATSU 01N222LT to ATSU 01N232LT**

Mounting on \perp (35 mm) rail with VW3 G4104 connector

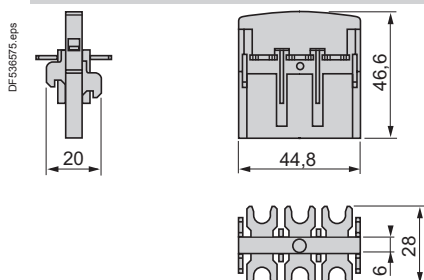


**TeSys U combination (non-reversing or reversing power base)
and ATSU 01N222LT to ATSU 01N232LT**

Side by side mounting



VW3 G4104 connector



Soft starters for asynchronous motors

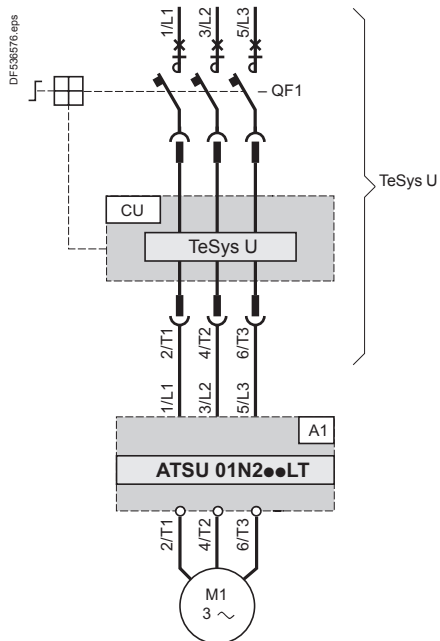
Altistart U01 and TeSys U

For 0.75 to 15 kW motors

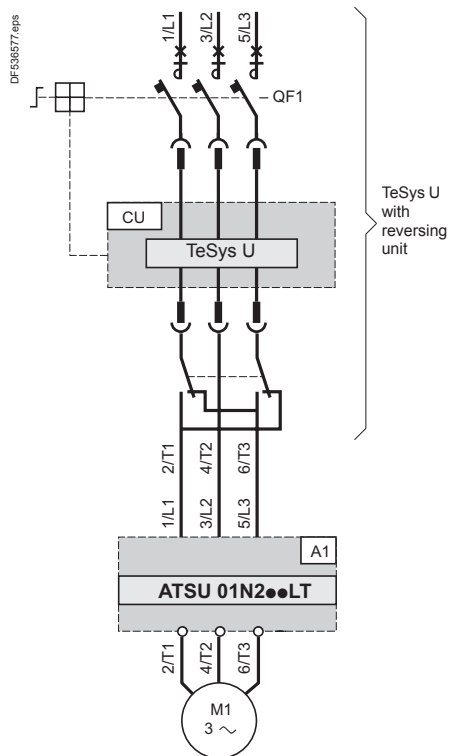
TeSys U

ATSU 01N2●●LT soft start/soft stop units

Power wiring



Power wiring with reversing unit



Compatible components

Code	Description
A1	Soft start/soft stop unit
QF1	TeSys U controller-starter
CU	TeSys U control unit

Soft starters for asynchronous motors

Altistart U01 and TeSys U

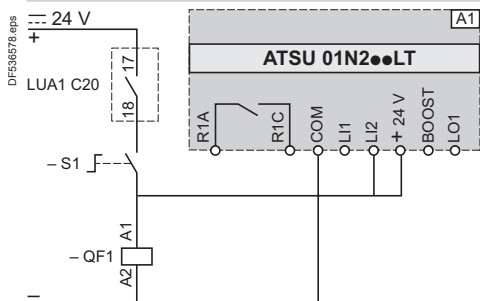
For 0.75 to 15 kW motors

TeSys U

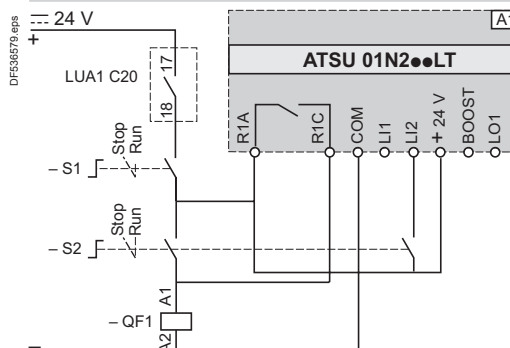
ATSU 01N2●●LT soft start/soft stop units (continued)

Automatic 2-wire control

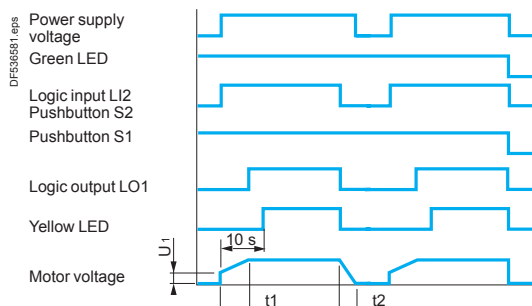
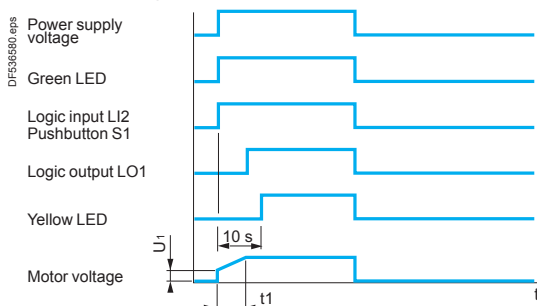
Without deceleration



With and without deceleration

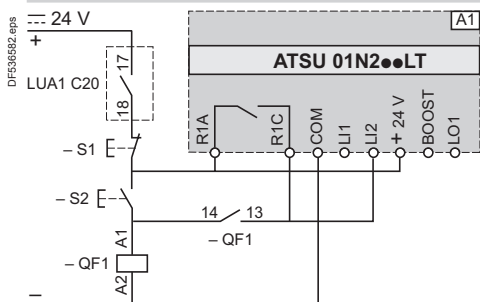


Functional diagrams

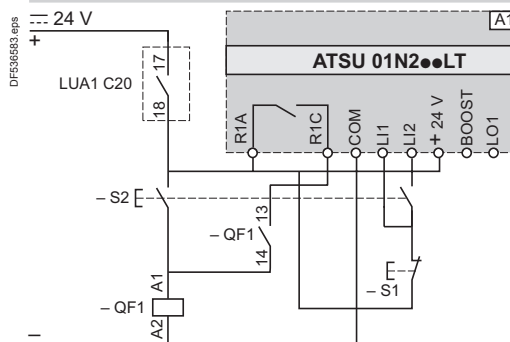


Automatic 3-wire control

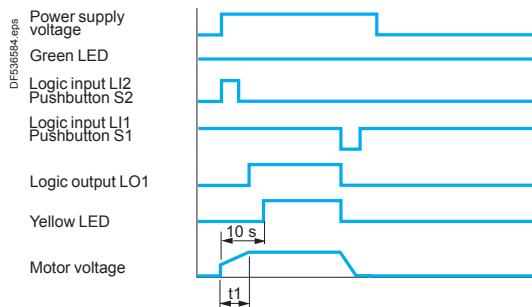
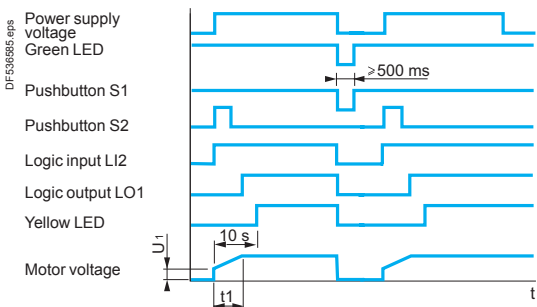
Without deceleration



With deceleration



Functional diagrams



A1: Soft start/soft stop unit
 S1, S2: XB4 B or XB5 B pushbuttons
 QF1: TeSys U controller-starter
 t1: Acceleration time can be controlled by a potentiometer
 t2: Deceleration time can be controlled by a potentiometer
 U_r: Starting time can be controlled by a potentiometer

Soft starters for asynchronous motors

Altistart U01 and TeSys U

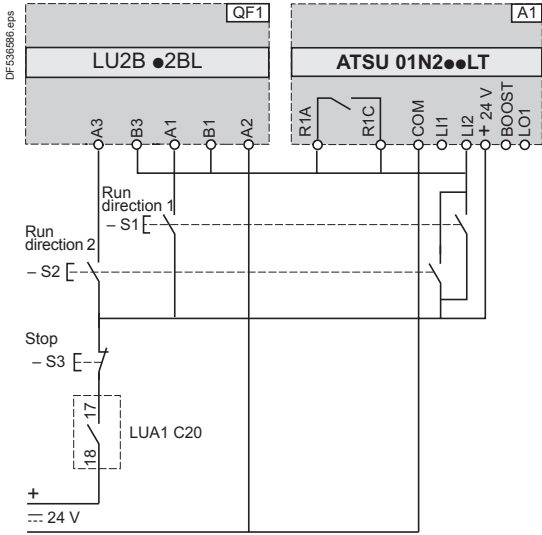
For 0.75 to 15 kW motors

TeSys U

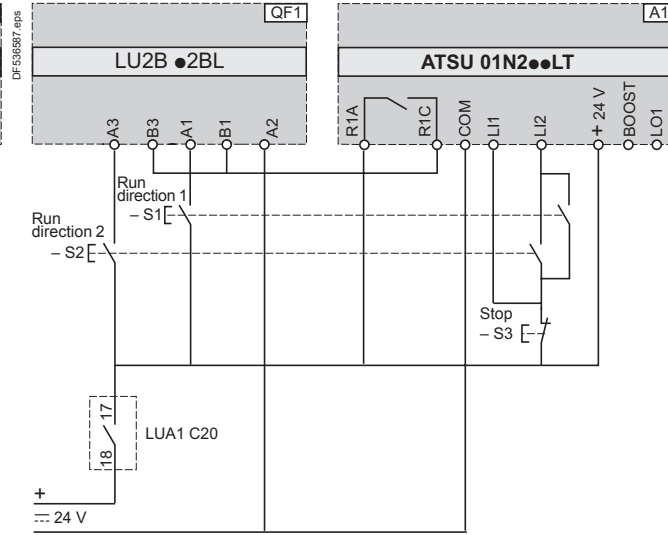
ATSU 01N2●●LT soft start/soft stop units (continued)

Automatic 3-wire control, with reversing unit

Without deceleration



With deceleration



QF1: TeSys U controller-starter with reversing unit

A1: Soft start/soft stop unit

S1, S2, S3: XB4 B or XB5 B pushbuttons

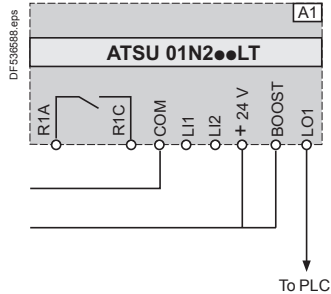
S3: minimum depression time 500 ms

QF1: TeSys U controller-starter with reversing unit

A1: Soft start/soft stop unit

S1, S2, S3: XB4 B or XB5 B pushbuttons

Boost on starting and end of starting signal



A1: Soft start/soft stop unit

Soft starters for asynchronous motors

Altistart U01 and TeSys U

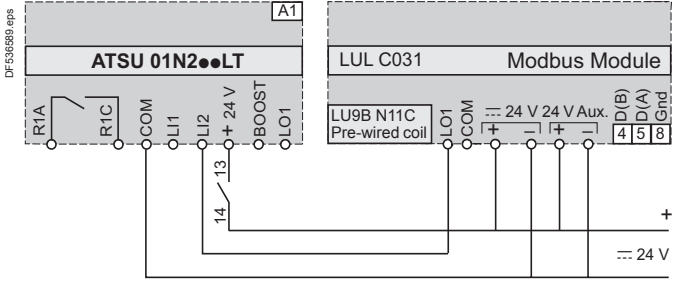
For 0.75 to 15 kW motors

TeSys U

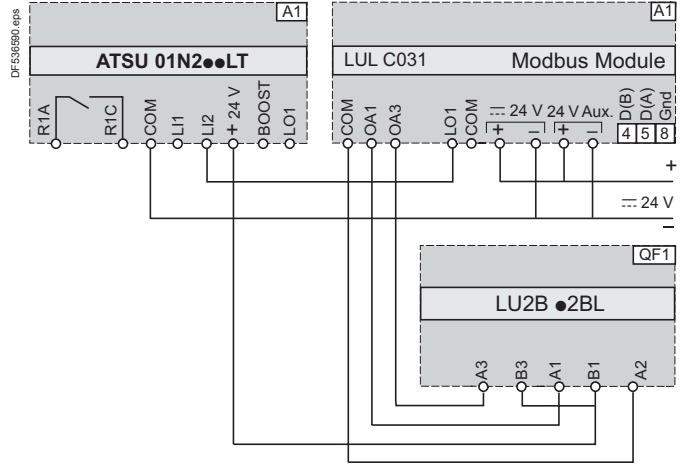
ATSU 01N2●●LT soft start/soft stop units (continued)

Automatic control with Modbus communication module, with and without deceleration

Without reversing unit



With reversing unit



Function	Register	Bit	Value
Powering down TeSys U and ATSU			
-	704	0	0
Automatic control without deceleration			
Run	700	0	1
Stop	704	0	0
Automatic control with deceleration			
Run	700	0	1
Soft stop	700	0	0

Function	Register	Bit	Value
Powering up TeSys U and ATSU			
Forward	704	0	1
Reverse	704	1	1
Powering down TeSys U and ATSU			
Forward	704	0	0
Reverse	704	1	0
Automatic control without deceleration			
Run	700	0	1
Stop forward	704	0	0
Stop reverse	704	1	0
Automatic control with deceleration (forward or reverse)			
Run	700	0	1
Soft stop	700	0	0

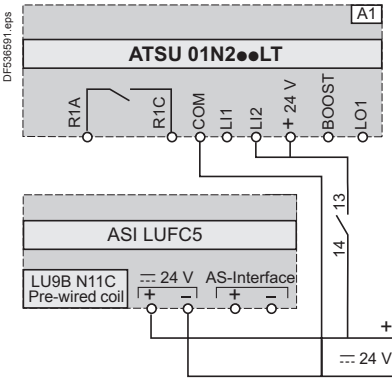
A1: Soft start/soft stop unit

A1: Soft start/soft stop unit

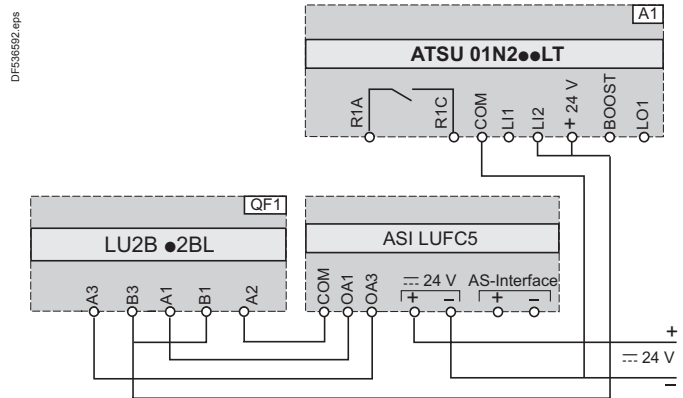
QF1: TeSys U controller-starter with reversing unit

Automatic control with AS-Interface communication module, without deceleration

Without reversing unit



With reversing unit



Function	Bit	Value
Power-up and automatic control without deceleration		
Run	D0	1
Stop	D0	0

Function	Bit	Value
Power-up and automatic control without deceleration		
Run forward	D0	1
Stop	D0	0
Run reverse	D1	1
Stop	D1	0

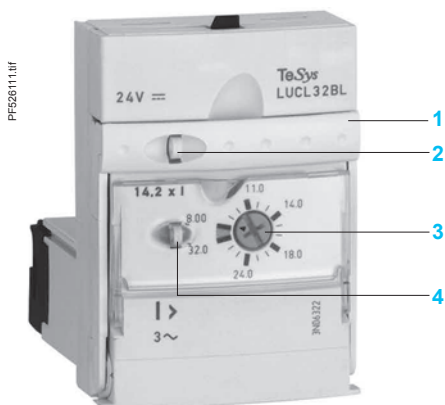
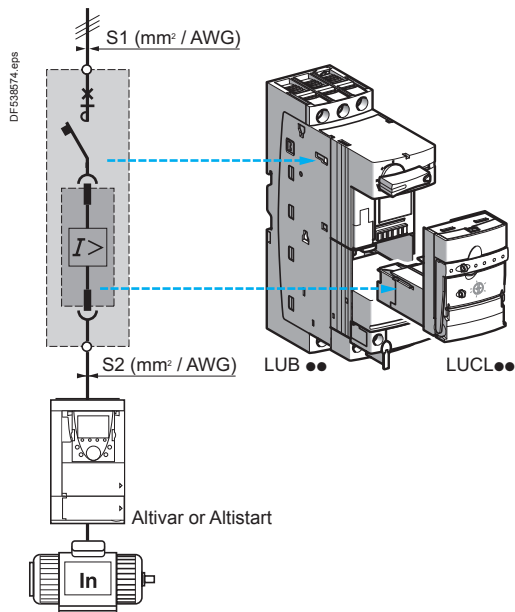
A1: Soft start/soft stop unit

A1: Soft start/soft stop unit

QF1: TeSys U controller-starter with reversing unit

TeSys motor starters - open version

Magnetic control unit for the protection of
variable speed controllers and soft start
units



Presentation

When installed upstream of a variable speed controller or soft start unit, control unit LUCL●●, used in conjunction with an LUB 12 or LUB 32 power base, provides:

- isolation,
- short-circuit protection of the motor starter.
(variable speed controller-based or soft start unit-based motor starters).

Note: control unit LUCL, when used in conjunction with power base LUB 12 or LUB 32, conforms to standard IEC 60947-2.

Installation regulations

When the length of the cable between the TeSys U starter and the variable speed controller is more than 1.5 m, the c.s.a. of the cable between the variable speed controller and the TeSys U starter (S2) must be equal to the c.s.a. of the cable upstream of TeSys U (S1).

Description

- 1 Extraction and locking handle
- 2 Sealing of locking handle
- 3 Dial for magnetic adjustment of motor In
- 4 Locking of settings by sealing the transparent cover

References

Description	Line current of the variable speed controller or soft start unit	Reference ⁽¹⁾
A		
Magnetic control unit	0.15...0.6	LUCLX6●●
	0.35...1.4	LUCL1X●●
	1.25...5	LUCL05●●
	3...12	LUCL12●●
	4.5...18	LUCL18●●
	8...32	LUCL32●●

⁽¹⁾ Standard control circuit voltage:

Volts	24	48...72	110...240
≡	BL ^{(2) (3)}	—	—
~	B	—	—
≡ or ~	—	ES ⁽⁴⁾	FU ⁽⁵⁾

⁽²⁾ Voltage code to be used for a starter-controller with communication module.

⁽³⁾ d.c. voltage with maximum ripple of ±10 %.

⁽⁴⁾ ≡: 48...72 V, ~: 48 V.

⁽⁵⁾ ≡: 110...220 V, ~: 110...240 V.

TeSys motor starters - open version

Magnetic control unit for the protection of variable speed controllers and soft start stop units

TeSys U

Control unit and associated power base selection						
Functions provided	Maximum motor power ratings 50/60 Hz			Power base reference	Control unit reference	Line current
	< 400/415 V	500 V	690 V			
	KW	KW	KW			
■ Short-circuit protection	0.09	–	–	LUB12 or LUB32	LUCLX6●●	0.15...0.6
■ Manual reset	0.25	–	–	LUB12 or LUB32	LUCL1X●●	0.35...1.4
	1.5	2.2	3	LUB12 or LUB32	LUCL05●●	1.25...5
	5.5	5.5	9	LUB12 or LUB32	LUCL12●●	3...12
	7.5	9	15	LUB32	LUCL18●●	4.5...18
	15	15	18.5	LUB32	LUCL32●●	8...32

Operating characteristics						
Control units	Standard		Advanced			Multifunction
	LUCA	LUCB	LUCB	LUCB	LUCB	LUCM
Thermal overload protection	Integrated function					
Over current protection	14.2 x the setting current					3 to 17 x the setting current
Short-circuit protection	14.2 x the max. current					
Protection against phase loss	Integrated function					
Protection against phase imbalance	Integrated function					
Earth fault protection (equipment protection only)	Integrated function					
Tripping class	10	10	10	20		5...30
Motor type	3-phase		Single-phase	3-phase	Single-phase and 3-phase	
Thermal overload test function	Integrated function					
Overtorque	Integrated function					
No-load running	Integrated function					
Long starting time	Integrated function					
Reset method	Manual	Integrated function				Parameters can be set
	Automatic or remote	With function module, or parameters can be set via the bus with a communication module (see page 24614/2).				Parameters can be set Parameters can be set via the bus with a communication module (see page 24614/2).

Integrated function

Function provided with accessory

Compatibility			
Compatibility of control unit LUCL●● with	References	Functions	
The starter-controller	Yes	LUB 12/LUB 32	Starter-controller (magnetic protection)
The starter	No	LUS 12/LUS 32	Starter without either magnetic or thermal overload protection)
The controller	No	LUT M	Controller (without thermal overload protection)
Add-on contact blocks with fault signalling and auxiliary contacts	Yes	LUA 1C11 LUA 1C20 LUF N20 LUF N11 LUF N02	Add-on contact blocks with fault signalling (1 N/O + 1 N/C) Add-on contact blocks with fault signalling (2 N/O) Auxiliary contacts (2 N/O) Auxiliary contacts (1 N/O + 1 N/C) Auxiliary contacts (2 N/C)
Communication modules	Yes	ASILUF C5 and ASILUF C51 LUF C00 LUL C07 LUL C08 LUL C09 LUL C15 LUL C031 LUL C033	AS-Interface communication modules Parallel wiring module Profibus DP communication module (1 output/2 inputs) CANopen communication module (1 output/2 inputs) DeviceNet communication module (1 output/2 inputs) Advantys STB communication module (1 output/2 inputs) Modbus communication module (1 output) Modbus communication module (1 output/2 inputs)
Function modules	No	LUF W10 LUF DH11 LUF DA01 LUF DA10 LUF V2	Alarm function module Thermal overload signalling module with manual reset Thermal overload signalling module with automatic or remote reset (1 N/C) Thermal overload signalling module with automatic or remote reset (1 N/O) Motor load indication module

TeSys motor starters - open version

TeSys U starter-controllers

TeSys U

Characteristics of magnetic control unit LUCL			
Protection	Motor type		3-phase
	Conforming to standard		When used in conjunction with an LUB 12 or LUB 32 power base, magnetic control unit LUCL conforms to standard IEC 60947-2.
Short-circuit protection	Tripping threshold		14.2 x I _n (max. setting current)
	Tripping tolerance		±20 %
Environment			
Product certifications			CE
Conforming to standards			When used in conjunction an LUB power base, control unit LUCL conforms to standard 60947-2.
Rated insulation voltage (U _i)	Conforming to IEC/EN 60947-1, overvoltage category III, degree of pollution: 3	V	690
Rated impulse withstand voltage (U _{imp})	Conforming to IEC/EN 60947-2	kV	6
Safety separation of circuits SELV	Conforming to IEC/EN 60947-1 appendix N	V	Between the control or auxiliary circuit and the main circuit: 400 Between the control and auxiliary circuits: 40
Degree of protection Conforming to IEC/EN 60947-1 (protection against direct finger contact)	Front panel outside connection zone		IP 40
	Front panel and wired terminals		IP 20
	Other faces		IP 20
Protective treatment	Conforming to IEC/EN 60068		"TH"
	Conforming to/EN 60068-2-30	Cycles	12
	Conforming to IEC/EN 60068-2-11	h	48
Ambient air temperature around the device	Storage	°C	- 40...+ 85
	Operation	°C	Power bases and standard and advanced control units: - 25... + 70. (At temperatures above 60°C and up to 70°C, for I _e = 32 A, leave a minimum gap of 9 mm between products). Power bases and multifunction control units: - 25...+ 60. (At temperatures above 45 °C, leave a minimum gap of 9 mm between products. At temperatures above 55 °C up to 60 °C, leave a gap of 20 mm between products.)
Maximum operating altitude		m	2000
Operating positions	In relation to normal vertical mounting plane		
Flame resistance	Conforming to UL 94		V2
	Conforming to IEC/EN 60695-2-12	°C	960 (parts supporting live components) °C 650
Environmental restrictions			Cadmium and silicone-free, recyclable
Shock resistance 1/2 sine wave = 11 ms	Conforming to IEC/EN60068-2-27 ⁽¹⁾		Power poles open: 10 gn Power poles closed: 15 gn
Vibration resistance 5...300 Hz	Conforming to IEC/EN 60068-2-6 ⁽¹⁾		Power poles open: 2 gn Power poles closed: 4 gn ⁽²⁾
Resistance to electrostatic discharge	Conforming to IEC/EN 61000-4-2	kV	In open air: 8 - Level 3
		kV	On contact: 8 - Level 4
Immunity to radiated high-frequency disturbance	Conforming to IEC/EN 61000-4-3	V/m	10 - Level 3
		kV	All circuits except for serial link: 4 - Level 4
Immunity to fast transient currents	Conforming to IEC/EN 61000-4-4	kV	Serial link: 2 - Level 3
		kV	
Immunity to dissipated shock waves	Conforming to IEC/EN 60947-2 U _c ~ 24...240 V, U _c ~ 48...220 V U _c = 24 V ~		Common mode
		kV	2
			Serial mode 1
Immunity to conducted high-frequency disturbance	Conforming to IEC/EN 61000-4-6	V	10
			Not applicable

⁽¹⁾ Without modifying the contact states, in the most unfavourable direction.
⁽²⁾ 2 gn with Advantys STB or CANopen communication modules.

TeSys motor starters - open version

TeSys U starter-controllers

Power bases and LUCL magnetic control unit

TeSys U

Power circuit connection characteristics					
Power base and control unit type		LUB 12 + LUCL		LUB 32 + LUCL	
Connection to Ø4 mm screw clamp terminals					
Flexible cable without cable end	1 conductor	mm ²	2.5...10	2.5...10	
	2 conductors	mm ²	1.5...6	1.5...6	
Flexible cable with cable end	1 conductor	mm ²	1...6	1...6	
	2 conductors	mm ²	1...6	1...6	
Flexible cable without cable end	1 conductor	mm ²	1...10	1...10	
	2 conductors	mm ²	1...6	1...6	
Screwdriver		Philips n° 2 or flat screwdriver: Ø6 mm			
Tightening torque		N.m	1.9...2.5	1.9...2.5	
Control circuit connection characteristics					
Connection to Ø3 mm screw clamp terminals					
Flexible cable without cable end	1 conductor	mm ²	0.75...1.5	0.75...1.5	
	2 conductors	mm ²	0.75...1.5	0.75...1.5	
Flexible cable with cable end	1 conductor	mm ²	0.34...1.5	0.34...1.5	
	2 conductors	mm ²	0.34...1.5	0.34...1.5	
Flexible cable without cable end	1 conductor	mm ²	0.75...1.5	0.75...1.5	
	2 conductors	mm ²	0.75...1.5	0.75...1.5	
Screwdriver		Philips n° 2 or flat screwdriver: Ø5 mm			
Tightening torque		N.m	0.8...1.2	0.8...1.2	
Control circuit characteristics					
Rated control circuit voltage	~ 50/60 Hz	V	24...240	24...240	
	≡	V	24...220	24...220	
Voltage limits	≡ 24 V ⁽¹⁾	V	20...27	20...27	
	Operation				
	~ 24 V	V	20...26.5	20...26.5	
	~ or ≡ 48...72 V	V	~ 38.5...72, ≡ 38.5...93	~ 38.5...72, ≡ 38.5...93	
	~ 110...240 V	V	~ 88...264	~ 88...264	
	≡ 110...240 V	V	≡ 88...242	≡ 88...242	
Drop-out	≡ 24 V	V	14.5	14.5	
	~ 24 V	V	14.5	14.5	
	~ or ≡ 48...72 V	V	29	29	
	~ 110...240 V, ≡ 110...220 V	V	55	55	
Typical consumption	≡ 24 V	mA	130	220	
	I max while closing				
	~ 24 V	mA	140	220	
	~ or ≡ 48...72 V	mA	280	280	
	~ 110...240 V, ≡ 110...220 V	mA	280	280	
I rms sealed	≡ 24 V	mA	60	80	
	~ 24 V	mA	70	90	
	~ or ≡ 48...72 V	mA	35	45	
	~ 110...240 V, ≡ 110...220 V	mA	35	25	
Heat dissipation		W	2	3	
Operating time	Closing	ms	24 V: 70; 48 V: 60; ≥ 72 V: 50	24 V: 70; 48 V: 60; ≥ 72 V: 50	
	Opening	ms	35	35	
Resistance to micro-breaks		ms	3	3	
Resistance to voltage dips		IEC/EN 61000-4-11	At least 70 % of Uc for 500 ms		
Mechanical durability		In millions of operating cycles	15	15	
Maximum operating rate		In operating cycles per hour	3600	3600	
Main pole characteristics					
Number of poles			3	3	
Isolation conforming to IEC/EN 60947-1	Possible		Yes	Yes	
	Padlocking		1 padlock with Ø6.9 mm shank	1 padlock with Ø6.9 mm shank	
Rated thermal current		A	12	32	
Rated operational current (Ue ≤ 440 V)	Conforming to IEC/EN 60947-2	Category AC-41	θ ≤ 70 °C: 12 A	θ ≤ 70 °C: 32 A	
		Category AC-43	θ ≤ 70 °C: 12 A	θ ≤ 70 °C: 32 A	
Rated operational voltage		V	690 ⁽³⁾	690 ⁽³⁾	
Frequency limits		Of the operating current	Hz	40...60	
Power dissipated in the power circuits	Operational current	A	3 6 9 12 18 25 32		
	Power dissipated in all three poles	W	0.1 0.3 0.6 1.1 2.4 4.6 7.5		
Rated breaking capacity on short-circuit		V	230 440 500 600		
		kA	50 50 10 4		
Total breaking time		ms	2 2 2		
Thermal limit		With Isc max on 440 V	kA ² s	90	120

(1) d.c. voltage with maximum ripple of ± 10 %.

(2) No consumption sealed.

(3) For 690 V, use phase barrier LU9SP0.

TeSys motor starters - open version

TeSys U starter-controllers

TeSys U

Coordination

The standard defines tests at different levels of current; the purpose of these tests is to place the equipment in extreme conditions.

The standard defines 2 types of coordination, according to the condition of the components after testing: type 1 and type 2.

Type 1 coordination requires that in a short-circuit condition, the contactor or starter must not present any danger to personnel or installations and must not be able to resume operation without repair or the replacement of parts.

The product combinations given below provide type 1 coordination

Soft start-soft stop unit/TeSys U starter controller combination with magnetic protection

TeSys U / Altistart 48: type 1 coordination

Power 400 V (kW)	TeSys U references (protection + power switching)	Soft start unit reference	
		Class 10	Class 20
5.5	LUB32 + LUCL32 or LUCL18	-	ATS48D17
7.5	LUB32 + LUCL32	ATS48D17	ATS48D22
11	LUB32 + LUCL32	ATS48D22	ATS48D32
15	LUB32 + LUCL32	ATS48D32	ATS48D38

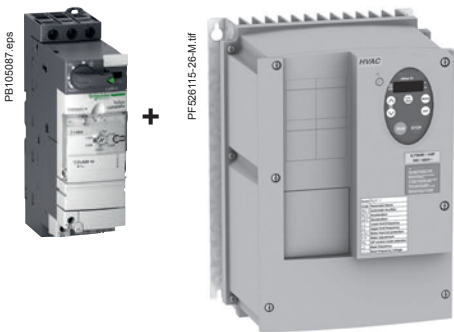
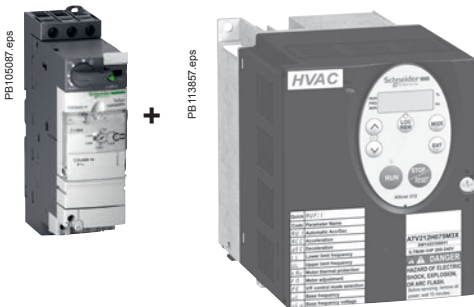
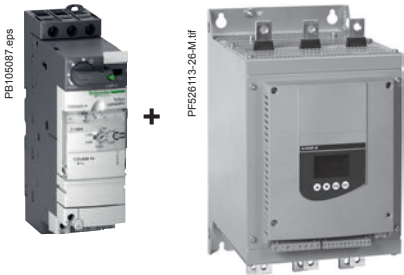
Variable speed controller/TeSys U starter controller combination with magnetic protection

TeSys U / Altivar 21 UL Type 1/IP 20: type 1 coordination

Power 400 V (kW)	TeSys U references (protection + power switching)	Variable speed controller reference
0.75	LUB12 + LUCL05	ATV21H075N4
		ATV21HU15N4
2.2	LUB12 + LUCL12	ATV21HU22N4
3	LUB12 + LUCL12	ATV21HU30N4
4	LUB12 + LUCL12	ATV21HU40N4
5.5	LUB32 + LUCL32 or LUCL18	ATV21HU55N4
7.5	LUB32 + LUCL32 or LUCL18	ATV21HU75N4
11	LUB32 + LUCL32	ATV21HD11N4
15	LUB32 + LUCL32	ATV21HD15N4

TeSys U / Altivar 21 IP 54: type 1 coordination

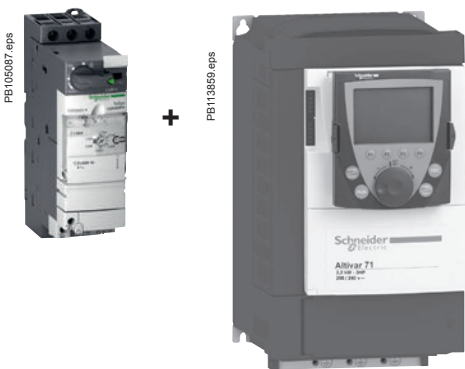
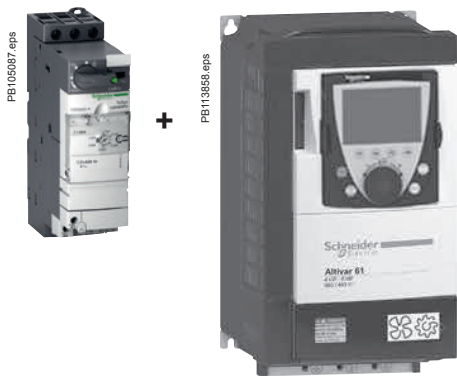
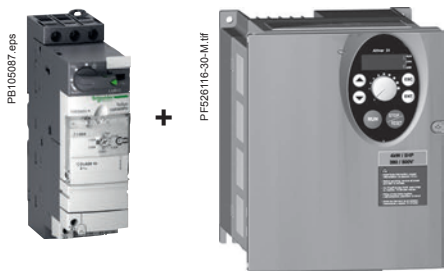
Power 400 V (kW)	TeSys U references (protection + power switching)	Variable speed controller reference
0.75	LUB12 + LUCL05	ATV21W075N4/N4C
1.5	LUB12 + LUCL12 or LUCL05	ATV21WU15N4/N4C
2.2	LUB12 + LUCL12	ATV21WU22N4/N4C
3	LUB12 + LUCL12	ATV21WU30N4/N4C
4	LUB12 + LUCL12	ATV21WU40N4/N4C
5.5	LUB32 + LUCL32 or LUCL18	ATV21WU55N4/N4C
7.5	LUB32 + LUCL32 or LUCL18	ATV21WU75N4/N4C
11	LUB32 + LUCL32	ATV21WD11N4/N4C
15	LUB32 + LUCL32	ATV21WD15N4/N4C



TeSys motor starters - open version

TeSys U starter-controllers

TeSys U



Variable speed controller/TeSys U starter controller combination with magnetic protection (continued)

TeSys U / Altistart 31: type 1 coordination

Power 400 V (kW)	TeSys U references (protection + power switching)	Variable speed controller reference
0.37	LUB12 + LUCL05	ATV31H037N4
0.55	LUB12 + LUCL05	ATV31H055N4
0.75	LUB12 + LUCL05	ATV31H075N4
1.1	LUB12 + LUCL12	ATV31HU11N4
1.5	LUB12 + LUCL12	ATV31HU15N4
2.2	LUB12 + LUCL12	ATV31HU22N4
3	LUB32 + LUCL18	ATV31HU30N4
4	LUB32 + LUCL18	ATV31HU40N4
5.5	LUB32 + LUCL32	ATV31HU55N4
7.5	LUB32 + LUCL32	ATV31HU75N4



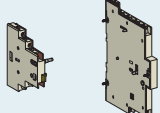
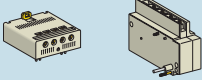
TeSys U / Altistart 61: type 1 coordination

Power 400V (kW)	TeSys U references (protection + power switching)	Variable speed controller reference
0.75	LUB12 + LUCL05	ATV61H075N4
1.5	LUB12 + LUCL12	ATV61HU15N4
2.2	LUB12 + LUCL12	ATV61HU22N4
3	LUB32 + LUCL18	ATV61HU30N4
4	LUB32 + LUCL18	ATV61HU40N4
5.5	LUB32 + LUCL32	ATV61HU55N4
7.5	LUB32 + LUCL32	ATV61HU75N4

TeSys U / Altistart 71: type 1 coordination

Power 400V (kW)	TeSys U references (protection + power switching)	Variable speed controller reference
0.75	LUB12 + LUCL05	ATV71H075N4
1.5	LUB12 + LUCL12	ATV71HU15N4
2.2	LUB12 + LUCL12	ATV71HU22N4
3	LUB32 + LUCL18	ATV71HU30N4
4	LUB32 + LUCL18	ATV71HU40N4
5.5	LUB32 + LUCL32	ATV71HU55N4

All-in-one motor starter: Integral 63

Type of product	Direct	Reversing	Range		Page
3 pole contactor breakers for motors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Up to 33 kW		A4/2
3 pole contactor breakers for resistive loads – AC1	<input checked="" type="checkbox"/>		Up to 63 kW		A4/4
Add-on blocks					A4/6
Accessories and spare parts					A4/8

Technical Data for Designers

A4/15

Motor starters - open version

Contactors and reversing contactors Integral 63 for control and protection of motors (for customer assembly)

Integral 63



LD1 LD030●

3-pole contactor breakers without protection module ⁽¹⁾

Without control test function, with padlocking facility							Basic reference ⁽³⁾ To be completed by adding the control circuit voltage code ⁽²⁾	Weight
Standard power ratings of 3-phase motors 50/60 Hz in AC-43					Operational current	Breaking capacity (I _q) for U _e ≤ 415 V		
220 V	400 V	440 V	500 V	660 V	A	kA		
kW	kW	kW	kW	kW			kg	
Black knob								
15	30 33	33	37	55	63	50	LD1LD030●	3.700

With control test function and padlocking facility

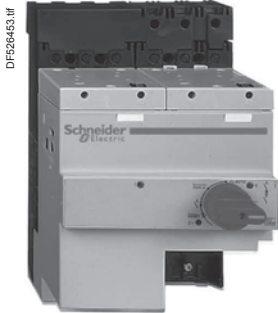
Standard power ratings of 3-phase motors 50/60 Hz in AC-43							Basic reference ⁽³⁾ To be completed by adding the control circuit voltage code ⁽²⁾	Weight
Standard power ratings of 3-phase motors 50/60 Hz in AC-43					Operational current	Breaking capacity (I _q) for U _e ≤ 415 V		
220 V	400 V	440 V	500 V	660 V	A	kA		
kW	kW	kW	kW	kW			kg	
Black knob (CNOMO, VDE 0113)								
15	30 33	33	37	55	63	50	LD4LD130●	3.800

Red knob on yellow background (CNOMO) Emergency Stop								
15	30 33	33	37	55	63	50	LD4LD030●	3.800

3-pole reversing contactor breakers without protection module ⁽¹⁾

With control test function and padlocking facility							Basic reference ⁽³⁾ To be completed by adding the control circuit voltage code ⁽²⁾	Weight
Standard power ratings of 3-phase motors 50/60 Hz in AC-43					Operational current	Breaking capacity (I _q) for U _e ≤ 415 V		
220 V	400 V	440 V	500 V	660 V	A	kA		
kW	kW	kW	kW	kW			kg	
Black knob (CNOMO, VDE 0113)								
15	30 33	33	37	55	63	50	LD5LD130●	7.600

Red knob on yellow background (CNOMO) Emergency Stop								
15	30 33	33	37	55	63	50	LD5LD030●	7.600



LD5 LC030●

⁽¹⁾ For the unit to function, it must be fitted with a protection module, to be ordered separately, see page opposite.
⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	36	42	48	110	120	220	230	240	380 400	415	440	480	500	600	660
50 Hz	B	-	D	E	F	-	M	M	U	Q	N	N	-	S	-	Y
60 Hz	BC	CC	-	CE	K	FC	LC	MC	MC	-	-	UX	Q	-	S	-
⋯ ⁽⁴⁾	BD	-	-	ED	FD	-	-	-	-	-	-	-	-	-	-	-

⁽³⁾ Variant: UL 508 "type E" approved version (SPCD) at 347/600 V; to order, add suffix **H5** to the reference.
 Example: **LD1 LD030MH5**.
⁽⁴⁾ For use on d.c., the unit is supplied with 1 or 2 converters, including coil suppression devices (2 converters for reversing contactor breakers).

Motor starters - open version

Contactors and reversing contactors Integral 63 for control and protection of motors (for customer assembly)

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LB1 LD03M●●

Thermal-magnetic protection modules (compensated and differential for normal starting motors) ⁽¹⁾									
Fixed magnetic protection, set at 15 Irth max, for mounting on Integral 63									
Standard power ratings of 3-phase motors 50/60 Hz in category AC-43					Thermal setting range (Irth min to Irth max)	Magnetic protection	Reference	Weight	
220 V	400 V	440 V	480 V	600 V	A	A			kg
240 V	415 V	440 V	525 V	690 V					
kW	kW	kW	kW	kW					
3	5.5	5.5	7.5	10	10...13	–	LB1LD03P16		0.780
4	9	9	11	15	13...18	–	LB1LD03P21		0.780
5.5	11	11	15	18.5	18...25	–	LB1LD03P22		0.780
7.5	15	15	18.5	22	23...32	–	LB1LD03P53		0.780
9	22	22	25	33	28...40	–	LB1LD03P55		0.780
11	25	25	33	45	35...50	–	LB1LD03P57		0.780
15	33	33	40	55	45...63	–	LB1LD03P61		0.780

Adjustable magnetic protection from 6 to 12 Irth max, for mounting on Integral 63									
Standard power ratings of 3-phase motors 50/60 Hz in category AC-43					Thermal setting range (Irth min to Irth max)	Magnetic protection	Reference	Weight	
220 V	400 V	440 V	480 V	600 V	A	A			kg
240 V	415 V	440 V	525 V	690 V					
kW	kW	kW	kW	kW					
3	5.5	5.5	7.5	10	10...13	78...156	LB1LD03M16		0.780
4	9	9	11	15	13...18	108...216	LB1LD03M21		0.780
5.5	11	11	15	18.5	18...25	150...300	LB1LD03M22		0.780
7.5	22	22	25	33	23...32	190...380	LB1LD03M53		0.780
9	22	22	25	33	28...40	240...480	LB1LD03M55		0.780
11	25	25	33	45	35...50	300...600	LB1LD03M57		0.780
15	33	33	40	55	45...63	380...760	LB1LD03M61		0.780

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LB6 LD03M●●

Magnetic only protection modules (for frequent starting motors)									
Standard power ratings of 3-phase motors 50/60 Hz in category AC-43					Magnetic protection	Reference	Weight		
220 V	400 V	440 V	480 V	600 V	A				kg
240 V	415 V	440 V	525 V	690 V					
kW	kW	kW	kW	kW					
3	5.5	5.5	7.5	10	78...156		LB6LD03M16		0.780
4	9	9	11	15	108...216		LB6LD03M21		0.780
5.5	11	11	15	18.5	150...300		LB6LD03M22		0.780
7.5	22	22	25	33	190...380		LB6LD03M53		0.780
9	22	22	25	33	240...480		LB6LD03M55		0.780
11	25	25	33	45	300...600		LB6LD03M57		0.780
15	33	33	40	55	380...760		LB6LD03M61		0.780

(1) Protection modules UL and CSA approved.

Motor starters - open version

Contactor breakers Integral 63
for control and protection of resistive circuits
in category AC-1

Integral 63

Selecting the type of contactor breaker and protection module

Neutral point connection	Type of circuit	Equipment scheme	Combination contactor breaker + protection module
Neutral connection (neutral and PE combined)	TNC (neutral and PE combined)	3-pole + PEN 	LD1 LD030● + LB1 LD03L●●
			LD4 LD130● + LB1 LD03L●●
			LD4 LD030● + LB1 LD03L●●

Note: the PEN conductor must not be isolated.

Neutral point connection	Type of circuit	Equipment scheme	Combination contactor breaker + protection module
Neutral connection (neutral and PE separated)	TNS (neutral and PE separated)	3-pole 	LD1 LC030● + LB1 LC03L●●
			LD4 LC130● + LB1 LC03L●●
			LD4 LC030● + LB1 LC03L●●

Note: all live conductors must be isolated. Neutral protection optional.

Motor starters - open version

Contactors breakers Integral 63 for control and protection of resistive circuits in category AC-1

Integral 63



LD1 LD030●



LB1 LD03L●●

3-pole contactor breakers without protection module ⁽¹⁾

Without control test function, with padlocking facility

Rated thermal current I _{th} θ ≤ 40 °C	Maximum operational current AC-1 θ ≤ 40 °C	Maximum operational voltage	Breaking capacity (I _q) for U _e ≤ 415 V	Number of poles	Basic reference. To be completed by adding the control voltage code ⁽²⁾	Weight
A	A	V	kA			kg
Black knob						
63	63	690	50	3	LD1LC030●	3.700

With control test function and padlocking facility

Rated thermal current I _{th} θ ≤ 40 °C	Maximum operational current AC-1 θ ≤ 40 °C	Maximum operational voltage	Breaking capacity (I _q) for U _e ≤ 415 V	Number of poles	Basic reference. To be completed by adding the control voltage code ⁽²⁾	Weight
A	A	V	kA			kg
Black knob (CNOMO. VDE 0113)						
63	63	690	50	3	LD4LD130●	3.800
Red knob on yellow background (CNOMO. VDE 0113) Emergency Stop						
63	63	690	50	3	LD4LD030●	3.800

Protection modules (for customer assembly)

Thermal-magnetic (compensated)

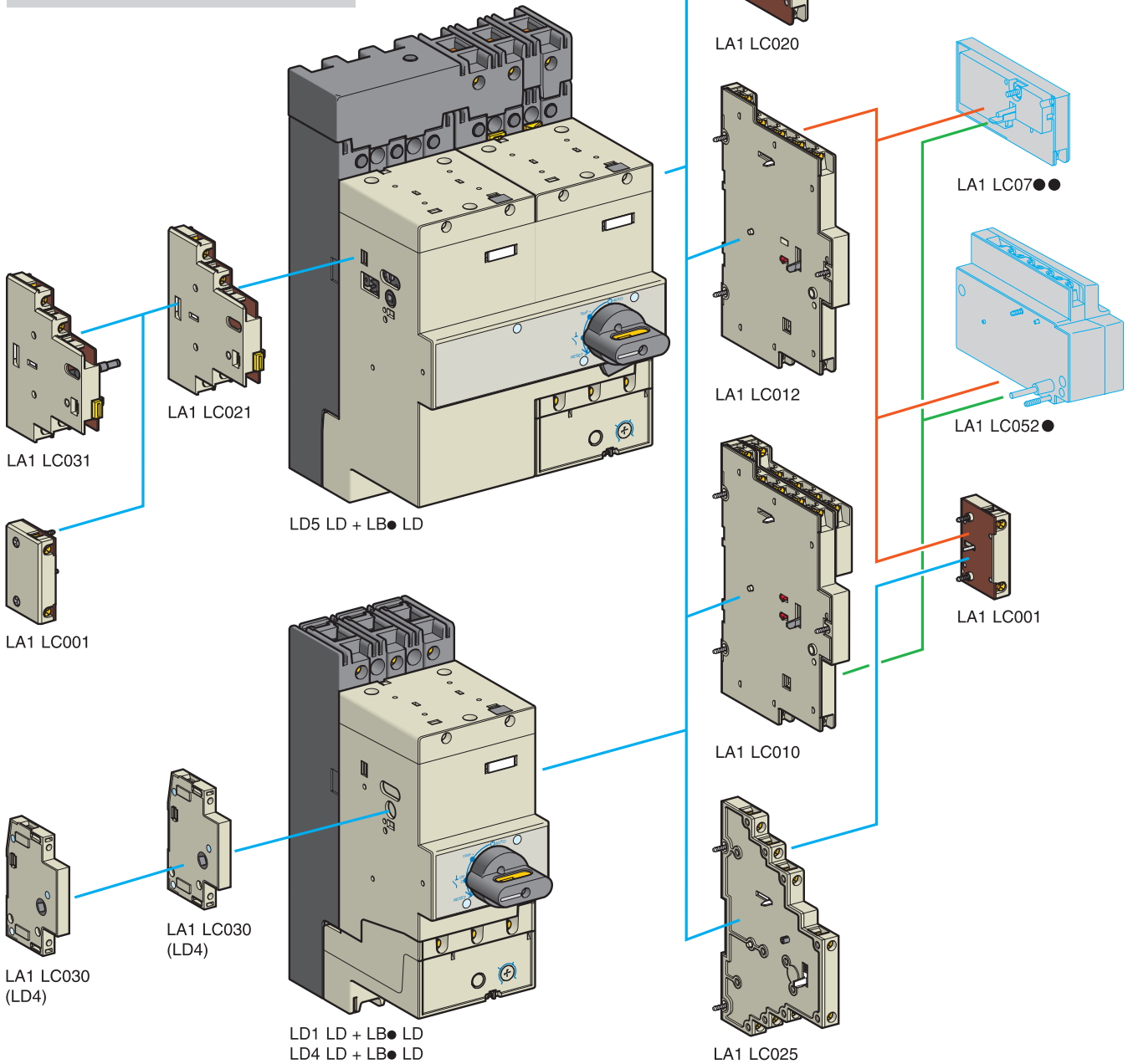
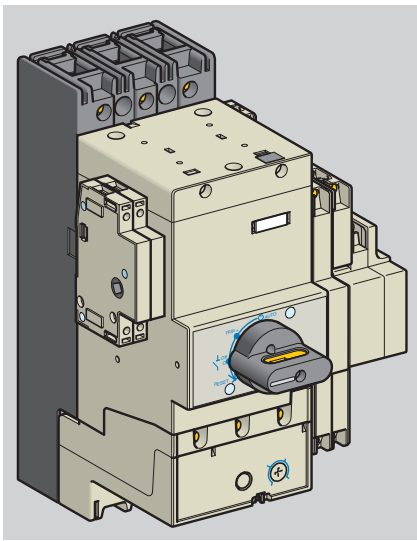
Thermal setting range (I _{rt} h min./I _{rt} h max.)	Magnetic setting range (3...6 I _{rt} h max.)	Number of poles	Number of protected poles	Reference	Weight
A	A				kg
10...13	39...78	3	3	LB1LD03L16	0.780
13...18	54...108	3	3	LB1LD03L21	0.780
18...25	75...150	3	3	LB1LD03L22	0.780
23...32	95...190	3	3	LB1LD03L53	0.780
28...40	120...240	3	3	LB1LD03L55	0.780
35...50	150...300	3	3	LB1LD03L57	0.780
45...63	190...380	3	3	LB1LD03L61	0.780

⁽¹⁾ For the unit to function, it must be fitted with a protection module, to be ordered separately.

⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	36	42	48	110	120	220	230	240	380 400	415	440	480	500	600	660
50 Hz	B	-	D	E	F	-	M	M	U	Q	N	N	-	S	-	Y
60 Hz	BC	CC	-	CE	K	FC	LC	MC	MC	-	-	UX	Q	-	S	-
~⁽³⁾	BD	-	-	ED	FD	-	-	-	-	-	-	-	-	-	-	-

⁽³⁾ For use on d.c., the unit is supplied with a converter, including coil suppression device.






Motor starters - open version

Contactors and reversing contactors Integral 63

Add-on blocks

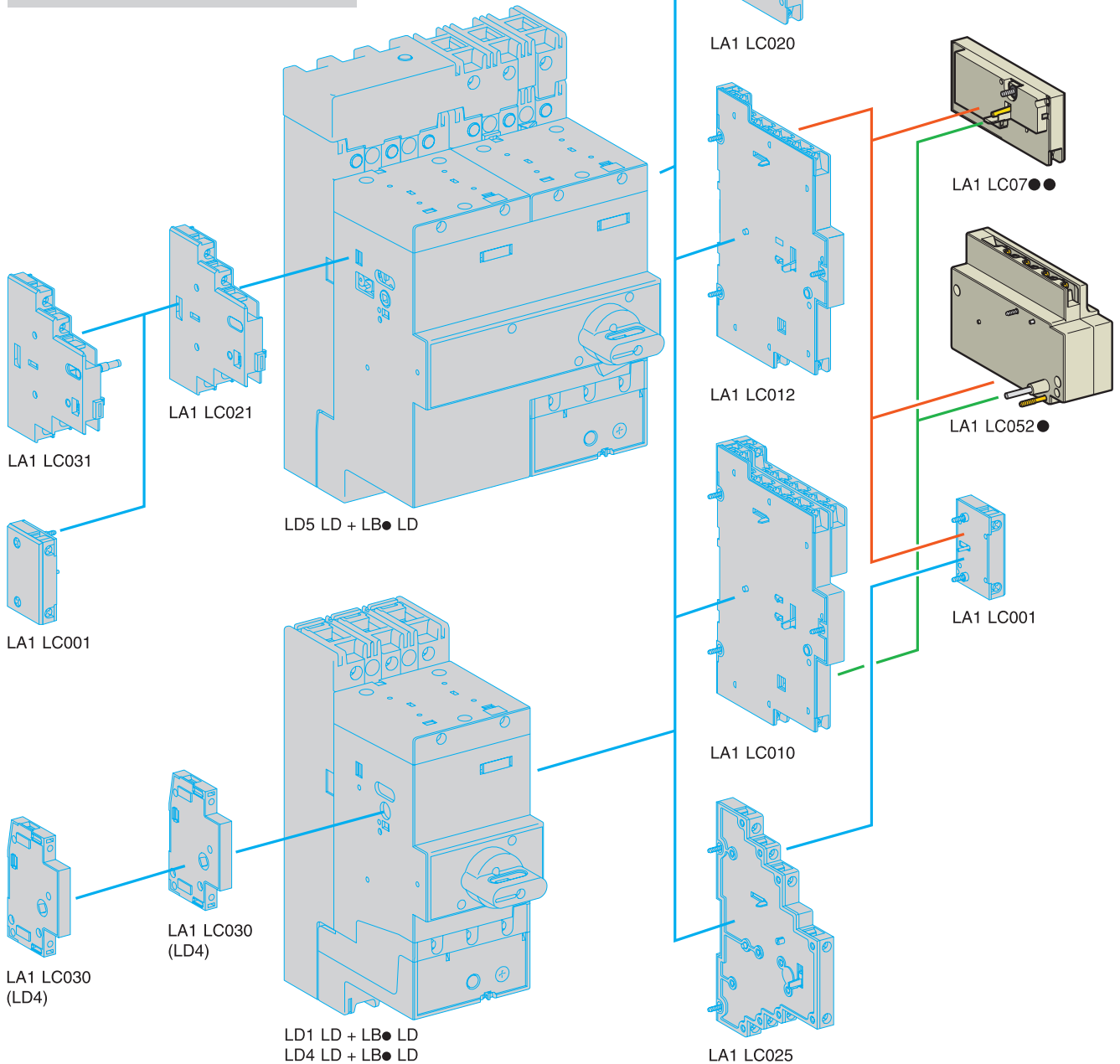
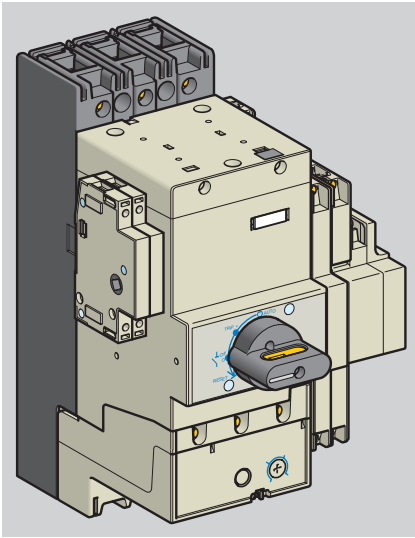
Instantaneous auxiliary contact blocks (IP 20) ⁽¹⁾

For use on	Type and number of blocks per unit	Composition			Reference
		N/O	N/C	C/O	
					
		N/O	N/C	C/O	
LD1D, LD4 or L5 Mounted on RH side	1 block of 6 contacts comprising: ■ 3 signalling contacts "contactor state" ■ 1 signalling contact "control knob in any position other than Auto" ■ 1 signalling contact tripped on short-circuit ■ 1 signalling contact "tripped"	2 - - -	1 - - -	- 1 1 -	LA1LC010
	1 block of 5 contacts comprising: ■ 3 signalling contacts "contactor state" ■ 1 signalling contact tripped on short-circuit ■ 1 signalling contact "tripped"	2 1 1	1 - -	- - -	LA1LC012
	1 block of 4 contacts comprising: ■ 3 signalling contacts "contactor state" ■ 1 signalling contact "tripped", selectable by the user	2 1	1 1	- -	LA1LC025
	1 block of 3 signalling contacts "contactor state"	2	1	-	LA1LC020
LD4 Mounted on LH side	1 control circuit isolating block (1 or 2 blocks per unit)	1	-	-	LA1LC030
LD5 Mounted on LH side	1 block of 3 signalling contacts "contactor state"	2	1	-	LA1LB021
	1 control circuit isolating block comprising 2 contacts	2	-	-	LA1LC031

Signalling contact block (IP 10) ⁽¹⁾

For use on	Type and number of blocks per unit	Composition			Reference
		N/O	N/C	C/O	
LD1, LD4 or LD5	1 block comprising 1 signalling contact "contactor state" Mounted on LH or RH side	-	1	-	LA1LC001

(1) UL and CSA approved.



Motor starters - open version

Contactors and reversing contactors

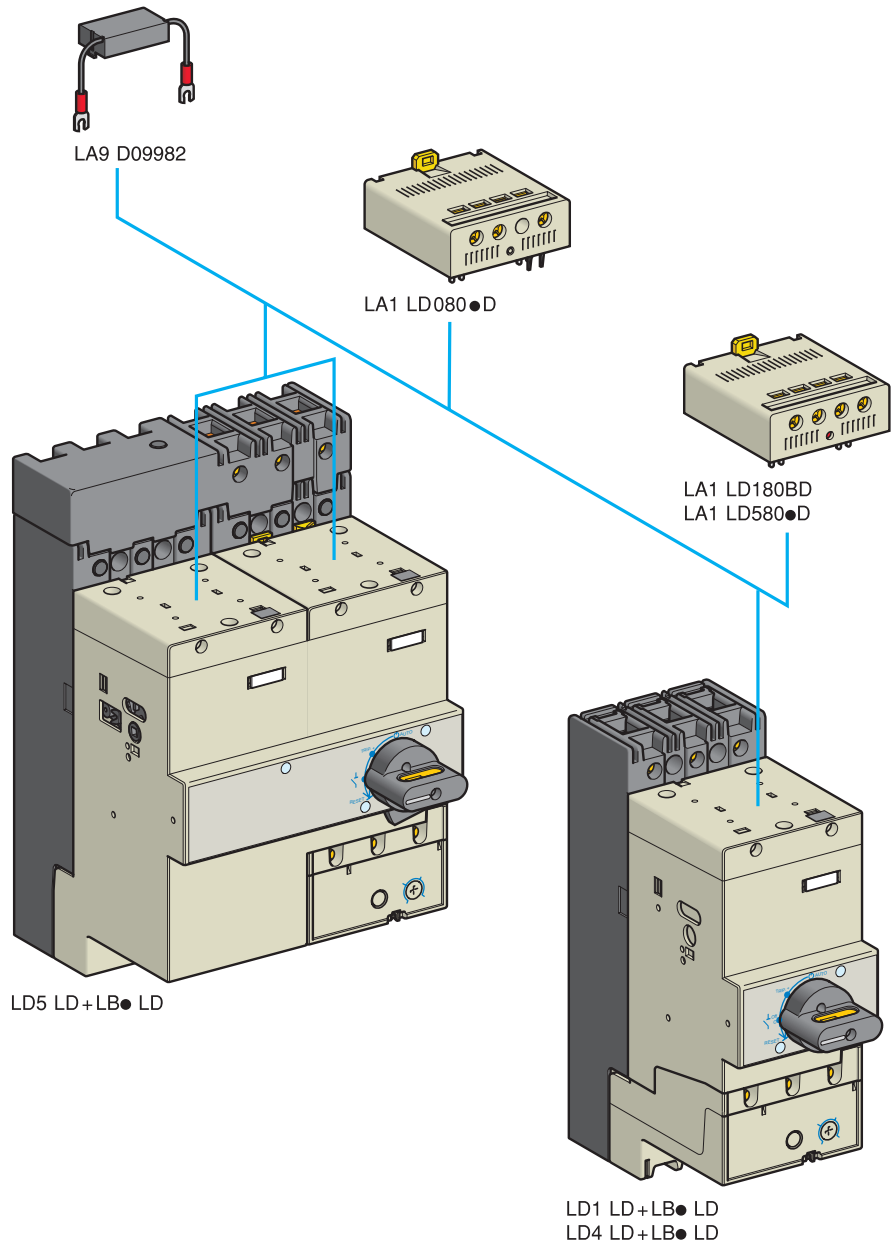
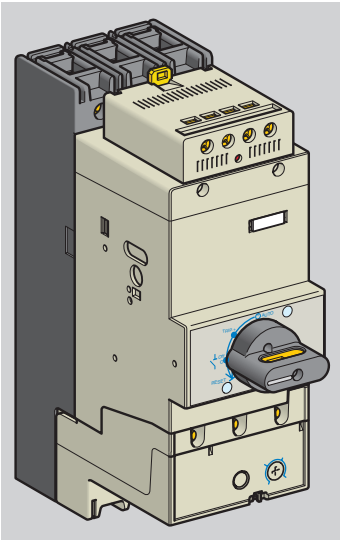
Integral 63

Accessories

Electrical tripping and reset devices			
For use on	Type and number of devices per unit		Basic reference. To be completed by adding the control voltage code ⁽¹⁾
LD1, LD4 or LD5 fitted with an LA1 LC010 or LA1 LC012 block	1 undervoltage trip	Time delay 0.2 s	LA1LC070●
		Instantaneous	LA1LC072●
	or 1 shunt trip	Instantaneous	LA1LC071●
LD1, LD4 or LD5 fitted with an LA1 LC010 or LA1 LC012 add-on block	1 remote electrical reset device	24 V 50/60 Hz	LA1LC052B
		42 V 50 Hz	LA1LC052E
		48 V 50/60 Hz	
		100/127 V 50/60 Hz	LA1LC052F
		200/240 V 50/60 Hz	LA1LC052M

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	48	110	120	220/230	240	380/400	415	440
50 Hz	B	E	F	–	M	U	Q	N	N
60 Hz	B	E	F	F	M	M	Q	–	N



Motor starters - open version

Contactors and reversing

contactors Integral 63

Accessories and spare parts

Integral 63

Interface modules ⁽¹⁾				
Mounting	Type	Control voltage --- V	Operational voltage 50/60 Hz V	Reference
On top of the integral unit	Solid state	5...24	24...240	LA1LD180BD
	Relay output	24	24...240	LA1LD580BD
		48	24...240	LA1LD580ED

Replacement coils and voltage converters ⁽¹⁾						
For --- control circuit operation						
Mounting	For use on integral	Operational voltage --- V ⁽²⁾	Consumption		Description	Reference ⁽³⁾
			Inrush W	Sealed W		
On top of the integral unit	LD●LD●●●BD	24 ⁽⁴⁾	300	8	Coil	LX1LD0249
					Converter	LA1LD080BD
	LD●LD●●●ED	48 ⁽⁴⁾	300	8	Coil	LX1LD0489
					Converter	LA1LD080ED
	LD●LD●●●FD	110	300	8	Coil	LX1LD01109
					Converter	LA1LD080FD

Suppressor module			
Mounting	Type	Operational voltage 50/60 Hz V	Reference
Clip-on	RC circuit (Resistor-Capacitor) ⁽⁵⁾	≤ 250	LA9D09982

(1) For reversing contactors, order 2 interface modules or 2 voltage converters.

(2) When used on rectified single-phase or 3-phase supply, the peak to peak ripple voltage must be equal to or less than 0.14 of the average voltage.
Operating limits 0.8 to 1.1 Uc for an ambient temperature ≤ 40 °C.

(3) It is essential that the voltage converter be associated with the specific coil indicated.

(4) 24 V and 48 V converters can be operated by "Low level input". In this case, the control circuit voltage must be the same as the supply voltage (24 or 48 V).

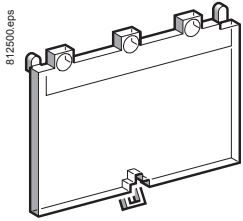
(5) An RC circuit provides effective protection for circuits highly sensitive to high frequency interference.
Voltage limited to 3 Uc max. and oscillating frequency limited to 400 Hz max.
Slight increase in drop-out time (1.2 to 2 times the normal time).

Motor starters - open version

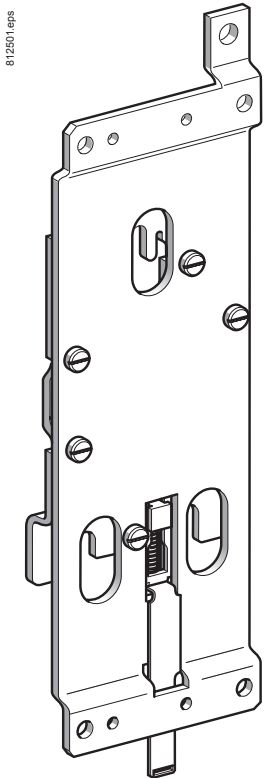
Contactors and reversing contactors Integral 63

Accessories

Integral 63



LA1 LC090



LA9 LD010

Protection accessories

Description	For use on	Sold in lots of	Unit reference
Power terminal protection shroud	Upstream power terminals (L1, L2, L3)	5	LA9LD701
Sealing cover	Protection module	1	LA1LC090

Mounting accessories

Description	For use on	Mounting on	Reference
Mounting plate	LD1, LD4, LD5	1 x 75 mm ↳ rail or 2 x 32 mm ↳ rails	LA9LD010

Door interlock mechanisms (IP 54)

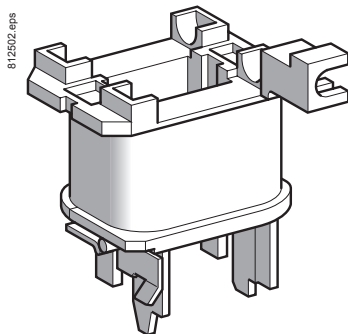
Type	For use on	Colour of knob	Unit reference
Adjustable from 0 to 185 mm with extension (control knob mounted on plate or door)	LD1	Red	LA9LC330
		Black	LA9LC331
	LD4, LD5	Red	LA9LC530
		Black	LA9LC531

Motor starters - open version

Contactors and reversing contactors Integral 63

Coils (replacement parts)

Integral 63



LX1 LD●●●

a.c. operation

Rated control circuit voltages		Average resistance at 20 °C ±10 %	Inductance of closed circuit	Voltage code ⁽¹⁾	Reference
Uc 50 Hz	Uc 60 Hz				
V	V	Ω	H		
–	24	0.213	0.045	BC	LX1LD020
24	–	0.323	0.071	B	LX1LD024
–	36	0.503	0.106	CC	LX1LD030
–	48	0.845	0.19	CE	LX1LD040
42	–	0.987	0.22	D	LX1LD042
48	–	1.26	0.29	E	LX1LD048
–	110	4.88	1	K	LX1LD090
–	115/120	5.89	1.18	FC	LX1LD100
110	–	6.48	1.48	F	LX1LD110
127	–	9.80	2.13	G	LX1LD127
–	220	19.82	4.2	LC	LX1LD180
–	230/240	23.24	4.5	MC	LX1LD190
220/230	–	30.51	6.7	M	LX1LD220
240	–	37.66	7.9	U	LX1LD240
–	440	80.46	16.7	UX	LX1LD360
380/400	460/480	93.63	20	Q	LX1LD380
415/440	–	116.46	23.7	N	LX1LD415
500	575/600	152.18	31	S	LX1LD500
660	–	290.80	60	Y	LX1LD660

Consumption at 50 Hz: inrush (cos φ: 0.55) 350 to 400 VA; sealed (cos φ: 0.28) 20 to 30 VA.

Consumption at 60 Hz: inrush (cos φ: 0.55) 420 to 500 VA; sealed (cos φ: 0.30) 24 to 36 VA.

d.c. operation

The Integral 63 can operate on a d.c. supply when fitted with a special coil and corresponding voltage converter: see page A4/11.

⁽¹⁾ Coil voltage reference code, used to complete the basic reference when ordering an integral unit.

Technical Data for Designers

Contents

Presentation	A4/16 to A4/21
Selection	A4/22 to A4/25
Characteristics	A4/26 to A4/31
Selection of protection module	A4/32 to A4/35
Operation	A4/36 and A4/37
Dimensions	A4/38 and A4/39
Schemes	A4/40 and A4/41

Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

Integral 63



Integral 63: a high performance concept for reliability of operation

Integral 63 contactor breakers combine all the functions of a power switching assembly up to 63 A in a single compact device, with performance equivalent to that of the best separate specialist devices.

They conform to the main standards currently in force, in particular IEC 60947-1, IEC 60947-2, IEC 60947-3, IEC 60947-4-1 and IEC 60947-6-2 (welding of power poles impossible), as well as to international approvals UL, CSA..., and the European directives.

The integral range ensures reliability of operation up to 63 A. In addition to safety of operation, integral has numerous other functions: increased protection, communication, remote control, fault identification, isolation, padlocking.

Functions performed by Integral 63 units

The equipment in a power switching circuit must perform 4 main functions:

- power switching,
- isolation,
- overload protection,
- short-circuit protection.

These functions are traditionally performed by separate devices which must be combined to form a motor starter assembly, the most common being:

- fuses + contactor + thermal overload relay,
- circuit breaker + contactor + thermal overload relay.



Power switching

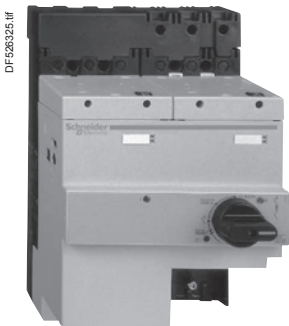
Contactor (for automatic and remote control)

■ Operational power for use in category AC-43:

- up to 30 kW at 400/415 V 50 Hz,
- up to 33 kW at 440/415 V 50 Hz.

■ Electrical life in number of operating cycles, in category AC-43, at 415 V and at rated power: 1.2 million.

■ Mechanical life in number of operating cycles: 5 million.



Reversing pairs

Two 3-pole contactors, horizontally mounted:

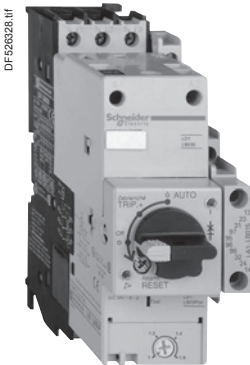
- mechanically interlocked.

Can be fitted with the same protection modules as Integral 63 contactor breaker.

Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

Integral 63



Functions performed by Integral 63 units (continued)

Isolation

Isolation conforming to IEC 60947

Integral 63 contactor breakers provide isolation and padlocking functions conforming to standards IEC 60947.

In addition, Integral 63 "LD4" contactor breakers and "LD5" reversing contactor breakers incorporate specific poles for control testing and padlocking.

Overload protection

Thermal-magnetic protection module (for protection against overload and overcurrent)

A range of interchangeable modules allows the equipment to be adapted to suit:

- the rated operational current (rating and settings),
- the application:
 - motors,
 - frequent starting motors,
 - distribution circuits.

Short-circuit protection

High breaking capacity current limiting circuit breaker

For short-circuit protection.

High breaking capacity with short-circuit limited by ultra-fast tripping.

Possibility of increasing the breaking capacity of the integral unit by adding a current limiter (LA9 LB920).

The current limiter is fitted upstream of the integral unit.

Several integral units may be fitted downstream of the current limiter (I_{th} = 63 A, I_e = 32 A).

Signalling and attachments

These devices provide comprehensive local signalling:

- pole position indicator,
- different signalling for "overload" and "short-circuit".

They also allow dialogue with the automated control system by means of numerous add-on blocks:

- auxiliary contact and signalling blocks,
- remote electrical reset device,
- undervoltage and shunt trips,
- control circuit switching,
- etc.

Simple fixing and cabling methods

Integral 63 contactor breakers and reversing contactor breakers fit onto 75 mm \perp rails using a separate mounting plate.

integral units can also be mounted on:

- panels,
- pre-slotted mounting plates type AM1 P,
- 2 x 35 mm \perp rails using sliding clip nuts,
- CMD prefabricated plug-in busbar trunking (providing an economical assembly, combining safety and simplicity of use),
- AK5 panel busbar systems.

Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

Integral 63

Terminology

Altitude

The rarefied atmosphere at high altitude reduces the dielectric strength of the air and hence the rated operational voltage of the contactor breaker. It also reduces the cooling effect of the air and hence the rated operational current of the contactor breaker (unless the temperature drops at the same time).

No derating is necessary up to 3000 m.

Derating factors to be applied above this altitude for main pole operational voltage and current (a.c. supply) are as follows:

Altitude	3500 m	4000 m	4500 m	5000 m
Rated operational voltage	0.90	0.80	0.70	0.60
Rated operational current	0.92	0.90	0.88	0.86

Ambient air temperature

The temperature of the air surrounding the device, measured near to the device.

The operating characteristics are given:

- with no restriction for temperatures between - 5 and + 55 °C.
- with restrictions, if necessary, for temperatures between - 50 and + 70 °C.

Rated operational current (Ie)

This is defined taking into account the rated operational voltage, operating rate and duty, utilisation category and air temperature around the device.

Conventional rated thermal current (Ith) ⁽¹⁾

The current Ith which a closed contactor breaker can sustain for a minimum of 8 hours without its temperature rise exceeding the limits given in the standards.

Short time rating

The current which a closed contactor breaker can sustain for a short time, after a period of no load, without dangerous overheating.

Rated operational voltage (Ue)

This is the voltage value which, in conjunction with the rated operational current, determines the use of the contactor breaker or starter, and on which the corresponding tests and the utilisation category are based. For 3-phase circuits, it is expressed as the voltage between phases.

Apart from exceptional cases such as rotor short-circuiting, the rated operational voltage Ue is less than or equal to the rated insulation voltage Ui.

Rated control circuit voltage (Uc)

The rated value of the control circuit voltage, on which the operating characteristics are based. For a.c. applications, the values are given for a near sinusoidal wave form (less than 5 % total harmonic distortion).

Rated insulation voltage (Ui)

This is the voltage value used to define the insulation characteristics of a device and referred to in dielectric tests determining leakage paths and creepage distances. As the specifications are not identical for all standards, the rated values given for each of them are not necessarily the same.

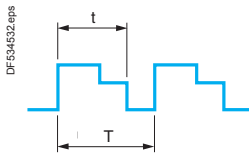
Rated impulse withstand voltage (Uimp)

This is the highest peak value of an impulse voltage, of prescribed form and polarity, which the device is able to withstand without failure under specified test conditions, and to which isolation clearance values are referred.

The rated impulse withstand voltage of a device must be equal to or higher than the values stated for the transient overvoltages appearing in the circuit in which the device is fitted.

Note: these definitions are based on extracts from standard IEC 60947.

(1) Conventional free air thermal current, conforming to IEC standards.



Terminology

Rated operational power (expressed in kW)

The rated power of the standard motor which can be switched by the contactor breaker, at the stated operational voltage.

Rated breaking capacity (Iq) ⁽¹⁾

This is the current value which the contactor breaker can break in accordance with the breaking conditions specified in the IEC standard.

Rated making capacity ⁽¹⁾

This is the current value which the contactor breaker can make in accordance with the making conditions specified in the IEC standard.

On-load factor (m)

This is the ratio between the time the current flows (t) and the duration of the cycle (T):

$$m = \frac{t}{T}$$

Cycle duration: duration of current flow + time at zero current.

Pole impedance

The impedance of one pole is the sum of the impedance of all the circuit components between the input terminal and the output terminal.

The impedance comprises a resistive component (R) and an inductive component ($X = L\omega$). The total impedance therefore depends on the frequency and is normally given for 50 Hz. The average value is given for the pole at its rated operational current.

Electrical durability

This is the average number of on-load operating cycles which the main pole contacts can perform without maintenance. The electrical durability depends on the utilisation category, the rated operational current and the rated operational voltage.

Mechanical durability

This is the average number of no-load operating cycles (i.e. with zero current flow through the main poles) which the contactor breaker can perform without mechanical failure.

Coordination

The coordination of protection devices involves combining, in a selective way, a short-circuit protection device (fuses or magnetic circuit-breakers) with a contactor and an overload protection device. Its objective is to break any abnormal current, in plenty of time, without any danger to personnel, whilst providing adequate protection of the equipment against an overload or short-circuit current.

Type 1 - IEC 60947-4-1

In a short-circuit condition, the contactor or starter must not present any danger to personnel or installations and may not be able to resume operation without repair or the replacement of parts.

Type 2 - IEC 60947-4-1

In a short-circuit condition, the contactor or starter must not present any danger to personnel or installations and must be able to resume operation. The risk of contact welding is permissible if they can be easily separated.

Total, ensuring reliability of operation - IEC 60947-6-2

In the event of a short-circuit, no damage or risk of welding is permissible on the equipment constituting the motor starter. Operation can be resumed without any maintenance.

Note: these definitions are based on extracts from standard IEC 60947.

(1) For a.c. applications, the breaking and making capacities are expressed by the rms value of the symmetrical component of the short-circuit current. Taking into account the maximum asymmetry which may exist in the circuit, the contacts therefore have to withstand a peak asymmetrical current which may be twice the rms symmetrical component.

Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

Integral 63

Definition

The standard utilisation categories define the current values which the contactor breaker must be able to make or break. These values depend on:

- the type of load being switched: squirrel cage or slip ring motor, resistors,
- the conditions under which making or breaking takes place: motor stalled, starting or running, reversing, plugging.

Reminder of standards IEC 60947

- IEC 60947-1: general rules,
- IEC 60947-2: circuit breakers,
- IEC 60947-3: isolating devices,
- IEC 60947-4-1: contactors and motor starters,
- IEC 60947-5-1: control and signalling units,
- IEC 60947-6-2: control and protection devices,

Standards for contactor breakers

IEC 60947-4-1

Standard IEC 60947-4-1: covers contactors and electromechanical motor starters. It concerns:

- types of equipment with main contacts designed for connection to circuits whose rated operational voltage does not exceed 1000 V for a.c. applications or 1500 V for d.c. applications,
- contactors used in conjunction with overload and/or short-circuit protection devices,
- motor starters used in conjunction with separate short-circuit protection devices and/or with separate short-circuit protection devices and built-in overload protection devices,
- contactors and combination motor starters which incorporate their own short-circuit protection device.

IEC 60947-6-2

Standard IEC 60947-6: covers multi-function equipment.

It concerns connection, power switching and protection devices (or equipment) with main contacts designed for connection to circuits whose rated operational voltage is less than or equal to 1000 V for a.c. applications, or 1500 V for d.c. applications. Such devices are designed to perform both the power switching function and the protection of remotely controlled circuits function; they can also perform other functions, such as isolation.

After short-circuit (I_{sc}) tests, the products must be able to make and break the currents corresponding to the specified utilisation categories, and to the number of operating cycles specified in the standard, without failing. This series of tests is completed by temperature rise tests.

Standard IEC 947-6-2 specifies that, in the event of a short-circuit, no damage or risk of contact welding is permissible on the devices constituting the motor starter.

The integral contactor breaker, through its design, ensures reliability of operation. After eliminating the fault, operation can be resumed instantly without any maintenance work on the product, other than resetting.

Utilisation categories for a.c. applications

Category AC-1

This category applies to all types of a.c. device (load) with a power factor equal to or greater than 0.95 ($\cos \varphi \leq 0.95$). Non inductive or slightly inductive loads.

Application examples: heating, distribution.

Category AC-2

This category applies to starting, plugging and inching of slip ring motors.

- On closing, the contactor breaker makes the starting current, which is about 2.5 times the rated current of the motor.
- On opening, it must break the starting current, at a voltage less than or equal to the mains supply voltage.

Category AC-3

This category applies to squirrel cage motors with breaking while motor running.

- On closing the contactor breaker makes the starting current, which is about 5 to 7 times the rated current of the motor.
- On opening, it breaks the rated current drawn by the motor; at this point, the voltage at the contactor breaker terminals is about 20 % of the mains supply voltage. Breaking is light.

Application examples: all standard squirrel cage motors (lifts, escalators, conveyor belts, bucket elevators, compressors, pumps, mixers, air conditioning units, etc.).

Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

Integral 63

Standards for contactor breakers

Utilisation categories for a.c. applications

Category AC-4

This category covers starting, plug braking and inching of squirrel cage motors. On closing, the contactor breaker makes a current peak which may be as high as 5 to 7 times the rated motor current. On opening, it breaks this same current at a voltage which is higher, the lower the motor speed. This voltage can be the same as the mains voltage. Breaking is severe.
Application examples: printing machines, wire drawing machines, hoisting equipment, metallurgy industry.

Category AC-41

This category applies to all types of a.c. device (load) with a power factor equal to or greater than 0.95 ($\cos \varphi \leq 0.95$). Non inductive or slightly inductive loads.
Application examples: heating, distribution.

Category AC-42

This category applies to starting, plugging and inching of slip ring motors.

- On closing, the contactor breaker makes the starting current, which is about 2.5 times the rated current of the motor.
- On opening, it must break the starting current, at a voltage less than or equal to the mains supply voltage.

Category AC-43

This category applies to squirrel cage motors with breaking while motor running; inching or occasional reversing of limited duration are permissible if the number of operating cycles does not exceed 5 per minute, or 10 within a 10 minute period.

- On closing the contactor breaker makes the starting current, which is about 5 to 7 times the rated current of the motor.
- On opening, it breaks the rated current drawn by the motor; at this point, the voltage at the contactor breaker terminals is about 20% of the mains supply voltage. Breaking is light.

Application examples: all standard squirrel cage motors: lifts, escalators, conveyor belts, bucket elevators, compressors, pumps, mixers, air conditioning units, etc.)

Category AC-44

This category covers applications with plug braking and inching of squirrel cage or slip ring motors. On closing, the contactor breaker makes a current peak which may be as high as 5 to 7 times the rated motor current. On opening, it breaks this same current at a voltage which is higher, the lower the motor speed. This voltage can be the same as the mains voltage. Breaking is severe.
Application examples: printing machines, wire drawing machines, hoisting equipment, metallurgy industry.

Tripping classes of protection modules

The creation of thermal tripping classes allows better adaptation of the thermal protection to suit different motor and application technologies (short or long starting times). Conforming to IEC 60947-4-1 and IEC 60947-6-2.

Class	10 A	10	20	30
Tripping time at 7.2 I _r ⁽¹⁾	2...10 s	4...10 s	6...20 s	9...30 s

Standards for auxiliary contacts

IEC 60947-5

Standard IEC 60947-5-1: covers switching devices and components for control circuits.

It concerns electromechanical devices for control circuits.

Utilisation categories for a.c. applications

Category AC-14 ⁽²⁾

This category applies to the switching of electromagnetic loads whose power drawn with the electromagnet closed is less than 72 VA.
Application example: switching the operating coil of contactors and relays.

Category AC-15 ⁽²⁾

This category applies to the switching of electromagnetic loads whose power drawn with the electromagnet closed is greater than 72 VA.
Application example: switching the operating coil of contactors.

Utilisation categories for d.c. applications

Category DC-13 ⁽³⁾

This category applies to the switching of electromagnetic loads for which the time taken to reach 95 % of the steady state current ($T = 0.95$) is equal to 6 times the power P drawn by the load (with $P \leq 50$ W).

Application example: switching the operating coil of contactor breakers.

⁽¹⁾ I_r = protection module setting current.

⁽²⁾ Replaces category AC-11.

⁽³⁾ Replaces category DC-11.

When designing an installation, it is essential to take into account precise criteria for determining the conductor c.s.a. and selecting equipment.

In particular:

- permissible currents for the conductors,
- maximum voltage drops,
- short-circuit protection,
- protection against indirect contact.

The latter three criteria must be taken into account when selecting the integral unit.

The principle behind the rules described below is, on the whole, common to all European publications. However, the calculations and values concerning protection against indirect contact are based on French standard NF C 15-100, and it is up to the user to check the regulations in force in the country concerned.

Cable protection against overload

To achieve this, the thermal setting value I_{rth} selected must be greater than the current drawn I_B and less than or equal to the permissible current I_z in the cable to be protected.

$$I_B < I_{rth} \leq I_z$$

Short-circuit protection

Breaking capacity rule

Check that the breaking capacity (BC) of the integral unit is equal to or greater than the prospective short-circuit current ($I_{sc \max}$) at the point where it is to be installed.
 $BC \geq I_{sc \max}$

Breaking time rule

2 conditions must be fulfilled:

- The short-circuit current at the end of the circuit, $I_{sc \min}$, must be greater than or equal to the minimum current required for magnetic tripping of the device,
- The short-circuit current at the start of the circuit, $I_{sc \max}$, must be such that:

$$I_{sc \max}^2 t_m \leq I_o^2 t_o$$

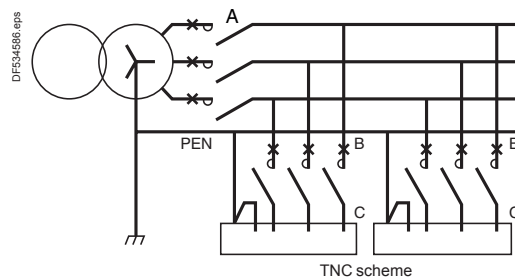
$I_o^2 t_o$ = permissible thermal stress limit for the circuit,
 t_m = operating time of the integral unit or of the short-circuit protection device.

These 2 checks need only be made when modules with a low rating are used.

Example: for a 6.3/10 A module, a cable c.s.a. $\geq 2.5 \text{ mm}^2$ is required to withstand $I_{sc \max} = 50 \text{ kA}$.

Protection against indirect contact in TN schemes

TN multiple earthed neutral scheme



- Neutral is connected to earth.
- The earths are connected to neutral.
- Any phase/earth insulation fault causes a short-circuit.
- As contact voltage is dangerous, breaking must occur at the first fault.
- The PE conductor and the neutral conductor may be:
 - combined (TNC scheme),
 - separate (TNS scheme).

Protection against indirect contact in TN schemes

- Protection against indirect contact (TN schemes), for dead shorts only, requires that the following 2 conditions be fulfilled simultaneously:
 - the fault current I_d must be greater than or equal to the minimum current required for magnetic tripping of the integral unit, i.e. $1.12 \mu I_{rth \max}$.

$$I_d = c \cdot q \cdot \frac{U_o}{Z_b}$$

c = coefficient taking into account the upstream part of the fault loop impedance assumed to be equal to 0.8, unless otherwise indicated.

q = coefficient dependent on the earth connection scheme and equal to 1 in the TN scheme.

U_o = phase-neutral voltage in volts.

Z_b = fault loop impedance in $m\Omega/m$ such that:

$Z_b \neq R$ (fault loop resistance).

L = length of the fault loop equal to twice the length L_c of the circuit.

S = Sph, c.s.a of the phase conductors = S_{PE} = c.s.a. of the protective conductors.

ρ = resistivity of the copper = 0.0225.

μ = ratio between the magnetic tripping current and the maximum setting current of the instantaneous thermal tripping device.

$$R = \rho \frac{L}{S} = 2 \rho \frac{L_c}{S}$$

- the contact voltage (U_L) for a dead short is at most equal to the value determined by the safety curve for the operating time t_m of the integral unit in its magnetic tripping zone.

This condition is generally fulfilled for power supplies of 230/415 V.

(In fact, for $U_L = 50$ V, a $t_m \leq 500$ ms would be required and for $U_L = 25$ V, a $t_m \leq 110$ ms would be required).

The first condition allows us to calculate the maximum length of the circuit to provide protection against indirect contact in the TN scheme.

For the TN scheme:

$$L \leq \frac{c \cdot q \cdot U_o \cdot S_{ph}}{2 \rho \cdot 1 \cdot \mu I_{rth}}$$

$$\text{i.e. } L_{\max} = \frac{0.8 \times U_o \times S_{ph}}{2 \times 0.0225 \times 1.2 \mu I_{rth \max}}$$

Maximum length of 230/415 V circuits with TN scheme

C.s.a.	$I_{rth \max}$	$\mu = 3$	$\mu = 6$	$\mu = 12$	$\mu = 15$
mm ²	A	m	m	m	m
1.5	10	180	90	45	36
	16	112	56	28	22
2.5	10	298	149	75	60
	16	186	93	47	37
	25	118	59	32	–
	32	92	46	23	–
4	16	296	148	74	60
	25	190	95	48	–
	32	148	74	37	–
	40	118	59	30	–
6	25	284	142	71	–
	32	222	111	56	–
	40	178	89	45	–
	50	142	71	36	–
10	32	370	185	93	–
	40	296	148	74	–
	50	236	118	59	–
	63	188	94	47	–
16	32	590	295	148	–
	40	472	236	118	–
	50	378	189	95	–
	63	300	150	75	–
25	32	922	461	281	–
	40	738	369	185	–
	50	590	295	148	–
	63	468	234	117	–

Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

Selection for a temperature $\theta \leq 40\text{ }^\circ\text{C}$

Rated operational voltage	V	220/240	400/415	440	480/525	600/690
Rated operational currents (according to the rated operational voltage)						
Integral 63	A	63	63	63	63	63

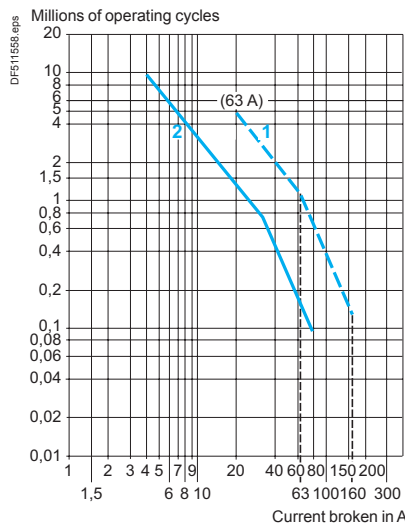
Rated operational powers (for standard motors)

Integral 63	kW	15	33	33	37	55
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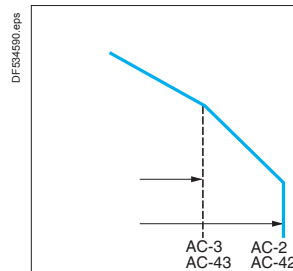
Electrical durability

Control and protection of motors at $U_e \leq 415\text{ V}$

- in utilisation categories AC2, AC3 conforming to IEC 60947-4-1,
- in utilisation categories AC2, AC3 conforming to IEC 60947-6-2.



- 1 Not having previously broken a short-circuit current
- 2 Having broken a short-circuit current 10 times at 30 Ie (most common values of short-circuit current during operation)



Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

a.c. supply, utilisation categories AC-1, AC-3, AC-41, AC-43

Rated operational currents (according to ambient temperature)

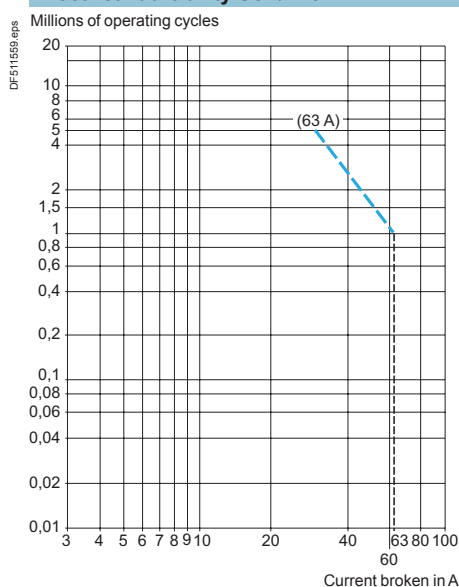
	With cable c.s.a.	A	$\theta \leq 40\text{ }^\circ\text{C}$		
			$\theta \leq 55\text{ }^\circ\text{C}$	$\theta \leq 70\text{ }^\circ\text{C}$	
Integral 63	16 mm ²	63	55	50	

a.c. supply, utilisation categories AC-1, AC-41

Maximum operating rates in operating cycles/hour

	Operating cycles/h	On-load factor 85 %		On-load factor 25 %
		Operation at le max	Operation at 0.5 le	Operation at le max
Integral 63	1200	2400	1800	

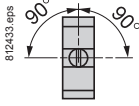
Electrical durability $U_e \leq 415\text{ V}$



Note: for use in category AC-44, please consult your Regional Sales Office.

Integral 63

Type		Integral 63
Number of poles		3
Rated operational current (Ie)	In AC-3	A 63
Rated operational voltage (Ue)		V 690
Electrical durability	In AC-3 at 400 V	1.2 million operating cycles
Mechanical durability at Uc		5 million operating cycles
Maximum operating rate at ambient temperature ≤ 55 °C	~ --- with converter	3600 operating cycles/hour 600 operating cycles/hour

Environment			
Conforming to standards			IEC: 158-1, 204-1, 204-2, 364, 947-1/2 and 4 UTE: NF C 63-110, C 63-120, C 63-130, C 63-650, C 79-100, C 20-040 VDE: 0100, 0110, 0113, 0170, 0171, 471, 0660 BS: 5424, 4752, 4941 NEN, NBN
Product certifications			ASE, ASEFA, ASTA, BV, CSA, DEMKO, DNV, GL NEMKO, NKK, ÖVE, RINA, SCC, SETI, UL, USSR, LROS
Protective treatment			"TH"
Ambient air temperature around the device	~ Operation Storage --- (1) Operation Storage	°C °C °C °C	-20...+60 -40...+80 -25...+50 -25...+70
Vibration resistance	5...100 Hz		Energised state: 3 gn De-energised state: 3 gn
Shock resistance	Impulse duration: 11 ms		Energised state: 8 gn De-energised state: 8 gn
Degree of protection	Conforming to IEC 60144 & 60529 Conforming to VDE 0106		IP 20B Protection against direct finger contact
Flame resistance			Conforming to IEC 60295-2-1, NF C 20-455 and decree of 22-12-81 (JO 27 NC of 1 st and 2/2/1982) Conforming to UL 94 - V0 and NF T 51-072
Maximum operating altitude	Without derating	m	3000
Operating positions (without derating)	In relation to normal vertical mounting plane		From main axis (left-right tilt) 

Control circuit characteristics			
Rated control circuit voltage (Uc)	~ 50 Hz ~ 60 Hz --- with converter	V V V	24...660 24...600 24, 48, 110
Voltage limits at θ ≤ 55 °C	Operation Drop-out		0.85...1.1 Uc 0.25...0.7 Uc
Average consumption at 20 °C and at Uc	~ Inrush Sealed --- (1) Inrush Sealed	VA VA W W	375 (50 Hz), 450 (60 Hz) 25 (50 Hz or 60 Hz) 300 for 50 ms 8
Heat dissipation		W	8 (50 Hz), 11 (60 Hz)
Operating time (2) at 20 °C and at Uc	~ 50/60 Hz "C" "O" --- with converter "C" "O"	ms ms ms ms	12...35 7...20 25...40 15...25

(1) With converter.

(2) The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles.

The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

Pole characteristics		Integral 63						
Type								
Conventional thermal current (I _{th})	θ ≤ 40 °C	A	63					
Frequency limits of the operational current		Hz	40...60					
Rated impulse withstand voltage (U _{imp})	Conforming to IEC 60947-4	kV	8					
Rated insulation voltage (U _i)	Conforming to IEC 60947-1	V	690					
Heat dissipation in the power circuits of the contactor breaker and its protection module	Operational current	A	25	32	40	50	63	
	Power per pole, hot state	W	4.4	5	5.8	7	9	
Rated making capacity	I _{rms}	A	12 or 15 x I _{th} (above this value, the breaker trips)					
	I _{peak}	kA	105					
Rated breaking capacity	conforming to IEC 60947-2	Operational voltage	V	220/240	380/415	440	480/525	600/690
		Value of cos φ		0.25	0.25	0.25	0.25	0.5
		Cycle P1 (O-t-CO) I _{cu} ⁽¹⁾	kA rms	50	50	50	35	10
	Cycle P2 (O-t-CO-t-CO) I _{cs} ⁽¹⁾	kA rms	50	50	50	35	10	
	conforming to IEC 60947-6-2 ensuring reliability of operation	I _{cu} = I _{cs}	kA rms	50	50	50	30	10
Total breaking time		ms	4					
Electrical durability in AC-3 at I _e max and at 415 V after 1 cycle O-CO-r-CO at I _{sc}	Prospective rms short-circuit current at terminals of a new device	kA	3	10	25	35	50	
	Millions of operating cycles		1	0.9	0.6	0.5	0.2	
Thermal limit	With I _{sc} max. at 415 V, 50 Hz	A²s	300 x 10 ³					
Cabling	Flexible cable without cable end	mm²	Maximum c.s.a.		Minimum c.s.a.			
			1 x 50 or 2 x 35		1 x 6			
	Flexible cable with cable end	mm²	2 x 25		1 x 6			
	Solid cable	mm²	1 x 50		1 x 6			
Tightening torque		N.m	6					

Characteristics of thermal-magnetic or magnetic only protection modules						
Module type		LB1 LD03P	LB1 LD03M	LB6 LD03M	LB1 LD03L	
Protection		Standard motors	Standard motors	Frequent starting	Distribution circuits	
	Conforming to standards	NF C 63-650	NF C 63-650	NF C 63-650	NF C 63-120	
	Number of poles	3	3	3	3	
	Number of protected poles	3	3	3	3	
	Rated operational voltage	V	690	690	690	690
Thermal protection	Max. continuous current	A	13...63	13...63	13...63	13...63
	Setting (I _{rth} min./I _{rth} max.)	A	10/13...45/63	10/13...45/63	—	10/13...45/63
	Temperature compensation	°C	-20...+60	20...+60	20...+60	20...+60
	Protection against phase imbalance		With	With	Without	Without
	Tripping class		20	20	—	—
Magnetic protection conforming to IEC 60947-1/2/4/6-2	Instantaneous trip current setting range		Fixed at 15 I _{rth} max	6...12 I _{rth} max (usual setting 9...10 I _{rth} maxi)	6...12 I _{rth} max	3...6 I _{rth} max
	Tripping tolerance		±20 %	±20 %	±20 %	±20 %

Characteristics of versions without control test function, with padlocking facility	
Conforming to standards	IEC 60947
Rated operational voltage	V 690
Mechanical durability	Operating cycles 10 000
Padlocking	By 1, 2 or 3 padlocks, Ø8 mm shank

Characteristics of versions with control test function and padlocking facility	
Conforming to standards	IEC 60947, NF C 63-130, VDE 0660, VDE 0113
Rated operational voltage	V 690
Mechanical durability	Operating cycles 10 000
Padlocking	1, 2 or 3 padlocks, shank Ø8 mm max and Ø5 mm min. When flush mounting, interlocking of the enclosure or cabinet door is possible.

(1) O: breaking short-circuit current (open),
t: time
CO: closing on short-circuit, breaking short-circuit current (closed-open)

Instantaneous auxiliary contacts LA1 L●●							
Conventional thermal current (I _{th})		A	6				
Rated insulation voltage (U _i)	Conforming to IEC 60947-5-1	V	690				
Switching capacity	With U ≥ 17 V and I ≥ 10 mA	mVA	600				
Rated operational ~ category power AC-15 ⁽¹⁾	Voltage	V	48	110/127	220/240	380/415	440
	1 million operating cycles	VA	300	500	600	520	500
	1.5 million operating cycles	VA	160	300	330	300	280
Making capacity	~ category AC-15	VA	1500	3500	6000	7500	7000
Rated operational --- category power DC-13 ⁽²⁾	Voltage	V	24	48	110	220	440
	1 million operating cycles	W	120	90	75	68	61
	1.5 million operating cycles	W	70	50	38	33	28
Making capacity	--- category DC-13	W	800	700	400	260	220
Cabling		mm²	Maximum c.s.a.: 2 x 2.5 Minimum c.s.a.: 2 x 1				

Isolating auxiliary contacts LA1 LC03●			
Conventional thermal current (I _{th})		A	6
Rated insulation voltage (U _i)	a.c. supply	V	690
	Conforming to IEC 60947 and NF C 63-130 d.c. supply	V	125
Cabling		mm²	Maximum c.s.a.: 2 x 1.5 or 1 x 2.5

Signalling contacts LA1 LC001							
Conventional thermal current (I _{th})		A	3				
Rated insulation voltage (U _i)	Conforming to IEC 60947-5-1	V	250				
Operational power for 200000 operating cycles	~	Voltage	V	–	–	110/127	220
		Resistive load	VA	–	–	600	750
		Lamp load ⁽³⁾	VA	–	–	90	125
		Inductive load ⁽⁴⁾	VA	–	–	875	500
		Motor ⁽⁵⁾	VA	–	–	160	200
	---	Voltage	V	24	48	110/125	200
		Resistive load	W	100	100	50	50
		Lamp load ⁽³⁾	W	50	50	6	7.5
		Inductive load ⁽⁴⁾	W	75	75	50	50
		Motor ⁽⁵⁾	W	75	75	6	7.5
Cabling		mm²	Maximum c.s.a.: 2 x 2.5 Minimum c.s.a.: 2 x 1				

(1) Electrical durability on an inductive load such as the coil of an electromagnet: making current (cos φ 0.7) = 10 times the power broken (cos φ 0.4).

(2) Electrical durability on an inductive load such as the coil of an electromagnet, the time constant increasing with the load.

(3) Lamp load: peak current = 10 times the rated current.

(4) Inductive load: cos φ 0.4 for a.c. operation; time constant 7 ms for d.c. operation.

(5) Motor: peak current = 6 times the rated current.

Type		Interface modules			Converters			
Used for control of the integral 32		By a programmable controller, with a.c. control of the electromagnet			By a programmable controller, with d.c. control of the electromagnet Control on d.c. supply			
Ambient air temperature around the device								
Storage		°C	-25...+70			-25...+70		
Operation		°C	-25...+50			-25...+50		
Isolation		kV	rms voltage between inputs and outputs: 2.5			Common negative terminal		
Cabling		mm ²	1 x 1			1 x 1		
		mm ²	2 x 2.5			2 x 2.5		
Operating limits		0.85...10.1 Uc			0.8...1.1 Uc ⁽²⁾			
Protection		Against reverse polarity (by diode) and against overvoltage			Against reverse polarity (by diode) and against overvoltage			
Module or converter type		LA1 LC 580BD 580ED 180BD			LA1 LC 080BD 080ED 080FD			

Control circuit characteristics

Schemes		LA1 LC●580●D			LA1 L●180BD			LA1 L●080BD LA1 L●080ED		LA1 L●080FD				
Indication of input state		By LED			-			-		-				
Input signals (logic side)	Voltage	V	~ 24 (E1-E2)	~ 48 (E1-E2)	~ 5...24 (E1-E2)	~ 24 (E1-E2)	~ 48 (E1-E2)	~ 5...24 (E1-E2)	~ 24 ⁽¹⁾ (E3-E2)	~ 48 ⁽¹⁾ (E3-E2)	-	~ 24 ⁽¹⁾ (E3-E2)	~ 48 ⁽¹⁾ (E3-E2)	-
	Current	mA	30	20	15...24 V 8.5...5 V	50	25	15...24 V 8.5...5 V	20	10	-	20	10	-
State "0" guaranteed	For U	V	< 2.4	< 4.8	< 2.5	< 2.4	< 4.8	< 2.5	< 7	< 14	-	< 7	< 14	-
	For I	mA	< 2	< 2	< 2	< 2	< 2	< 2	< 5	< 2.5	-	< 5	< 2.5	-
State "1" guaranteed	For U	V	> 20.4	> 40.8	> 4	> 20.4	> 4	> 4	> 14	> 28	-	> 14	> 28	-
Supply voltage		V	~ 24...240 (A1-A2)	~ 24...240 (A1-A2)	~ 24...240 (A1-A2)	~ 24...240 (A1-A2)	~ 24...240 (A1-A2)	~ 24...240 (A1-A2)	~ 24 ⁽²⁾ (E1-E2)	~ 48 ⁽²⁾ (E1-E2)	~ 110 ⁽²⁾ (E1-E2)	~ 24 ⁽²⁾ (E1-E2)	~ 48 ⁽²⁾ (E1-E2)	~ 110 ⁽²⁾ (E1-E2)

Operating characteristics

Electrical durability in millions of operating cycles		5							1						
Average consumption	Inrush	50 Hz	VA	160	160	160	375	375	375	-	-	-	-	-	-
		60 Hz	VA	185	185	185	450	450	450	-	-	-	-	-	-
	Sealed	50/60 Hz	VA	12	12	12	25	25	25	-	-	-	-	-	-
		...	W	-	-	-	-	-	-	250	250	250	300	300	300
Operating time at 20 °C and at Uc	Pull-in	ms	15...30	15...30	10...35	20...40	20...40	10...45	30	30	30	35	35	35	
	Drop-out	ms	22...35	22...35	8...30	25...45	25...45	8...30	15	15	15	20	20	20	

(1) For direct control by external contact: connect E1-E3.


(2) Warning: for supply from rectified a.c., the 2 following conditions must be met: the power supply must exceed 300 VA and the maximum ripple must be ≤ 14 %.

Motor starters - open version

Contactors and reversing contactors Integral 63

Tripping and reset devices, coil suppressor module

Integral 63

Environment				
Conforming to standards			IEC 60337-1	
Protective treatment			"TH"	
Ambient air temperature around the device	Storage	°C	-40...+80	
	Operation	°C	-25...+55	
	Permissible for operation at U _c	°C	-25...+70	
Protection against direct finger contact			Conforming to VDE 0106	
Tripping devices				
Type			LA1 LC070●, LC072●	LA1 LC071●
Pull-in voltage	U _c		0.8...1.1	0.7...1.1
Drop-out voltage	U _c		0.35...0.7	–
Average consumption	Inrush	VA	8	8
	Sealed	VA	4	4
Minimum pulse time		ms	–	10
Reset devices				
Type			LA1 LC052●	
Consumption		VA	9	
Duration of a reset cycle		s	9	
Minimum pulse duration		s	0.5	
Suppressor module LA9 D09982				
Type of protection			RC (resistor-capacitor)	
Connection scheme				
Operational voltage		V	≤ 250	

Motor starters - open version

Contactors and reversing contactors Integral 63

Integral 63

Breaking capacity of Integral 63 contactor breakers, according to the operational voltage and protection module fitted.

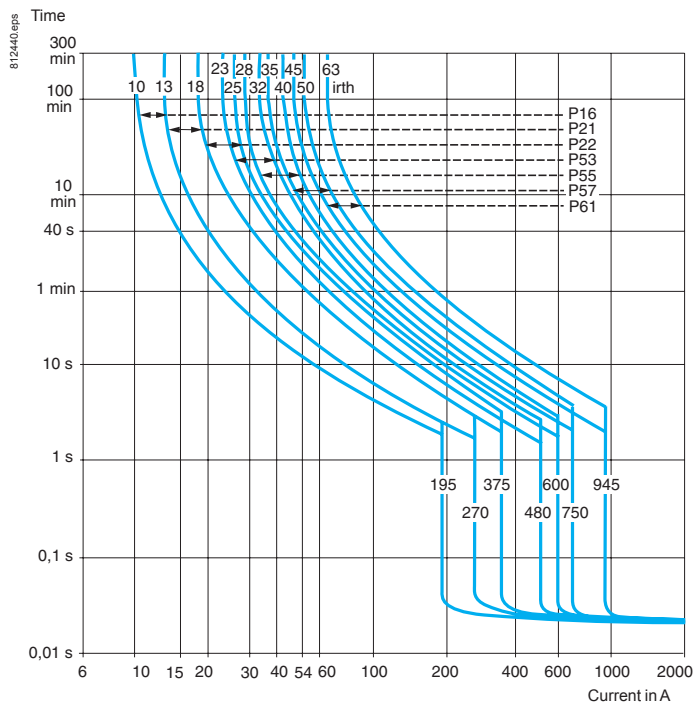
Breaking capacity							
Protection module			Operational voltage				
Reference	I _{rth}		220/240 V	400/415 V	440 V	500 V	600/690 V
	min	max	kA	kA	kA	kA	kA
LB●LD03●16	10	13	≥ 130	≥ 130	≥ 130	≥ 130	10
LB●LD03●21	13	18	≥ 130	≥ 130	≥ 130	≥ 130	10
LB●LD03●22	18	25	≥ 130	≥ 130	50	35	10
LB●LD03●53	23	32	≥ 130	50	50	35	10
LB●LD03●55	28	40	≥ 130	50	50	30	10
LB●LD03●57	35	50	≥ 130	50	50	30	10
LB●LD03●61	45	63	≥ 130	50	50	30	10

Motor starters - open version

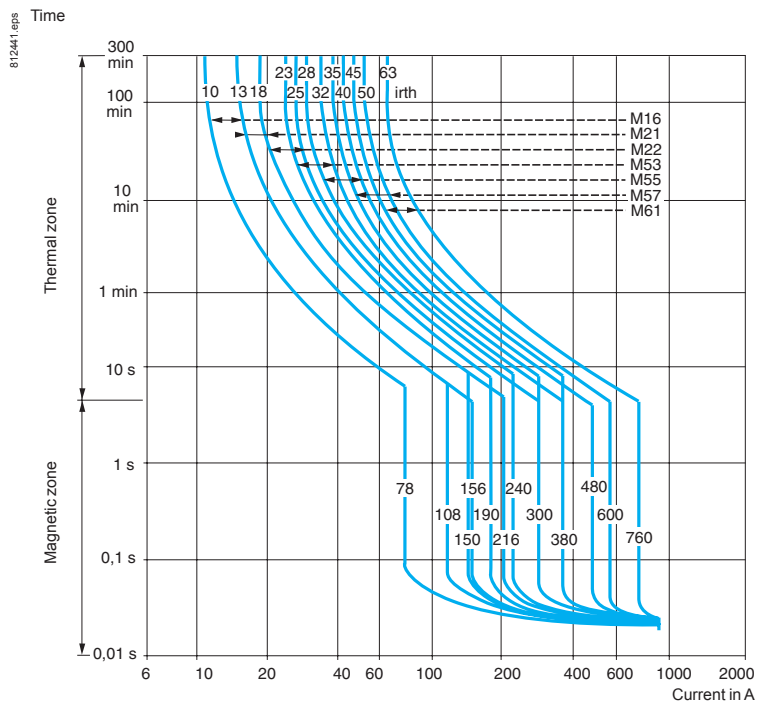
Contactors breakers and reversing contactor breakers Integral 63

Motor protection (normal starting)

By thermal-magnetic modules LB1 LD03P ⁽¹⁾



By thermal-magnetic modules LB1 LD03M ⁽¹⁾



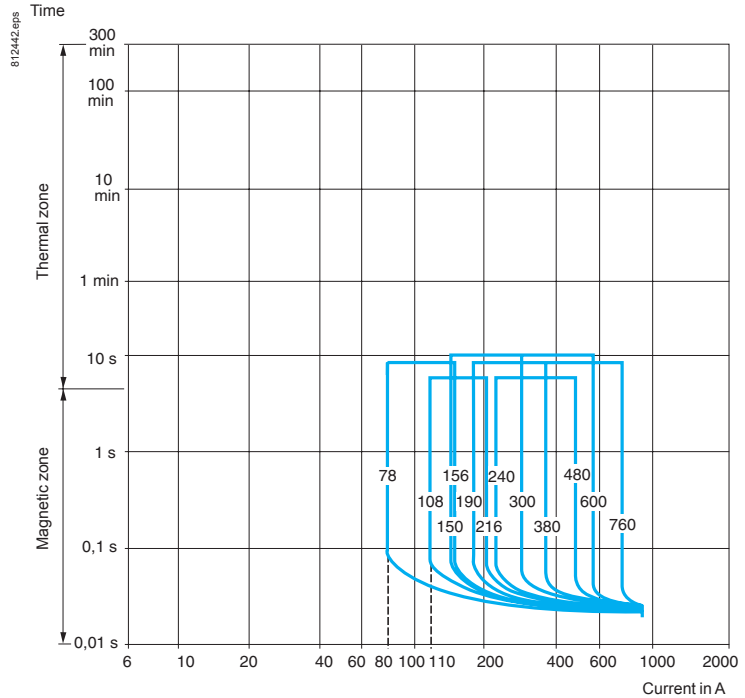
⁽¹⁾ Thermal protection: the average operating times shown in the above curves are for an ambient air temperature of 20 °C, without prior current flow (cold state). The average operating times after prolonged current flow (hot state) can be calculated by applying the coefficient 0.5.

Motor starters - open version

Contactors breakers and reversing contactor breakers Integral 63

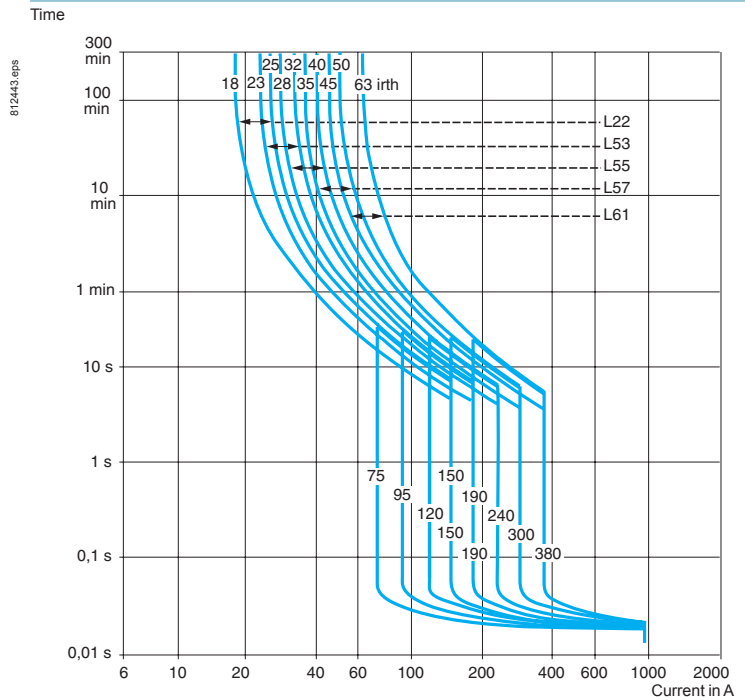
Motor protection (frequent starting)

By magnetic modules LB6 LD03M



Distribution circuit protection

By thermal-magnetic modules LB1 LD03L



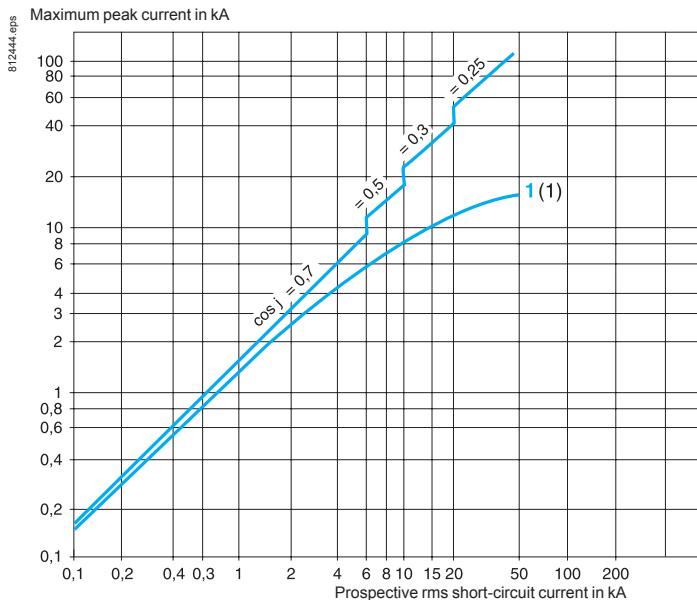
Motor starters - open version

Contactors and reversing contactor breakers Integral 63

Current limitation and thermal limit on short-circuit

3-phase 400/415 V, 50 Hz

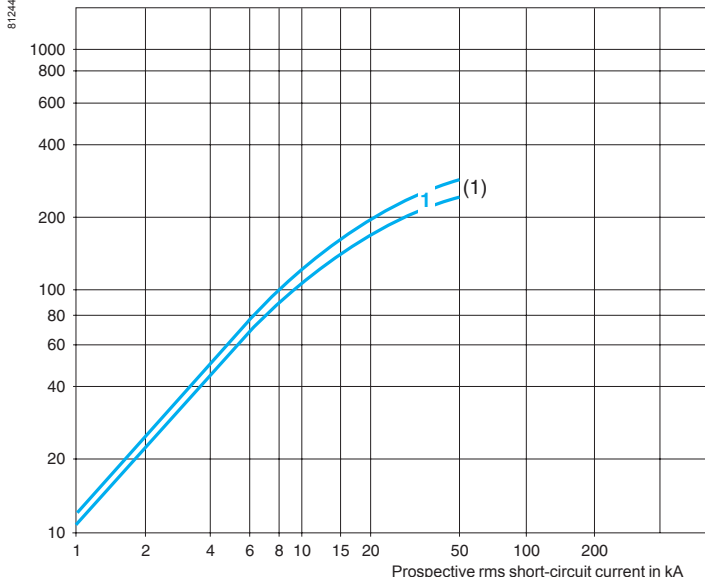
Current limitation on short-circuit



1 18 to 25 A up to 45 to 63 A

Maximum thermal limit on short-circuit

Thermal limit I^2t in kA²s in the short-circuit protection zone



1 18 to 25 A up to 45 to 63 A

(1) LB1 LD03●22 to LD06●61: rating of associated thermal overload module.

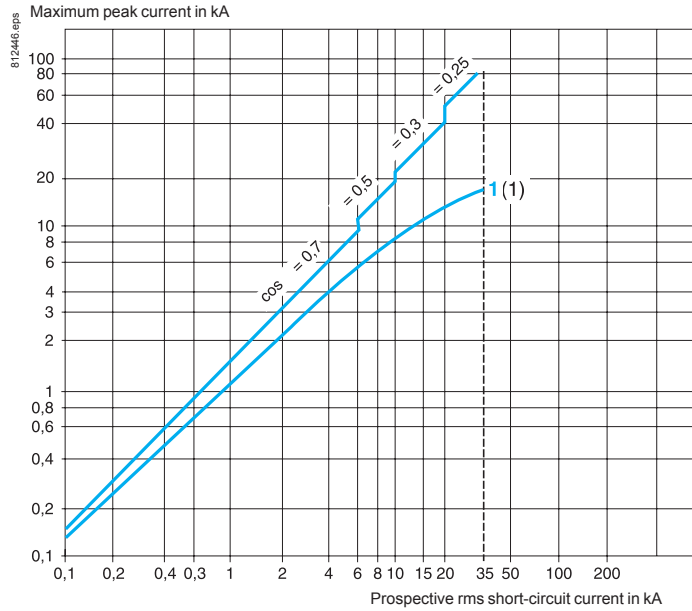
Motor starters - open version

Contactors breakers and reversing contactor breakers Integral 63

Current limitation and thermal limit on short-circuit

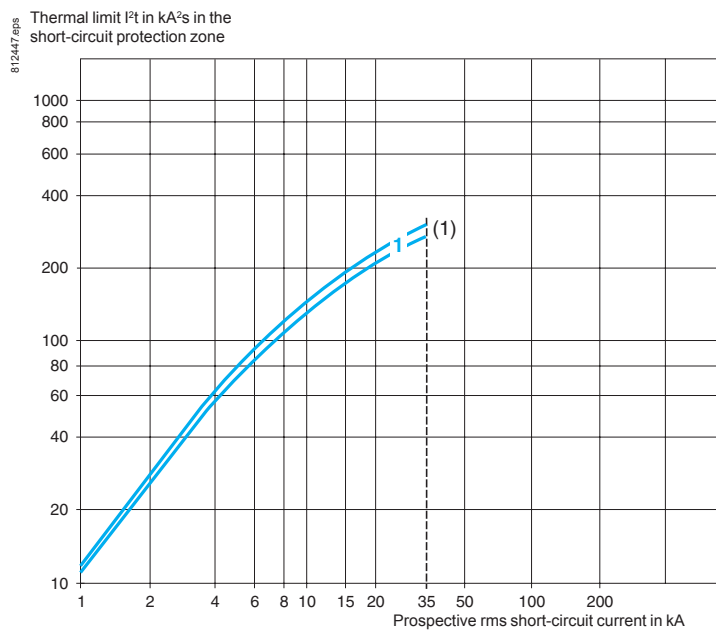
3-phase 480/500 V, 50 Hz

Current limitation on short-circuit



1 18 to 25 A up to 45 to 63 A

Current limitation on short-circuit



1 18 to 25 A up to 45 to 63 A

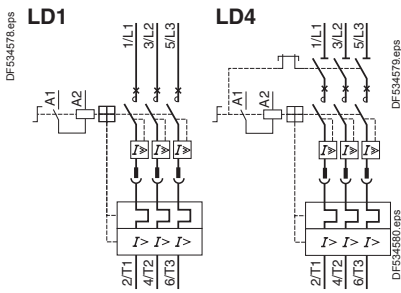
(1) LB1 LD03•22 to LD03•61: rating of associated thermal overload module.

Motor starters - open version

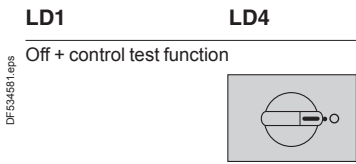
Contactors Integral 63

Auxiliary contact states according to the positions of the control knob

Integral 63



□ Contact open
 ■ Contact closed



Auxiliary contact actuators									

Auxiliary contacts										
LA1 LC010			LA1 LC012			LA1 LC025		LA1 LC001	LA1 LC020	LA1 LC030

Off + control test function														
Off														
On, contactor open														
On, contactor closed														
Off after overload														
Tripped on overload														
Tripped on short-circuit														
Off after short-circuit														
Manual reset														

Motor starters - open version

Reversing contactor breakers Integral 63

Auxiliary contact states according to the positions of the control knob

Integral 63

<p>DF534582.eps</p> <p>DF534583.eps</p> <p>DF536039.eps</p> <p> <input type="checkbox"/> Contact open <input checked="" type="checkbox"/> Contact closed </p>	Auxiliary contact actuators												
	Auxiliary contacts												
	LA1 LC010			LA1 LC012			LA1 LC025		LA1 LC020	LA1 LC001	LA1 LC021	LA1 LC031	
Off + control test function 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
Off 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
On, reversing contactor open 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
On, closed <input type="checkbox"/> 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
On, closed <input checked="" type="checkbox"/> 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
Tripped on overload 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
Off after overload 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
Tripped on short-circuit 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
Off after short-circuit 	13 23 31 14 24 32	16 18 15	06 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64
Manual reset 	13 23 31 14 24 32	16 18 15	06 08 05	96 98 95	13 23 31 14 24 32	08 05	98 95	13 23 31 14 24 32	96 98 95 95	13 23 31 14 24 32	41 42	13 23 31 14 24 32	53 63 54 64

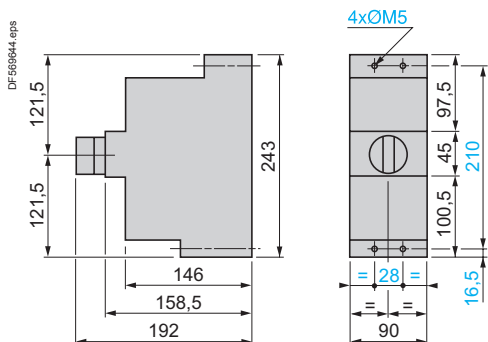
Integral 63

Integral 63

Contactor breakers Integral 63

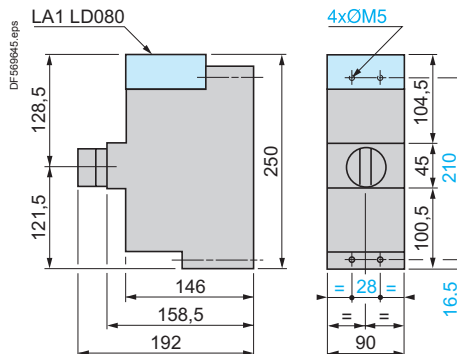
Control circuit: a.c.

LD● LD●30 + LB● LD03



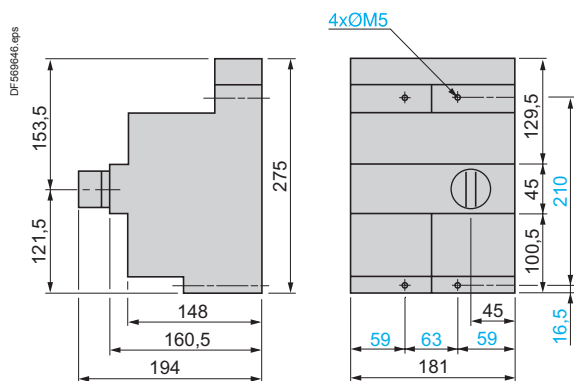
Control circuit: d.c.

LD● LD●30 + LB● LD03 + LA1 LD080



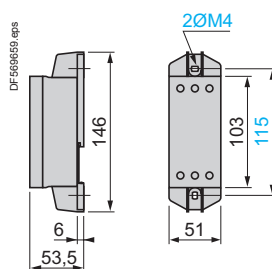
Reversing contactor breakers Integral 63

LD5 LD●30 + LB● LD03M



Current limiter

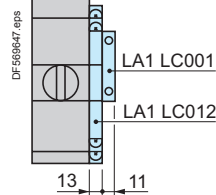
LA9 LB920



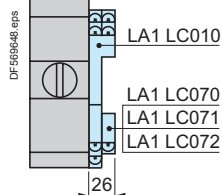
Add-on blocks

For mounting on contactor breakers Integral 63

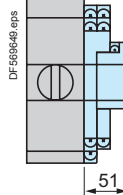
LA1 LC012
LA1 LC001



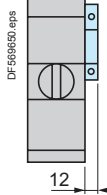
LA1 LC010
LA1 LC07●



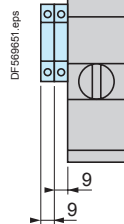
LA1 LC052



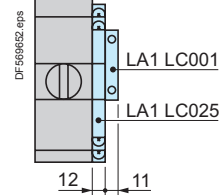
LA1 LC020



LA1 LC030
(1 ou 2)

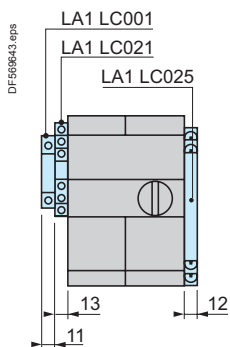


LA1 LC025
LA LC001

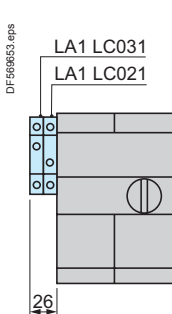


For mounting on reversing contactor breakers Integral 63

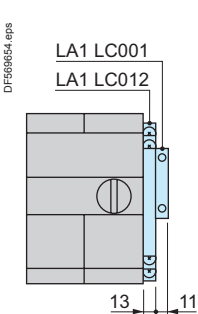
LA1 LC021, LC025
LA1 LC001



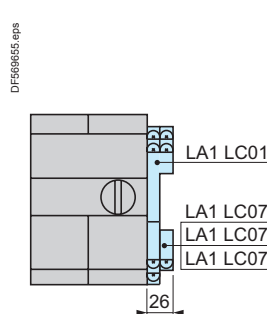
LA1 LC031



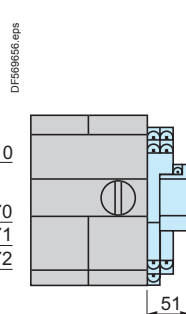
LA1 LC012
LA1 LC001



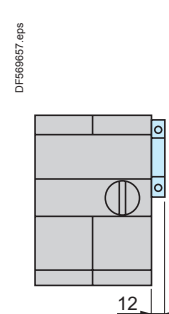
LA1 LC010
LA1 LC07●



LA1 LC052●



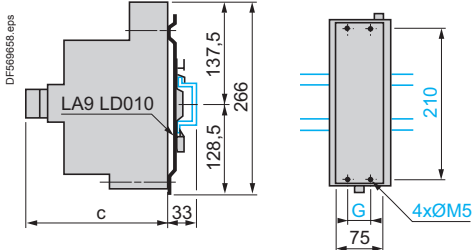
LA1 LC020



Integral 63

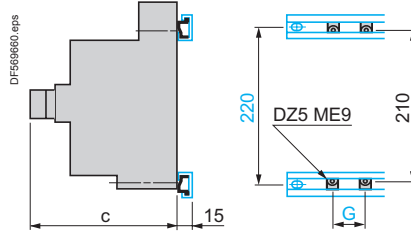
Mounting

On 75 mm L rail, with mounting plate LA9 LD010



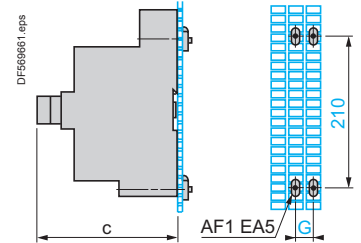
	a	b	c	G
LD1	266	137,5	192	28
LD4	266	137,5	192	28
LD5	282	153,5	194	63

On 32 mm L rails, at 220 mm centres



	c	G
LD1	192	28
LD4	192	28
LD5	194	63

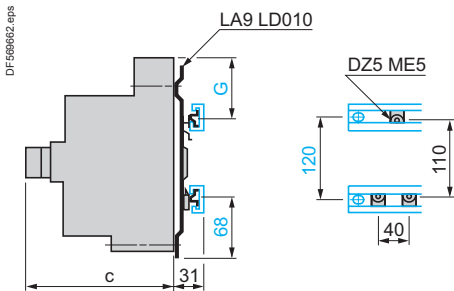
On pre-slotted mounting plate AM1 P



	c	G
LD1	192	28
LD4	192	28
LD5	194	63

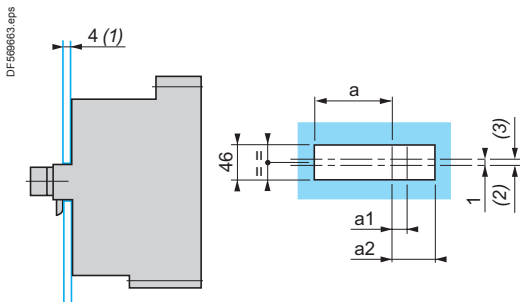
With mounting plate LA9 LD010

SO on 32 mm L rails, at 120 mm centres



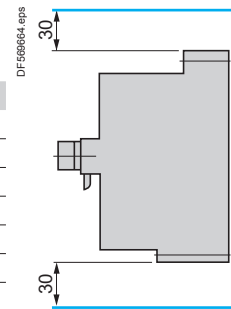
	c	G
LD1	192	78
LD4	192	78
LD5	194	94

Flush mounting (contactor breakers and reversing contactor breakers)



	a	a1	a2
LD1 LD030	90	-	-
LD4 LD●30	90	-	-
LD5 LD●30	181	-	-
LA1 LC010	-	13	-
LA1 LC012	-	13	-
LA1 LC010 + LA1 LC052●	-	-	51
LA1 LC012 + LA1 LC052●	-	-	51

Minimum electrical clearance



(1) Maximum door thickness for interlocking by LD4 and LD5.

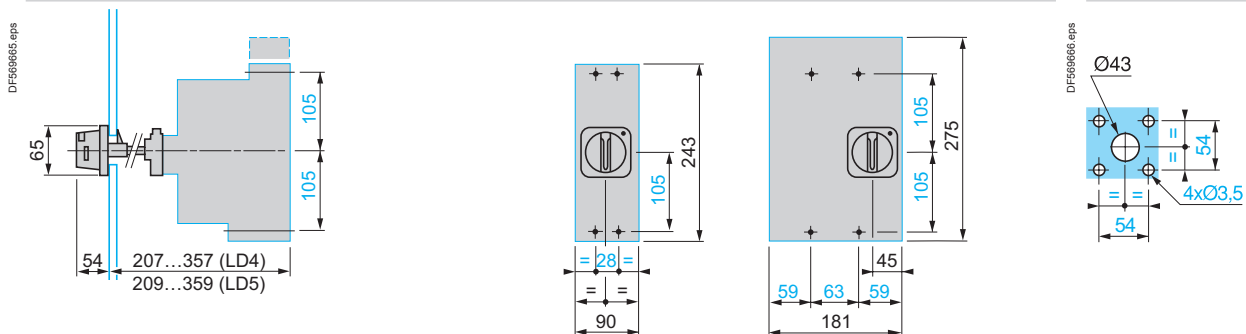
(2) Centre of operating handle.

(3) Fixing centre.

Adjustable door interlock mechanisms LA9 LC33● and LA9 LC53●

For mounting on LD4 LD●30 and LD5 LD●30

Door drillings



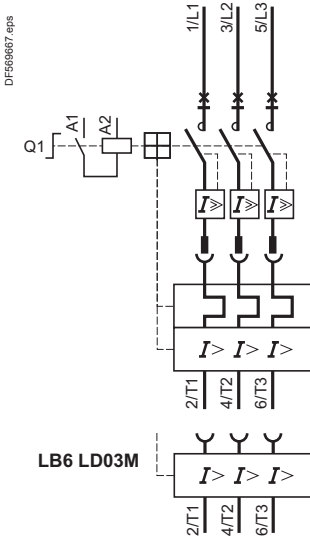
Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

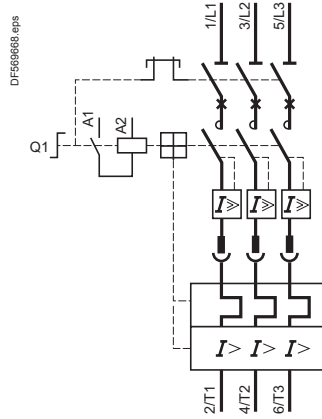
Integral 63

Contactor breakers Integral 63 with protection module LB●

LD1 LD030 + LB1 LD03●

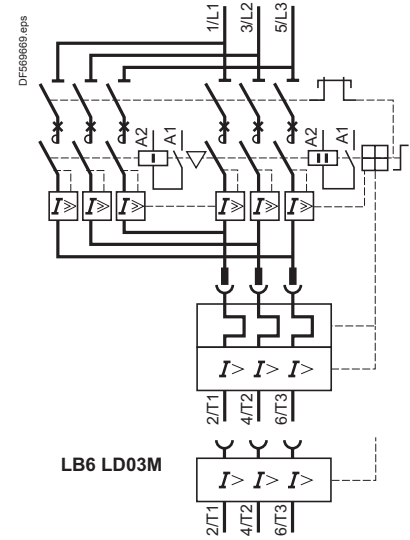


LD4 LD●30 + LB1 LD03●



Reversing contactor breakers Integral 63 with protection module LB●

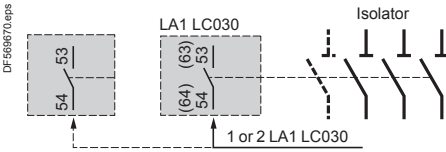
LD5 LD●30 + LB1 LD03M ou LD03P



Add-on blocks

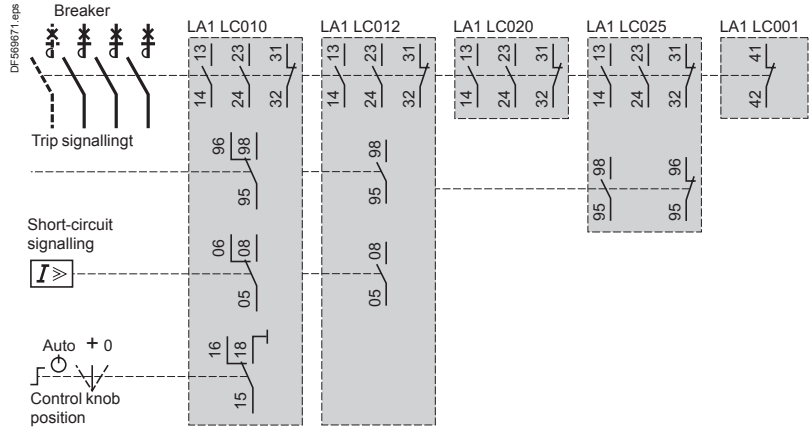
For contactor breakers LD4

Mounted on LH side



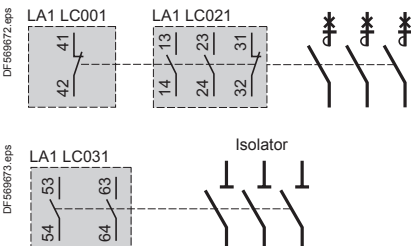
For contactor breakers LD1 or LD4 and reversing contactor breakers LD5

Mounted on RH side



For reversing contactor breakers LD5

Mounted on LH side



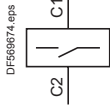
Motor starters - open version

Integral 63 contactor breakers and reversing contactor breakers

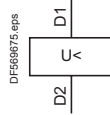
Integral 63

Tripping devices ⁽¹⁾ for LD1, LD4, LD5

LA1 LC071

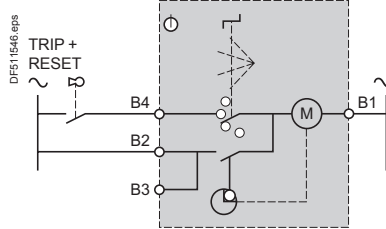


LA1 LC070, LC072



Remote electrical reset devices ⁽¹⁾ for LD1 to LD5

LA1 LC052●

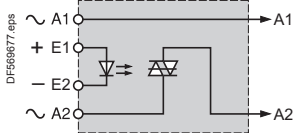


The use of instantaneous auxiliary contact block LA1 LC020 prevents the use of tripping devices or electrical reset devices

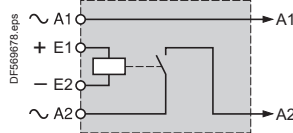
⁽¹⁾ For contactor breakers and reversing contactor breakers already fitted with an LA1 LC010 or LA1 LC012 instantaneous auxiliary contact block.

Interface modules

LA1 LD180



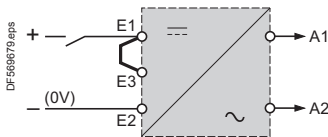
LA1 LD580



Voltage converter LA1 LD080 (supply with contactor breakers for ~ control circuit operation)

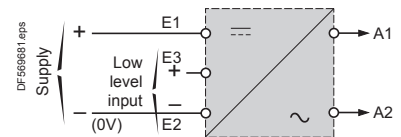
Switching by control contact

24 or 48 V



Switching by "Low level" input

24 or 48 V



Coordination between protection and control components**Type of information****Page**

Types of coordination, according to the standard currents in the circuit to be considered	A5/2
Selection of the coordination type	A5/3

Suggested coordinated Direct-On-Line motor starter combinations

Fuse + contactors + thermal overload relay	A5/4
Circuit breaker (with built in overload protection) + contactors	A5/9
Circuit breaker + contactors + thermal overload relay	A5/11

Suggested coordinated Star-delta motor starter combinations

Fuse + contactors + thermal overload relay	A5/15
Circuit breaker (with built in overload protection) + contactors	A5/18
Circuit breaker + contactors + thermal overload relay	A5/20

Contactors: Utilisation categories – Standard characteristics – Selection tables per categorie

Definition: utilisation categories : AC-1, AC-2, AC-3	A5/22
Definition: contactor standard characteristics	A5/23
Contactor selection tables per utilisation categorie	A5/24

Contactors for specific application – Design information

Selection of contactors for lighting circuits	A5/38
Selection of contactors for heating circuits	A5/44
Selection of contactors for switching primaries of 3P LV/LV transformers	A5/46
Selection of contactors for switching 3P capacitor banks (factor correction)	A5/47
Selection of contactors auto-transformer starting	A5/48
Selection of contactors for rotor circuit of slip-ring motors	A5/50
Design of long distance remote control for contactors	A5/52
Current of asynchronous squirrel cage motors at nominal load	A5/56

Standards – Protection against contact – Protective treatments

International standards and certifications	A5/57
Protective product treatments, according environment or climate	A5/59
Protection against accidental direct contacts / IP codes	A5/61

Type 1 and type 2 coordination according to the standard

The standard defines tests at different levels of current; the purpose of these tests is to place the equipment in extreme conditions.

The standard defines 2 types of coordination, according to the condition of the components after testing:

- type 1,**
- type 2.**

To determine the type of coordination, the standard requires that the behaviour of the equipment be tested under overload and short-circuit conditions for 3 fault current values, covering overload and short-circuit conditions.

Type 1 coordination

Type 1 coordination requires that in a short-circuit condition, the contactor or starter must not present any danger to personnel or installations and must not be able to resume operation without repair or the replacement of parts.

Type 2 coordination

Type 2 coordination requires that in a short-circuit condition, the contactor or starter must not present any danger to personnel or installations and must subsequently be able to resume operation. The risk of contact welding is permissible; in this case, the manufacturer must indicate measures to be taken regarding maintenance of the equipment.

Type 2 coordination increases reliability of operation.

Current values

Current "Ico" (overload I < 10 In)

The thermal overload relay associated with the contactor provides protection against this type of fault, up to a value Ico (see curve) defined by the manufacturer.

Standard IEC 60947-4-1 specifies the 2 current values to be used for checking coordination between the thermal overload relay and the short-circuit protection device:

- at 0.75 Ico only the thermal overload relay must trip,
- at 1.25 Ico the short-circuit protection device must operate.

Current "r" (low level short-circuit 10 < I < 50 In)

The main cause of this type of fault is the deterioration of insulating materials. Standard IEC 60947-4-1 defines an intermediate short-circuit current "r". This test current makes it possible to check whether the protection device is providing protection against low-level short-circuits.

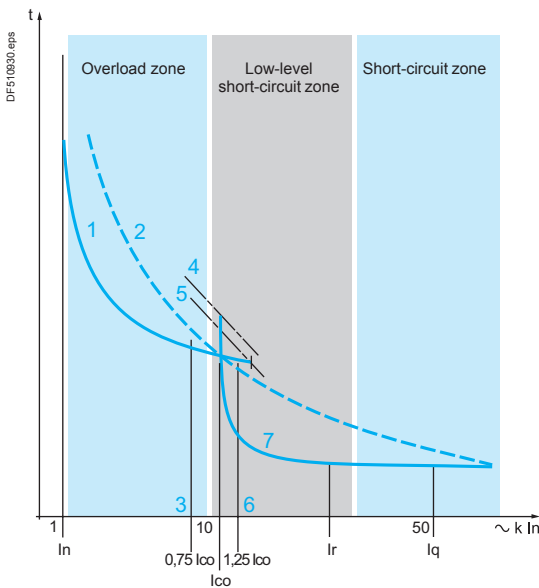
Operational current Ie (AC-3) (A)	Current "r" (kA)
Ie ≤ 16	1
16 < Ie ≤ 63	3
63 < Ie ≤ 125	5
125 < Ie ≤ 315	10
315 < Ie ≤ 630	18
630 < Ie ≤ 1000	30

Current "Iq" (short-circuit > current "r")

This type of fault corresponds to a dead short and is relatively rare. It can be caused by a connection error during maintenance work. Short-circuit protection is provided by fast operating devices.

Standard IEC 60947-4-1 defines a current "Iq". The coordination tables supplied by Schneider Electric are based on a current "Iq" that is generally ≥ 50 kA.

(1) SCPD: short-circuit protection device.



- 1 Thermal overload relay curve.
- 2 Fuse.
- 3 Tripping of thermal overload relay only.
- 4 Thermal limit of the circuit breaker.
- 5 Thermal overload relay limit.
- 6 Current broken by the SCPD (1).
- 7 Circuit breaker magnetic trip.

Selection**No coordination**

Considerable risks to both persons and equipment.

Not authorised by standards:

- NF C 15-100 and IEC 60364-1, article 133-1 (installation regulations),
- EN/IEC 60204-1, article 7 (electrical equipment in machines),
- IEC 60947-4-1, article 8.2.5. (starters)

Type 1 coordination

The most frequently used solution.

- Equipment costs are lower.
- Reliability of operation is not a requirement.
- Before restarting, it may be necessary to repair the motor starter.

Consequences:

- significant amount of machine downtime,
- skilled maintenance personnel required to repair, check, obtain supplies.

Example: air conditioning in commercial premises.

Type 2 coordination

This solution ensures reliability of operation.

Consequences:

- reduced machine downtime,
- reduced maintenance after a short-circuit.

Example: escalators.

Total coordination

With this solution, no damage or misadjustment is permissible and reliability of operation is guaranteed.

Consequences:

- immediate return to service,
- no special precautions required.

Examples: smoke extraction, fire-fighting pumps.

0.06 to 55 kW at 400/415 V: type 1 coordination											
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3						Fuse carrier ⁽¹⁾ (basic block)	aM fuses		Contactors	Thermal overload relay class 10	
400/415 V		440 V		500 V		Reference	Size	Rating	Reference ⁽²⁾	Reference	Setting range
P	I _e	P	I _e	P	I _e			A			A
kW	A	kW	A	kW	A						A
0.06	0.2	0.06	0.19	–	–	LS1D32	10 x 38	2	LC1K06	LR2K0302	0.16...0.23
–	–	0.09	0.28	–	–	LS1D32	10 x 38	2	LC1K06	LR2K0303	0.23...0.36
0.09	0.3	–	–	–	–	LS1D32	10 x 38	2	LC1K06	LR2K0304	0.36...0.54
0.12	0.44	0.12	0.37	–	–	LS1D32	10 x 38	2	LC1K06	LR2K0304	0.36...0.54
0.18	0.6	0.18	0.55	–	–	LS1D32	10 x 38	2	LC1K06	LR2K0305	0.54...0.8
–	–	0.25	0.76	–	–	LS1D32	10 x 38	2	LC1K06	LR2K0305	0.54...0.8
0.25	0.85	–	–	–	–	LS1D32	10 x 38	2	LC1K06	LR2K0306	0.8...1.2
0.37	1.1	0.37	1	0.37	0.88	LS1D32	10 x 38	2	LC1K06	LR2K0306	0.8...1.2
0.55	1.5	0.55	1.36	0.55	1.2	LS1D32	10 x 38	2	LC1K06	LR2K0307	1.2...1.8
–	–	0.75	1.68	0.75	1.5	LS1D32	10 x 38	2	LC1K06	LR2K0307	1.2...1.8
0.75	1.9	–	–	1.1	2.2	LS1D32	10 x 38	4	LC1K06	LR2K0308	1.8...2.6
1.1	2.7	1.1	2.37	1.5	2.9	LS1D32	10 x 38	4	LC1K06	LR2K0308	1.8...2.6
1.5	3.6	1.5	3.06	–	–	LS1D32	10 x 38	4	LC1K06	LR2K0310	2.6...3.7
2.2	4.9	–	–	2.2	3.9	LS1D32	10 x 38	6	LC1K06	LR2K0312	3.7...5.5
–	–	–	–	3	5.2	LS1D32	10 x 38	6	LC1K06	LR2K0312	3.7...5.5
–	–	2.2	4.42	–	–	LS1D32	10 x 38	8	LC1K06	LR2K0312	3.7...5.5
3	6.5	3	5.77	4	6.8	LS1D32	10 x 38	8	LC1K09	LR2K0314	5.5...8
4	8.5	4	7.9	5.5	9.2	LS1D32	10 x 38	12	LC1K09	LR2K0316	8...11.5

⁽¹⁾ For breaking under load, add a rotary switch-disconnector.

⁽²⁾ For reversing operation, replace the prefix LC1 with LC2.

0.06 to 55 kW at 400/415 V: type 1 coordination											
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3						Fuse carrier ⁽¹⁾ (basic block)	aM fuses		Contactor	Thermal overload relay classe 10	
400/415 V		440 V		500 V		Reference	Size	Rating	Reference ⁽²⁾	Reference	Setting range
P	I _e	P	I _e	P	I _e			A			A
kW	A	kW	A	kW	A						A
5.5	11.5	5.5	10.4	7.5	12.4	LS1D32	10 x 38	16	LC1K12	LR2K0321	10...14
7.5	15.5	7.5	13.7	9	13.9	LS1D32	10 x 38	16	LC1D18	LRD21	12...18
-	-	9	16.9	-	-	LS1D32	10 x 38	20	LC1D25	LRD21	12...18
9	18.1	-	-	11	17.6						
11	22	11	20.1	15	23	GK1EK	14 x 51	25	LC1D25	LRD22	16...24
15	29	15	26.5	18.5	28	GK1EK	14 x 51	32	LC1D32	LRD32	23...32
18.5	35	18.5	32.8	22	33	GK1EK	14 x 51	40	LC1D40	LRD3355	30...40
22	41	22	39	30	44	GS●J	22 x 58	50	LC1D50A	LRD350	37...50
-	-	30	51.5	-	-	GS●J	22 x 58	80	LC1D50A	LRD365	48...65
-	-	-	-	37	53	GS●J	22 x 58	80	LC1D65A	LRD365	48...65
30	55	37	64	-	-	GS●J	22 x 58	80	LC1D65A	LRD365	48...65
-	-	-	-	45	64	GS●J	22 x 58	80	LC1D80	LRD3361	55...70
37 ⁽³⁾	66	45	76	-	-	GS●J	22 x 58	100	LC1D80	LRD3363	63...80
45	80	-	-	55	78	GS●J	22 x 58	100	LC1D95	LRD3365	80...93
-	-	55	90	-	-	GS●J	22 x 58	125	LC1D115	LRD4365	80...104
55	97	-	-	75	106	GS●J	22 x 58	125	LC1D115	LRD4367	95...120

⁽¹⁾ For breaking under load, add a rotary switch-disconnector.

⁽²⁾ For reversing operation, replace the prefix LC1 with LC2.

⁽³⁾ 400 V maximum.

0.06 to 315 kW at 400/415 V: type 2 coordination											
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3						Switch-disconnector	aM fuses		Contactor	Thermal overload relay classe 10	
400/415 V		440 V		500 V		Reference ⁽¹⁾	Size	Rating	Reference ⁽²⁾	Reference	Setting range
P	I _e	P	I _e	P	I _e			A			A
kW	A	kW	A	kW	A						
0.06	0.2	0.06	0.19	–	–	GS1DD	10 x 38	2	LC1D09	LRD02	0.16...0.25
–	–	0.09	0.28	–	–	GS1DD	10 x 38	2	LC1D09	LRD03	0.25...0.4
0.09	0.3	–	–	–	–						
0.12	0.44	0.12	0.37	–	–	GS1DD	10 x 38	2	LC1D09	LRD04	0.4...0.63
0.18	0.6	0.18	0.55	–	–						
–	–	0.25	0.76	–	–	GS1DD	10 x 38	2	LC1D09	LRD05	0.63...1
0.25	0.85	–	–	0.37	0.88						
0.37	1.1	0.37	1	0.55	1.2						
0.55	1.5	0.55	1.36	0.75	1.5	GS1DD	10 x 38	2	LC1D09	LRD06	1...1.7
0.75	1.9	0.75	1.68	–	–						
–	–	1.1	2.37	1.1	2.2	GS1DD	10 x 38	4	LC1D09	LRD07	1.6...2.5
1.1	2.7	–	–	1.5	2.9						
1.5	3.6	1.5	3.06	2.2	3.9	GS1DD	10 x 38	4	LC1D09	LRD08	2.5...4
2.2	4.9	2.2	4.42	3	5.2	GS1DD	10 x 38	6	LC1D09	LRD10	4...6
3	6.5	3	5.77	4	6.8	GS1DD	10 x 38	8	LC1D09	LRD12	5.5...8
4	8.5	4	7.9	5.5	9.2	GS1DD	10 x 38	10	LC1D09	LRD14	7...10
5.5	11.5	5.5	10.4	7.5	12.4	GS1DD	10 x 38	16	LC1D12	LRD16	9...13
7.5	15.5	7.5	13.7	9	13.9	GS1DD	10 x 38	16	LC1D18	LRD21	12...18
–	–	9	16.9	–	–	GS•F	14 x 51	20	LC1D25	LRD21	12...18
9	18.1	11	20.1	11	17.6						
11	22	–	–	15	23	GS•F	14 x 51	25	LC1D25	LRD22	16...24
15	29	15	26.5	18.5	28	GS•F	14 x 51	32	LC1D32	LRD32	23...32
18.5	35	18.5	32.8	22	33	GS•F	14 x 51	40	LC1D40A	LRD340	30...40
22	41	22	39	30	44	GS•J	22 x 58	50	LC1D50A	LRD350	37...50
–	–	30	51.5	–	–	GS•J	22 x 58	80	LC1D65A	LRD365	48...65
–	–	–	–	37	53	GS•J	22 x 58	80	LC1D65A	LRD365	48...65
30	55	37	64	–	–	GS•J	22 x 58	80	LC1D65A	LRD365	48...65
–	–	–	–	45	64	GS•J	22 x 58	80	LC1D95	LRD3361	55...70
37	66	45	76	–	–	GS•J	22 x 58	100	LC1D80	LRD3363	63...80
–	–	–	–	55	78	GS•J	22 x 58	100	LC1D115	LR9D5367	60...100
45	80	–	–	–	–	GS•J	22 x 58	100	LC1D95	LRD3365	80...93
55	97	55	90	75	106	GS•L	T0	125	LC1D150	LR9D5369	90...150
75	132	75	125	90	128	GS•L	T0	160	LC1D150	LR9D5369	90...150
90	160	90	146	110	156	GS•N	T1	200	LC1F185	LR9F5371	132...220
110	195	110	178	132	184	GS•N	T1	250	LC1F225	LR9F5371	132...220
132	230	132	215	160	224	GS•QQ	T2	315	LC1F265	LR9F7375	200...330
–	–	160	256	–	–	GS•QQ	T2	315	LC1F330	LR9F7375	200...330
160	280	200	321	200	280	GS•QQ	T2	400	LC1F330	LR9F7375	200...330
–	–	–	–	220	310	GS•QQ	T2	400	LC1F400	LR9F7375	200...330
200	350	–	–	–	–						
220	388	220	353	250	344	GS2S	T3	500	LC1F400	LR9F7379	300...500
250	430	250	401	–	–	GS2S	T3	500	LC1F500	LR9F7379	300...500
–	–	–	–	315	432						
–	–	–	–	355	488	GS2S	T3	630	LC1F500	LR9F7381	380...630
315	540	315	505	–	–	GS2S	T3	630	LC1F630	LR9F7381	380...630
–	–	355	549	–	–						
–	–	400	611	400	552	GS2V	T4	800	LC1F630	LR9F7381	380...630

(1) GS•: GS1 for direct operator or GS2 for external operator.

(2) For reversing operation, replace the prefix LC1 with LC2.

TeSys motor starters - open version

D.O.L starters with fuse protection
(NF C or DIN fuses, type aM)

0.75 to 400 kW at 690 V: type 2 coordination							
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3		Switch-disconnector	aM fuses		Contactor	Thermal overload relay classe 10	
P	I _e	Reference ⁽¹⁾	Size	Rating	Reference ⁽²⁾	Reference	Setting range
kW	A			A			A
0.75	1.1	GS●F	14 x 51	2	LC1D09	LRD06	1...1.6
1.1	1.6	GS●F	14 x 51	2	LC1D09	LRD06	1...1.6
1.5	2.1	GS●F	14 x 51	4	LC1D09	LRD07	1.6...2.5
2.2	2.8	GS●F	14 x 51	4	LC1D09	LRD08	2.5...4
3	3.8	GS●F	14 x 51	6	LC1D09	LRD08	2.5...4
4	4.9	GS●F	14 x 51	6	LC1D09	LRD10	4...6
5.5	6.7	GS●F	14 x 51	8	LC1D09	LRD12	5.5...8
7.5	8.9	GS●F	14 x 51	10	LC1D25	LRD16	9...13
11	12.8	GS●F	14 x 51	16	LC1D25	LRD16	9...13
15	17	GS●F	14 x 51	20	LC1D25	LRD22	16...24
18.5	21	GS●F	14 x 51	25	LC1D32	LRD22	16...24
22	24	GS●J	22 x 58	32	LC1D40A	LRD332	23...32
30	32	GS●J	22 x 58	40	LC1D40A	LRD340	30...40
37	39	GS●J	22 x 58	50	LC1D65A	LRD350	37...50
45	47	GS●J	22 x 58	63	LC1D80	LR2D3357	37...50
55	57	GS●J	22 x 58	80	LC1D115	LR2D3359	48...65
75	77	GS●KK	T00	100	LC1D115	LR2D3363	63...80
90	93	GS●KK	T00	125	LC1D150	LR9D5369	90...150
110	113	GS●KK	T00	125	LC1F185	LR9D5369	90...150
132	134	GS●L	T0	160	LC1F265	LR9F5371	132...220
160	162	GS●N	T1	200	LC1F265	LR9F5371	132...220
200	203	GS●N	T1	250	LC1F330	LR9F7375	200...330
220	224	GS●QQ	T2	250	LC1F400	LR9F7375	200...330
250	250	GS●QQ	T2	315	LC1F400	LR9F7375	200...330
315	313	GS●QQ	T2	355	LC1F500	LR9F7379	300...500
355	354	GS●QQ	T2	400	LC1F630	LR9F7379	300...500
400	400	GS2S	T3	500	LC1F630	LR9F7379	300...500

(1) GS●: GS1 for direct operator or GS2 for external operator.

(2) For reversing operation, replace the prefix LC1 with LC2.

0.06 to 375 kW at 415 V: type 2 coordination											
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3						Switch-disconnector-fuse	BS fuses		Contactor	Thermal overload relay	
415 V		440 V		500 V			Reference	Size		Rating	Reference ⁽¹⁾
P	I _e	P	I _e	P	I _e			A			A
kW	A	kW	A	A	kA						
0.06	0.22	0.06	0.19	–	–	GS1DDB	A1	NIT 2	LC1D09	LRD02	0.16...0.25
–	–	0.09	0.28	–	–	GS1DDB	A1	NIT 2	LC1D09	LRD03	0.25...0.4
0.09	0.36	–	–	–	–						
0.12	0.42	0.12	0.37	–	–	GS1DDB	A1	NIT 2	LC1D09	LRD04	0.4...0.63
0.18	0.6	0.18	0.55	–	–	GS1DDB	A1	NIT 2	LC1D09	LRD05	0.63...1
–	–	0.25	0.76	–	–	GS1DDB	A1	NIT 4	LC1D09	LRD05	0.63...1
0.25	0.88	0.37	1	0.37	1						
0.37	1	0.55	1.36	0.55	1.2						
0.55	1.5	0.75	1.68	0.75	1.5	GS1DDB	A1	NIT 6	LC1D09	LRD06	1...1.7
0.75	2	–	–	–	–	GS1DDB	A1	NIT 10	LC1D09	LRD07	1.6...2.5
–	–	–	–	1.5	2.6	GS1DDB	A1	NIT 10	LC1D09	LRD08	2.5...4
1.5	3.5	1.5	3.06	2.2	3.8	GS1DDB	A1	NIT 16	LC1D09	LRD08	2.5...4
2.2	5	2.2	4.42	3	5	GS1DDB	A1	NIT 16	LC1D09	LRD10	4...6
3	6.5	3	5.77	4	6.5	GS1DDB	A1	NIT 20	LC1D09	LRD12	5.5...8
4	8.4	4	7.9	5.5	9	GS1DDB	A1	NIT 20	LC1D09	LRD14	7...10
5.5	11	5.5	10.4	7.5	12	GS1DDB	A1	NIT 20M25	LC1D12	LRD16	9...13
7.5	14	7.5	13.7	9	13.9	GS1DDB	A1	NIT 20M32	LC1D18	LRD21	12...18
9	18.1	9	16.9	–	–	GS2GB	A2	TIA 32M35	LC1D18	LRD21	12...18
11	21	11	20	11	18.4						
–	–	–	–	15	23	GS2GB	A2	TIA 32M50	LC1D25	LRD22	16...24
15	28.5	15	26.5	–	–	GS2GB	A2	TIA 32M63	LC1D32	LRD32	23...32
–	–	–	–	22	33	GS2GB	A3	TIS 63M80	LC1D40	LRD3355	30...40
22	42	22	39	30	45	GS2GB	A3	TIS 63M100	LC1D50	LRD3357	37...50
–	–	30	51.5	–	–	GS2GB	A3	TIS 63M100	LC1D50	LRD3359	48...65
30	57	–	–	–	–	GS2GB	A3	TIS 63M100	LC1D65	LRD3359	48...65
–	–	45	76	45	65	GS2LLB	A4	TCP 100M125	LC1D80	LRD3363	63...80
45	81	–	–	55	80	GS2LLB	A4	TCP 100M125	LC1D95	LRD3365	80...93
55	100	–	–	–	–	GS2LLB	A4	TCP 100M160	LC1D115	LR9D5369	90...150
–	–	55	90	–	–	GS2LLB	A4	TCP 100M160	LC1D115	LR9D5367	60...100
–	–	–	–	80	116	GS2LB	B2	TF 200	LC1D150	LR9D5369	90...150
80	138	80	132	–	–	GS2LB	B2	TF 200M250	LC1D150	LR9D5369	90...150
–	–	–	–	100	143						
–	–	–	–	110	156	GS2LB	B2	TF 200M250	LC1F185	LR9F5371	132...220
100	182	100	162	–	–	GS2MMB	B2	TF 200M250	LC1F185	LR9F5371	132...220
110	196	110	178	–	–	GS2MMB	B2	TF 200M315	LC1F225	LR9F5371	132...220
–	–	–	–	140	200	GS2NB	B3	TKF 315M355	LC1F265	LR9F5371	132...220
140	250	140	226	160	220	GS2NB	B3	TKF 315M355	LC1F265	LR9F7375	200...330
160	285	160	256	–	–	GS2QQB	B4	TKF 315M355	LC1F330	LR9F7375	200...330
–	–	–	–	220	310	GS2QQB	B4	TMF 400	LC1F400	LR9F7379	300...500
220	388	220	353	257	362	GS2QQB	B4	TMF 400M450	LC1F400	LR9F7379	300...500
–	–	–	–	270	380	GS2SB	C2	TTM 500	LC1F500	LR9F7379	300...500
257	450	257	412	–	–						
270	460	270	433	–	–	GS2SB	C2	TTM 500	LC1F500	LR9F7381	380...630
375	610	375	577	375	508						
–	–	–	–	425	556	GS2SB	C2	TTM 630	LC1F630	LR9F7381	380...630

(1) For reversing operation, replace the prefix LC1 with LC2.

0.06 to 110 kW at 400/415 V: type 1 coordination										Circuit breaker		Contactor
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Reference	Setting range of thermal trips	Reference ⁽²⁾	
400/415 V			440 V			500 V						
P	I _e	I _q ⁽¹⁾	P	I _e	I _q ⁽¹⁾	P	I _e	I _q ⁽¹⁾		A		
kW	A	kA	kW	A	kA	kW	A	kA				
0.06	0.2	50	0.06	0.19	50	–	–	–	GV2ME02	0.16...0.25	LC1K06 or LC1D09	
0.09	0.3	50	0.09 0.12	0.28 0.37	50 50	–	–	–	GV2ME03	0.25...0.40	LC1K06 or LC1D09	
0.12	0.44	50	–	–	–	–	–	–	GV2ME04	0.40...0.63	LC1K06 or LC1D09	
0.18	0.6	50	0.18	0.55	50	–	–	–	GV2ME05	0.63...1	LC1K06 or LC1D09	
0.25	0.85	50	0.25	0.76	50	–	–	–	GV2ME06	1...1.6	LC1K06 or LC1D09	
0.37	1.1	50	0.37	0.99	50	–	–	–	GV2ME06	1...1.6	LC1K06 or LC1D09	
–	–	–	–	–	–	0.37	0.88	50	GV2ME06	1...1.6	LC1K06 or LC1D09	
0.55	1.5	50	0.55	1.36	50	0.55	1.2	50	GV2ME06	1...1.6	LC1K06 or LC1D09	
–	–	–	–	–	–	0.75	1.5	50	GV2ME06	1...1.6	LC1K06 or LC1D09	
0.75	1.9	50	0.75	1.68	50	–	–	–	GV2ME07	1.6...2.5	LC1K06 or LC1D09	
–	–	–	1.1	2.37	50	1.1	2.2	50	GV2ME07	1.6...2.5	LC1K06 or LC1D09	
1.1	2.7	50	–	–	–	1.5	2.9	50	GV2ME08	2.5...4	LC1K06 or LC1D09	
1.5	3.6	50	1.5	3.06	50	2.2	3.9	50	GV2ME08	2.5...4	LC1K06 or LC1D09	
2.2	4.9	50	2.2	4.42	50	–	–	–	GV2ME10	4...6.3	LC1K06 or LC1D09	
–	–	–	3	5.77	50	3	5.2	50	GV2ME10	4...6.3	LC1K06 or LC1D09	
3	6.5	50	–	–	–	4	6.8	10	GV2ME14	6...10	LC1K09 or LC1D09	
4	8.5	50	4	7.9	15	5.5	9.2	10	GV2ME14	6...10	LC1K09 or LC1D09	
5.5	11.5	15	5.5	10.4	8	7.5	12.4	6	GV2ME16	9...14	LC1K12 or LC1D12	
7.5	15.5	15	7.5	13.7	8	9	13.9	6	GV2ME20	13...18	LC1D18	
–	–	–	9	16.9	8	–	–	–	GV2ME20	13...18	LC1D18	
9	18.1	15	11	20.1	6	11	17.6	4	GV2ME21	17...23	LC1D25	
11	22	15	–	–	–	15	23	4	GV2ME22	20...25	LC1D25	
15	29	10	15	26.5	6	18.5	28	4	GV2ME32	24...32	LC1D32	
18.5	35	50	18.5	32.8	50	22	33	10	GV3P40	30...40	LC1D40A	
22	41	50	22	39	50	30	44	10	GV3P50	37...50	LC1D50A	
30	55	50	37	51.5	50	37	53	10	GV3P65	48...65	LC1D65A	
–	–	–	37	64	25	45	64	18	GV7RE80	48...80	LC1D65A	
37	66	15	45	76	10	55	78	4	GV3ME80	56...80	LC1D80	
37	66	25	45	76	25	55	78	18	GV7RE80	48...80	LC1D80	
45	80	25	–	–	–	–	–	–	GV7RE100	60...100	LC1D95	
–	–	–	50	90	25	–	–	–	GV7RE100	60...100	LC1D115	
55	97	25	–	–	–	75	106	30	GV7RE150	90...150	LC1D115	
75	132	35	75	125	35	90	128	30	GV7RE150	90...150	LC1D150	
–	–	–	90	146	35	–	–	–	GV7RE150	90...150	LC1F185	
90	160	35	–	–	–	110	156	30	GV7RE220	132...220	LC1F185	
–	–	–	–	–	–	132	184	30	GV7RE220	132...220	LC1F265	
–	–	–	110	178	35	160	224	30	GV7RE220	132...220	LC1F265	
110	195	35	132	215	35	–	–	–	GV7RE220	132...220	LC1F225	

(1) The breaking performance of circuit breakers GV2 ME can be increased by adding a current limiter GV1 L3, see page 24509/5.

(2) For reversing operation, replace the prefix LC1 with LC2.

TeSys motor starters - open version

D.O.L. starters with circuit breaker
and overload protection built into
the circuit breaker

0.06 to 110 kW at 400/415 V: type 2 coordination										Circuit breaker Reference	Setting range of thermal trips A	Contactor Reference ⁽²⁾
Standard power ratings of 3-phase motor 50/60 Hz in category AC-3												
400/415 V			440 V			500 V						
P	I _e	I _q ⁽¹⁾	P	I _e	I _q ⁽¹⁾	P	I _e	I _q ⁽¹⁾				
kW	A	kA	kW	A	kA	kW	A	kA				
0.06	0.2	130	0.06	0.19	130	–	–	–	–	GV2P02 or GV2ME02	0.16...0.25	LC1D09
–	–	–	0.09	0.28	130	–	–	–	–	GV2P03 or GV2ME03	0.25...0.4	LC1D09
0.09	0.3	130	0.12	0.37	130	–	–	–	–	–	–	–
0.12	0.44	130	–	–	–	–	–	–	–	GV2P04 or GV2ME04	0.4...0.63	LC1D09
0.18	0.6	130	0.18	0.55	130	–	–	–	–	–	–	–
0.25	0.85	130	0.25	0.76	130	–	–	–	–	GV2P05 or GV2ME05	0.63...1	LC1D09
0.37	1.1	130	0.37	0.99	130	–	–	–	–	–	–	–
–	–	–	–	–	–	0.37	0.88	130	–	GV2P06 or GV2ME06	1...1.6	LC1D09
0.55	1.5	130	0.55	1.36	130	0.55	1.2	130	–	–	–	–
–	–	–	–	–	–	0.75	1.5	130	–	GV2P06 or GV2ME06	1...1.6	LC1D09
0.75	1.9	130	0.75	1.68	130	–	–	–	–	–	–	–
–	–	–	1.1	2.37	130	1.1	2.2	130	–	GV2P07 or GV2ME07	1.6...2.5	LC1D09
1.1	2.7	130	–	–	–	1.5	2.9	130	–	–	–	–
1.5	3.6	130	1.5	3.06	130	2.2	3.9	130	–	GV2P08 or GV2ME08	2.5...4	LC1D09
–	–	–	–	–	–	–	–	–	–	–	–	–
2.2	4.9	130	–	–	–	–	–	–	–	GV2P10 or GV2ME10	4...6.3	LC1D09
–	–	–	2.2	4.42	50	–	–	–	–	–	–	–
–	–	–	3	5.77	50	3	5.2	50	–	GV2ME10	4...6.3	LC1D09
–	–	–	2.2	4.42	130	–	–	–	–	–	–	–
–	–	–	3	5.77	130	3	5.2	130	–	GV2P10	4...6.3	LC1D09
3	6.5	130	–	–	–	–	–	–	–	–	–	–
4	8.5	130	–	–	–	–	–	–	–	GV2P14 or GV2ME14	6...10	LC1D09
–	–	–	4	7.9	15	4	6.8	10	–	–	–	–
–	–	–	–	–	–	5.5	9.2	10	–	GV2ME14	6...10	LC1D09
–	–	–	–	–	–	4	6.8	50	–	–	–	–
–	–	–	4	7.9	130	5.5	9.2	50	–	GV2P14	6...10	LC1D12
5.5	11.5	130	5.5	10.4	50 or 8	7.5	12.4	42 or 6	–	–	–	–
–	–	–	7.5	13.7	50 or 8	9	13.9	42 or 6	–	–	–	–
7.5	15.5	50 or 15	9	16.9	20 or 8	–	–	–	–	GV2P20 or GV2ME20	13...18	LC1D25
9	18.1	50 or 15	11	20.1	20 or 8	11	17.6	10 or 6	–	–	–	–
11	22	50 or 15	–	–	–	–	–	–	–	GV2P21 or GV2ME21	17...23	LC1D25
–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	15	23	10 or 6	–	GV2P22 or GV2ME22	20...25	LC1D25
–	–	–	–	–	–	–	–	–	–	–	–	–
15	29	50 or 10	15	26.5	20 or 6	18.5	28	10 or 4	–	GV2P32 or GV2ME32	25...40	LC1D32
18.5	35	50	–	–	–	–	–	–	–	–	–	–
–	–	–	18.5	32.8	50	22	33	10	–	GV3P40	30...40	LC1D50A
–	–	–	–	–	–	–	–	–	–	–	–	–
22	41	50	–	–	–	–	–	–	–	GV3P40	30...40	LC1D65A
–	–	–	22	39	50	30	44	10	–	GV3P50	37...50	LC1D50A
–	–	–	–	–	–	–	–	–	–	–	–	–
30	55	50	37	51.5	50	–	–	–	–	GV3P50	37...50	LC1D65A
–	–	–	–	–	–	37	53	10	–	GV3P65	48...65	LC1D65A
–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	22	39	65	–	–	–	–	GV3P65	48...65	LC1D80
–	–	–	–	–	–	30	44	50	–	GV7RS40	25...40	LC1D80
–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	37	53	50	–	GV7RS50	30...50	LC1D80
–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–
22	41	70	–	–	–	–	–	–	–	GV7RS80	48...80	LC1D80
30	55	70	30	51.5	65	–	–	–	–	–	–	–
37	66	70	37	64	65	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	45	76	65	–	–	–	–	GV7RS80	48...80	LC1D80
–	–	–	–	–	–	45	64	50	–	–	–	–
–	–	–	–	–	–	55	78	50	–	GV7RS80	48...80	LC1D115
–	–	–	–	–	–	–	–	–	–	–	–	–
45	80	70	–	–	–	–	–	–	–	–	–	–
–	–	–	55	90	65	–	–	–	–	GV7RS80	48...80	LC1D115
–	–	–	–	–	–	–	–	–	–	–	–	–
55	97	70	75	125	65	–	–	–	–	GV7RS100	60...100	LC1D115
75	132	70	90	146	65	90	128	50	–	GV7RS150	90...150	LC1D150
90	160	70	110	178	65	110	156	50	–	–	–	–
110	195	70	132	215	65	–	–	–	–	GV7RS220	132...220	LC1F185
–	–	–	–	–	–	132	184	50	–	–	–	–
–	–	–	–	–	–	160	224	50	–	GV7RS220	132...220	LC1F225
–	–	–	–	–	–	–	–	–	–	–	–	–

(1) The breaking performance of circuit breakers GV2 P can be increased by adding a current limiter GV1 L3, see page 24509/5.

(2) Combinations with circuit breaker GV2 ME are type 2 coordinated only at 400/415 V and 440 V.

TeSys motor starters - open version

D.O.L. starters with circuit breaker
and overload protection by separate
thermal overload relay

0.06 to 250 kW at 400/415 V: type 1 coordination														
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Circuit breaker			Contactor	Thermal overload relay	
400/415 V			440 V			500 V			Reference	Rating	I _{rm} ⁽¹⁾	Reference ⁽²⁾	Reference	Setting range
P	I _e	I _q	P	I _e	I _q	P	I _e	I _q		A	A			A
kW	A	kA	kW	A	kA	kW	A	kA						
0.06	0.2	50	0.06	0.19	50	–	–	–	GV2LE03	0.4	5	LC1K06	LR2K0302	0.16...0.23
–	–	–	0.09	0.28	50	–	–	–	GV2LE03	0.4	5	LC1K06	LR2K0303	0.23...0.36
0.09	0.3	50	0.12	0.37	50	–	–	–	GV2LE03	0.4	5	LC1K06	LR2K0304	0.36...0.54
0.12	0.44	50	–	–	–	–	–	–	GV2LE04	0.63	8	LC1K06	LR2K0304	0.36...0.54
0.18	0.6	50	0.18	0.55	50	–	–	–	GV2LE04	0.63	8	LC1K06	LR2K0305	0.54...0.8
–	–	–	0.25	0.76	50	–	–	–	GV2LE05	1	13	LC1K06	LR2K0305	0.54...0.8
0.25	0.85	50	–	–	–	–	–	–	GV2LE05	1	13	LC1K06	LR2K0306	0.8...1.2
0.37	1.1	50	0.37	1	50	0.37	0.88	50	GV2LE05	1	13	LC1K06	LR2K0306	0.8...1.2
0.55	1.5	50	0.55	1.36	50	0.55	1.2	50	GV2LE06	1.6	22.5	LC1K06	LR2K0307	1.2...1.8
–	–	–	–	–	–	0.75	1.5	50	GV2LE06	1.6	22.5	LC1K06	LR2K0307	1.2...1.8
–	–	–	0.75	1.68	50	–	–	–	GV2LE07	2.5	33.5	LC1K06	LR2K0307	1.2...1.8
0.75	1.9	50	–	–	–	–	–	–	GV2LE07	2.5	33.5	LC1K06	LR2K0308	1.8...2.6
1.1	2.7	50	1.1	2.37	50	1.1	2.2	50	GV2LE07	2.5	33.5	LC1K06	LR2K0308	1.8...2.6
1.5	3.6	50	1.5	3.06	50	1.5	2.9	50	GV2LE08	4	51	LC1K06	LR2K0310	2.6...3.7
–	–	–	–	–	–	2.2	3.9	50	GV2LE08	4	51	LC1K06	LR2K0312	3.7...5.5
2.2	4.9	50	2.2	4.4	50	3	5.2	50	GV2LE10	6.3	78	LC1K06	LR2K0312	3.7...5.5
–	–	–	3	5.77	50	–	–	–	GV2LE10	6.3	78	LC1K06	LR2K0314	5.5...8
–	–	–	4	7.9	15	–	–	–	GV2LE14	10	138	LC1K09	LR2K0314	5.5...8
3	6.5	50	–	–	–	4	6.8	10	GV2LE14	10	138	LC1K09	LR2K0314	5.5...8
4	8.5	50	–	–	–	–	–	–	GV2LE14	10	138	LC1K09	LR2K0316	8...11.5
5.5	11.5	15	5.5	10.4	8	7.5	12.4	6	GV2LE16	14	170	LC1K12	LR2K0321	10...14
–	–	–	7.5	13.7	8	9	13.9	6	GV2LE16	14	170	LC1D18	LRD21	12...18
7.5	15.5	15	9	16.9	8	–	–	–	GV2LE20	18	223	LC1D18	LRD21	12...18
9	18.1	15	–	–	–	11	17.6	4	GV2LE22	25	327	LC1D25	LRD22	16...24
11	22	15	11	20.1	6	15	23	4	GV2LE22	25	327	LC1D25	LRD22	16...24
15	29	10	15	26.5	6	18.5	28	4	GV2LE32	32	416	LC1D32	LRD32	23...32
18.5	35	50	18.5	32.5	50	22	33	10	GV3L40	40	560	LC1D40A	LRD340	30...40
22	41	50	22	39	50	30	44	10	GV3L50	50	700	LC1D50A	LRD350	37...50

(1) I_{rm}: setting current of the magnetic trip.

(2) For reversing operation, replace the prefix LC1 with LC2.

TeSys motor starters - open version

D.O.L. starters with circuit breaker
and overload protection by separate
thermal overload relay

0.06 to 250 kW at 400/415 V: type 1 coordination										Circuit breaker		Contactor	Thermal overload relay	
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Reference	Rating I _{rm} ⁽¹⁾		Reference ⁽²⁾	Reference	Setting range
400/415 V			440 V			500 V								
P	I _e	I _q	P	I _e	I _q	P	I _e	I _q		A	A			A
kW	A	kA	kW	A	kA	kW	A	kA						
30	55	50	37	51.5	50	37	53	10	GV3L65	65	910	LC1D65A	LRD365	48...65
-	-	-	37	64	50	37	53	10	GV3L65	65	910	LC1D65A	LRD365	48...65
-	-	-	-	-	-	45	64	50	GV3L65	65	910	LC1D80	LRD3361	48...65
37	66	70	45	76	65	55	78	25	NSX80HMA	80	1040	LC1D80	LRD3363	63...80
45	80	⁽³⁾	-	-	-	-	-	-	NSX100●MA ⁽³⁾	100	1300	LC1D95	LRD3365	80...104
-	-	-	-	-	-	50	90	⁽³⁾	NSX100●MA ⁽³⁾	100	1200	LC1D115	LRD4365	80...104
-	-	-	-	-	-	75	106	⁽³⁾	NSX160●MA ⁽³⁾	150	1500	LC1D115	LRD4367	95...120
55	97	⁽³⁾	-	-	-	-	-	-	NSX160●MA ⁽³⁾	150	1350	LC1D115	LRD4367	95...120
75	132	⁽³⁾	75	125	⁽³⁾	90	128	⁽³⁾	NSX160●MA ⁽³⁾	150	1800	LC1D150	LRD4369	110...140
-	-	-	90	146	⁽³⁾	-	-	-	NSX160●MA ⁽³⁾	150	1950	LC1F185	LR9F5371	132...220
90	160	⁽³⁾	-	-	-	110	156	⁽³⁾	NSX250●MA ⁽³⁾	220	2200	LC1F185	LR9F5371	132...220
110	195	⁽³⁾	-	-	-	-	-	-	NSX250●MA ⁽³⁾	220	2640	LC1F225	LR9F5371	132...220
-	-	-	110	178	⁽³⁾	-	-	-	NSX250●MA ⁽³⁾	220	2420	LC1F225	LR9F5371	132...220
-	-	-	-	-	-	132	184	⁽³⁾	NSX250●MA ⁽³⁾	220	2640	LC1F265	LR9F5371	132...220
-	-	-	132	215	⁽³⁾	-	-	-	NSX250●MA ⁽³⁾	220	2860	LC1F265	LR9F5371	132...220
132	230	⁽³⁾	-	-	-	-	-	-	NSX400● + Micrologic 1.3M ⁽³⁾	320	3200	LC1F265	LR9F7375	200...330
-	-	-	-	-	-	160	224	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	2860	LC1F265	LR9F7375	200...330
-	-	-	160	256	⁽³⁾	-	-	-	NSX400● + Micrologic 1.3M ⁽³⁾	320	3520	LC1F330	LR9F7375	200...330
160	280	⁽³⁾	200	321	⁽³⁾	-	-	-	NSX400● + Micrologic 1.3M ⁽³⁾	320	4160	LC1F330	LR9F7375	200...330
-	-	-	-	-	-	200	280	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	3840	LC1F330	LR9F7375	200...330
-	-	-	-	-	-	220	310	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	4160	LC1F400	LR9F7379	300...500
200	350	⁽³⁾	220	353	⁽³⁾	-	-	-	NSX630● + Micrologic 1.3M ⁽³⁾	500	5000	LC1F400	LR9F7379	300...500
-	-	-	250	401	⁽³⁾	-	-	-	NSX630● + Micrologic 1.3M ⁽³⁾	500	5550	LC1F400	LR9F7379	300...500
-	-	-	-	-	-	250	344	⁽³⁾	NSX630● + Micrologic 1.3M ⁽³⁾	500	5000	LC1F400	LR9F7379	300...500
220	388	⁽³⁾	-	-	-	-	-	-	NSX630● + Micrologic 1.3M ⁽³⁾	500	5500	LC1F400	LR9F7379	300...500
250	430	⁽³⁾	280	470	⁽³⁾	315	432	⁽³⁾	NSX630● + Micrologic 1.3M ⁽³⁾	500	6000	LC1F500	LR9F7379	300...500
-	-	-	-	-	-	355	488	⁽³⁾	NSX630● + Micrologic 1.3M ⁽³⁾	500	6500	LC1F500	LR9F7381	380...630

(1) I_{rm}: setting current of the magnetic trip.

(2) For reversing operation, replace the prefix LC1 with LC2.

(3) Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance I _q (kA)	NSX100●MA		NSX160●MA and NSX250●MA		NSX400● and NSX630●	
400/415 V	36	70	36	70	70	150
440 V	35	65	35	65	65	130
500 V	25	50	25	50	50	70
660/690 V	8	10	8	10	20	20
Code	F	H	F	H	H	L

TeSys motor starters - open version

D.O.L. starters with circuit breaker
and overload protection by separate
thermal overload relay

0.06 to 250 kW at 400/415 V: type 2 coordination														
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Circuit breaker			Contactor	Thermal overload relay	
400/415 V			440 V			500 V			Reference	Rating	I _{rm} ⁽¹⁾	Reference ⁽²⁾	Reference	Setting range
P	I _e	I _q	P	I _e	I _q	P	I _e	I _q		A	A			A
kW	A	kA	kW	A	kA	kW	A	kA						
0.06	0.2	130	0.06	0.19	130	–	–	–	GV2L03 or LE03	0.4	5	LC1D09	LRD02	0.16...0.25
0.09	0.3	130	0.09	0.28	130	–	–	–	GV2L03 or LE03	0.4	5	LC1D09	LRD03	0.25...0.40
–	–	–	0.12	0.37	130	–	–	–						
0.12	0.44	130	–	–	–	–	–	–	GV2L04 or LE04	0.63	8	LC1D09	LRD04	0.4...0.63
0.18	0.6	130	0.18	0.55	130	–	–	–						
0.25	0.85	130	0.25	0.76	130	–	–	–	GV2L05 or LE05	1	13	LC1D09	LRD05	0.63...1
0.37	1.1	130	0.37	0.99	130	–	–	–						
–	–	–	–	–	–	0.37	0.88	130	GV2L05 or LE05	1	13	LC1D09	LRD06	1...1.7
0.55	1.5	130	–	–	–	0.55	1.2	130	GV2L06 or LE06	1.6	22.5	LC1D09	LRD06	1...1.7
–	–	–	0.55	1.36	130	0.75	1.5	130						
0.75	1.9	130	0.75	1.68	130	1.1	2.2	130	GV2L07 or LE07	2.5	33.5	LC1D09	LRD07	1.6...2.5
1.1	2.7	130	1.1	2.37	130	1.5	2.9	130	GV2L08 or LE08	4	51	LC1D09	LRD08	2.5...4
1.5	3.6	130	–	–	–	2.2	3.9	130						
–	–	–	1.5	3.06	130	–	–	–	GV2L08 or LE08	4	51	LC1D09	LRD10	4...6
2.2	4.9	130	–	–	–	–	–	–	GV2L10 or LE10	6.3	78	LC1D09	LRD10	4...6
–	–	–	–	–	–	3	5.2	13						
–	–	–	2.2	4.42	50	–	–	–	GV2LE10	6.3	78	LC1D09	LRD10	4...6
–	–	–	3	5.77	50	3	5.2	50						
–	–	–	2.2	4.42	130	–	–	–	GV2L10	6.3	78	LC1D09	LRD10	4...6
–	–	–	3	5.77	130	3	5.2	130						
3	6.5	130	–	–	–	–	–	–	GV2L14 or LE14	10	10	LC1D09	LRD12	5.5...8
–	–	–	–	–	–	4	6.8	10	GV2LE14	10	138	LC1D12	LRD12	5.5...8
–	–	–	–	–	–	4	6.8	50	GV2L14	10	138	LC1D12	LRD12	5.5...8
4	8.5	130	–	–	–	–	–	–	GV2L14 or LE14	10	138	LC1D09	LRD14	7...10
–	–	–	4	7.9	15	–	–	–	GV2LE14	10	138	LC1D09	LRD14	7...10
–	–	–	4	7.9	130	–	–	–	GV2L14	10	138	LC1D09	LRD14	7...10
–	–	–	–	–	–	5.5	9.2	10	GV2LE14	10	138	LC1D09	LRD14	7...10
–	–	–	–	–	–	5.5	9.2	50	GV2L14	10	138	LC1D09	LRD14	7...10
5.5	11.5	130	5.5	10.4	50	7.5	12.4	42	GV2L16	14	170	LC1D25	LRD16	9...13
–	–	–	7.5	13.7	50	–	–	–	GV2L16	14	170	LC1D25	LRD21	12...18
7.5	15.5	50	9	16.9	20	9	13.9	10	GV2L20	18	223	LC1D25	LRD21	12...18
9	18.1	50	–	–	–	–	–	–	GV2L22	25	327	LC1D25	LRD22	16...24
11	22	50	11	20.1	20	–	–	–						
–	–	–	–	–	–	11	17.6	10	GV2L22	25	327	LC1D32	LRD22	16...24
–	–	–	–	–	–	15	23	10						
15	29	50	15	26.5	50	–	–	–	GV3L32	32	448	LC1D40A	LRD332	23...32
–	–	–	–	–	–	18.5	28	10	GV3L32	32	448	LC1D65A	LRD332	23...32

(1) I_{rm}: setting current of the magnetic trip.

(2) For reversing operation, replace the prefix LC1 with LC2.

TeSys motor starters - open version

D.O.L. starters with circuit breaker
and overload protection by separate
thermal overload relay

0.06 to 250 kW at 400/415 V: type 2 coordination														
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Circuit breaker			Contactor	Thermal overload relay	
400/415 V			440 V			500 V			Reference	Rating	I _{rm} ⁽¹⁾	Reference ⁽²⁾	Reference	Setting range
P	I _e	I _q	P	I _e	I _q	P	I _e	I _q		A	A			A
kW	A	kA	kW	A	kA	kW	A	kA						
18.5	35	50	–	–	–	–	–	–	GV3L40	40	560	LC1D50A	LRD340	30...40
–	–	–	18.5	32.5	50	–	–	–	GV3L40	40	560	LC1D65A	LRD340	30...40
22	41	50	–	–	–	–	–	–	GV3L50	50	700	LC1D50A	LRD350	37...50
–	–	–	22	39	50	30	44	10	GV3L50	50	700	LC1D65A	LRD350	37...50
30	55	50	37	51.5	50	–	–	–	GV3L65	65	910	LC1D65A	LRD365	48...65
–	–	–	37	64	50	37	53	10	GV3L65	65	910	LC1D80	LRD3359	48...65
37	66	70	45	76	65	–	–	–	NS80HMA	80	1000	LC1D80	LRD3363	63...80
–	–	–	–	–	–	55	78	⁽³⁾	NSX100●MA ⁽³⁾	100	1040	LC1D80	LRD3363	63...80
45	80	⁽³⁾	55	90	⁽³⁾	–	–	–	NSX100●MA ⁽³⁾	100	1300	LC1D115	LR9D5367	60...100
55	97	⁽³⁾	–	–	–	–	–	–	NSX160●MA ⁽³⁾	150	1500	LC1D115	LR9D5369	90...150
–	–	–	–	–	–	75	106	⁽³⁾	NSX160●MA ⁽³⁾	150	1950	LC1D115	LR9D5369	90...150
75	132	⁽³⁾	75	125	⁽³⁾	–	–	–	NSX160●MA ⁽³⁾	150	1950	LC1D150	LR9D5369	90...150
–	–	–	90	146	⁽³⁾	–	–	–	NSX160●MA ⁽³⁾	150	1950	LC1D150	LR9D5369	90...150
–	–	–	–	–	–	90	128	⁽³⁾	NSX160●MA ⁽³⁾	150	1200	LC1D150	LR9D5369	90...150
90	160	⁽³⁾	110	178	⁽³⁾	–	–	–	NSX250●MA ⁽³⁾	220	2420	LC1F185	LR9F5371	132...220
–	–	–	–	–	–	110	156	⁽³⁾	NSX250●MA ⁽³⁾	220	1540	LC1F185	LR9F5371	132...220
110	195	⁽³⁾	–	–	–	–	–	–	NSX250●MA ⁽³⁾	220	2860	LC1F225	LR9F5371	132...220
–	–	–	132	215	⁽³⁾	132	184	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	3500	LC1F265	LR9F5371	132...220
132	230	⁽³⁾	160	256	⁽³⁾	–	–	–	NSX400● + Micrologic 1.3M ⁽³⁾	320	3520	LC1F265	LR9F7375	200...330
–	–	–	–	–	–	160	224	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	2200	LC1F265	LR9F7375	200...330
160	280	⁽³⁾	–	–	–	–	–	–	NSX400● + Micrologic 1.3M ⁽³⁾	320	4000	LC1F330	LR9F7375	200...330
–	–	–	200	321	⁽³⁾	–	–	–	NSX400● + Micrologic 1.3M ⁽³⁾	320	4000	LC1F330	LR9F7379	300...500
–	–	–	–	–	–	200	280	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	3500	LC1F400	LR9F7375	200...330
–	–	–	–	–	–	220	310	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	3500	LC1F400	LR9F7379	300...500
–	–	–	220	353	⁽³⁾	–	–	–	NSX630● + Micrologic 1.3M ⁽³⁾	500	5500	LC1F400	LR9F7379	300...500
200	350	⁽³⁾	250	401	⁽³⁾	–	–	–	NSX630● + Micrologic 1.3M ⁽³⁾	500	4500	LC1F500	LR9F7379	300...500
–	–	–	–	–	–	250	344	⁽³⁾	NSX630● + Micrologic 1.3M ⁽³⁾	500	6250	LC1F500	LR9F7379	300...500
–	–	–	–	–	–	315	432	⁽³⁾	NSX630● + Micrologic 1.3M ⁽³⁾	500	6250	LC1F500	LR9F7379	300...500
220	388	⁽³⁾	–	–	–	–	–	–	NSX630● + Micrologic 1.3M ⁽³⁾	500	6250	LC1F500	LR9F7379	300...500
250	430	⁽³⁾	–	–	–	–	–	–	NSX630● + Micrologic 1.3M ⁽³⁾	500	5000	LC1F630	LR9F7381	380...630
–	–	–	–	–	–	355	488	⁽³⁾	NSX630● + Micrologic 1.3M ⁽³⁾	500	5000	LC1F630	LR9F7381	380...630

(1) I_{rm}: setting current of the magnetic trip.

(2) For reversing operation, replace the prefix LC1 with LC2.

(3) Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance I _q (kA)	NSX100●MA		NSX160●MA and NSX250●MA		NSX400● and NSX630●	
400/415 V	36	70	36	70	70	150
440 V	35	65	35	65	65	130
500 V	25	50	25	50	50	70
660/690 V	8	10	8	10	20	20
Code	F	H	F	H	H	L

1.5 to 315 kW at 400/415 V: type 1 coordination

Maximum operating rate: LC3 K and LC3 F: 12 starts/hour; LC3 D: 30 starts/hour.

Maximum starting time: LC3 K and LC3 D: 30 seconds; LC3 F: 20 seconds.

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3								Fuse carrier (basic block)	aM fuses		Star-delta contactors	Thermal overload relay	
400/415 V				440 V				Reference	Size	Rating	Reference	Reference	Setting range
P	I _e	I _{rD} ⁽¹⁾	I _q	P	I _e	I _{rD} ⁽¹⁾	I _q						
kW	A	A	kA	kW	A	A	kA			A		A	
1.5	3.5	2	50	1.5	3.06	2	50	LS1D32	10 x 38	4	LC3K06	LR2K0308	1.8...2.6
2.2	5	3	50	-	-	-	-	LS1D32	10 x 38	6	LC3K06	LR2K0310	2.6...3.7
-	-	-	-	2.2	4.42	3	50						
-	-	-	-	3	5.77	3	50	LS1D32	10 x 38	8	LC3K06	LR2K0310	2.6...3.7
3	6.5	4	50	-	-	-	-	LS1D32	10 x 38	8	LC3K06	LR2K0312	3.7...5.5
4	8.4	5	50	4	7.9	5	50	LS1D32	10 x 38	12	LC3K06	LR2K0312	3.7...5.5
5.5	11	6	50	5.5	10.4	6	50	LS1D32	10 x 38	16	LC3K06	LR2K0314	5.5...8
7.5	14.8	9	50	7.5	13.7	8	50	LS1D32	10 x 38	16	LC3K09	LR2K0316	8...11.5
9	18.1	10	100	9	16.9	10	50	LS1D32	10 x 38	20	LC3D12A	LRD16	9...13
11	21	12	100	11	20.1	12	100	GK1EK	14 x 51	25	LC3D12A	LRD16	9...13
15	28.5	16	100	15	26.5	15	100	GK1EK	14 x 51	32	LC3D18A	LRD21	12...18
18.5	35	20	100	18.5	32.8	19	100	GK1EK	14 x 51	40	LC3D18A	LRD22	16...24
-	-	-	-	22	39	23	100	GS●J	22 x 58	50	LC3D18A	LRD22	16...24
22	42	24	100	-	-	-	-	GS●J	22 x 58	50	LC3D32A	LRD32	23...32
-	-	-	-	30	51.5	30	100	GS●J	22 x 58	63	LC3D32A	LRD32	23...32
30	57	33	100	37	64	37	100	GS●J	22 x 58	80	LC3D40	LRD3355	30...40
37	69	40	100	-	-	-	-	GS●J	22 x 58	80	LC3D40	LRD3357	37...50
-	-	-	-	45	76	44	100	GS●J	22 x 58	80	LC3D50	LRD3357	37...50
45	81	47	100	-	-	-	-	GS●J	22 x 58	100	LC3D50	LRD3357	37...50
-	-	-	-	55	90	52	100	GS●K	22 x 58	100	LC3D50	LRD3359	48...65
55	100	58	100	-	-	-	-	GS●K	22 x 58	125	LC3D50	LRD3361	55...70
75	135	78	100	75	125	72	100	GS●L	T0	160	LC3D80	LRD3363	63...80
-	-	-	-	90	146	84	100	GS●L	T0	160	LC3D115	LRD4365	80...104
90	165	95	100	-	-	-	-	GS●N	T1	200	LC3D115	LRD4367	95...120
110	200	115	100	110	178	103	100	GS●N	T1	200	LC3D115	LRD4367	95...120
132	240	139	100	132	215	124	100	GS●QQ	T2	250	LC3D150	LRD4369	110...140
160	285	165	100	160	256	148	100	GS●QQ	T2	315	LC3F185	LR9F5371	132...220
-	-	-	-	200	321	185	100	GS●QQ	T2	400	LC3F225	LR9F5369	132...220
220	388	225	100	-	-	-	-	GS●QQ	T2	400	LC3F265	LR9F7375	200...330
-	-	-	-	250	401	233	100	GS2S	T3	500	LC3F265	LR9F7375	200...330
280	480	278	100	-	-	-	-	GS2S	T3	500	LC3F330	LR9F7375	200...330
-	-	-	-	315	505	293	100						
315	555	322	100	355	518	300	100	GS2S	T3	630	LC3F330	LR9F7375	200...330
-	-	-	-	375	575	334	100	GS2S	T3	630	LC3F400	LR9F7379	300...500

(1) I_{rD}: current in the motor windings in delta connection.

TeSys motor starters - open version

Star-delta starters with fuse protection (NF C or DIN fuses)

1.5 to 355 kW at 400/415 V: type 2 coordination

Maximum operating rate: LC1 D: 30 starts/hour; LC1 F: 12 starts/hour.

Maximum starting time: LC1 D: 30 seconds; LC1 F: 20 seconds.

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3						Switch-disconnector-fuse	aM fuses		Star-delta contactors	Thermal overload relay	
400/415 V			440 V			Reference	Size	Rating	Reference	Reference	Setting range
P	I _e	I _q	P	I _e	I _q						
kW	A	kA	kW	A	kA			A			A
1.5	3.5	50	1.5	3.06	50	GS1DD	10 x 38	4	3 x LC1D09	LRD08	2.5...4
2.2	5	50	2.2	4.42	50	GS1DD	10 x 38	6	3 x LC1D09	LRD10	4...6
3	6.5	50	3	5.77	50	GS1DD	10 x 38	8	3 x LC1D09	LRD12	5.5...8
4	8.4	50	4	7.9	50	GS1DD	10 x 38	10	3 x LC1D09	LRD14	7...10
5.5	11	50	5.5	10.4	50	GS1DD	10 x 38	16	3 x LC1D12	LRD16	9...13
7.5	14.8	50	7.5	13.7	50	GS1DD	10 x 38	16	3 x LC1D18	LRD21	12...18
9	18.1	100	9	16.9	100						
11	21	100	11	20.1	100	GS●F	14 x 51	25	3 x LC1D25	LRD22	16...24
15	28.5	100	15	26.5	100	GS●F	14 x 51	32	3 x LC1D32	LRD32	23...32
18.5	35	100	18.5	32.8	100	GS●F	14 x 51	40	3 x LC1D40A	LRD340	30...40
22	42	100	22	39	100	GS●J	22 x 58	50	3 x LC1D50A	LRD350	37...50
30	57	100	30	51.5	100	GS●J	22 x 58	80	3 x LC1D65A	LRD365	48...65
37	69	100	37	64	100	GS●J	22 x 58	80	3 x LC1D80	LRD3363	63...80
–	–	–	45	76	100	GS●J	22 x 58	80	3 x LC1D80	LRD3365	80...93
45	81	100	–	–	–	GS●J	22 x 58	100	3 x LC1D115	LR9D5367	60...100
–	–	–	55	90	100	GS●L	T0	125	3 x LC1D115	LR9D5369	90...150
55	100	100	–	–	–	GS●L	T0	125	3 x LC1D150	LR9D5369	90...150
–	–	–	75	125	100	GS●L	T0	160	3 x LC1D150	LR9D5369	90...150
75	135	100	–	–	–	GS●L	T0	160	3 x LC1F185	LR9D5369	90...150
90	165	100	90	146	100	GS●N	T1	200	3 x LC1F185	LR9F5371	132...220
110	200	100	110	178	100	GS●N	T1	250	3 x LC1F225	LR9F5371	132...220
132	240	100	132	215	100	GS●QQ	T2	315	3 x LC1F265	LR9F7375	200...330
160	285	100	160	256	100	GS●QQ	T2	400	3 x LC1F330	LR9F7375	200...330
–	–	–	200	321	100	GS●QQ	T2	400	3 x LC1F330	LR9F7379	300...500
200	352	100	220	353	100						
220	388	100	250	401	100	GS2S	T3	500	3 x LC1F400	LR9F7379	300...500
250	437	100	–	–	–	GS2S	T3	500	3 x LC1F500	LR9F7379	300...500
315	555	100	315	505	100	GS2S	T3	630	3 x LC1F630	LR9F7381	380...630
–	–	–	355	549	100						
–	–	–	400	611	100	GS2V	T4	800	3 x LC1F630	LR9F7381	380...630
355	605	100	–	–	–	GS2V	T4	800	3 x LC1F780	LR9F7381	380...630

TeSys motor starters - open version

Star-delta starters with fuse protection (BS fuses)

1.5 to 375 kW at 415 V: type 2 coordination

Maximum operating rate: LC1 D: 30 starts/hour; LC1 F: 12 starts/hour.

Maximum starting time: LC1 D: 30 seconds; LC1 F: 20 seconds.

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3						Switch-disconnector-fuse	BS fuses		Contactor	Thermal overload relay	
415 V			440 V				Reference	Size		Rating	Reference
P	le	Iq	P	le	Iq			A			A
kW	A	kA	kW	A	kA						
1.5	3.5	50	1.5	3.06	50	GS1DDB	A1	NIT 16	3 x LC1D09	LRD08	2.5...4
2.2	5	50	2.2	4.42	50	GS1DDB	A1	NIT 16	3 x LC1D09	LRD10	4...6
3	6.5	50	3	5.77	50	GS1DDB	A1	NIT 20	3 x LC1D09	LRD12	5.5...8
4	8.4	50	4	7.9	50	GS1DDB	A1	NIT 20	3 x LC1D09	LRD14	7...10
5.5	11	50	5.5	10.4	50	GS1DDB	A1	NIT 20M25	3 x LC1D12	LRD16	9...13
7.5	14.8	50	7.5	13.7	50	GS1DDB	A1	NIT 20M32	3 x LC1D18	LRD21	12...18
9	18.1	50	9	16.9	50	GS2GB	A2	TIA 32M35	3 x LC1D18	LRD21	12...18
11	21	50	11	20.1	50	GS2GB	A2	TIA 32M50	3 x LC1D25	LRD22	16...24
15	28.5	50	15	26.5	50	GS2GB	A2	TIA 32M63	3 x LC1D32	LRD32	23...32
22	42	50	22	39	50	GS2GB	A3	TIS 63M80	3 x LC1D40	LRD3355	30...40
-	-	-	30	51.5	50	GS2GB	A3	TIS 63M100	3 x LC1D50	LRD3359	48...65
30	57	50	-	-	-	GS2GB	A3	TIS 63M100	3 x LC1D65	LRD3359	48...65
45	81	50	45	76	50	GS2LLB	A4	TCP 100M125	3 x LC1D80	LRD3363	63...80
55	100	80	55	90	80	GS2LLB	A4	TCP 100M160	3 x LC1D115	LR9D5369	90...150
80	138	80	80	132	80	GS2LB	B2	TF 200M250	3 x LC1D150	LR9D5369	90...150
100	182	80	100	162	80	GS2MMB	B2	TF 200M250	3 x LC1F185	LR9F5371	132...220
110	196	80	110	178	80	GS2MMB	B2	TF 200M315	3 x LC1F225	LR9F5371	132...220
140	250	80	140	226	80	GS2NB	B3	TFK 315M355	3 x LC1F265	LR9F7375	200...330
160	285	80	160	256	80	GS2QQB	B3	TFK 315M355	3 x LC1F330	LR9F7375	200...330
220	388	80	220	353	80	GS2QQB	B4	TMF 400M450	3 x LC1F400	LR9F7379	300...500
257	450	80	257	412	80	GS2SB	C2	TTM 500	3 x LC1F500	LR9F7379	300...500
270	460	80	270	433	80						
375	610	80	375	577	80	GS2SB	C2	TTM 630	3 x LC1F630	LR9F7381	380...630

TeSys motor starters - open version

Star-delta starters with circuit breaker
and overload protection built into the
circuit breaker

1.5 to 110 kW at 400/415 V: type 1 coordination

Maximum operating rate: LC3 K: 12 starts/hour; LC3 D: 30 starts/hour.

Maximum starting time: 30 seconds.

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3								Circuit breaker		Star-delta contactors
400/415 V				440 V				Reference	Setting range of thermal trips	Reference
P	I _e	I _{rD} ⁽¹⁾	I _q ⁽²⁾	P	I _e	I _{rD} ⁽¹⁾	I _q ⁽²⁾		A	
kW	A	A	kA	kW	A	A	kA			
1.5	3.6	2	50	1.5	3.06	1.8	50	GV2ME08	2.5...4	LC3K06
2.2	4.9	2.9	50	2.2	4.42	2.6	50	GV2ME10	4...6.3	LC3K06
–	–	–	–	3	5.77	3.3	50			
3	6.5	3.8	50	–	–	–	–	GV2ME14	6...10	LC3K06
4	8.5	4.9	50	4	7.9	4.6	15			
5.5	11.5	6.4	15	5.5	10.4	6	8	GV2ME16	9...14	LC3K06
7.5	15.5	8.6	15	7.5	13.7	7.9	8	GV2ME20	13...18	LC3K09
–	–	–	–	9	16.9	9.8	8	GV2ME20	13...18	LC3D12A
9	18.1	10	15	11	20.1	12	6	GV2ME21	17...23	LC3D12A
11	22	12	15	–	–	–	–	GV2ME22	20...25	LC3D12A
15	29	17	10	15	26.5	15	6	GV2ME32	24...32	LC3D18A
18.5	35	20	50	18.5	32.8	19	50	GV3P40	30...40	LC3D18A
–	–	–	–	22	39	23	50	GV3P50	37...50	LC3D32A
22	41	24	50	30	51.5	30	50	GV3P50	37...50	LC3D32A
30	55	33	50	30	51.5	30	50	GV3P65	48...65	LC3D32A
37	66	40	50	37	64	37	50	GV3P65	48...65	3 x LC1D40A ⁽³⁾
37	66	40	25	37	64	37	25	GV7RE80	48...80	3 x LC1D40A ⁽³⁾
–	–	–	–	45	76	44	10	GV3ME80	56...80	2 x LC1D50A +1 x LC1D40A ⁽³⁾
–	–	–	–	45	76	44	25	GV7RE80	48...80	2 x LC1D50A +1 x LC1D40A ⁽³⁾
45	80	47	25	–	–	–	–	GV7RE100	60...100	2 x LC1D50A +1 x LC1D40A ⁽³⁾
55	97	58	25	55	90	52	25			
55	97	58	25	55	90	52	25	GV7RE100	60...100	2 x LC1D65A +1 x LC1D40A ⁽³⁾
75	132	78	35	75	125	72	35	GV7RE150	90...150	LC3D80
–	–	–	–	90	146	84	35	GV7RE150	90...150	LC3D115
90	160	95	35	110	178	103	35	GV7RE220	132...220	LC3D115
110	195	115	35							
–	–	–	–	132	215	124	35	GV7RE220	132...220	LC3D150

(1) I_{rD}: current in the motor windings in delta connection.

(2) The breaking performance of circuit breakers **GV2 ME** can be increased by adding a current limiter **GV1 L3**, see page B6/23.

(3) For mounting 3 contactors **LC1 D●●A**, star-delta starter kit **LAD 9SD3** must be ordered separately, see page B8/23.

TeSys motor starters - open version

Star-delta starters with circuit breaker and overload protection built into the circuit breaker

1.5 to 110 kW at 400/415 V: type 2 coordination

Maximum operating rate: LC1 D: 30 starts/hour; LC1 F: 12 starts/hour.

Maximum starting time: LC1 D: 30 seconds; LC1 F: 20 seconds.

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3						Circuit breaker		Star-delta contactors
400/415 V			440 V			Reference	Setting range of thermal trips	Reference
P	I _e	I _q	P	I _e	I _q ⁽¹⁾		A	
kW	A	kA	kW	A	kA			
1.5	3.6	130	1.5	3.06	130	GV2P08	2.5...4	3 x LC1D09 ⁽²⁾
2.2	4.9	130	2.2	4.42	130	GV2P10	4...6.3	3 x LC1D18 ⁽³⁾
-	-	-	3	5.77	130	GV2P10	4...6.3	3 x LC1D18 ⁽³⁾
3	6.5	130	-	-	-	GV2P14	6...10	3 x LC1D18 ⁽³⁾
4	8.5	130	4	7.9	130	GV2P14	6...10	3 x LC1D18 ⁽³⁾
5.5	11.5	130	5.5	10.4	50	GV2P16	9...14	3 x LC1D25 ⁽³⁾
-	-	-	7.5	13.7	50	GV2P16	9...14	3 x LC1D25 ⁽³⁾
7.5	15.5	50	9	16.9	20	GV2P20	13...18	3 x LC1D25 ⁽³⁾
9	18.1	50	11	20.1	20	GV2P21	17...23	3 x LC1D25 ⁽³⁾
11	22	50	-	-	-	GV2P22	20...25	3 x LC1D25 ⁽³⁾
15	29	50	15	26.5	50	GV3P32	23...32	3 x LC1D40A ⁽⁴⁾
18.5	35	50	-	-	-	GV3P40	30...40	2 x LC1D50A +1 x LC1D40A ⁽³⁾
-	-	-	18.5	32.8	50	GV3P40	30...40	2 x LC1D65A +1 x LC1D40A ⁽⁴⁾
22	41	50	-	-	-	GV3P50	37...50	2 x LC1D50A +1 x LC1D40A ⁽³⁾
-	-	-	22	39	50	GV3P50	37...50	2 x LC1D65A +1 x LC1D40A ⁽⁴⁾
30	55	50	30	51.5	50	GV3P65	48...65	2 x LC1D65A +1 x LC1D40A ⁽⁴⁾
37	66	70	37	64	65	GV7RS80	48...80	3 x LC1D80 ⁽⁵⁾
-	-	-	45	76	65	GV7RS80	48...80	3 x LC1D80 ⁽⁵⁾
45	80	70	-	-	-	GV7RS100	60...100	3 x LC1D115 ⁽⁶⁾
55	97	70	55	90	65	GV7RS100	60...100	3 x LC1D115 ⁽⁶⁾
75	132	70	75	125	65	GV7RS150	90...150	3 x LC1D150 ⁽⁶⁾
-	-	-	90	146	65	GV7RS150	90...150	3 x LC1D150 ⁽⁶⁾
90	160	70	110	178	65	GV7RS220	132...220	3 x LC1F185 ⁽⁷⁾
110	195	70	132	215	65	GV7RS220	132...220	3 x LC1F225 ⁽⁷⁾

(1) The breaking performance of circuit breakers GV2 P can be increased by adding a current limiter GV1 L3, see page B6/54.

(2) For mounting 3 contactors LC1 D09, star-delta starter kit LAD 91217 must be ordered separately, see page B8/23.

(3) For mounting 3 contactors LC1 D18 or LC1 D25, star-delta starter kit LAD 93217 must be ordered separately, see page B8/23.

(4) For mounting 3 contactors LC1 D●●A, star-delta starter kit LAD 9SD3 must be ordered separately, see page B8/23.

(5) For mounting 3 contactors LC1 D80, star-delta starter kit LA9 D8017 must be ordered separately, see page B8/23.

(6) For mounting 3 contactors LC1 D115 or LC1 D150, see A2/15.

(7) For mounting 3 contactors LC1 F185 or LC1 F225, see pages A2/17 and A2/19.

TeSys motor starters - open version

Star-delta starters with circuit breaker
and overload protection by separate
thermal overload relay

1.5 to 315 kW at 400/415 V: type 1 coordination

Maximum operating rate: LC3 K and LC3 F: 12 starts/hour; LC3 D: 30 starts/hour.

Maximum starting time: LC3 K and LC3 D: 30 seconds; LC3 F: 20 seconds.

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3								Circuit breaker			Star-delta contactors	Thermal overload relay	
400/415 V				440 V				Reference	Rating	I _{rm} ⁽²⁾	Reference	Reference	Setting range
P	I _e	I _{rD} ⁽¹⁾	I _q	P	I _e	I _{rD} ⁽¹⁾	I _q		A	A		A	
kW	A	A	kA	kW	A	A	kA						
1.5	3.6	2	50	1.5	3.06	1.8	50	LC3D32A	4	51	LC3K06	LR2K0308	1.8...2.6
2.2	4.9	3	50	2.2	4.42	3	50						
3	6.5	4	50	3	5.77	3	50	GV2LE10	6.3	78	LC3K06	LR2K0310	2.6...3.7
								GV2LE14	10	138	LC3K06	LR2K0312	3.7...5.5
				4	7.9	5	50	GV2LE10	6.3	78	LC3K06	LR2K0312	3.7...5.5
4	8.5	5	50					GV2LE14	10	138	LC3K06	LR2K0312	3.7...5.5
				5.5	10.4	6	15	GV2LE14	10	138	LC3K06	LR2K0314	5.5...8
5.5	11.5	6	15					GV2LE16	14	170	LC3K06	LR2K0314	5.5...8
				7.5	13.7	8	8	GV2LE16	14	170	LC3K09	LR2K0316	8...11.5
7.5	15.5	9	15					GV2LE20	18	223	LC3K09	LR2K0316	8...11.5
				9	16.9	1	8	GV2LE16	14	170	LC3D12A	LRD16	9...13
9	18.1	10	15					GV2LE22	25	327	LC3K12	LR2K0316	8...11.5
				11	20.1	12	8	GV2LE20	18	223	LC3K12	LR2K0321	10...14
								GV2LE22	25	327	LC3K12	LR2K0321	10...14
				15	26.5	15	6	GV2LE22	25	327	LC3D18A	LRD21	12...18
15	29	16	10					GV2LE32	32	384	LC3D18A	LRD21	12...18
18.5	35	20	50	18.5	32.8	19	50	GV3L40	40	560	LC3D18A	LRD22	16...24
22	41	24	50	22	39	23	50	GV3L50	50	700	LC3D32A	LRD32	23...32
				30	51.5	30	50	GV3L65	65	910	LC3D32A	LRD32	23...32
30	55	33	50					GV3L65	65	910	LC3D32A	LRD35	30...38
				37	64	37	50	GV3L65	65	910	3 x LC1D40A ⁽⁴⁾	LRD340	30...40
				45	76	44	65	NS80HMA	80	640	2 x LC1D50A + 1 x LC1D40A ⁽⁴⁾	LRD350	37...50
				55	90	52	65	NS80HMA	80	800	2 x LC1D65A + 1 x LC1D40A ⁽⁴⁾	LRD365	48...65
37	66	40	70					NS80HMA	80	640	3 x LC1D40A ⁽⁴⁾	LRD350	37...50
				75	125	72	⁽³⁾	NSX160●MA ⁽³⁾	150	1200	LC3D80	LRD3363	63...80
45	80	47	⁽³⁾					NSX100●MA ⁽³⁾	100	800	2 x LC1D50A + 1 x LC1D40A ⁽⁴⁾	LRD350	37...50
								NSX100●MA ⁽³⁾	100	1200	2 x LC1D65A + 1 x LC1D40A ⁽⁴⁾	LRD365	48...65
75	132	78	⁽³⁾					NSX160●MA ⁽³⁾	150	1200	LC3D80	LRD3363	63...80
				90	146	85	⁽³⁾	NSX160●MA ⁽³⁾	150	1200	LC3D115	LRD4365	80...104
90	160	96	⁽³⁾	110	178	103	⁽³⁾	NSX250●MA ⁽³⁾	220	1760	LC3D115	LRD4365	80...104
				132	215	125	⁽³⁾	NSX250●MA ⁽³⁾	220	1760	LC3D150	LRD4369	110...140
110	195	116	⁽³⁾					NSX250●MA ⁽³⁾	220	1760	LC3D115	LRD4367	95...120
				160	256	148	⁽³⁾	NSX400●+ Micrologic 1.3M ⁽³⁾	320	2240	LC3D150	LR9D5369	90...150
				200	321	186	⁽³⁾	NSX630●+ Micrologic 1.3M ⁽³⁾	500	3150	LC3F225	LR9F5371	132...220
132	230	139	⁽³⁾					NSX400●+ Micrologic 1.3M ⁽³⁾	320	2240	LC3D150	LRD4369	110...140
160	280	165	⁽³⁾					NSX400●+ Micrologic 1.3M ⁽³⁾	320	2560	LC3F185	LR9F5371	132...220
200	350	204	⁽³⁾	220	353	204	⁽³⁾	NSX630●+ Micrologic 1.3M ⁽³⁾	500	3150	LC3F225	LR9F5371	132...220
220	388	225	⁽³⁾	250	401	233	⁽³⁾	NSX630●+ Micrologic 1.3M ⁽³⁾	500	3500	LC3F265	LR9F7375	200...330
280	480	278	⁽³⁾					NSX630●+ Micrologic 1.3M ⁽³⁾	500	4000	LC3F330	LR9F7375	200...330
				315	505	295	⁽³⁾	NSX800●+ Micrologic 5.0 - LR off	800	4000	LC3F330	LR9F7375	200...330
315	540	322	⁽³⁾	355	518	300	⁽³⁾	NSX800●+ Micrologic 5.0 - LR off	800	4500	LC3F330	LR9F7375	200...330
				375	575	334	⁽³⁾	NSX800●+ Micrologic 5.0 - LR off	800	5000	LC3F400	LR9F7379	300...500

(1) I_{rD}: current in the motor windings in delta connection.

(2) I_{rm}: setting current of the magnetic trip.

(3) Products marketed under the Merlin Gerin brand. Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance I _q (kA)	NSX100●MA		NSX160●MA, NSX250●MA		NSX400●, NSX630●		NS800●	
400/415 V	36	70	36	70	70	150	70	150
440 V	35	65	35	65	65	130	65	130
Code	F	H	F	H	H	L	H	L

(4) For mounting 3 contactors LC1 D●●A, star-delta starter kit LAD 9SD3 must be ordered separately, see page B8/23.

1.5 to 250 kW at 400/415 V: type 2 coordination

Maximum operating rate: LC3 D: 30 starts/hour; LC3 F: 12 starts/hour.

Maximum starting time: LC3 D: 30 seconds; LC3 F: 20 seconds.

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3						Circuit breaker			Star-delta contactors	Thermal overload relay	
400/415 V			440 V			Reference	Rating	I _{rm} ⁽¹⁾	Reference	Reference	Setting range
P kW	I _e A	I _q kA	P kW	I _e A	I _q kA		A	A		A	A
1.5	3.6	130	1.5	3.06	130	GV2L08	4	51	3 x LC1D09	LRD08	2.5...4
2.2	4.9	130	2.2	4.42	130	GV2L10	6.3	78	3 x LC1D09	LRD10	4...6
3	6.5	130	3	5.77	130						
–	–	–	4	7.9	20	GV2L14	10	138	3 x LC1D18	LRD14	7...10
4	8.5	130	–	–	–	GV2L14	10	138	3 x LC1D18	LRD16	9...13
5.5	11.5	50	5.5	10.4	20	GV2L16	14	170	3 x LC1D25	LRD16	9...13
7.5	15.5	50	7.5	13.7	20	GV2L20	18	223	3 x LC1D25	LRD21	12...18
–	–	–	9	16.9	20	GV2L22	25	327	3 x LC1D25	LRD21	12...18
9	18.1	50	–	–	–	GV2L22	25	327	3 x LC1D25	LRD22	16...24
11	22	50	11	20.1	20						
15	29	50	15	26.5	50	GV3L32	32	448	3 x LC1D40A ⁽²⁾	LRD332	23...32
18.5	35	50	–	–	–	GV3L40	40	560	2 x LC1D50A +1 x LC1D40A ⁽²⁾	LRD340	30...40
–	–	–	18.5	32.8	50	GV3L40	40	560	2 x LC1D65A +1 x LC1D40A ⁽²⁾	LRD340	30...40
22	41	50	–	–	–	GV3L50	50	700	2 x LC1D50A +1 x LC1D40A ⁽²⁾	LRD350	37...50
–	–	–	22	39	50	GV3L50	50	700	2 x LC1D65A +1 x LC1D40A ⁽²⁾	LRD350	37...50
30	55	50	30	51.5	50	GV3L65	65	910	2 x LC1D65A +1 x LC1D40A ⁽²⁾	LRD365	48...65
–	–	–	37	64	50	GV3L65	65	910	3 x LC1D80	LRD3359	48...65
37	66	70	45	76	65	NS80HMA	80	640	3 x LC1D80	LRD3363	63...80
45	80	⁽³⁾	55	90	⁽³⁾	NSX100●MA ⁽³⁾	100	800	3 x LC1D115	LR9D5367	60...100
55	97	⁽³⁾	–	–	–	NSX160●MA ⁽³⁾	150	1200	3 x LC1D115	LR9D5369	90...150
–	–	–	75	125	⁽³⁾	NSX160●MA ⁽³⁾	150	1200	3 x LC1D150	LR9D5369	90...150
75	132	⁽³⁾	90	146	⁽³⁾	NSX160●MA ⁽³⁾	150	1200	3 x LC1D150	LR9D5369	90...150
90	160	⁽³⁾	110	178	⁽³⁾	NSX250●MA ⁽³⁾	220	1760	3 x LC1F185	LR9F5371	132...220
110	195	⁽³⁾	–	–	–	NSX250●MA ⁽³⁾	220	1760	3 x LC1F225	LR9F5371	132...220
–	–	–	132	215	⁽³⁾	NSX250●MA ⁽³⁾	220	1760	3 x LC1F225	LR9F7375	200...330
132	230	⁽³⁾	160	256	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	2240	3 x LC1F265	LR9F7375	200...330
160	280	⁽³⁾	–	–	–	NSX400● + Micrologic 1.3M ⁽³⁾	320	2560	3 x LC1F330	LR9F7375	200...330
–	–	–	200	321	⁽³⁾	NSX400● + Micrologic 1.3M ⁽³⁾	320	2880	3 x LC1F330	LR9F7379	300...500
200	350	⁽³⁾	220	353	⁽³⁾	NSX630● + Micrologic 1.3M ⁽³⁾	500	3150	3 x LC1F400	LR9F7379	300...500
220	388	⁽³⁾	250	401	⁽³⁾	NSX630● + Micrologic 1.3M ⁽³⁾	500	3500	3 x LC1F400	LR9F7379	300...500
250	430	⁽³⁾	–	–	–	NSX630● + Micrologic 1.3M ⁽³⁾	500	4000	3 x LC1F500	LR9F7379	300...500

⁽¹⁾ I_{rm}: setting current of the magnetic trip.

⁽²⁾ For mounting 3 contactors LC1 D●●A, star-delta starter kit LAD 9SD3 must be ordered separately, see page B8/23.

⁽³⁾ Products marketed under the Merlin Gerin brand. Reference to be completed by replacing the ● with the breaking performance code:

Breaking performance I _q (kA)	NSX100●MA		NSX160●MA, NSX250●MA		NSX400●, NSX630●	
400/415 V	36	70	36	70	70	150
440 V	35	65	35	65	65	130
Code	F	H	F	H	H	L

Contactor utilisation categories conforming to IEC 60947-1

The standard utilisation categories define the current values which the contactor must be able to make or break.

These values depend on:

- the type of load being switched: squirrel cage or slip ring motor, resistors,
- the conditions under which making or breaking takes place: motor stalled, starting or running, reversing, plugging.

a.c. applications

Category AC-1	<p>This category applies to all types of a.c. load with a power factor equal to or greater than 0.95 ($\cos \varphi \geq 0.95$).</p> <p>Application examples: heating, distribution.</p>
Category AC-2	<p>This category applies to starting, plugging and inching of slip ring motors.</p> <ul style="list-style-type: none"> ■ On closing, the contactor makes the starting current, which is about 2.5 times the rated current of the motor. ■ On opening, it must break the starting current, at a voltage less than or equal to the mains supply voltage.
Category AC-3	<p>This category applies to squirrel cage motors with breaking during normal running of the motor.</p> <ul style="list-style-type: none"> ■ On closing, the contactor makes the starting current, which is about 5 to 7 times the rated current of the motor. ■ On opening, it breaks the rated current drawn by the motor. <p>Application examples: all standard squirrel cage motors: lifts, escalators, conveyor belts, bucket elevators, compressors, pumps, mixers, air conditioning units, etc... .</p>
Category AC-4	<p>This category covers applications with plugging and inching of squirrel cage and slip ring motors. The contactor closes at a current peak which may be as high as 5 or 7 times the rated motor current. On opening it breaks this same current at a voltage which is higher, the lower the motor speed. This voltage can be the same as the mains voltage. Breaking is severe.</p> <p>Application examples: printing machines, wire drawing machines, cranes and hoists, metallurgy industry.</p>

d.c. applications

Category DC-1	<p>This category applies to all types of d.c. load with a time constant (L/R) of less than or equal to 1 ms.</p>
Category DC-3	<p>This category applies to starting, counter-current braking and inching of shunt motors. Time constant ≤ 2 ms.</p> <ul style="list-style-type: none"> ■ On closing, the contactor makes the starting current, which is about 2.5 times the rated motor current. ■ On opening, the contactor must be able to break 2.5 times the starting current at a voltage which is less than or equal to the mains voltage. The slower the motor speed, and therefore the lower its back e.m.f., the higher this voltage. Breaking is difficult.
Category DC-5	<p>This category applies to starting, counter-current braking and inching of series wound motors. Time constant ≤ 7.5 ms.</p> <p>On closing, the contactor makes a starting current peak which may be as high as 2.5 times the rated motor current. On opening, the contactor breaks this same current at a voltage which is higher, the lower the motor speed. This voltage can be the same as the mains voltage. Breaking is severe.</p>

Utilisation categories for auxiliary contacts & control relays conforming to IEC 60947-1

a.c. applications

Category AC-14⁽¹⁾	<p>This category applies to the switching of electromagnetic loads whose power drawn with the electromagnet closed is less than 72 VA.</p> <p>Application example: switching the operating coil of contactors and relays.</p>
Category AC-15⁽¹⁾	<p>This category applies to the switching of electromagnetic loads whose power drawn with the electromagnet closed is more than 72 VA.</p> <p>Application example: switching the operating coil of contactors.</p>

d.c. applications

Category DC-13⁽²⁾	<p>This category applies to the switching of electromagnetic loads for which the time taken to reach 95 % of the steady state current ($T = 0.95$) is equal to 6 times the power P drawn by the load (with $P \leq 50$ W).</p> <p>Application example: switching the operating coil of contactors without economy resistor.</p>
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⁽¹⁾ Replaces category AC-11.

⁽²⁾ Replaces category DC-11.

Definitions

Altitude	<p>The rarefied atmosphere at high altitude reduces the dielectric strength of the air and hence the rated operational voltage of the contactor. It also reduces the cooling effect of the air and hence the rated operational current of the contactor (unless the temperature drops at the same time).</p> <p>No derating is necessary up to 3000 m.</p> <p>Derating factors to be applied above this altitude for main pole operational voltage and current (a.c. supply) are as follows.</p> <table border="1"> <thead> <tr> <th>Altitude</th> <th>3500 m</th> <th>4000 m</th> <th>4500 m</th> <th>5000 m</th> </tr> </thead> <tbody> <tr> <td>Rated operational voltage</td> <td>0.90</td> <td>0.80</td> <td>0.70</td> <td>0.60</td> </tr> <tr> <td>Rated operational current</td> <td>0.92</td> <td>0.90</td> <td>0.88</td> <td>0.86</td> </tr> </tbody> </table>	Altitude	3500 m	4000 m	4500 m	5000 m	Rated operational voltage	0.90	0.80	0.70	0.60	Rated operational current	0.92	0.90	0.88	0.86
Altitude	3500 m	4000 m	4500 m	5000 m												
Rated operational voltage	0.90	0.80	0.70	0.60												
Rated operational current	0.92	0.90	0.88	0.86												
Ambient air temperature	<p>The temperature of the air surrounding the device, measured near to the device.</p> <p>The operating characteristics are given:</p> <ul style="list-style-type: none"> - with no restriction for temperatures between -5 and +55 °C, - with restrictions, if necessary, for temperatures between -50 and +70 °C. 															
Rated operational current (Ie)	This is defined taking into account the rated operational voltage, operating rate and duty, utilisation category and ambient temperature around the device.															
Rated conventional thermal current (Ith) ⁽¹⁾	The current which a closed contactor can sustain for a minimum of 8 hours without its temperature rise exceeding the limits given in the standards.															
Permissible short time rating	The current which a closed contactor can sustain for a short time after a period of no load, without dangerous overheating.															
Rated operational voltage (Ue)	This is the voltage value which, in conjunction with the rated operational current, determines the use of the contactor or starter, and on which the corresponding tests and the utilisation category are based. For 3-phase circuits it is expressed as the voltage between phases. Apart from exceptional cases such as rotor short-circuiting, the rated operational voltage Ue is less than or equal to the rated insulation voltage Ui.															
Rated control circuit voltage (Uc)	The rated value of the control circuit voltage, on which the operating characteristics are based. For a.c. applications, the values are given for a near sinusoidal wave form (less than 5 % total harmonic distortion).															
Rated insulation voltage (Ui)	This is the voltage value used to define the insulation characteristics of a device and referred to in dielectric tests determining leakage paths and creepage distances. As the specifications are not identical for all standards, the rated value given for each of them is not necessarily the same.															
Rated impulse withstand voltage (Uimp)	The peak value of a voltage surge which the device is able to withstand without breaking down.															
Rated operational power (expressed in kW)	The rated power of the standard motor which can be switched by the contactor, at the stated operational voltage.															
Rated breaking capacity ⁽²⁾	This is the current value which the contactor can break in accordance with the breaking conditions specified in the IEC standard.															
Rated making capacity ⁽²⁾	This is the current value which the contactor can make in accordance with the making conditions specified in the IEC standard.															
On-load factor (m)	<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> $m = \frac{t}{T}$ </div> <div> <p>This is the ratio between the time the current flows (t) and the duration of the cycle (T).</p> <p>Cycle duration: duration of current flow + time at zero current.</p> </div> </div>															
Pole impedance	<p>The impedance of one pole is the sum of the impedance of all the circuit components between the input terminal and the output terminal.</p> <p>The impedance comprises a resistive component (R) and an inductive component ($X = L\omega$).</p> <p>The total impedance therefore depends on the frequency and is normally given for 50 Hz.</p> <p>This average value is given for the pole at its rated operational current.</p>															
Electrical durability	This is the average number of on-load operating cycles which the main pole contacts can perform without maintenance. The electrical durability depends on the utilisation category, the rated operational current and the rated operational voltage.															
Mechanical durability	This is the average number of no-load operating cycles (i.e. with zero current flow through the main poles) which the contactor can perform without mechanical failure.															

(1) Conventional thermal current, in free air, conforming to IEC standards.
(2) For a.c. applications, the breaking and making capacities are expressed by the rms value of the symmetrical component of the short-circuit current. Taking into account the maximum asymmetry which may exist in the circuit, the contacts therefore have to withstand a peak asymmetrical current which may be twice the rms symmetrical component.
Note: these definitions are extracted from standard IEC 60947-1.

Operational current and power conforming to IEC ($\theta \leq 60\text{ }^\circ\text{C}$)

Contactor size			LC1/ LP1 K06	LC1/ LP1 K09	LC1 K12	LC1 K16	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38	LC1 D40A
Maximum operational current in AC-3	$\leq 440\text{ V}$	A	6	9	12	16	9	12	18	25	32	38	40
Rated operational power P (standard motor power ratings)	220/240 V	kW	1.5	2.2	3	3	2.2	3	4	5.5	7.5	9	11
	380/400 V	kW	2.2	4	5.5	7.5	4	5.5	7.5	11	15	18.5	18.5
	415 V	kW	2.2	4	5.5	7.5	4	5.5	9	11	15	18.5	22
	440 V	kW	3	4	5.5	7.5	4	5.5	9	11	15	18.5	22
	500 V	kW	3	4	4	5.5	5.5	7.5	10	15	18.5	18.5	22
	660/690 V	kW	3	4	4	4	5.5	7.5	10	15	18.5	18.5	30
	1000 V	kW	–	–	–	–	–	–	–	–	–	–	–

Maximum operating rate in operating cycles/hour⁽¹⁾

On-load factor	Operational power	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38	LC1 D40A				
$\leq 85\%$	P	–	–	–	–	1200	1200	1200	1000	1000	1000	
	0.5 P	–	–	–	–	3000	3000	2500	2500	2500	2500	
$\leq 25\%$	P	–	–	–	–	1800	1800	1800	1800	1200	1200	1200

Operational current and power conforming to UL, CSA ($\theta \leq 60\text{ }^\circ\text{C}$)

Contactor size			LC1/ LP1 K06	LC1/ LP1 K09	LC1/ LP1 K12	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38	LC1 D40A
Maximum operational current in AC-3	$\leq 440\text{ V}$	A	6	9	12	9	12	18	25	32	–	40
Rated operational power P (standard motor power ratings 60 Hz)	200/208 V	HP	1.5	2	3	2	3	5	7.5	10	–	10
	230/240 V	HP	1.5	3	3	2	3	5	7.5	10	–	10
	460/480 V	HP	3	5	7.5	5	7.5	10	15	20	–	30
	575/600 V	HP	3	5	10	7.5	10	15	20	25	–	30

(1) Depending on the operational power and the on-load factor ($\theta \leq 60\text{ }^\circ\text{C}$).

TeSys contactors

For utilisation category AC-3

Coordination and standards

LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
50	65	80	95	115	150	185	225	265	330	400	500	630	780	800	750	1000	1500	1800
15	18,5	22	25	30	40	55	63	75	100	110	147	200	220	250	220	280	425	500
22	30	37	45	55	75	90	110	132	160	200	250	335	400	450	400	500	750	900
25	37	45	45	59	80	100	110	140	180	220	280	375	425	450	425	530	800	900
30	37	45	45	59	80	100	110	140	200	250	295	400	425	450	450	560	800	900
30	37	55	55	75	90	110	129	160	200	257	355	400	450	450	500	600	750	900
33	37	45	45	80	100	110	129	160	220	280	335	450	475	475	560	670	750	900
-	-	45	45	65	75	100	100	147	160	185	335	450	450	450	530	530	670	750

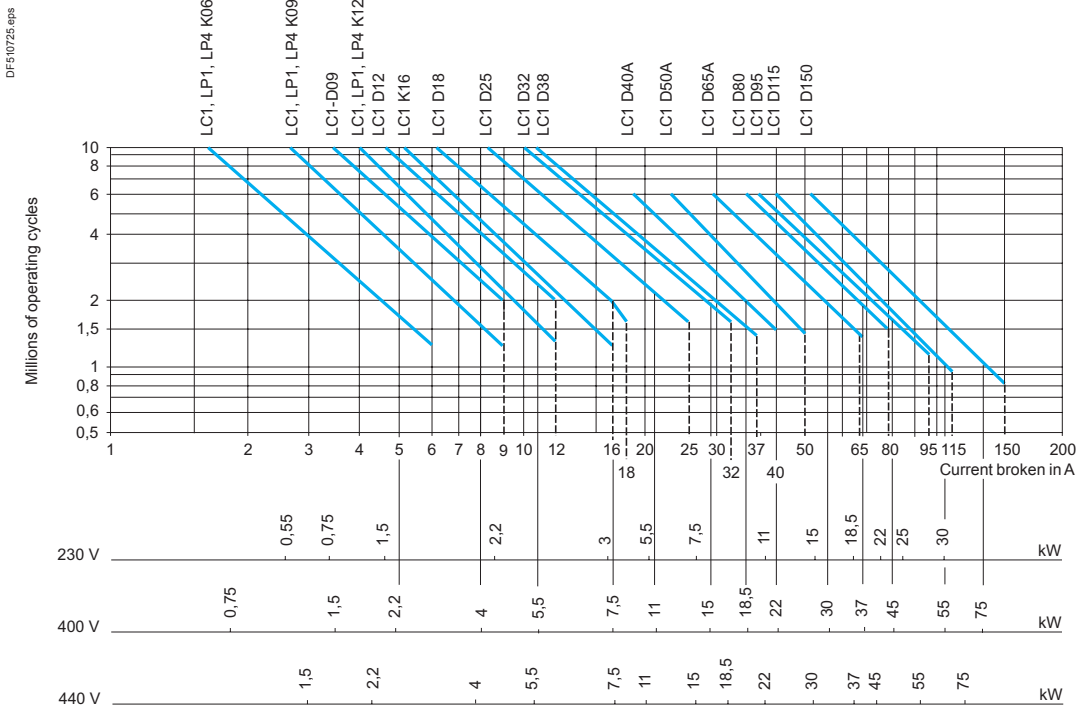
LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
1000	1000	750	750	750	750	750	750	750	750	500	500	500	500	500	120	120	120	120
2500	2500	2000	2000	2000	1200	2000	2000	2000	2000	1200	1200	1200	1200	600	120	120	120	120
1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	600	600	120	120	120	120

LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800
50	65	80	95	115	150	185	225	265	330	400	500	630	780	800
15	20	30	30	30	40	50	60	60	75	100	150	250	-	350
15	20	30	30	40	50	60	75	75	100	125	200	300	450	400
40	40	60	60	75	100	125	150	150	200	250	400	600	900	900
40	50	60	60	100	125	150	150	200	250	300	500	800	-	900

Coordination and standards

Selection according to required electrical durability, in category AC-3 ($U_e \leq 440\text{ V}$)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.
The current broken (I_c) in category AC-3 is equal to the rated operational current (I_e) of the motor.



Operational power in kW-50 Hz.

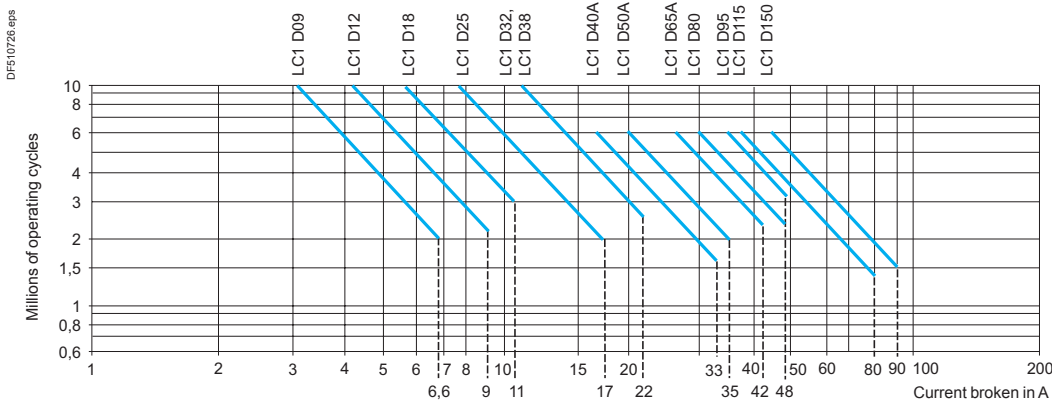
Example:

Asynchronous motor with $P = 5.5\text{ kW}$ - $U_e = 400\text{ V}$ - $I_e = 11\text{ A}$ - $I_c = I_e = 11\text{ A}$
or asynchronous motor with $P = 5.5\text{ kW}$ - $U_e = 415\text{ V}$ - $I_e = 11\text{ A}$ - $I_c = I_e = 11\text{ A}$
3 million operating cycles required.

The above selection curves show the contactor rating needed: LC1 D18.

Selection according to required electrical durability, in category AC-3 ($U_e = 660/690\text{ V}$)⁽¹⁾

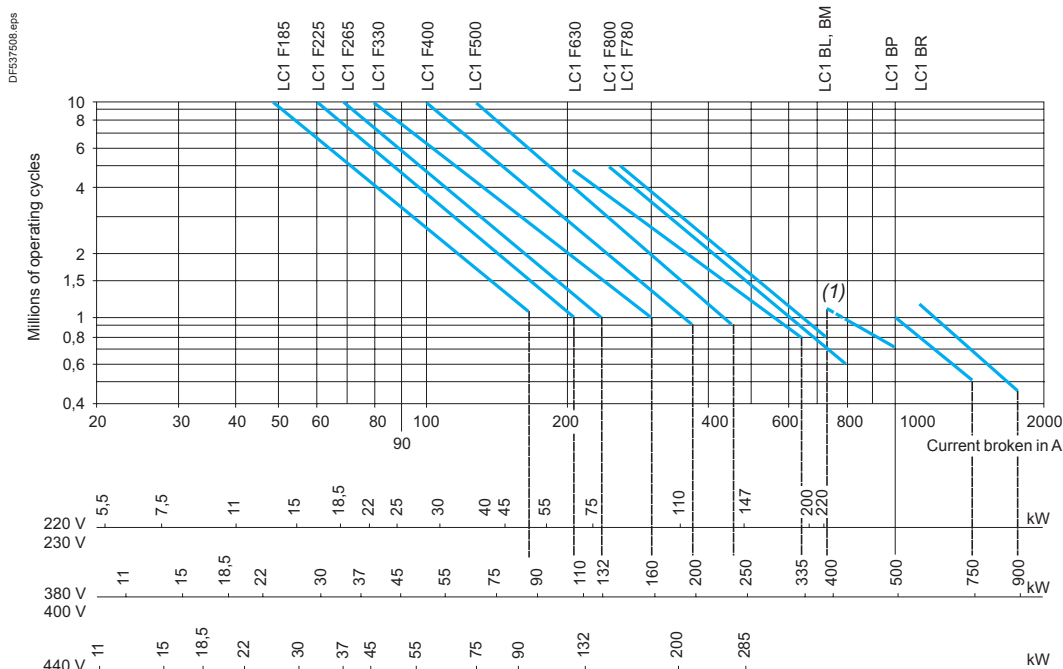
Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.
The current broken (I_c) in category AC-3 is equal to the rated operational current (I_e) of the motor.



⁽¹⁾ For $U_e = 1000\text{ V}$, use the 660/690 V curves, but do not exceed the operational current at the operational power indicated for 1000 V.

Selection according to required electrical durability, in category AC-3 ($U_e \leq 440$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.
The current broken (I_c) in category AC-3 is equal to the rated operational current (I_e) of the motor.



Operational power in kW-50 Hz.

Example:

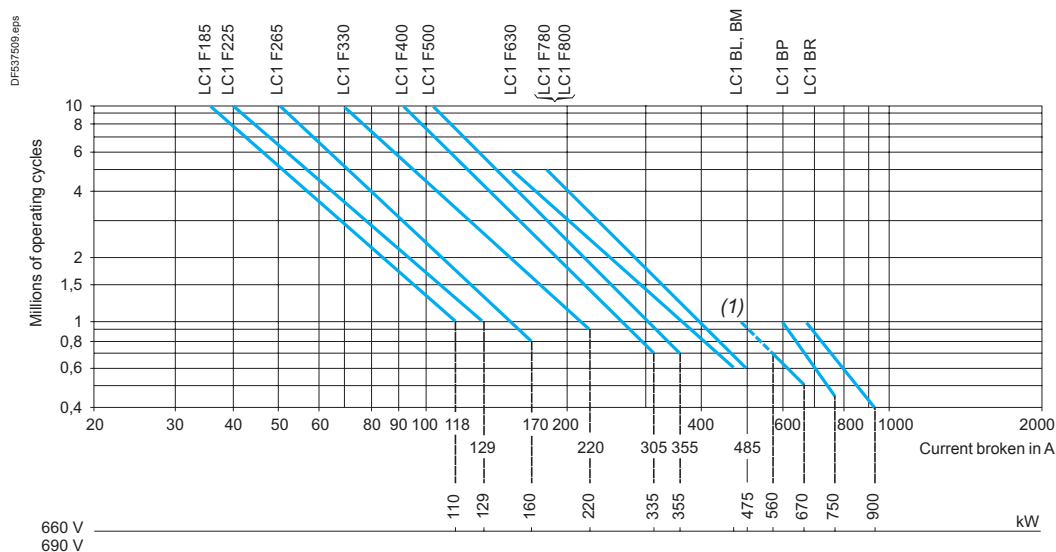
Asynchronous motor with $P = 132$ kW - $U_e = 380$ V - $I_e = 245$ A - $I_c = I_e = 245$ A
or asynchronous motor with $P = 132$ kW - $U_e = 415$ V - $I_e = 240$ A - $I_c = I_e = 240$ A
1.5 million operating cycles required.

The above selection curves show the contactor rating needed: LC1 F330.

(1) The dotted lines are only applicable to LC1 BL contactors.

Selection according to required electrical durability, in category AC-3 ($U_e = 660/690$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.
The current broken (I_c) in category AC-3 is equal to the rated operational current (I_e) of the motor.



Example:

Asynchronous motor with $P = 132$ kW - $U_e = 660$ V - $I_e = 140$ A - $I_c = I_e = 140$ A
1.5 million operating cycles required.

The above selection curves show the contactor rating needed: LC1 F330.

(1) The dotted lines are only applicable to LC1 BL contactors.

Maximum operational current (open-mounted device)

Contactor size		LC1/LP1 K09	LC1/LP1 K12	LC1 D09	LC1 DT20	LC1 D12 DT25	LC1 D18 DT32	LC1 D25 DT40	LC1 D32	LC1 D38	LC1 D40A DT60A	LC1 D50A	
Maximum operating rate in operating cycles/hour		600	600	600	600	600	600	600	600	600	600	600	
Connection conforming to IEC 60947-1	Cable c.s.a. mm ²	4	4	4	4	4	6	6	10	10	35	35	
	Bar c.s.a. mm	-	-	-	-	-	-	-	-	-	-	-	
Operational current in AC-1 in A, according to the ambient temperature conforming to IEC 60947-1	≤ 40 °C	A	20	20	25	20	25	32	40	50	50	60	80
	≤ 60 °C	A	20	20	25	20	25	32	40	50	50	60	80
	≤ 70 °C	A (at UC) ⁽¹⁾	(1)	(1)	17	(1)	17	22	28	35	35	42	56
Maximum operational power ≤ 60 °C	220/230 V	kW	8	8	9	8	9	11	14	18	18	21	29
	240 V	kW	8	8	9	8	9	12	15	19	19	23	31
	380/400 V	kW	14	14	15	14	15	20	25	31	31	37	50
	415 V	kW	14	14	17	14	17	21	27	34	34	41	54
	440 V	kW	15	15	18	15	18	23	29	36	36	43	58
	500 V	kW	17	17	20	17	20	23	33	41	41	49	65
	660/690 V	kW	22	22	27	22	27	34	43	54	54	65	80
	1000 V	kW	-	-	-	-	-	-	-	-	-	-	-

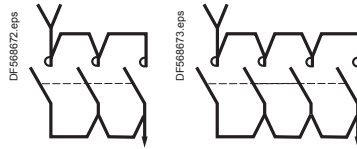
(1) Please consult your Regional Sales Office.

(2) With set of right connectors LA9F2100.

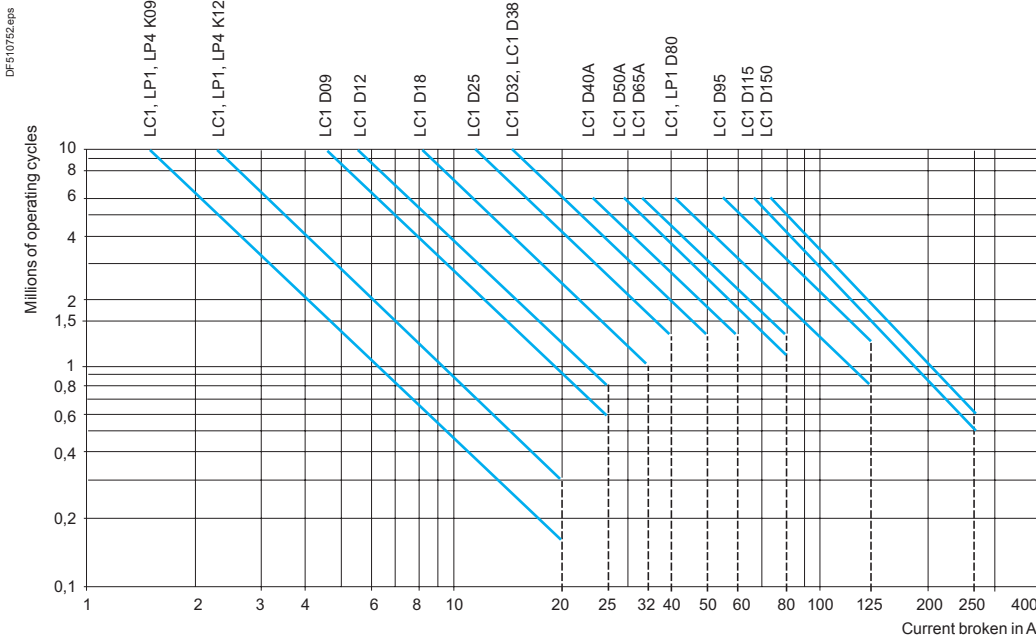
Increase in operational current by parallel connection of poles

Apply the following coefficients to the currents or power values given above; these coefficients take into account an often unbalanced current distribution between the poles:

- 2 poles in parallel: K = 1.6
- 3 poles in parallel: K = 2.25
- 4 poles in parallel: K = 2.8



Selection according to required electrical durability, in category AC-1 (Ue ≤ 690 V)



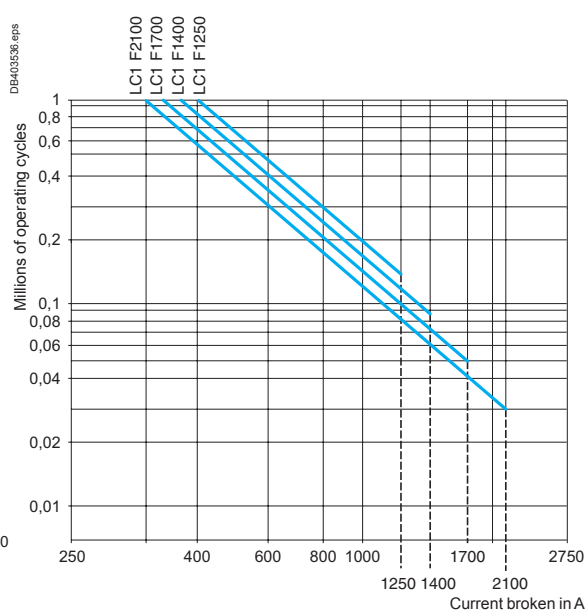
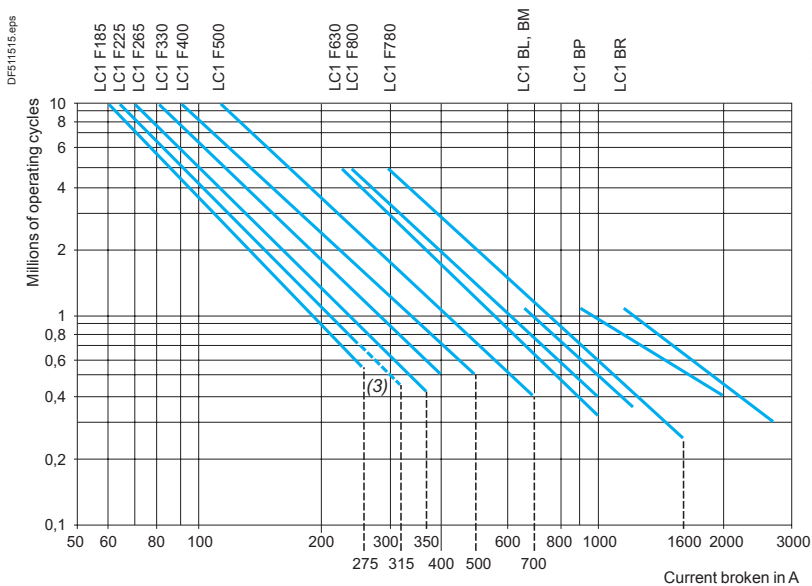
Control of resistive circuits (cos φ ≥ 0.95).

The current broken (Ic) in category AC-1 is equal to the current (Ie) normally drawn by the load.

Example:

- Ue = 220 V - Ie = 50 A @ ≤ 40 °C - Ic = Ie = 50 A
- 2 million operating cycles required
- the above selection curves show the contactor rating needed: either LC1 or LP1 D50.

LC1 D65A DT80A	LC1 LP1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100	LC1 BL	LC1 BM	LC1 BP	LC1 BR
600	600	600	600	600	600	600	600	600	600	600	600	600	600	300	200	200	200	120	120	120	120
35	50	50	120	120	150	185	185	240	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	3	4	2	2	2	2
									30 x 5	40 x 5	60 x 5	100 x 5	60 x 5	100 x 5	100 x 5	100 x 5	100 x 5	50 x 5	80 x 5	100 x 5	100 x 10
80	125	125	250	250	275	315	350	400	500	700	1000	1600	1000	1260	1400	1700	2100 (2)	800	1250	2000	2750
80	125	125	200	200	275	280	300	360	430	580	850	1350	850	1060	1190	1450	1750	700	1100	1750	2400
56	80	80	160	160	180	200	250	290	340	500	700	1100	700	-	-	-	-	600	900	1500	2000
29	45	45	80	80	90	100	120	145	170	240	350	550	350	420	474	570	700	300	425	700	1000
31	49	49	83	83	100	110	125	160	180	255	370	570	370	440	490	600	780	330	450	800	1100
50	78	78	135	135	165	175	210	250	300	430	600	950	600	730	820	1000	1200	500	800	1200	1600
54	85	85	140	140	170	185	220	260	310	445	630	1000	630	760	850	1050	1300	525	825	1250	1700
58	90	90	150	150	180	200	230	290	330	470	670	1050	670	810	910	1100	1350	550	850	1400	2000
65	102	102	170	170	200	220	270	320	380	660	750	1200	750	920	1000	1250	1550	600	900	1500	2100
80	135	135	235	235	280	300	370	400	530	740	1000	1650	1000	1260	1400	1700	2100	800	1100	1900	2700
-	120	120	345	345	410	450	540	640	760	950	1500	2400	1500	1840	2100	2500	3100	1100	1700	3000	4200



Example:

- $U_e = 220\text{ V}$ - $I_e = 500\text{ A}$ - $\theta \leq 40\text{ }^\circ\text{C}$ - $I_c = I_e = 500\text{ A}$
- 2 million operating cycles required
- the above selection curves show the contactor rating needed: LC1 F780.

(3) The dotted lines are only applicable to LC1 F225.

Maximum breaking current

Category AC-2: slip ring motors - breaking the starting current.

Category AC-4: squirrel cage motors - breaking the starting current.

Contactor size			LC1/ LP1 K06	LC1/ LP1 K09	LC1/ LP1 K12	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38	LC1 D40A
In category AC-4 (I _e max)	U _e ≤ 440 V I _e max broken = 6 × I motor	A	36	54	54	54	72	108	150	192	192	240
	440 V < U _e ≤ 690 V I _e max broken = 6 × I motor	A	26	40	40	40	50	70	90	105	105	150

Depending on the maximum operating rate ⁽¹⁾ and the on-load factor, θ ≤ 60 °C ⁽²⁾

From 150 and 15 % to 300 and 10 %	A	20	30	30	30	40	45	75	80	80	110
From 150 and 20 % to 600 and 10 %	A	18	27	27	27	36	40	67	70	70	96
From 150 and 30 % to 1200 and 10 %	A	16	24	24	24	30	35	56	60	60	80
From 150 and 55 % to 2400 and 10 %	A	13	19	19	19	24	30	45	50	50	62
From 150 and 85 % to 3600 and 10 %	A	10	16	16	16	21	25	40	45	45	53

(1) Do not exceed the maximum number of operating cycles.

(2) For temperatures higher than 60 °C, use a maximum operating rate value equal to 80 % of the actual value when selecting from the tables.

Counter current braking (plugging)

The current varies from the maximum plug-braking current to the rated motor current.

The making current must be compatible with the rated making and breaking capacities of the contactor.

As breaking normally takes place at a current value at or near the locked rotor current, the contactor can be selected using the criteria for categories AC-2 and AC-4.

Permissible AC-4 power rating for 200 000 operating cycles

Operational voltage		LC●/ LP● K06	LC●/ LP● K09	LC● LP● K12	LC● D09	LC● D12	LC● D18	LC● D25	LC● D32	LC● D38	LC● D40A
220/230 V	kW	0.75	1.1	1.1	1.5	1.5	2.2	3	4	4	4
380/400 V	kW	1.5	2.2	2.2	2.2	3.7	4	5.5	7.5	7.5	9
415 V	kW	1.5	2.2	2.2	2.2	3	3.7	5.5	7.5	7.5	9
440 V	kW	1.5	2.2	2.2	2.2	3	3.7	5.5	7.5	7.5	11
500 V	kW	2.2	3	3	3	4	5.5	7.5	9	9	11
660/690 V	kW	3	4	4	4	5.5	7.5	10	11	11	15

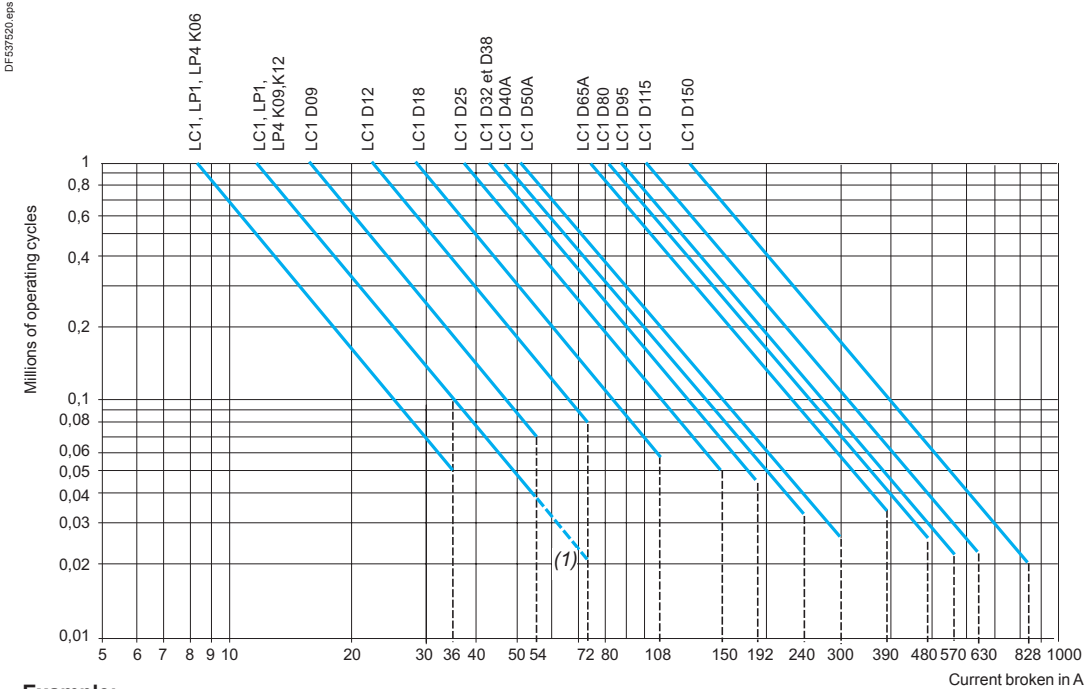
LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F26	LC1 F330	LC1 F40	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
300	390	480	570	630	830	1020	1230	1470	1800	2220	2760	3360	4260	3690	4320	5000	7500	9000
170	210	250	250	540	640	708	810	1020	1410	1830	2130	2760	2910	2910	4000	4800	5400	6600
140	160	200	200	280	310	380	420	560	670	780	1100	1400	1600	1600	2250	3000	4500	5400
120	148	170	170	250	280	350	400	500	600	700	950	1250	1400	1400	2000	2400	3750	5000
100	132	145	145	215	240	300	330	400	500	600	750	950	1100	1100	1500	2000	3000	3600
80	110	120	120	150	170	240	270	320	390	450	600	720	820	820	1000	1500	2000	2500
70	90	100	100	125	145	170	190	230	290	350	500	660	710	710	750	1000	1500	1800

Coordination
and
standards

LC● D50A	LC● D65A	LC● D80	LC● D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
5.5	7.5	7.5	9	9	11	18.5	22	28	33	40	45	55	63	63	90	110	150	200
11	11	15	15	18.5	22	33	40	51	59	75	80	100	110	110	160	160	220	250
11	11	15	15	18.5	22	37	45	55	63	80	90	100	110	110	160	160	250	280
11	15	15	15	18.5	22	37	45	59	63	80	100	110	132	132	160	200	250	315
15	15	22	22	30	37	45	55	63	75	90	110	132	150	150	180	200	250	355
15	18.5	25	25	30	45	63	75	90	110	129	140	160	185	185	200	250	315	450

Selection according to required electrical durability, in categories AC-2 or AC-4 ($U_e \leq 440\text{ V}$)

Control of 3-phase asynchronous squirrel cage motors (AC-4) or slip ring motors (AC-2) with breaking whilst motor stalled.
The current broken (I_c) in AC-2 is equal to $2.5 \times I_e$.
The current broken (I_c) in AC-4 is equal to $6 \times I_e$ (I_e = rated operational current of the motor).



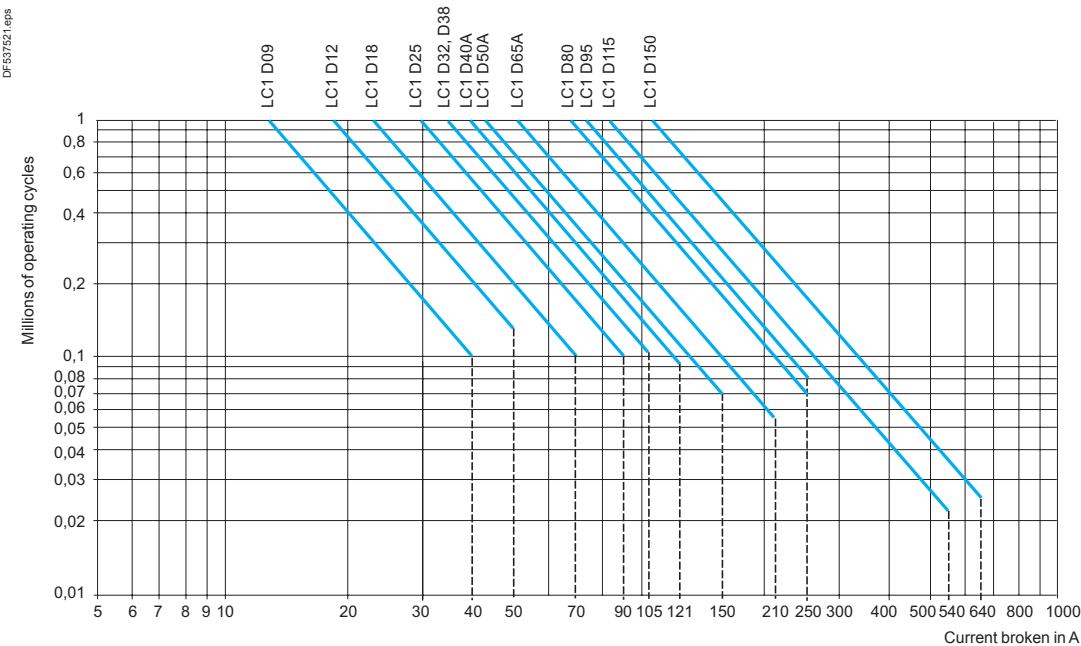
Example:

- asynchronous motor with $P = 5.5\text{ kW}$ - $U_e = 400\text{ V}$ - $I_e = 11\text{ A}$. $I_c = 6 \times I_e = 66\text{ A}$
- or asynchronous motor with $P = 5.5\text{ kW}$ - $U_e = 415\text{ V}$ - $I_e = 11\text{ A}$. $I_c = 6 \times I_e = 66\text{ A}$
- 200 000 operating cycles required
- the above selection curves show the contactor rating needed: LC1 D25.

(1) The dotted lines are only applicable to LC1, LP1 K12 contactors.

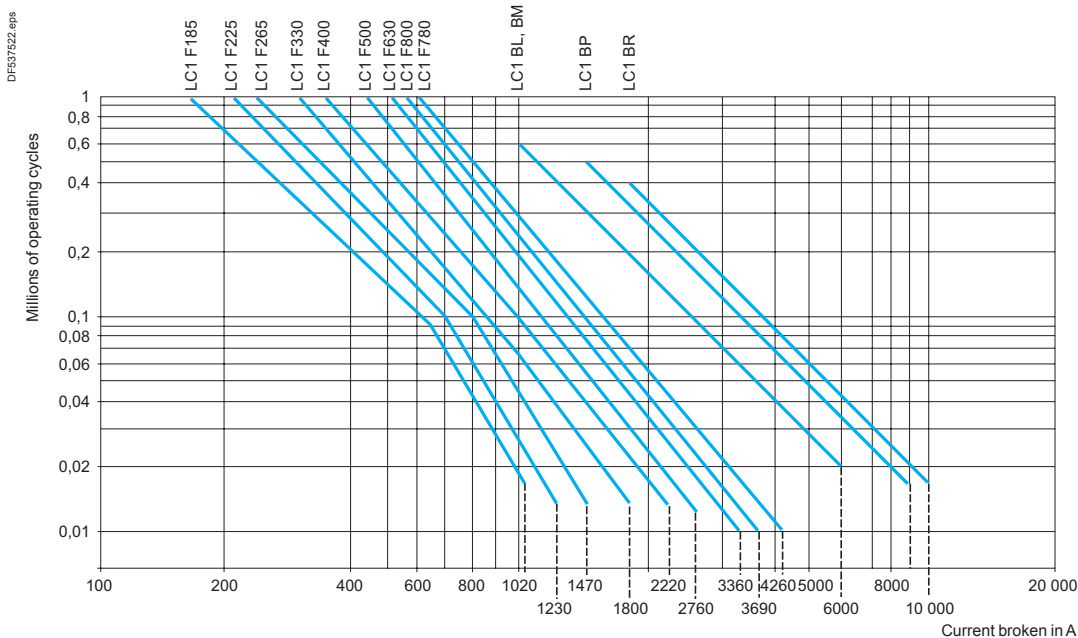
Selection according to required electrical durability, use in category AC-4 ($440\text{ V} < U_e \leq 690\text{ V}$)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst motor stalled.
The current broken (I_c) in AC-2 is equal to $2.5 \times I_e$.
The current broken (I_c) in AC-4 is equal to $6 \times I_e$ (I_e = rated operational current of the motor).



Selection according to required electrical durability, in categories AC-2 or AC-4 ($U_e \leq 440\text{ V}$)

Control of 3-phase asynchronous squirrel cage motors (AC-4) or slip ring motors (AC-2) with breaking whilst motor stalled.
The current broken (I_c) in AC-4 is equal to $6 \times I_e$.
(I_e = rated operational current of the motor).

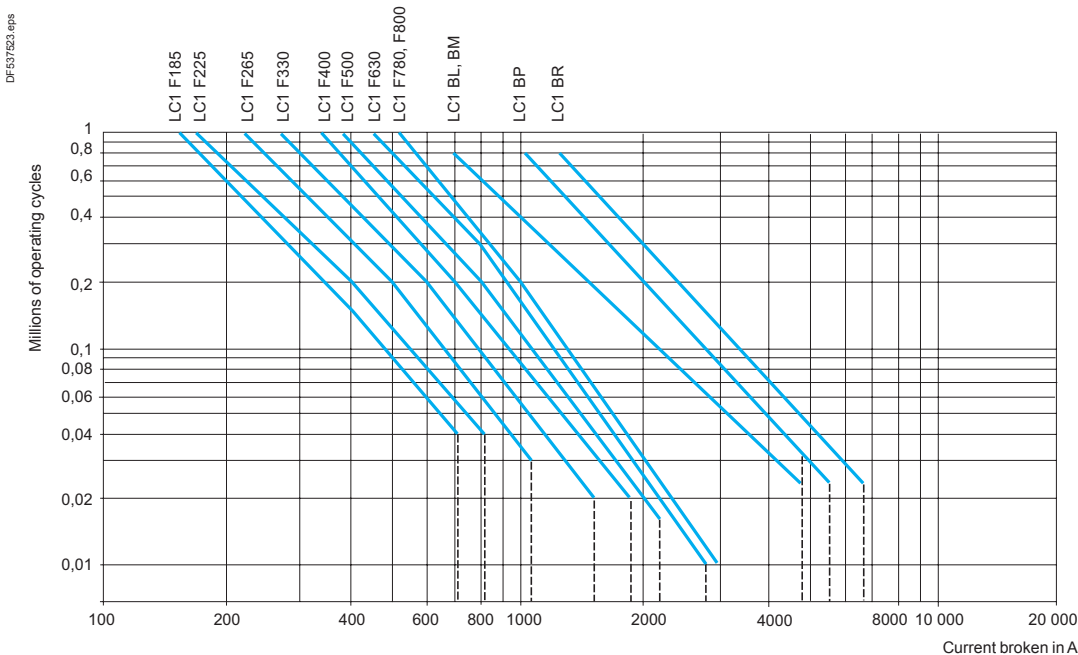


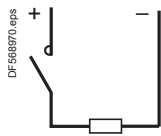
Example:

- asynchronous motor with $P = 90\text{ kW}$ - $U_e = 380\text{ V}$ - $I_e = 170\text{ A}$. $I_c = 6 \times I_e = 1020\text{ A}$.
or asynchronous motor with $P = 90\text{ kW}$ - $U_e = 415\text{ V}$ - $I_e = 165\text{ A}$. $I_c = 6 \times I_e = 990\text{ A}$.
- 60 000 operating cycles required.
- the above selection curves show the contactor rating needed: LC1 F265.

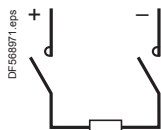
Selection according to required electrical durability, use in category AC-4 ($440\text{ V} < U_e \leq 690\text{ V}$)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst motor stalled.
The current broken (I_c) in AC-4 is equal to $6 \times I_e$ (I_e = rated operational current of the motor).

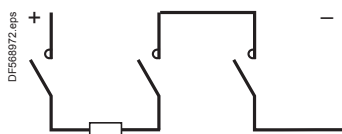




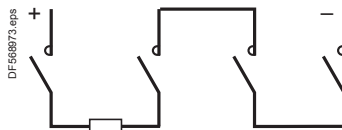
1 pole



2 poles



3 poles



4 poles

Rated operational current (Ie) in Amperes, in utilisation category DC-1, resistive loads: time constant $\frac{L}{R} \leq 1$ ms, ambient temperature ≤ 60 °C

Rated operational voltage Ue V	No. of poles connected in series	Contactor rating ⁽¹⁾									
		LC1 D09	LC1 DT20	LC1 D12 DT25	LC1 D18 DT32	LC1 D25 DT40	LC1 D32	LC1 D38	LC1 D40A	LC1 DT60A	
24	1	20	20	20	25	32	40	40	50	50	
	2	20	20	20	25	32	40	40	50	50	
	3	20	20	20	25	32	40	40	50	50	
	4	-	20	20	25	32	-	-	-	50	
48/75	1	20	20	20	25	32	40	40	50	50	
	2	20	20	20	25	32	40	40	50	50	
	3	20	20	20	25	32	40	40	50	50	
	4	-	20	20	25	32	-	-	-	50	
125	1	4	4	4	4	7	7	7	7	7	
	2	20	20	20	25	32	40	40	50	50	
	3	20	20	20	25	32	40	40	50	50	
	4	-	20	20	25	32	-	-	-	50	
250	1	1	1	1	1	1	1	1	1	1	
	2	4	4	4	4	7	7	7	7	7	
	3	20	20	20	25	32	40	40	50	50	
	4	-	20	20	25	32	-	-	-	50	
300	3	4	4	4	4	7	7	7	7	-	
	4	-	20	20	25	32	-	-	-	50	
460	1	-	-	-	-	-	-	-	-	-	
	4	-	-	-	-	-	-	-	-	-	
900	2	-	-	-	-	-	-	-	-	-	
1200	3	-	-	-	-	-	-	-	-	-	
1500	4	-	-	-	-	-	-	-	-	-	

Rated operational current (Ie) in Amperes, in utilisation category DC-2 to DC-5, inductive loads: time constant $\frac{L}{R} \leq 15$ ms, ambient temperature ≤ 60 °C

Rated operational voltage Ue V	No. of poles connected in series	Contactor rating ⁽¹⁾									
		LC1 D09	LC1 DT20	LC1 D12 DT25	LC1 D18 DT32	LC1 D25 DT40	LC1 D32	LC1 D38	LC1 D40A	LC1 DT60A	
24	1	20	20	20	25	32	40	40	50	50	
	2	20	20	20	25	32	40	40	50	50	
	3	20	20	20	25	32	40	40	50	50	
	4	-	20	20	25	32	-	-	-	50	
48/75	1	20	20	20	25	32	40	40	50	50	
	2	20	20	20	25	32	40	40	50	50	
	3	20	20	20	25	32	40	40	50	50	
	4	-	20	20	25	32	-	-	-	50	
125	1	2	2	2	2	3	3	3	4	4	
	2	20	20	20	25	32	40	40	50	50	
	3	20	20	20	25	32	40	40	50	50	
	4	-	20	20	25	32	-	-	-	50	
250	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	1	
	2	2	2	2	2	3	3	3	4	4	
	3	8	8	8	8	32	40	40	50	50	
	4	-	20	20	25	32	-	-	-	50	
300	3	2	2	2	2	3	3	3	3	3	
	4	-	8	8	8	32	-	-	-	50	
460	1	-	-	-	-	-	-	-	-	-	
	4	-	-	-	-	-	-	-	-	-	
900	2	-	-	-	-	-	-	-	-	-	
1200	3	-	-	-	-	-	-	-	-	-	
1500	4	-	-	-	-	-	-	-	-	-	

⁽¹⁾ For rated operational currents of contactors LC1 and LP1 K: please consult your Regional Sales Office.

LC1 D50A	LC1 D65A	LC1 DT80A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
7	7	7	12	12	12	12	210	230	270	320	380	520	760	1180	760	700	1100	1750	2400
65	65	65	100	100	200	200	210	230	270	320	380	520	760	1180	760	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
1	1.5	1.5	2	2	10	10	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
7	7	7	12	12	200	200	190	200	250	280	350	450	700	1000	700	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
7	7	7	12	12	200	200	190	200	250	280	350	450	700	1000	700	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1000	850	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	200	-	190	200	250	280	350	450	700	1000	700	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400

Coordination
and
standards

LC1 D50A	LC1 D65A	LC1 DT80A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
4	4	4	5	5	10	10	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
65	65	65	100	100	200	200	160	180	250	300	350	500	700	1000	700	700	1100	1750	2400
65	65	65	100	100	200	200	240	240	280	310	350	550	850	1000	850	700	1100	1750	2400
-	-	65	100	-	200	-	240	240	280	310	350	550	850	1000	850	700	1100	1750	2400
1	1.5	1.5	1	1	3	3	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
4	4	4	5	5	200	200	140	160	220	280	310	480	680	900	680	700	1100	1750	2400
65	65	65	100	100	200	200	160	180	250	300	350	500	700	1000	700	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
3	3	3	5	5	200	200	140	160	220	280	310	480	680	900	680	700	1100	1750	2400
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	200	-	140	160	220	280	310	480	680	800	680	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400

Selection according to required electrical durability, use in categories DC-1 to DC-5

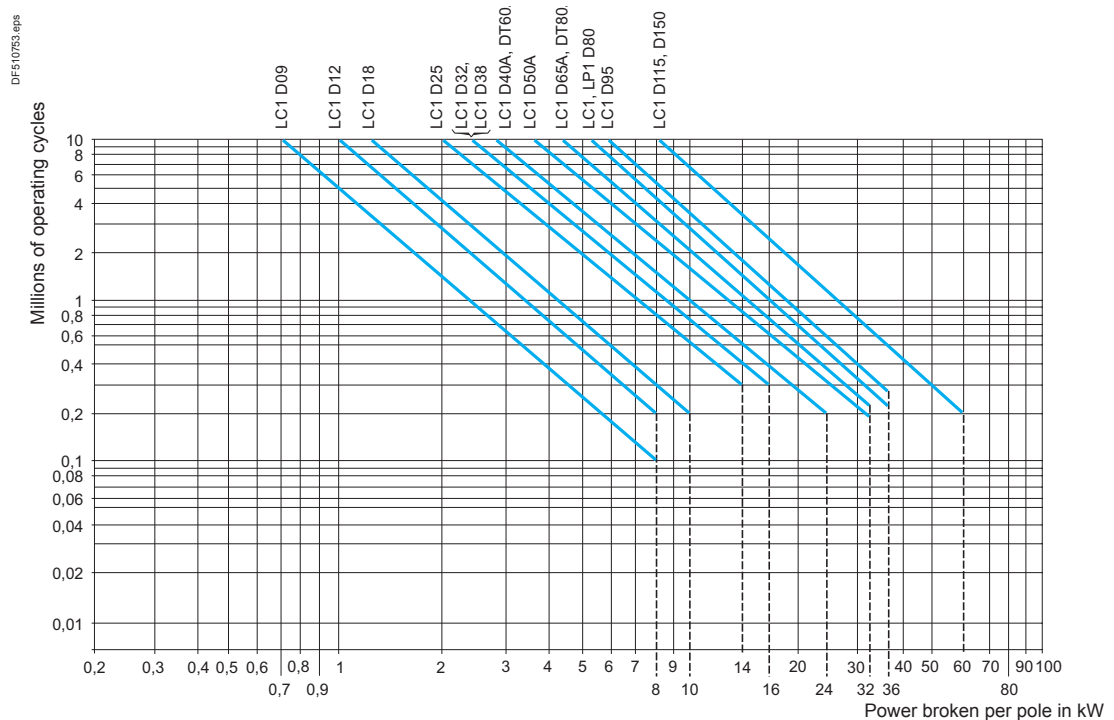
The criteria for contactor selection are:

- the rated operational current I_e
- the rated operational voltage U_e
- the utilisation category and the time constant L/R
- the required electrical durability.

Maximum operating rate (operating cycles)

The following limits must not be exceeded: 120 operating cycles/hour at rated operational current I_e .

Electrical durability



Example

Series wound motor - $P = 1.5 \text{ kW}$ - $U_e = 200 \text{ V}$ - $I_e = 7.5 \text{ A}$.

Utilisation: reversing, inching.

- Utilisation category = DC-5.
- Select contactor LC1 D09 with 3 poles in series.
- The power broken is: $P_c \text{ total} = 2.5 \times 200 \times 7.5 = 3.75 \text{ kW}$.
- The power broken per pole is: 1.25 kW .
- The electrical durability read from the curve is ≥ 3 millions of operating cycles.

Use of poles in parallel

Electrical durability can be increased by using poles connected in parallel.

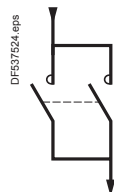
With N poles connected in parallel, the electrical durability becomes: electrical durability read from the curves $\times N \times 0.7$.

Note:

When the poles are connected in parallel, the maximum operational currents indicated on pages A5/34 and A5/35 must not be exceeded.

Note:

Ensure that the connections are made in such a way as to equalise the currents in each pole.



Selection according to required electrical durability, use in categories DC-1 to DC-5

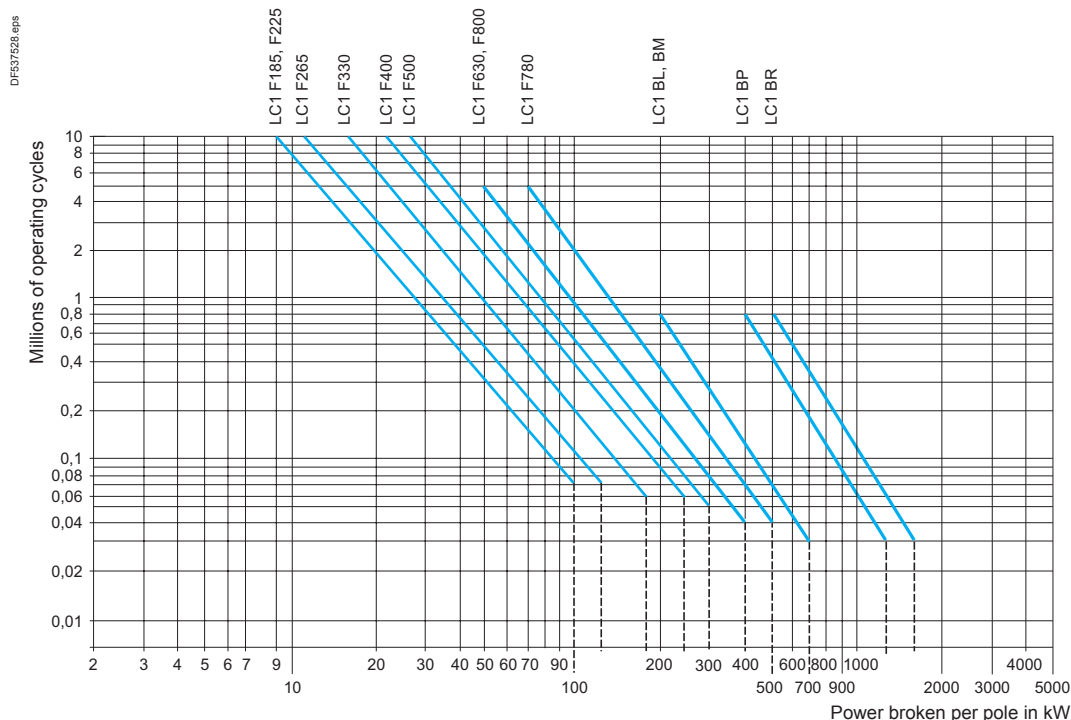
Determining the electrical durability

The electrical durability can be read directly from the curves below, having previously calculated the power broken as follows:

$$P_{\text{broken}} = U_{\text{broken}} \times I_{\text{broken}}$$

The tables below give the values of U_c and I_c for the various utilisation categories.

Power broken			
Utilisation categories	U broken	I broken	P broken
DC-1 Non inductive or slightly inductive loads	U_e	I_e	$U_e \times I_e$
DC-2 Shunt wound motors, breaking whilst motor running	$0.1 U_e$	I_e	$0.1 U_e \times I_e$
DC-3 Shunt wound motors, reversing, inching	U_e	$2.5 I_e$	$U_e \times 2.5 I_e$
DC-4 Series wound motors, breaking whilst motor running	$0.3 U_e$	I_e	$0.3 U_e \times I_e$
DC-5 Series wound motors, reversing, inching	U_e	$2.5 I_e$	$U_e \times 2.5 I_e$



Example

Series wound motor: $P = 40 \text{ kW}$ - $U_e = 200 \text{ V}$ - $I_e = 200 \text{ A}$.

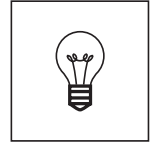
Utilisation: reversing, inching.

Utilisation category = DC-5.

- Select contactor LC1 F265 with 2 poles in series.
- The power broken is: $P_c \text{ total} = 2.5 \times 200 \times 200 = 100 \text{ kW}$.
- The power broken per pole is 50 kW.
- The electrical durability read from the curve is 500000 operating cycles.

TeSys contactors

For lighting circuits



General

The operating conditions of lighting circuits have the following characteristics:

- continuous duty: the switching device can remain closed for several days or even months
- a dispersion factor of 1: all luminaires in the same group are switched on or off simultaneously
- a relatively high temperature around the device due to the enclosure, the presence of fuses, or an unventilated control panel location.

This is why the operational current for lighting is lower than the value given for AC-1 duty.

Protection

The continuous duty current drawn by a lighting circuit is constant. In fact:

- it is unlikely that the number of luminaires of an existing circuit will be modified
- this type of circuit cannot create an overload of long duration.

It is therefore only necessary to provide short-circuit protection. This can be provided by:

- gG type fuses, or
- modular circuit breakers.

Nevertheless, it is always possible and sometimes more economical (smaller cable size) to protect the circuit by a thermal overload relay and associated aM type uses.

Distribution system

Single-phase circuit, 220/240 V

The tables on pages A5/39 to A5/43 are based on a single-phase 220/240 V circuit and can therefore be applied directly in this case.

3-phase circuit, 380/415 V (with neutral)

The total number of lamps (N) to be switched simultaneously is divided into three equal groups, each connected between one phase and neutral. The contactor can then be selected from the 220/240 V single-phase tables for a number of lamps equal to $\frac{N}{3}$ lamps.

3-phase circuit, 220/240 V

The total number of lamps (N) to be switched simultaneously is divided into three equal groups, each connected between 2 phases (L1-L2), (L2-L3), (L3-L1). The contactor can then be selected from the 220/240 V single-phase table for a number of lamps equal to $\frac{N}{\sqrt{3}}$ lamps.

Contactor selection tables

For the different types of lamps, the tables on pages A5/39 to A5/43 give the maximum number of lamps of unit power P (in Watts), which can be switched simultaneously for each size of contactor.

They are based on:

- a 220/240 V single-phase circuit
- an ambient temperature of 55 °C ⁽¹⁾, taking into account the operating conditions (see General paragraph)
- an electrical life of more than 10 years (200 days' operation per year).

They take into account:

- the total current drawn (including ballast)
- transient phenomena which occur at switch-on
- the starting currents and their duration
- the circulation of any harmonics which may be present.

Lamps with compensating capacitor C (µF) connected in parallel

Parallel connected compensating capacitors C cause a current peak at the moment of switch-on. To ensure that the value of this current peak remains compatible with the making characteristics of the contactors, the unit value of the capacitance must not exceed the following:

Switching contactor rating	LC1 K09	LP1 K09	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38	LC1 D40A	LC1 D50A	LC1 D65A	LC1 D80
----------------------------	---------	---------	---------	---------	---------	---------	---------	---------	----------	----------	----------	---------

Maximum unit value C (µF) of parallel connected compensating capacitor

	7	3	18	18	25	60	96	96	120	120	240	240
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Switching contactor rating	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F800
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Maximum unit value C (µF) of parallel connected compensating capacitor

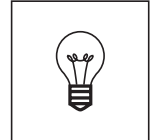
	240	300	360	800	1200	1700	2500	4000	6000	9000	10800
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This value is independent of the number of lamps switched by the contactor.

⁽¹⁾ For an ambient temperature of 40 °C, multiply the number by 1.2.

TeSys contactors

For lighting circuits



Usual values

The tables show the following values:

- IB: value of current drawn by each lamp at its rated voltage,
 - C: unit capacitance for each lamp,
- corresponding to the values normally quoted by lamp manufacturers.

These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

Incandescent and halogen lamps										
P (W)	60	75	100	150	200	300	500	750	1000	
IB (A)	0.27	0.34	0.45	0.68	0.91	1.40	2.30	3.40	4.60	LC1
Max. no. of lamps according to P (W)	35	28	21	14	10	6	4	2	2	K09
	59	47	35	23	17	11	7	4	3	D09, D12
	77	61	46	30	23	15	9	6	4	D18
	92	73	55	36	27	18	11	7	5	D25
	129	103	77	51	38	25	15	10	7	D32, D38
	163	129	97	64	48	31	19	13	9	D40A
	207	164	124	82	62	40	24	16	12	D50A, D65A
	296	235	177	117	88	57	34	23	17	D80, D95
	430	340	256	170	126	82	50	34	24	D115
	466	370	280	184	138	90	54	36	26	D150
	710	564	426	282	210	136	82	56	40	F185
	770	610	462	304	228	148	90	60	44	F225
	888	704	532	352	262	170	104	70	52	F265
	1006	800	604	400	298	194	118	80	58	F330
	1274	1010	764	504	378	244	148	100	74	F400
	1718	1364	1030	682	508	330	200	136	100	F500
	2328	1850	1396	924	690	448	272	184	136	F630
	2776	2204	1666	1102	824	534	326	220	162	F800

Mixed lighting lamps						
P (W)	100	160	250	500	1000	
IB (A)	0.45	0.72	1.10	2.30	4.50	LC1
Max. no. of lamps according to P (W)	21	13	8	4	2	K09
	35	22	14	7	3	D09, D12
	46	29	18	9	4	D18
	55	36	23	11	5	D25
	77	48	30	15	7	D32, D38
	97	61	38	19	9	D40A
	124	77	49	24	12	D50A, D65A
	177	111	70	34	17	D80, D95
	256	160	104	50	26	D115
	280	174	114	54	28	D150
	426	266	174	82	42	F185
	462	288	188	90	46	F225
	532	332	218	104	52	F265
	604	378	246	118	60	F330
	764	478	312	150	76	F400
	1030	644	422	202	102	F500
	1398	874	572	272	140	F630
	1666	1040	680	326	166	F800

TeSys contactors

For lighting circuits



Usual values

The tables show the following values:

- IB: value of current drawn by each lamp at its rated voltage
- C: unit capacitance for each lamp

corresponding to the values normally quoted by lamp manufacturers.

These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

Fluorescent lamps with starter. Single fitting												
	Non corrected				With parallel correction						LC1	
	P (W)	20	40	65	80	110	20	40	65	80		110
	IB (A)	0.39	0.45	0.70	0.80	1.2	0.17	0.26	0.42	0.52		0.72
	C (µF)	–	–	–	–	–	5	5	7	7	16	
Max. no. of lamps according to P (W)	24	21	13	12	8	56	36	22	18	–	–	K09
	41	35	22	20	13	94	61	38	30	22	–	D09, D12
	53	46	30	26	17	123	80	50	40	29	–	D18
	66	57	37	32	21	152	100	61	50	36	–	D25
	89	77	50	43	29	205	134	83	67	48	–	D32, D38
	112	97	62	55	36	258	169	104	84	61	–	D40A
	143	124	80	70	46	329	215	133	107	77	–	D50A, D65A
	205	177	114	100	66	470	367	190	153	111	–	D80, D95
	410	354	228	200	132	940	614	380	306	222	–	D115, D150
	492	426	274	240	160	1128	738	456	368	266	–	F185
	532	462	296	260	172	1224	800	490	400	288	–	F225
	614	532	342	300	200	1412	922	570	462	332	–	F265
	696	604	388	340	226	1600	1046	648	522	378	–	F330
	882	764	490	430	286	2024	1322	818	662	478	–	F400
	1190	1030	662	580	386	2728	1724	1104	892	644	–	F500
1612	1398	698	786	524	3700	2418	1498	1210	874	–	F630, F800	

Fluorescent lamps with starter. Twin fitting												
	Non corrected					With series correction					LC1	
	P (W)	2x20	2x40	2x65	2x80	2x110	2x20	2x40	2x65	2x80		2x110
	IB (A)	2x0.22	2x0.41	2x0.67	2x0.82	2x1.1	2x0.13	2x0.24	2x0.39	2x0.48		2x0.65
	C (µF)	–	–	–	–	–	–	–	–	–		
Max. no. of lamps according to P (W)	2x21	2x11	2x7	2x5	2x4	2x36	2x20	2x12	2x10	2x7	–	K09
	2x36	2x18	2x10	2x8	2x6	2x60	2x32	2x20	2x16	2x12	–	D09, D12
	2x46	2x24	2x14	2x12	2x8	2x80	2x42	2x26	2x20	2x16	–	D18
	2x58	2x30	2x18	2x14	2x10	2x100	2x54	2x32	2x26	2x20	–	D25
	2x78	2x42	2x26	2x20	2x14	2x134	2x72	2x44	2x36	2x26	–	D32, D38
	2x100	2x52	2x32	2x26	2x18	2x168	2x90	2x56	2x44	2x32	–	D40A
	2x126	2x68	2x40	2x34	2x24	2x214	2x116	2x70	2x58	2x42	–	D50A, D65A
	2x180	2x96	2x58	2x48	2x36	2x306	2x166	2x102	2x82	2x60	–	D80, D95
	2x360	2x194	2x118	2x96	2x72	2x614	2x332	2x204	2x166	2x122	–	D115, D150
	2x436	2x234	2x142	2x116	2x86	2x738	2x400	2x246	2x200	2x148	–	F185
	2x472	2x254	2x154	2x126	2x94	2x800	2x432	2x266	2x216	2x160	–	F225
	2x544	2x292	2x178	2x146	2x108	2x922	2x500	2x308	2x250	2x184	–	F265
	2x618	2x332	2x202	2x166	2x124	2x1046	2x566	2x348	2x282	2x208	–	F330
	2x782	2x420	2x256	2x210	2x156	2x1322	2x716	2x440	2x358	2x264	–	F400
	2x1054	2x566	2x346	2x282	2x210	2x1784	2x966	2x594	2x482	2x356	–	F500
2x1430	2x766	2x468	2x384	2x286	2x2418	2x1310	2x806	2x654	2x484	–	F630, F800	

TeSys contactors

For lighting circuits



Usual values

The tables show the following values:

■ IB: value of current drawn by each lamp at its rated voltage

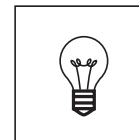
■ C: unit capacitance for each lamp

corresponding to the values normally quoted by lamp manufacturers.

These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

Fluorescent lamps without starter. Single fitting												
	Non corrected					With parallel correction					LC1	
	P (W)	20	40	65	80	110	20	40	65	80		110
	IB (A)	0.43	0.55	0.80	0.95	1.4	0.19	0.29	0.46	0.57		0.79
C (µF)	–	–	–	–	–	5	5	7	7	16		
Max. no. of lamps according to P (W)	22	17	12	10	6	50	33	20	16	–	K09	
	37	29	20	16	11	84	55	34	28	20	D09, D12	
	48	38	26	22	15	110	72	45	36	26	D18	
	60	47	32	27	18	136	89	56	45	32	D25	
	97	63	43	36	25	184	101	76	61	44	D32, D38	
	102	80	55	46	31	231	151	95	77	55	D40A	
	130	101	70	58	40	294	193	121	98	70	D50A, D65A	
	186	145	100	84	57	421	275	173	140	101	D80, D95	
	372	290	200	168	114	842	550	346	280	202	D115, D150	
	446	348	240	202	136	1010	662	416	336	242	F185	
	484	378	260	218	148	1094	716	452	364	262	F225	
	558	436	300	252	170	1262	828	522	420	304	F265	
	632	494	340	286	194	1432	938	590	476	344	F330	
	800	624	430	362	246	1810	1186	748	604	434	F400	
	1078	844	580	488	330	2442	1600	1008	814	586	F500	
	1462	1144	786	662	448	3310	2168	1366	1104	796	F630, F800	

Fluorescent lamps without starter. Twin fitting												
	Non corrected					With series correction					LC1	
	P (W)	2x20	2x40	2x65	2x80	2x110	2x20	2x40	2x65	2x80		2x110
	IB (A)	2x0.25	2x0.47	2x0.76	2x0.93	2x1.3	2x0.14	2x0.26	2x0.43	2x0.53		2x0.72
Max. no. of lamps according to P (W)	2x19	2x10	2x6	2x5	2x3	2x34	2x18	2x11	2x9	2x6	K09	
	2x32	2x16	2x10	2x8	2x6	2x56	2x30	2x18	2x14	2x10	D09, D12	
	2x42	2x22	2x12	2x10	2x8	2x74	2x40	2x24	2x18	2x14	D18	
	2x52	2x26	2x16	2x12	2x10	2x92	2x50	2x30	2x24	2x18	D25	
	2x70	2x36	2x22	2x18	2x12	2x124	2x66	2x40	2x32	2x24	D32, D38	
	2x88	2x46	2x28	2x22	2x16	2x156	2x84	2x50	2x40	2x30	D40A	
	2x112	2x58	2x36	2x30	2x20	2x200	2x106	2x64	2x52	2x38	D50A, D65A	
	2x160	2x84	2x52	2x42	2x30	2x234	2x152	2x92	2x74	2x54	D80, D95	
	2x320	2x170	2x104	2x86	2x60	2x570	2x306	2x186	2x150	2x110	D115, D150	
	2x384	2x204	2x126	2x102	2x74	2x686	2x368	2x222	2x180	2x132	F185	
	2x416	2x220	2x136	2x112	2x80	2x742	2x400	2x242	2x196	2x144	F225	
	2x480	2x254	2x158	2x128	2x92	2x856	2x462	2x278	2x226	2x166	F265	
	2x544	2x288	2x178	2x146	2x104	2x970	2x522	2x316	2x256	2x188	F330	
	2x688	2x366	2x226	2x184	2x132	2x1228	2x662	2x400	2x324	2x238	F400	
	2x928	2x494	2x304	2x248	2x178	2x1656	2x892	2x540	2x438	2x322	F500	
	2x1258	2x668	2x414	2x338	2x242	2x2246	2x1210	2x730	2x592	2x436	F630, F800	



Usual values

The tables show the following values:

- IB: value of current drawn by each lamp at its rated voltage
- C: unit capacitance for each lamp

corresponding to the values normally quoted by lamp manufacturers.

These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

Low pressure sodium vapour lamps															
	Non corrected							With parallel correction							
	P (W)	35	55	90	135	150	180	200	35	55	90	135	150	180	200
	IB (A)	1.2	1.6	2.4	3.1	3.2	3.3	3.4	0.3	0.4	0.6	0.9	1	1.2	1.3
	C (µF)	–	–	–	–	–	–	17	17	25	36	36	36	36	LC1
Max. no. of lamps according to P (W)	6	5	3	2	2	2	2	–	–	–	–	–	–	–	K09
	10	7	5	3	3	3	3	40	30	–	–	–	–	–	D09, D12
	12	9	6	4	4	4	4	50	37	25	–	–	–	–	D18
	15	11	7	6	5	5	5	63	47	31	21	19	15	14	D25
	21	16	10	8	8	7	7	86	65	43	28	26	21	20	D32, D38
	27	20	13	10	10	10	9	110	82	55	36	33	27	25	D40A
	35	26	17	13	13	12	12	140	105	70	46	42	35	32	D50A, D65A
	50	37	25	19	18	18	17	200	150	100	66	60	50	46	D80, D95
	100	75	50	38	36	36	34	400	300	200	132	120	100	92	D115, D150
	140	104	70	54	52	50	48	560	420	280	186	168	140	128	F185
	152	114	76	58	56	54	54	606	454	302	202	182	152	140	F225
	174	130	88	68	66	64	62	700	524	350	232	210	174	162	F265
	198	148	98	76	74	72	70	792	594	396	264	238	198	182	F330
	250	188	124	96	94	90	88	1002	752	502	334	300	250	252	F400
	338	254	168	130	126	122	118	1352	1014	676	450	406	338	312	F500
	496	372	248	192	186	180	174	1982	1488	992	660	594	496	458	F630, F800

High pressure sodium vapour lamps												
	Non corrected					With parallel correction						
	P (W)	150	250	400	700	1000	150	250	400	700	1000	
	IB (A)	1.9	3.2	5	8.8	12.4	0.84	1.4	2.2	3.9	5.5	
	C (µF)	–	–	–	–	–	20	32	48	96	120	LC1
Max. no. of lamps according to P (W)	4	2	1	–	–	–	–	–	–	–	K09	
	6	3	2	1	–	–	–	–	–	–	D09, D12	
	7	4	3	1	1	17	–	–	–	–	D18	
	10	5	3	2	1	22	13	8	–	–	D25	
	13	8	5	2	2	30	18	11	6	–	D32, D38	
	17	10	6	3	2	39	23	15	8	6	D40A	
	22	13	8	4	3	50	30	19	10	7	D50A, D65A	
	31	18	12	6	4	71	42	27	15	10	D80, D95	
	62	36	24	12	8	142	84	54	30	20	D115, D150	
	88	52	34	18	14	200	120	76	42	30	F185	
	96	56	36	20	16	216	130	82	46	32	F225	
	110	66	42	24	18	250	150	94	54	38	F265	
	124	74	48	26	20	282	170	108	60	42	F330	
	158	94	60	34	24	358	214	136	76	54	F400	
	214	126	80	46	32	482	290	184	104	74	F500	
	312	186	118	68	48	708	424	270	152	108	F630, F800	



Usual values

The tables show the following values:

■ IB: value of current drawn by each lamp at its rated voltage

■ C: unit capacitance for each lamp

corresponding to the values normally quoted by lamp manufacturers.

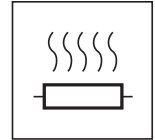
These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

High pressure mercury vapour lamps																
	Non corrected							With parallel correction								
	P (W)	50	80	125	250	400	700	1000	50	80	125	250	400	700	1000	
	IB (A)	0.54	0.81	1.20	2.30	4.10	6.80	9.90	0.3	0.45	0.67	1.3	2.3	3.8	5.5	
	C (µF)	–	–	–	–	–	–	–	10	10	10	18	25	40	60	LC1
Max. no. of lamps according to P (W)	14	9	6	3	1	–	–	–	–	–	–	–	–	–	–	K09
	22	14	9	5	2	1	1	40	26	17	9	–	–	–	–	D09, D12
	27	18	12	6	3	2	1	50	33	22	11	6	–	–	–	D18
	35	23	15	8	4	2	1	63	42	28	14	8	5	3	–	D25
	48	32	21	11	6	3	2	86	57	38	20	11	6	4	–	D32, D38
	61	40	27	14	8	4	3	110	73	49	25	14	8	6	–	D40A
	77	51	34	17	10	6	4	140	93	62	32	18	11	7	–	D50A, D65A
	111	74	49	26	14	8	6	200	133	89	46	26	15	10	–	D80, D95
	222	148	100	52	28	16	12	400	266	178	92	52	30	20	–	D115, D150
	310	206	140	72	40	24	17	560	372	250	128	72	44	30	–	F185
	336	224	152	78	44	26	18	606	404	272	140	78	48	32	–	F225
	388	258	174	90	50	30	20	700	466	312	162	90	54	38	–	F265
	440	294	198	102	58	34	24	792	528	354	182	102	62	42	–	F330
	556	372	250	130	72	44	30	1002	668	448	232	130	78	54	–	F400
	752	500	338	176	98	60	40	1352	902	606	312	176	106	74	–	F500
	1102	734	496	258	144	88	60	1982	1322	888	458	258	156	108	–	F630, F800

Metal iodine vapour lamps										
	Non corrected				With parallel correction					
	P (W)	250	400	1000	2000	250	400	1000	2000	
	IB (A)	2.5	3.6	9.5	20	1.4	2	5.3	11.2	
	C (µF)	–	–	–	–	32	32	64	140	LC1
Max. no. of lamps according to P (W)	3	2	–	–	–	–	–	–	–	K09
	4	3	1	–	–	–	–	–	–	D09, D12
	6	4	1	–	–	–	–	–	–	D18
	7	5	2	–	–	–	–	–	–	D25
	10	7	2	1	–	–	–	–	–	D32, D38
	13	9	3	1	–	–	–	–	–	D40A
	16	11	4	2	–	–	–	–	–	D50A, D65A
	24	16	6	3	–	–	–	–	–	D80, D95
	48	32	12	6	–	–	–	–	–	D115, D150
	66	46	18	8	–	–	–	–	–	F185
	72	50	20	10	–	–	–	–	–	F225
	84	58	22	12	–	–	–	–	–	F265
	94	66	24	14	–	–	–	–	–	F330
	120	84	32	16	–	–	–	–	–	F400
	162	112	42	20	–	–	–	–	–	F500
	238	164	62	30	–	–	–	–	–	F630, F800

TeSys contactors

For heating circuits



General

A heating circuit is a power switching circuit supplying one or more resistive heating elements switched by a contactor. The same general rules apply as for motor circuits, except that heating circuits are not normally subjected to overload currents. It is therefore only necessary to provide short-circuit protection.

Characteristics of heating elements

The examples below are based on resistive heating elements used for industrial furnaces or for the heating of buildings (infra-red or resistive radiant type, convactor heaters, closed loop heating circuits, etc.). The variation in resistance values between hot and cold states causes a current peak at switch-on which never exceeds 2 to 3 times the rated operational current (I_n). This initial peak does not recur during normal operation where subsequent switching is thermostatically controlled. The rated power and current of a heater are given for the normal operating temperature.

Protection

The steady state current drawn by a heating circuit is constant when the voltage is stable. In fact:

- it is unlikely that the number of loads in an existing circuit will be modified
- this type of circuit cannot create overloads. It is therefore only necessary to provide short-circuit protection.

This can be provided by:

- gG type fuses, or
- modular circuit breakers.

Nevertheless, it is always possible and sometimes more economical (smaller cable size) to protect the circuit by a thermal overload relay and associated aM type fuses.

Switching, control, protection

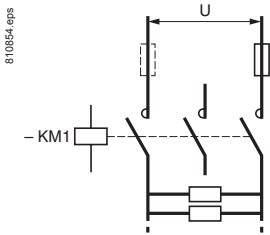
A heating element or group of heating elements of a given power may be either single-phase or 3-phase and may be supplied from a 220/127 V or a 400/230 V distribution system. Excluding a single-phase 127 V system (which is no longer commonly used), the following 3 types of circuit arrangement are possible:

- single-phase, 2-pole switching
- single-phase, 4-pole switching
- 3-phase switching

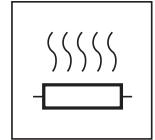
Component selection according to the power switched

The combinations suggested below are based on an ambient temperature of 55 °C and for powers at the nominal voltage, but they also ensure switching in the event of prolonged overloads up to 1.05 Ue.

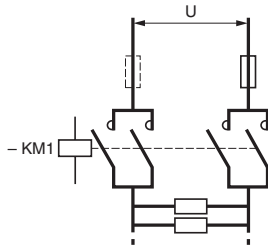
Single-phase, 2-pole switching				Contactor rating
Maximum power (kW)				
220/240 V	380/415 V	660/690 V	1000 V	
3.5	6.5	11	–	LC1, LP1K09
4.5	8	14	–	LC1D12
6	10.5	18.5	–	LC1D18
7	13	22.5	–	LC1D25
10	18	30.5	–	LC1D32, LC1D38
13	22.5	39.5	48	LC1D40A
16.5	28.5	43.5	68	LC1D65A
24	42	73	82.5	LC1, LP1D80
44	76	118	157	LC1D115, LC1D150
48	83	130	170	LC1F185
52	90	145	185	LC1F225
60	104	160	210	LC1F265
75	130	200	250	LC1F330
86	145	230	300	LC1F4002
116	200	310	400	LC1F5002
170	290	450	695	LC1F6302, LC1F800
270	460	715	945	LC1F780
140	242	370	490	LC1BL32
220	380	580	770	LC1BM32
350	605	925	1225	LC1BP32
480	830	1270	1680	LC1BR32



Circuit controlled by 2 poles of the contactor.

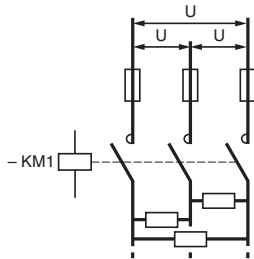


810856.eps



Circuit controlled by a 4-pole contactor with the poles parallel connected in pairs using appropriate connecting links. This solution enables the control of power values approximately equivalent to those controlled by the same contactor on 3-phase.

810857.eps



Circuit controlled by 3 poles of the contactor.

Component selection according to the power switched

Single-phase, 4-pole switching

Maximum power (kW)				Contactor rating
220/240 V	380/415 V	660/690 V	1000 V	
4.5	8	13.5	–	LC1, LP1K09004
7	13	22.5	–	LC1DT25
12	21	36.5	–	LC1DT40
26	45.5	79.5	109	LC1DT80A
38	66	117.5	132	LC1, LP1D80004
70	121	190	251	LC1D115004
76	132	202	270	LC1F1854
80	142	230	295	LC1F2254
96	166	253	335	LC1F2654
120	205	320	400	LC1F3304
137	236	363	480	LC1F4004
185	320	490	650	LC1F5004
272	470	718	950	LC1F6304
425	735	1140	1520	LC1F7804
224	387	590	785	LC1BL34
352	608	930	1230	LC1BM34
560	968	1478	1960	LC1BP34
768	1328	2025	2685	LC1BR34

3-phase switching

Maximum power (kW)				Contactor rating
220/240 V	380/415 V	660/690 V	1000 V	
4.5	8	13.5	–	LC1, LP1K09
7	13	22.5	–	LC1D12
10	18	30.5	–	LC1D18
13	22.5	39.5	–	LC1D25
18	31	52.5	–	LC1D32, LC1D38
22.5	38	68	78	LC1D40A
28.5	49	86	112.5	LC1D65A
40.5	70.5	126	135.5	LC1, LP1D80
76	131	206	275	LC1D115, LC1D150
82	143	220	295	LC1F185
90	155	250	320	LC1F225
103	179	275	370	LC1F265
130	225	345	432	LC1F330
149	256	395	525	LC1F400
200	346	530	710	LC1F500
294	509	780	1030	LC1F630, LC1F800
463	800	1235	1650	LC1F780
242	419	640	850	LC1BL33
380	658	1005	1350	LC1BM33
606	1047	1600	2150	LC1BP33
830	1437	2200	2950	LC1BR33

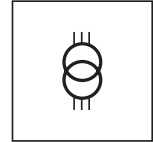
Application example

For a 220 V, 50 Hz, single-phase circuit supplying a total heating load of 12.5 kW. Select a 3-pole contactor **LC1D65A**.

(1) See complete contactor references on pages B8/2 to B8/7 or consult your Regional Sales Office.

TeSys contactors

For switching the primaries of 3-phase LV/LV transformers



Operating conditions

Maximum ambient temperature: 55 °C.

When a transformer is switched on, there is generally an initial current surge which reaches its peak value almost instantaneously and then decreases in a largely exponential manner to quickly reach its steady state value.

The value of this current depends on:

- the characteristics of the magnetic circuit and of the windings (cross sectional area of the core, rated inductance, number of turns, layout and size of the windings, ...)
- the performance of the magnetic laminations used
- the magnetic state of the circuit and the instantaneous value of the a.c. mains voltage at the moment of switch-on.

The inrush current at the moment of switch-on can reach 20 to 40 times the rated current for the various kVA power ratings in the tables below. This value is independent of the “no-load” or “on-load” state of the transformer.

Contactor selection

The peak magnetising current of the transformer must be lower than the values given in the tables below.

Maximum operating rate: 120 operating cycles/hour.

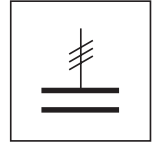
Contactor rating		LC1/LP1 K06	LC1/LP1 K09	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38	LC1 D40A	LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	
Maximum permissible current peak at switch-on	A	160	225	350	350	420	630	770	770	1100	1250	1400	1550	1650	1800	2000	
Maximum operational power ⁽¹⁾	220 V 240 V	kVA	2	2.5	4	4	5	7	8.5	8.5	14	16	18	19.5	19.5	25	25
	380 V 400 V	kVA	3.5	5	7	7	8	12.5	15	15	24	27	31	34	34	50	50
	415 V 440 V	kVA	4	5.5	8	8	9	14	17	17	28	32	36	39	39	55	55
	500 V	kVA	5	7	9	9	11	16.5	20	20	32	36	40	45	45	65	65
	660 V 690 V	kVA	6	8.5	12	12	14	21.5	26.5	26.5	42	48	53	59	59	80	80
	1000 V	kVA	-	-	-	-	-	-	-	-	-	-	-	85	95	100	100

Contactor rating		LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR	
Maximum permissible current peak at switch-on	A	2900	3300	3800	5000	6300	7700	9000	12000	11000	18000	18000	24000	30000	
Maximum operational power ⁽¹⁾	220 V 240 V	kVA	40	45	50	65	75	100	120	175	145	230	230	300	380
	380 V 400 V	kVA	75	80	90	120	130	170	200	280	245	400	400	530	660
	415 V 440 V	kVA	80	90	100	130	140	190	220	310	270	450	450	560	700
	500 V	kVA	95	100	110	140	170	225	260	350	315	480	480	600	750
	660 V 690 V	kVA	120	130	140	170	200	270	350	400	425	600	600	800	950
	1000 V	kVA	150	170	200	225	250	375	470	650	550	700	700	1000	1200

⁽¹⁾ Maximum operational power corresponding to a current peak at switch-on of 30 In.

TeSys contactors

For switching 3-phase capacitor banks used for power factor correction



Standard contactors

Capacitors, together with the circuits to which they are connected, form oscillatory circuits which can, at the moment of switch-on, give rise to high transient currents (> 180 In) at high frequencies (1 to 15 kHz).

As a general rule, the peak current on energisation is lower when:

- the mains inductances are high
- the line transformer ratings are low
- the transformer short-circuit voltage is high
- the ratio between the sum of the ratings of the capacitors already switched into the circuit and that of the capacitor to be switched in is small (for multiple step capacitor banks).

In accordance with standards IEC 60070, NF C 54-100, VDE 0560, the switching contactor must be able to withstand a continuous current of 1.43 times the rated current of the capacitor bank step being switched.

The rated operational powers given in the tables below take this overload into account. Short-circuit protection is normally provided by gl type HPC fuses rated at 1.7 to 2 In.

Operating conditions

Capacitors are directly switched. **The values of peak current at switch-on must not exceed the values indicated opposite.**

An inductor may be inserted in each of the three phases supplying the capacitors to reduce the peak current, if necessary.

Inductance values are determined according to the selected operating temperature.

Power factor correction by a single-step capacitor bank

The use of a choke inductor is unnecessary: the inductance of the mains supply is adequate to limit the peak to a value compatible with the contactor characteristics.

Power factor correction by a multiple-step capacitor bank

Select a special contactor as defined on page B8/13.

If a standard contactor is used, it is essential to insert a choke inductor in each of the three phases of each step.

Standard contactors

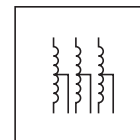
Maximum operating rate: 120 operating cycles/hour.

Electrical durability at maximum load: 100 000 operating cycles.

With choke inductors connected, where necessary.

Operational power at 50/60 Hz						Max. peak current	Contactor rating
$\theta \leq 40\text{ °C}^{(1)}$			$\theta \leq 55\text{ °C}^{(1)}$				
220/240 V	400/440 V	600/690 V	220/240 V	400/440 V	600/690 V	A	
kvAR	kvAR	kvAR	kvAR	kvAR	kvAR		
6	11	15	6	11	15	560	LC1D09, D12
9	15	20	9	15	20	850	LC1D18
11	20	25	11	20	25	1600	LC1D25
14	25	30	14	25	30	1900	LC1D32, D38
17	30	37	17	30	37	2160	LC1D40
22	40	50	22	40	50	2160	LC1D50
22	40	50	22	40	50	3040	LC1D65
35	60	75	35	60	75	3040	LC1D80, D95
50	90	125	38	75	80	3100	LC1D115
60	110	135	40	85	90	3300	LC1D150
70	125	160	50	100	100	3500	LC1F185
80	140	190	60	110	110	4000	LC1F225
90	160	225	75	125	125	5000	LC1F265
100	190	275	85	140	165	6500	LC1F330
125	220	300	100	160	200	8000	LC1F400
180	300	400	125	220	300	10 000	LC1F500
250	400	600	190	350	500	12 000	LC1F630
250	400	600	190	350	500	14 200	LC1F800
200	350	500	180	350	500	25 000	LC1BL
300	550	650	250	500	600	25 000	LC1BM
500	850	950	400	750	750	25 000	LC1BP
600	1100	1300	500	1000	1000	25 000	LC1BR

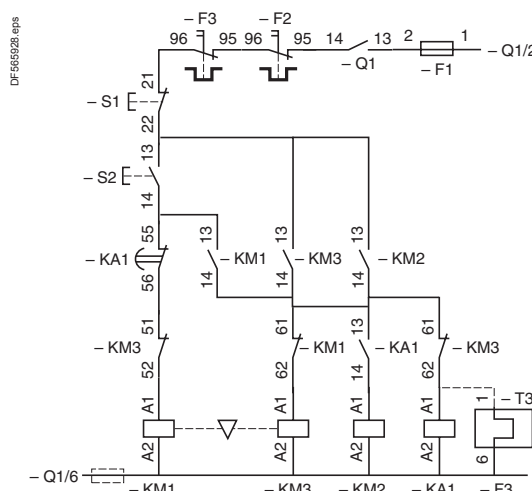
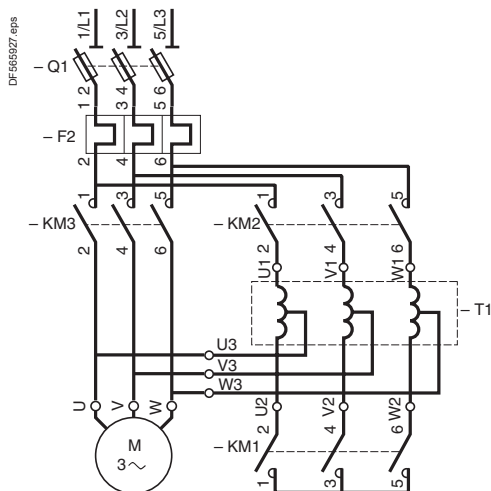
(1) Upper limit of temperature category conforming to IEC 60070.



Applications

Auto-transformer starting is suitable for starting all types of squirrel cage motors: with 3, 6 or even 9 terminals according to North American technology. Starting is performed at reduced voltage and produces maximum torque at minimum line current. It allows the starting torque ($C = f(U)^2$) to be adapted to the resistive torque of the driven machine by means of the 2 or 3 intermediate voltage take-off connections on the auto-transformer (0.65 and 0.8 U_n or 0.5, 0.65 and 0.8 U_n). In general, only one take-off connection is used. This type of starting is used for high power and/or high inertia machines. The motor is never disconnected from its power supply during starting (closed transition) and transient phenomena are eliminated.

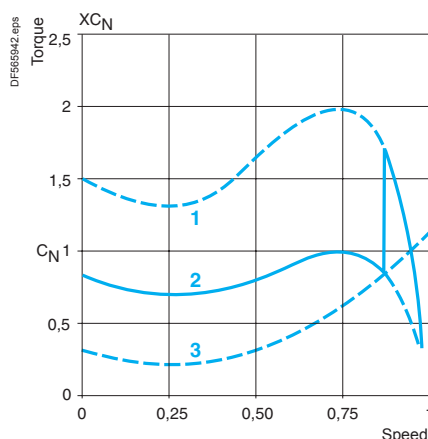
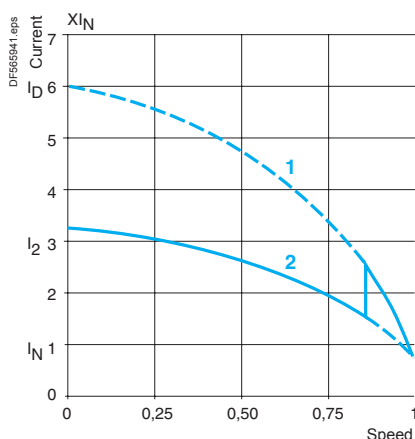
Recommended wiring scheme



Operation

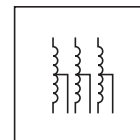
- Starting is performed in 3 stages:
- star connection of the auto-transformer is made by KM1, then contactor KM2 closes and the motor starts under reduced voltage
 - the neutral point is opened by KM1; part of the auto-transformer winding is switched into each phase for a short moment, constituting a stator starting inductance
 - KM3 switches the motor to full mains voltage and causes the auto-transformer to be shunted out of circuit by KM2.

The auto-transformer used generally has an air gap (adjusted or not) in order to obtain, during the second phase of starting, a series inductance whose value is compatible with correct starting.



- 1 Direct switching current
- 2 Current with auto-transformer

- 1 Direct motor torque
- 2 Torque with auto-transformer
- 3 Resistive torque of the machine



Auto-transformer starters from 59 to 900 kW up to 440 V (type 1 coordination)

The components recommended in the table below have been determined according to the following characteristics:

- auto-transformer: on 0.65 U_n connection with non adjusted air gap
- 3 starts per hour, of which 2 consecutive
- motor starting current: $I_d/I_n = 6$
- $I_q = 70$ kA
- transient current on closing of KM3 $\leq 7 \sqrt{2} I_n$
- maximum starting time: 30 seconds
- ambient temperature $\theta \leq 40$ °C.

Switch-disconnector-fuses: operators and accessories, please consult your Regional Sales Office.

Contactors: 3-pole.

LC1 D: see pages B8/2 and B8/7,

LC1 F: please consult your Regional Sales Office,

LC1 B: please consult your Regional Sales Office.

Auxiliary contact blocks:

- for contactors LC1 D: one LAD N11 (1 N/O + 1 N/C) on KM1
- for contactors LC1 F: one LAD N22 (2 N/O + 2 N/C) on KM1, KM2 and KM3.

Thermal overload relays:

- LR: see pages B11/4 to B11/9
- LR9 D: see pages B11/5 to B11/9
- LR9 F: please consult your Regional Sales Office.

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3					Switch-disconnector-fuse Reference	aM fuses		Contactors			Overload relays	
220/230 V	380/400 V	415 V	440 V	In max		Size	Rating	KM3 LC1	KM2 LC1	KM1 LC1	Reference (1)	Setting range
kW	kW	kW	kW	A		A						A
30	55	59	59	105	GS●K	22 x 58	125	D115	D115	D3210	LR9 D5369	90...150
											LRD 4367	95...120
40	75	80	80	138	GS●L	T0	160	D150	D115	D5011	LR9 D5369	90...150
											LRD 4369	110...140
51	90	90	100	170	GS●N	T1	200	F185	D115	D5011	LR9 F5371	132...220
63	110	110	110	205	GS●N	T1	250	F225	D150	D8011	LR9 F5371	132...220
75	132	132	150	245	GS●N	T1	250	F265	F185	D115	LR9 F5375	200...330
90	160	160	185	300	GS●QQ	T2	315	F330	F265	D115	LR9 F5375	200...330
110	200	200	220	370	GS●QQ	T2	400	F400	F330	D115	LR9 F5379	300...500
140	250	257	280	460	GS2 S	T3	500	F500	F400	D115	LR9 F5379	300...500
180	315	355	375	584	GS2 S	T3	630	F630	F400	D185	LR9 F5381	380...630
200	355	375	400	635	GS2 V	T4	800	F800	F500	F185	TC800/1 + LRD 05	505...800
220	400	425	450	710	GS2 V	T4	800	F800	F500	F265	TC800/1 + LRD 05	505...800
250	450	475	500	800	GS2 V	T4	800	F800	F500	F265	TC1000/1 + LRD 05	630...1000
280	500	530	560	900	GS2 V	T4	1000	BM33●22	F630	F330	TC1000/1 LRD 05	630...1000
315	560	600	630	1000	GS2 V	T4	1000	BM33●22	F630	F400	TC1250/1 LRD 05	790...1250
335	630	670	710	1100	GS2 V	T4	1250	BP33●22	F630	F400	TC1250/1 LRD 05	790...1250
400	710	750	800	1260	On base	T4	2 x 800 (2)	BP33●22	F780	F400	TC1500/1 LRD 05	945...1500
450	800	800	800	1450	On base	T4	2 x 800 (2)	BP33●22	F780	F400	TC1750/1 LRD 05	100...1750
500	900	900	900	1600	On base	T4	2 x 800 (2)	BR33●22	F780	F500	TC2000/1 LRD 05	260...2000

(1) For power ratings greater than or equal to 400 kW at 415 V, use one LRD-05 on the current transformer.

(2) Check with the motor manufacturer whether the fuses should be fitted in parallel.

Applications

These contactors are used to eliminate starting resistance in the rotor circuit of slip-ring motors.

The most common application is for starters without inching and without rotor speed adjustment: pumps, fans, conveyors, compressors, ...

In the case of control by means of a manually operated master controller, the use of contactors with magnetic blow-out is recommended. Please consult your Regional Sales Office.

For hoisting applications, contactor selection must take into account the type of motor duty, the operating rate, the rotor voltage and current, the type of connection, the ambient temperature, etc.
Please consult your Regional Sales Office.

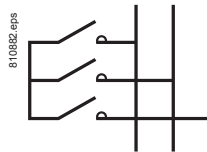
Operation

The rotor circuit contactors are interlocked with the stator contactor and therefore do not open until after the stator contactor has opened, when the rotor voltage has disappeared, or virtually disappeared.

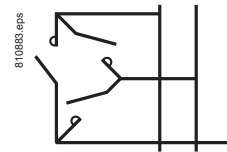
They make the current corresponding to the normal starting peak (1.5 to 2.5 times the rated rotor current) and open the circuit under no-load. Making and breaking are easy.

Different types of rotor connection

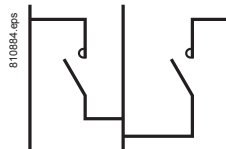
Star connection



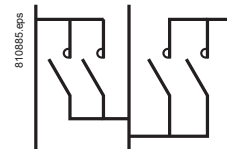
Delta connection



'V' connection



'W' connection



Contactor selection according to the type of connection

Rotor current and voltage coefficients

Coefficients to be applied to the operational current values shown in the table below.

Type of connection	Rotor I coefficient	3-phase rotor U _e ⁽¹⁾			
		Maximum	With counter-current		
	Operational I	LC1 F	LC1 B	LC1 F	LC1 B
Star	1	2000 V	2000 V	1000 V	1000 V
Delta	1.4	1700 V	1700 V	850 V	850 V
In V	1	1700 V	1700 V	850 V	850 V
In W	1.6	1700 V	1700 V	850 V	850 V

Selection according to the operational current

The selection examples below take into account:

- a ratio of 2 between the maximum operational rotor voltage (U_{er}) and the rated stator operational voltage (U_{es}). This ratio is given in standard IEC 60947-4,
- a guarantee of occasional duty (making and breaking capacities) specified in the above standards.

Time current flowing	Contactor rating											
	LC1 D150	LC1 F185	LC1 F265	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 BL	LC1 BM	LC1 BP	LC1 BR	
Intermediate contactor: with number of operating cycles ≤ 30/h												
10 s	450 A	550 A	800 A	1100 A	1500 A	2000 A	2500 A	2000 A	2400 A	3750 A	5000 A	
30 s	280 A	400 A	550 A	730 A	1000 A	1500 A	2000 A	1200 A	1800 A	2600 A	3600 A	
60 s	220 A	300 A	400 A	550 A	750 A	1200 A	1500 A	1000 A	1500 A	2200 A	3000 A	
Intermediate contactor: with number of operating cycles ≤ 60/h												
5 s	450 A	550 A	800 A	1100 A	1500 A	2000 A	2500 A	2000 A	2400 A	3750 A	5000 A	
10 s	330 A	450 A	620 A	860 A	1250 A	1800 A	2300 A	1600 A	2200 A	3400 A	4500 A	
30 s	220 A	300 A	400 A	550 A	750 A	1200 A	1500 A	1000 A	1500 A	2200 A	3000 A	
Intermediate contactor: with number of operating cycles ≤ 150/h for LC1 F and 120/h for LC1 B												
5 s	300 A	420 A	580 A	820 A	1150 A	1650 A	2200 A	1500 A	2100 A	3200 A	4200 A	
10 s	250 A	350 A	430 A	600 A	850 A	1300 A	1600 A	1100 A	1600 A	2300 A	3200 A	
Rotor short-circuit contactor and intermediate contactor: with number of operating cycles > 150/h for LC1 F and 120/h for LC1 B												
–	200 A	270 A	350 A	500 A	700 A	1000 A	1600 A	800 A	1250 A	2000 A	2750 A	

Electrical durability

For automatic starting, the electrical durability is in the region of 1 million operating cycles.

⁽¹⁾ For use up to 3000 V, please consult your Regional Sales Office.

TeSys contactors

Long distance remote control

Voltage drop caused by the inrush current

When the operating coil of a contactor is energised, the inrush current produces a voltage drop in the control circuit cable caused by the resistance of the conductors, which can adversely affect closing of the contactor.

An excessive voltage drop in the control supply cables (both a.c. and d.c.) can lead to non closure of the contactor poles or even destruction of the coil due to overheating.

This phenomenon is aggravated by:

- a long line
- a low control circuit voltage
- a cable with a small c.s.a.
- a high inrush power drawn by the coil.

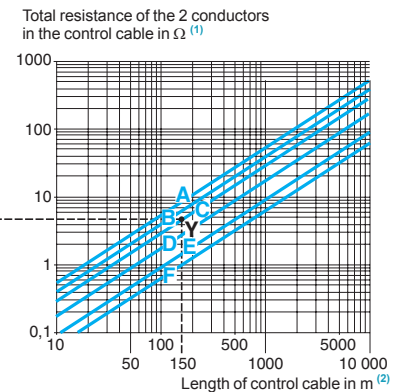
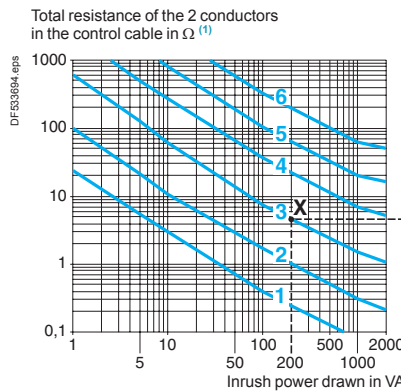
The maximum length of cable, depending on the control voltage, the inrush power and the conductor c.s.a., is indicated in the graphs below.

Remedial action

To reduce the voltage drop at switch-on:

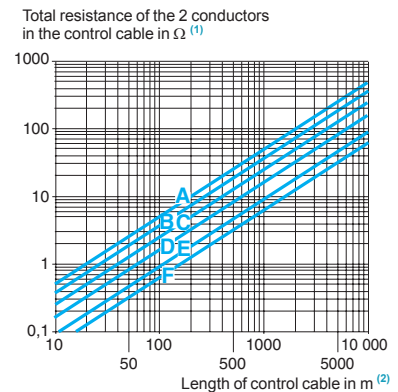
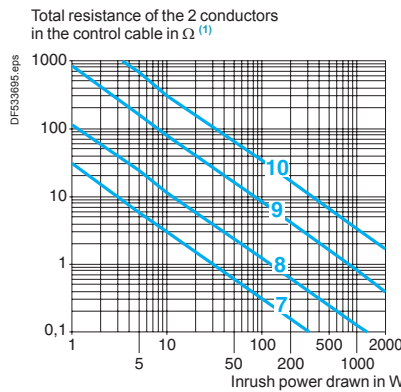
- increase the conductor c.s.a.
- use a higher control circuit voltage
- use an intermediate control relay.

These graphs are for a maximum line voltage drop of 5%. They give a direct indication of the copper conductor c.s.a. to be used for the control cable, depending on its length, the inrush power drawn by the contactor coil and the control circuit voltage (see example page A5/53).



1 ~ 24 V 3 ~ 115 V 5 ~ 400 V

C.s.a. of copper cables
 A 0.75 mm² C 1.5 mm² E 4 mm²



2 ~ 48 V 4 ~ 230 V 6 ~ 690 V

B 1 mm² D 2.5 mm² F 6 mm²

7 ~ 24 V 9 ~ 125 V
 8 ~ 48 V 10 ~ 250 V

C.s.a. of copper cables
 A 0.75 mm² C 1.5 mm² E 4 mm²
 B 1 mm² D 2.5 mm² F 6 mm²

(1) For 3-wire control, the current only flows in 2 of the conductors.
 (2) This is the length of the cable comprising 2 or 3 conductors. (Distance between the contactor and the control device).

Voltage drop caused by the inrush current

What cable c.s.a. is required for the control circuit of an LC1 D40A, 115 V contactor, operated from a distance of 150 metres?

- Contactor LC1 D40A, voltage 115 V, 50 Hz: inrush power: 200 VA.

On the left-hand graph on the page opposite, point X is at the intersection of the vertical line corresponding to 200 VA and the ~ 115 V voltage curve.

On the right-hand graph on the page opposite, point Y is at the intersection of the vertical line corresponding to 150 m and the horizontal line passing through point X.

Use the conductor c.s.a. indicated by the curve which passes through point Y, i.e.: 1.5 mm².

If point Y lies between two c.s.a. curves, choose the larger of the c.s.a. values.

Calculating the maximum cable length

The maximum permissible length for acceptable line voltage drop is calculated by the formula:

$$L = \frac{U^2}{SA} \cdot s \cdot K$$

where:

- L : distance between the contactor and the control device in m (length of the cable)
- U : supply voltage in V
- SA : apparent inrush power drawn by the coil in VA
- s : conductor c.s.a. in mm²
- K : factor given in the table below.

a.c. supply	SA in VA	20	40	100	150	200
	K	1.38	1.5	1.8	2	2.15
d.c. supply	Irrespective of the apparent inrush power SA, expressed in W K = 1.38					

Residual current in the coil due to cable capacitance

When the control contact of a contactor is opened, the control cable capacitance is effectively in series with the coil of the electromagnet. This capacitance can cause a residual current to be maintained in the coil, with the risk that the contactor will remain closed.

This only applies to contactors operating on an a.c. supply.

This phenomenon is aggravated by:

- a long line length between the coil control contact and the contactor, or between the coil control contact and the power supply,
- a high control circuit voltage,
- a low coil consumption, sealed,
- a low value of contactor drop-out voltage.

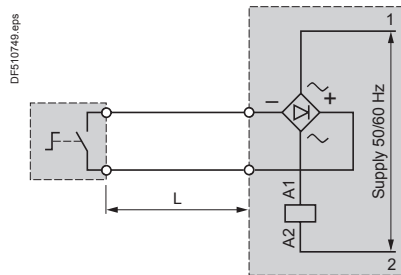
The maximum control cable length, according to the contactor coil supply voltage, is indicated in the graph on the page opposite.

Remedial action

Various solutions can be adopted to avoid the risk of the contactor remaining closed due to cable capacitance:

- use a d.c. control voltage, or
- add a rectifier, connected as shown in the scheme below, but retaining an a.c. operating coil: in this way, rectified a.c. current flows in the control cable.

When calculating the maximum cable length, take the resistance of the conductors into account.



- Connect a resistor in parallel with the contactor coil ⁽¹⁾.

Value of the resistance:

$$R \Omega = \frac{1}{10^{-3} C (\mu F)} \quad (C \text{ capacitance of the control cable})$$

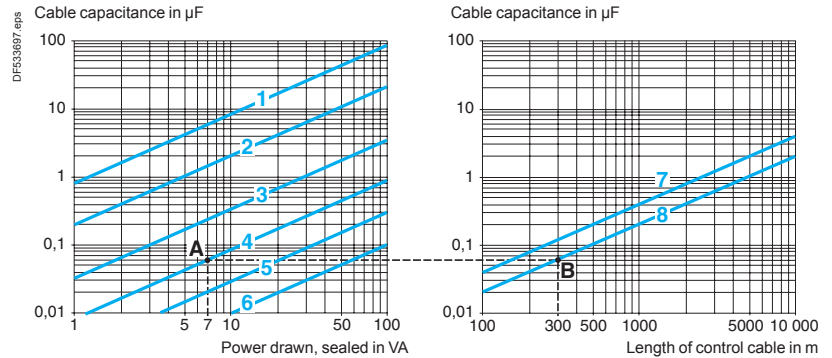
Power to be dissipated:

$$PW = \frac{U^2}{R}$$

⁽¹⁾ To avoid increasing the voltage drop due to inrush current, this resistor must be brought into operation after the contactor has closed by using an N/O contact.

Residual current in the coil due to cable capacitance

These graphs are for a capacitance, between 2 conductors, of 0.2 µF/km. They make it possible to determine whether there is a risk of the contactor remaining closed due to the power drawn by the coil when sealed, as well as the control circuit voltage, according to the length of the control cable.



1 ~ 24 V	3 ~ 115 V	5 ~ 400 V	7 3-wire control
2 ~ 48 V	4 ~ 230 V	6 ~ 690 V	8 2-wire control

In the zones below the straight lines for 3-wire and 2-wire control respectively, there is a risk of the contactor remaining closed.

Examples

What is the maximum length for the control cable of an LC1 D12 contactor, operating on 230 V, with 2-wire control?

- Contactor LC1 D12, voltage 230 V, 50 Hz: power sealed 7 VA.

On the left-hand graph, point A is at the intersection of the vertical line for 7 VA with the ~ 230 V voltage curve.

On the right-hand graph, point B is at the intersection of the horizontal line with the 2-wire control curve.

The maximum cable length is therefore 300 m.

In the same example, with a 600 m cable, the point lies in the risk zone. A resistor must therefore be connected in parallel with the contactor coil.

$$R = \frac{1}{10^{-3} \cdot C} = \frac{1}{10^{-3} \cdot 0.12} = 8.3 \Omega$$

Value of this resistance:

$$P = \frac{U^2}{R} = \frac{(220)^2}{8300} = 6 \text{ W}$$

Power to be dissipated:

Alternative solution: use a d.c. control supply.

Calculating the cable length

The maximum permitted length of control cable to avoid the effects of capacitance is calculated using the formula:

$$L = 455 \cdot \frac{S}{U^2 \cdot C_0}$$

L : distance between the contactor and the control device in km (length of the cable),

S : apparent power, sealed, in VA,

U : control voltage in V,

C₀ : line capacitance of the cable in µF/km.

Technical information

Current of asynchronous squirrel cage motors at nominal load

3-phase 4-pole motors

Current values for power in kW

Rated operational power ⁽¹⁾	Indicative rated operational current values at:			
	230 V	400 V	500 V	690 V
kW	A			
0.06	0.35	0.2	0.16	0.12
0.09	0.52	0.3	0.24	0.17
0.12	0.7	0.44	0.32	0.23
0.18	1	0.6	0.48	0.35
0.25	1.5	0.85	0.68	0.49
0.37	1.9	1.1	0.88	0.64
0.55	2.6	1.5	1.2	0.87
0.75	3.3	1.9	1.5	1.1
1.1	4.7	2.7	2.2	1.6
1.5	6.3	3.6	2.9	2.1
2.2	8.5	4.9	3.9	2.8
3	11.3	6.5	5.2	3.8
4	15	8.5	6.8	4.9
5.5	20	11.5	9.2	6.7
7.5	27	15.5	12.4	8.9
11	38	22	17.6	12.8
15	51	29	23	17
18.5	61	35	28	21
22	72	41	33	24
30	96	55	44	32
37	115	66	53	39
45	140	80	64	47
55	169	97	78	57
75	230	132	106	77
90	278	160	128	93
110	340	195	156	113
132	400	230	184	134
160	487	280	224	162
200	609	350	280	203
250	748	430	344	250
315	940	540	432	313
355	1061	610	488	354
400	1200	690	552	400
500	1478	850	680	493
560	1652	950	760	551
630	1844	1060	848	615
710	2070	1190	952	690
800	2340	1346	1076	780
900	2640	1518	1214	880
1000	2910	1673	1339	970

Current values for power in hp

Rated operational power ⁽²⁾	Indicative rated operational current values at:						
	110 - 120 V	200 V	208 V	220 - 240 V	380 - 415 V	440 - 480 V	550 - 600 V
hp	A						
1/2	4.4	2.5	2.4	2.2	1.3	1.1	0.9
3/4	6.4	3.7	3.5	3.2	1.8	1.6	1.3
1	8.4	4.8	4.6	4.2	2.3	2.1	1.7
1 1/2	12	6.9	6.6	6	3.3	3	2.4
2	13.6	7.8	7.5	6.8	4.3	3.4	2.7
3	19.2	11	10.6	9.6	6.1	4.8	3.9
5	30.4	17.5	16.7	15.2	9.7	7.6	6.1
7 1/2	44	25.3	24.2	22	14	11	9
10	56	32.2	30.8	28	18	14	11
15	84	48.3	46.2	42	27	21	17
20	108	62.1	59.4	54	34	27	22
25	136	78.2	74.8	68	44	34	27
30	160	92	88	80	51	40	32
40	208	120	114	104	66	52	41
50	260	150	143	130	83	65	52
60	-	177	169	154	103	77	62
75	-	221	211	192	128	96	77
100	-	285	273	248	165	124	99
125	-	359	343	312	208	156	125
150	-	414	396	360	240	180	144
200	-	552	528	480	320	240	192
250	-	-	-	604	403	302	242
300	-	-	-	722	482	361	289
350	-	-	-	828	560	414	336
400	-	-	-	954	636	477	382
450	-	-	-	1030	-	515	412
500	-	-	-	1180	786	590	472

(1) Values conforming to standard IEC 60072-1 (at 50 Hz).

(2) Values conforming to standard UL 508 (at 60 Hz).

Note: These values are given as a guide. They may vary depending on the type of motor, its polarity and the manufacturer.

Technical information

Product standards and certifications

Standardisation

Conformity to standards

Schneider Electric products satisfy, in the majority of cases, national (for example: BS in Great Britain, NF in France, DIN in Germany), European (for example: CENELEC) or international (IEC) standards. These product standards precisely define the performance of the designated products (such as IEC 60947 for low voltage equipment).

When used correctly, as designated by the manufacturer and in accordance with regulations and correct practices, these products will allow users to build equipment, machine systems or installations that conform to their appropriate standards (for example: IEC 60204-1, relating to electrical equipment used on industrial machines).

Schneider Electric is able to provide proof of conformity of its production to the standards it has chosen to comply with, through its quality assurance system.

On request, and depending on the situation, Schneider Electric can provide the following:

- a declaration of conformity,
- a certificate of conformity (ASEFA/LOVAG),
- a homologation certificate or approval, in the countries where this procedure is required or for particular specifications, such as those existing in the merchant navy.

Code	Certification authority		Country
	Name	Abbreviation	
ANSI	American National Standards Institute	ANSI	USA
BS	British Standards Institution	BSI	Great Britain
CEI	Comitato Elettrotecnico Italiano	CEI	Italy
DIN/VDE	Verband Deutscher Electrotechniker	VDE	Germany
EN	Comité Européen de Normalisation Electrotechnique	CENELEC	Europe
GOST	Gosudarstvenn Komitet Standartov	GOST	Russia
IEC	International Electrotechnical Commission	IEC	Worldwide
JIS	Japanese Industrial Standards Committee	JISC	Japan
NBN	Institut Belge de Normalisation	IBN	Belgium
NEN	Nederlands Normalisatie Instituut	NNI	Netherlands
NF	Union Technique de l'Electricité	UTE	France
SAA	Standards Association of Australia	SAA	Australia
UNE	Asociacion Española de Normalizacion y Certificacion	AENOR	Spain

European EN standards

These are technical specifications established in conjunction with, and with approval of, the relative bodies within the various CENELEC member countries (European Union, European Free Trade Association and many central and eastern European countries having «member» or «affiliated» status). Prepared in accordance with the principle of consensus, the European standards are the result of a weighted majority vote. Such adopted standards are then integrated into the national collection of standards, and contradictory national standards are withdrawn. European standards incorporated within the French collection of standards carry the prefix NF EN. At the 'Union Technique de l'Electricité' (*Technical Union of Electricity*) (UTE), the French version of a corresponding European standard carries a dual number: European reference (NF EN ...) and classification index (C ...).

Therefore, the standard NF EN 60947-4-1 relating to motor contactors and starters, effectively constitutes the French version of the European standard EN 60947-4-1 and carries the UTE classification C 63-110.

This standard is identical to the British standard BS EN 60947-4-1 or the German standard DIN EN 60947-4-1.

Whenever reasonably practical, European standards reflect the international standards (IEC).

With regard to automation system components and distribution equipment, in addition to complying with the requirements of French NF standards, Schneider Electric brand components conform to the standards of all other major industrial countries.

Regulations

European Directives

Opening up of European markets assumes harmonisation of the regulations pertaining to each of the member countries of the European Union.

The purpose of the European Directive is to eliminate obstacles hindering the free circulation of goods within the European Union, and it must be applied in all member countries. Member countries are obliged to transcribe each Directive into their national legislation and to simultaneously withdraw any contradictory regulations. The Directives, in particular those of a technical nature which concern us, only establish the objectives to be achieved, referred to as "essential requirements".

The manufacturer must take all the necessary measures to ensure that his products conform to the requirements of each Directive applicable to his production.

As a general rule, the manufacturer certifies conformity to the essential requirements of the Directive(s) for his product by affixing the CE mark.

The CE mark is affixed to Schneider Electric brand products concerned, in order to comply with French and European regulations.

Significance of the CE mark

- The CE mark affixed to a product signifies that the manufacturer certifies that the product conforms to the relevant European Directive(s) which concern it; this condition must be met to allow free distribution and circulation within the countries of the European Union of any product subject to one or more of the E.U. Directives.
- The CE mark is intended solely for national market control authorities.
- The CE mark must not be confused with a conformity marking.

Technical information

Product standards and certifications

European Directives

For electrical equipment, only conformity to standards signifies that the product is suitable for its designated function, and only the guarantee of an established manufacturer can provide a high level of quality assurance.

For Schneider Electric brand products, one or several Directives are likely to be applicable, depending on the product, and in particular:

- the Low Voltage Directive 2006/95/EC: the CE mark relating to this Directive has been compulsory since 16th January 2007.
- the Electromagnetic Compatibility Directive 89/336/EEC, amended by Directives 92/31/EEC and 93/68/EEC: the CE mark on products covered by this Directive has been compulsory since 1st January 1996.

ASEFA-LOVAG certification

The function of ASEFA (Association des Stations d'Essais Française d'Appareils électriques - Association of French Testing Stations for Low Voltage Industrial Electrical Equipment) is to carry out tests of conformity to standards and to issue certificates of conformity and test reports. ASEFA laboratories are authorised by the French authorisation committee (COFRAC). ASEFA is now a member of the European agreement group LOVAG (Low Voltage Agreement Group). This means that any certificates issued by LOVAG/ASEFA are recognised by all the authorities which are members of the group and carry the same validity as those issued by any of the member authorities.

Quality labels

When components can be used in domestic and similar applications, it is sometimes recommended that a "Quality label" be obtained, which is a form of certification of conformity.

Code	Quality label	Country
CEBEC	Comité Electrotechnique Belge	Belgium
KEMA-KEUR	Keuring van Electrotechnische Materialen	Netherlands
NF	Union Technique de l'Electricité	France
ÖVE	Österreichischer Verband für Electrotechnik	Austria
SEMKO	Svenska Elektriska Materiel Kontrollnatanalen	Sweden


Product certifications

In some countries, the certification of certain electrical components is a legal requirement. In this case, a certificate of conformity to the standard is issued by the official test authority.

Each certified device must bear the relevant certification symbols when these are mandatory:

Code	Certification authority	Country
CSA	Canadian Standards Association	Canada
UL	Underwriters Laboratories	USA
CCC	China Compulsory Certification	China

Note on certifications issued by the Underwriters Laboratories (UL). There are two levels of approval:

- "Recognized" ()** The component is fully approved for inclusion in equipment built in a workshop, where the operating limits are known by the equipment manufacturer and where its use within such limits is acceptable by the Underwriters Laboratories.

The component is not approved as a "Product for general use" because its manufacturing characteristics are incomplete or its application possibilities are limited.

A "Recognized" component does not necessarily carry the certification symbol.
- "Listed" (UL)** The component conforms to all the requirements of the classification applicable to it and may therefore be used both as a "Product for general use" and as a component in assembled equipment. A "Listed" component must carry the certification symbol.

Marine classification societies

Prior approval (= certification) by certain marine classification societies is generally required for electrical equipment which is intended for use on board merchant vessels.

Code	Classification authority	Country
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway
GL	Germanischer Lloyd	Germany
LR	Lloyd's Register	Great Britain
NKK	Nippon Kaiji Kyokai	Japan
RINA	Registro Italiano Navale	Italy
RRS	Register of Shipping	Russia

Note: for further details on a specific product, please refer to the "Characteristics" pages in this catalogue or consult your Regional Sales Office.

Technical information

Protective treatment of equipment according to climatic environment

Depending on the climatic and environmental conditions in which the equipment is placed, Schneider Electric can offer specially adapted products to meet your requirements.

In order to make the correct choice of protective finish, two points should be remembered:

- the prevailing climate of the country is never the only criterion,
- only the atmosphere in the immediate vicinity of the equipment need be considered.

All climates treatment “TC”

This is the standard treatment for Schneider-electric brand equipment and is suitable for the vast majority of applications. It is the equivalent of treatments described as “Klimafest”, “Climateproof”.

In particular, it meets the requirements specified in the following publications:

- Publication UTE C 63-100 (method I), successive cycles of humid heat at: +40 °C and 95 % relative humidity.
- DIN 50016 - Variations of ambient conditions within a climatic chamber: +23 °C and 83 % relative humidity, +40 °C and 92 % relative humidity.

It also meets the requirements of the following marine classification societies: BV-LR-GL-DNV-RINA.

Characteristics

- Steel components are usually treated with zinc. When they have a mechanical function, they may also be painted.
- Insulating materials are selected for their high electrical, dielectric and mechanical characteristics.
- Metal enclosures have a stoved paint finish, applied over a primary phosphate protective coat, or are galvanised (e.g. some prefabricated busbar trunking components).

Limits for use of “TC” (All climates) treatment

- “TC” treatment is suitable for the following temperatures and humidity:

Temperature (°C)	Relative humidity (%)
20	95
40	80
50	50

“TC” treatment is therefore suitable for all latitudes and in particular tropical and equatorial regions where the equipment is mounted in normally ventilated industrial premises. Being sheltered from external climatic conditions, temperature variations are small, the risk of condensation is minimised and the risk of dripping water is virtually non-existent.

Extension of use of “TC” (All climates) treatment

In cases where the humidity around the equipment exceeds the conditions described above, or in equatorial regions if the equipment is mounted outdoors, or if it is placed in a very humid location (laundries, sugar refineries, steam rooms, etc.), “TC” treatment can still be used if the following precautions are taken:

- The enclosure in which the equipment is mounted must be protected with a “TH” finish (see next page) and must be well ventilated to avoid condensation and dripping water (e.g. enclosure base plate mounted on spacers).
- Components mounted inside the enclosure must have a “TC” finish.
- If the equipment is to be switched off for long periods, a heater must be provided (0.2 to 0.5 kW per square decimetre of enclosure), that switches on automatically when the equipment is turned off. This heater keeps the inside of the enclosure at a temperature slightly higher than the outside surrounding temperature, thereby avoiding any risk of condensation and dripping water (the heat produced by the equipment itself during normal running is sufficient to provide this temperature difference).
- Special considerations for “Operator dialog” and “Detection” products: for certain pilot devices, the use of “TC” treatment can be extended to outdoor use provided their enclosure is made of light alloys, zinc alloys or plastic material. In this case, it is also essential to ensure that the degree of protection against penetration of liquids and solid objects is suitable for the applications involved.

Technical information

Protective treatment of equipment according to climatic environment

“TH” treatment for hot and humid environments

This treatment is suitable for hot and humid atmospheres where installations are regularly subject to condensation, dripping water and the risk of fungi.

In addition, plastic insulating components are resistant to attacks from insects such as termites and cockroaches. These properties have often led to this treatment being described as “Tropical Finish”, but this does not mean that all equipment installed in tropical and equatorial regions must systematically have undergone “TH” treatment. On the other hand, certain operating conditions in temperate climates may well require the use of “TH” treated equipment (see limitations for use of “TC” treatment).

Special characteristics of “TH” treatment

- All insulating components are made of materials which are either resistant to fungi or treated with a fungicide, and which have increased resistance to creepage (Standards IEC 60112, NF C 26-220, DIN 5348).
- Metal enclosures receive a top-coat of stoved, fungicidal paint, applied over a rust inhibiting undercoat. Components with “TH” treatment may be subject to a surcharge ⁽¹⁾. Please consult your Regional Sales Office.

Protective treatment selection guide

Surrounding environment	Duty cycle	Internal heating of enclosure when not in use	Type of climate	Protective treatment of equipment of enclosure	
Indoors					
No dripping water or condensation	Unimportant	Not necessary	Unimportant	“TC”	“TC”
Presence of dripping water or condensation	Frequent switching off for periods of more than 1 day	No	Temperate	“TC”	“TH”
		Yes	Equatorial	“TH”	“TH”
	Continuous	Not necessary	Unimportant	“TC”	“TH”
Outdoors (sheltered)					
No dripping water or dew	Unimportant	Not necessary	Temperate	“TC”	“TC”
Exposed outdoors or near the sea					
Frequent and regular presence of dripping water or dew	Frequent switching off for periods of more than 1 day	No	Temperate	“TC”	“TH”
		Yes	Equatorial	“TH”	“TH”
	Continuous	Not necessary	Unimportant	“TC”	“TH”

These treatments cover, in particular, the applications defined by methods I and II of guide UTE C 63-100.

Special precautions for electronic equipment

Electronic products always meet the requirements of “TC” treatment. A number of them are “TH” treated as standard.

Some electronic products (for example: programmable controllers, flush mountable controllers CCX and flush mountable operator terminals XBT) require the use of an enclosure providing a degree of protection to at least IP 54, as defined by standards IEC 60664 and NF C 20 040, for use in industrial applications or in environmental conditions requiring “TH” treatment.

These electronic products, including flush mountable products, must have a degree of protection to at least IP 20 (provided either by their own enclosure or by their installation method) for restricted access locations where the degree of pollution does not exceed 2 (a test booth not containing machinery or other dust producing activities, for example).

Special treatments

For particularly harsh industrial environments, Schneider Electric is able to offer special protective treatments. Please consult your Regional Sales Office.

⁽¹⁾ A large number of the Schneider electric brand products are “TH” treated as standard and are, therefore, not subject to a surcharge.

Technical information

Degrees of protection provided by enclosures IP code

Degrees of protection against the penetration of solid bodies, water and personnel access to live parts

The European standard EN 60529 dated October 1991, IEC publication 529 (2nd edition - November 1989), defines a coding system (IP code) for indicating the degree of protection provided by electrical equipment enclosures against accidental direct contact with live parts and against the ingress of solid foreign objects or water. This standard does not apply to protection against the risk of explosion or conditions such as humidity, corrosive gasses, fungi or vermin.

Certain equipment is designed to be mounted on an enclosure which will contribute towards achieving the required degree of protection (example : control devices mounted on an enclosure).















Different parts of an equipment can have different degrees of protection (example : enclosure with an opening in the base).

Standard NF C 15-100 (May 1991 edition), section 512, table 51 A, provides a cross-reference between the various degrees of protection and the environmental conditions classification, relating to the selection of equipment according to external factors.

Practical guide UTE C 15-103 shows, in the form of tables, the characteristics required for electrical equipment (including minimum degrees of protection), according to the locations in which they are installed.

IP ●●● code

The IP code comprises **2 characteristic numerals** (e.g. **IP 55**) and may include **an additional letter** when the actual protection of personnel against direct contact with live parts is better than that indicated by the first numeral (e.g. IP 20C). Any characteristic numeral which is unspecified is replaced by an X (e.g. IP XXB).

1 st characteristic numeral		2 nd characteristic numeral		Additional letter	
corresponds to protection of the equipment against penetration of solid objects and protection of personnel against direct contact with live parts.		corresponds to protection of the equipment against penetration of water with harmful effects.		corresponds to protection of personnel against direct contact with live parts.	
Protection of the equipment	Protection of personnel				
0 Non-protected	Non-protected	0 Non-protected	Non-protected	A	With the back of the hand.
1 Ø 50 mm 	Protected against the penetration of solid objects having a diameter greater than or equal to 50 mm.	1 	Protected against vertical dripping water, (condensation).	B	With the finger.
2 Ø 12,5 mm 	Protected against the penetration of solid objects having a diameter greater than or equal to 12.5 mm.	2 15° 	Protected against dripping water at an angle of up to 15°.	C	With a Ø2.5 mm tool.
3 Ø 2,5 mm 	Protected against the penetration of solid objects having a diameter greater than or equal to 2.5 mm.	3 60° 	Protected against rain at an angle of up to 60°.	D	With a Ø1 mm wire.
4 Ø 1 mm 	Protected against the penetration of solid objects having a diameter greater than or equal to 1 mm.	4 	Protected against splashing water in all directions.		
5 	Dust protected (no harmful deposits).	5 	Protected against water jets in all directions.		
6 	Dust tight.	6 	Protected against powerful jets of water and waves.		
		7 	Protected against the effects of temporary immersion.		
		8 	Protected against the effects of prolonged immersion under specified conditions.		

Coordination and standards

Technical information

Degrees of protection provided by enclosures

IK code

Degrees of protection against mechanical impact

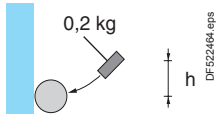
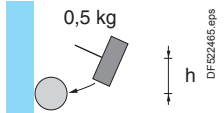
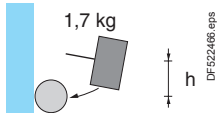
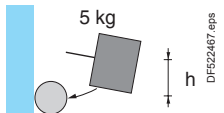
The European standard EN 50102 dated March 1995 defines a coding system (IK code) for indicating the degree of protection provided by electrical equipment enclosures against external mechanical impact. Standard NF C 15-100 (May 1991 edition), section 512, table 51 A, provides a cross-reference between the various degrees of protection and the environmental conditions classification, relating to the selection of equipment according to external factors. Practical guide UTE C 15-103 shows, in the form of tables, the characteristics required for electrical equipment (including minimum degrees of protection), according to the locations in which they are installed.

IK ●● code

The IK code comprises **2 characteristic numerals** (e.g. **IK 05**).


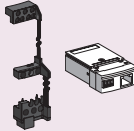


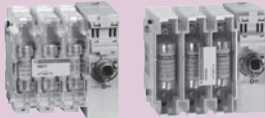

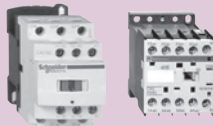


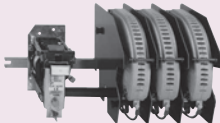
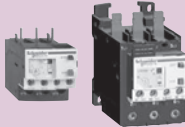

2 characteristic numerals

corresponding to a value of impact energy.

		h (cm)	Energy (J)
00	Non-protected		
01		7.5	0.15
02		10	0.2
03		17.5	0.35
04		25	0.5
05		35	0.7
06		20	1
07		40	2
08		30	5
09		20	10
10		40	20

Part B Components

For customer made solutions

Type of product	Range	Product views	Page	
Power busbar systems: Linergy BZ, HK	Up to 630 A		B1/1	Power busbar systems
Motor starter wiring systems			B2/1	Wiring systems
Switch-disconnectors: TeSys Vario	Up to 175 A		B3/1	Switch-disconnectors
Fuse carriers: TeSys DF, LS, GK	Up to 125 A		B4/1	Fuse carriers
Switch-disconnectors fuses: TeSys GS	Up to 1250 A		B5/1	Switch-disconnectors fuses
Circuit breakers: TeSys GV, GB	Up to 250 kW		B6/1	Circuit breakers
Control relays: TeSys SK, K, D			B7/1	Control relays
Contactors: TeSys SK, K, D, SKGC, GC, GY, GF	Up to 200 A		B8/1	Contactors
High power contactors: TeSys F, V, FG, CR1F	Up to 2100 A		B9/1	High power contactors
Bar mounted contactors: TeSys B	Up to 16300 A		B10/1	Bar mounted contactors
Overload relays: TeSys LRx (for TeSys K, D, F) TeSys RM1X, LR97, LT47	Up to 630 A		B11/1	Overload relays
Motor management systems: TeSys U, T	Up to 800 A		B12/1	Motor controllers

Busbar systems for electrical distribution and motors starters

Type of product	Range	Pages
Presentation Linergy BZ		B1/2
Multistandard power busbar Linergy BZ	From 160 to 630 A	B1/4
Presentation Linergy HK		B1/10
Multistandard hot-plug distribution system Linergy HK	Up to 160 A	B1/12

Technical Data for Designers

B1/17



All Schneider Electric **distribution and connection systems** are brought together into a single brand name: **Linergy**

- Distribution blocks
- Device feeders
- Power busbars
- Hot plug busbar system
- Terminal blocks and bars.

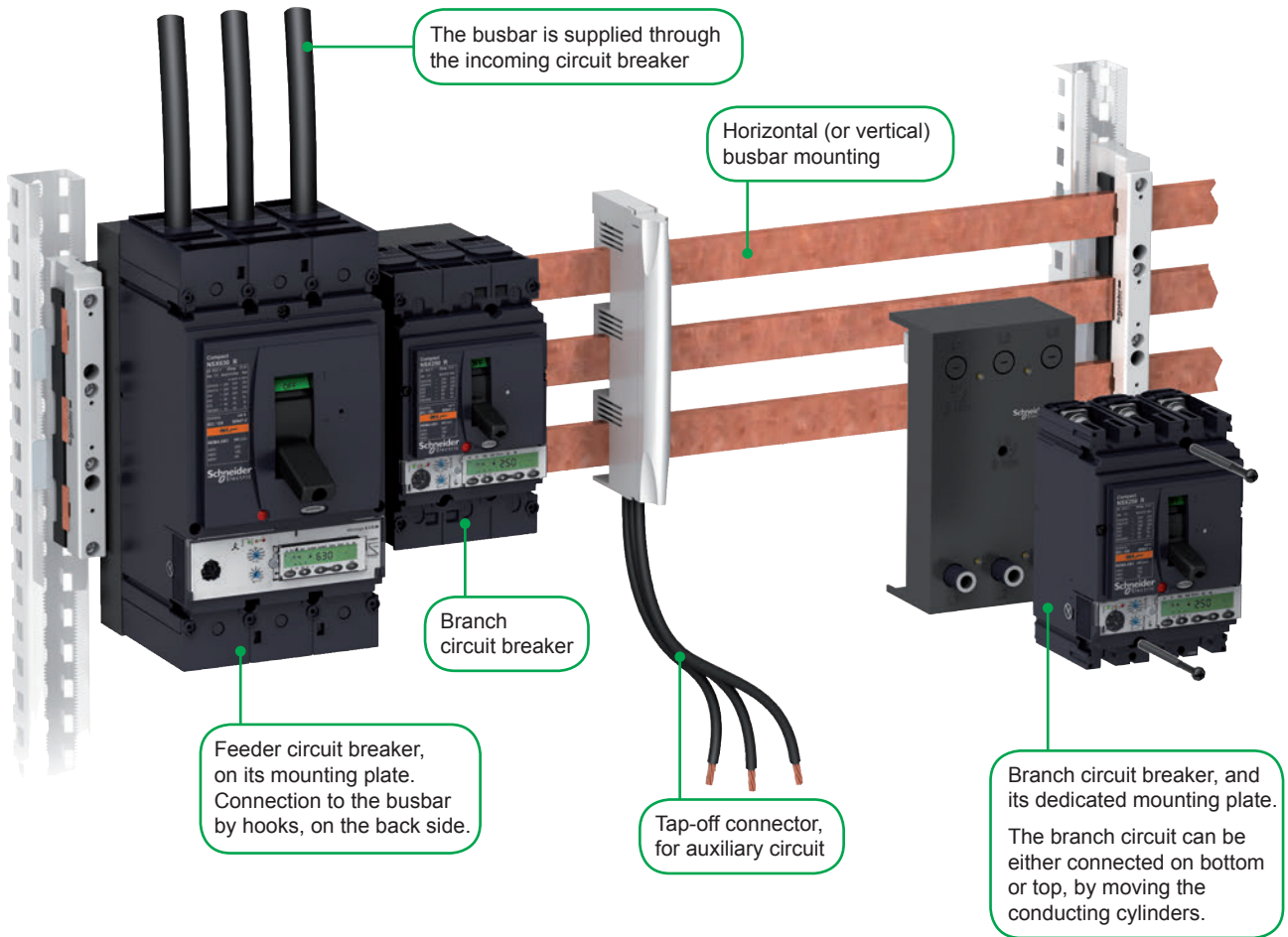
Catalogue reference: **LVYED13001EN**

Lineryg BZ, Multistandard power busbar system

Application: electrical distribution, up to 630 A

Lineryg BZ

In enclosures, when space saving and fast connection are a strong requirement



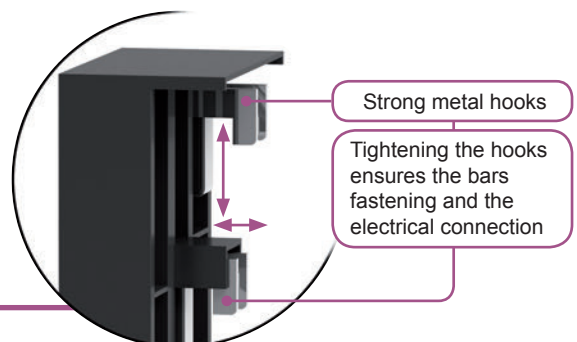
Ideal for industrial process application

Advantages

- Considerable space saving: components are directly mounted on the busbar
- Quick connection, disconnection: a metal hook combines mechanical fastening and electrical connection
- Multi standard: conform to IEC and UL standards

Detailed view: back face of a mounting plate

- Mounting plates, for Compact NSX, Powerpact and GV7 circuit breakers
- Compatible with bars:
 - Height 12, 15, 20, 25 or 30 mm,
 - Width 5 or 10 mm



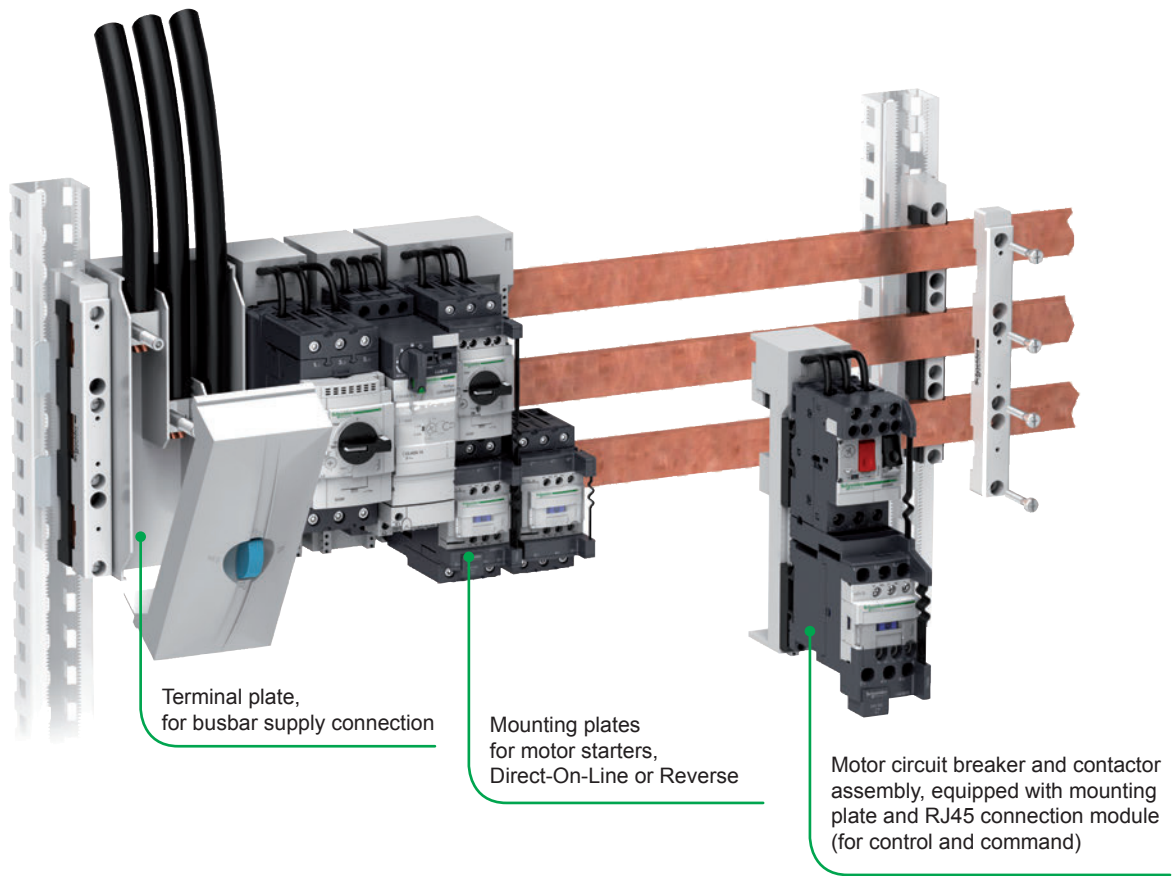
Linergy BZ, Multistandard power busbar system

Application: power distribution to motor starters

Linergy BZ

Power busbar systems

In control switchboards, when space saving, quick mounting and replacement are required

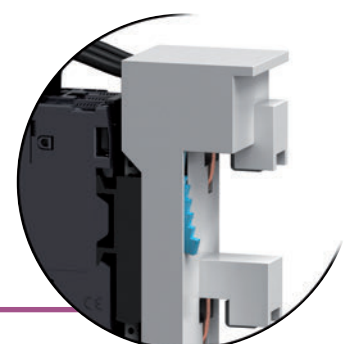


Advantages

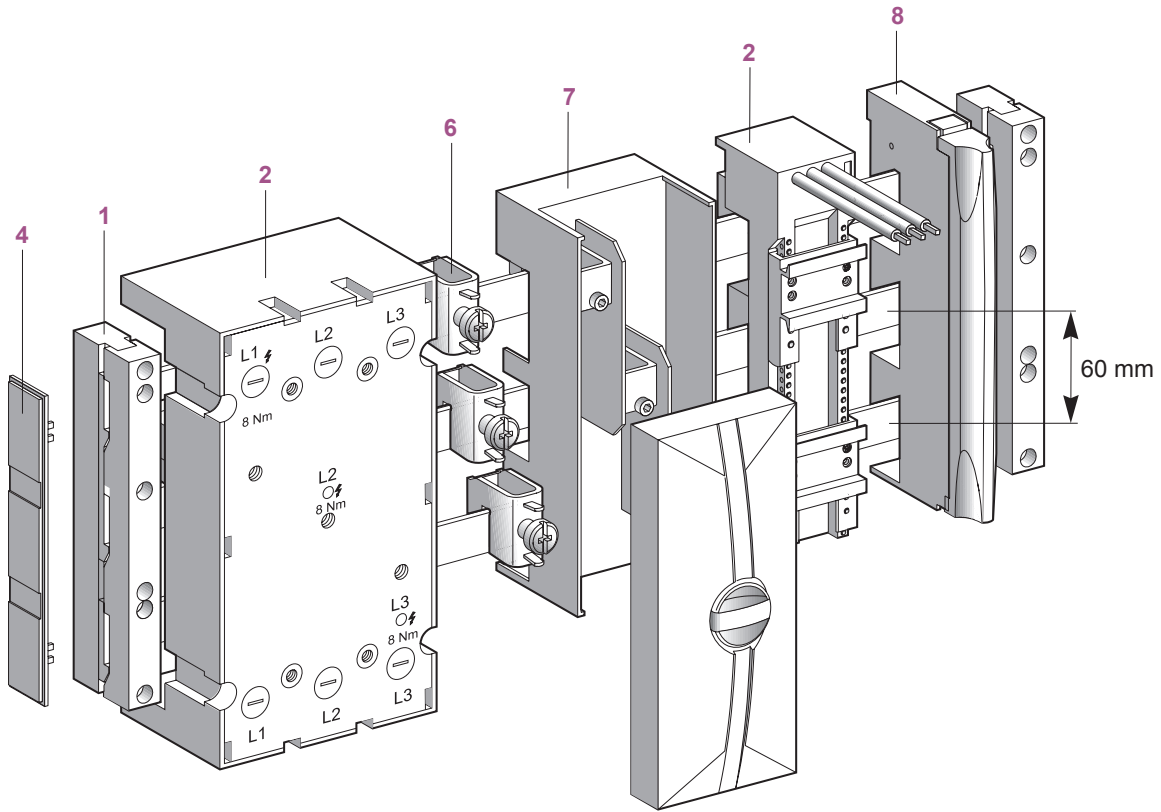
- Considerable space saving: components are directly mounted on the busbar
- Large choice of mounting plates (for GV2, GV3 motor circuit breakers and assemblies, GV7, TeSys U)
- Quick connection, deconnection (power off): clip-on mounting plates
- Vibration resistant busbar connections: no periodical re-tightening required

Detailed view: back face of a motor starter mounting plate

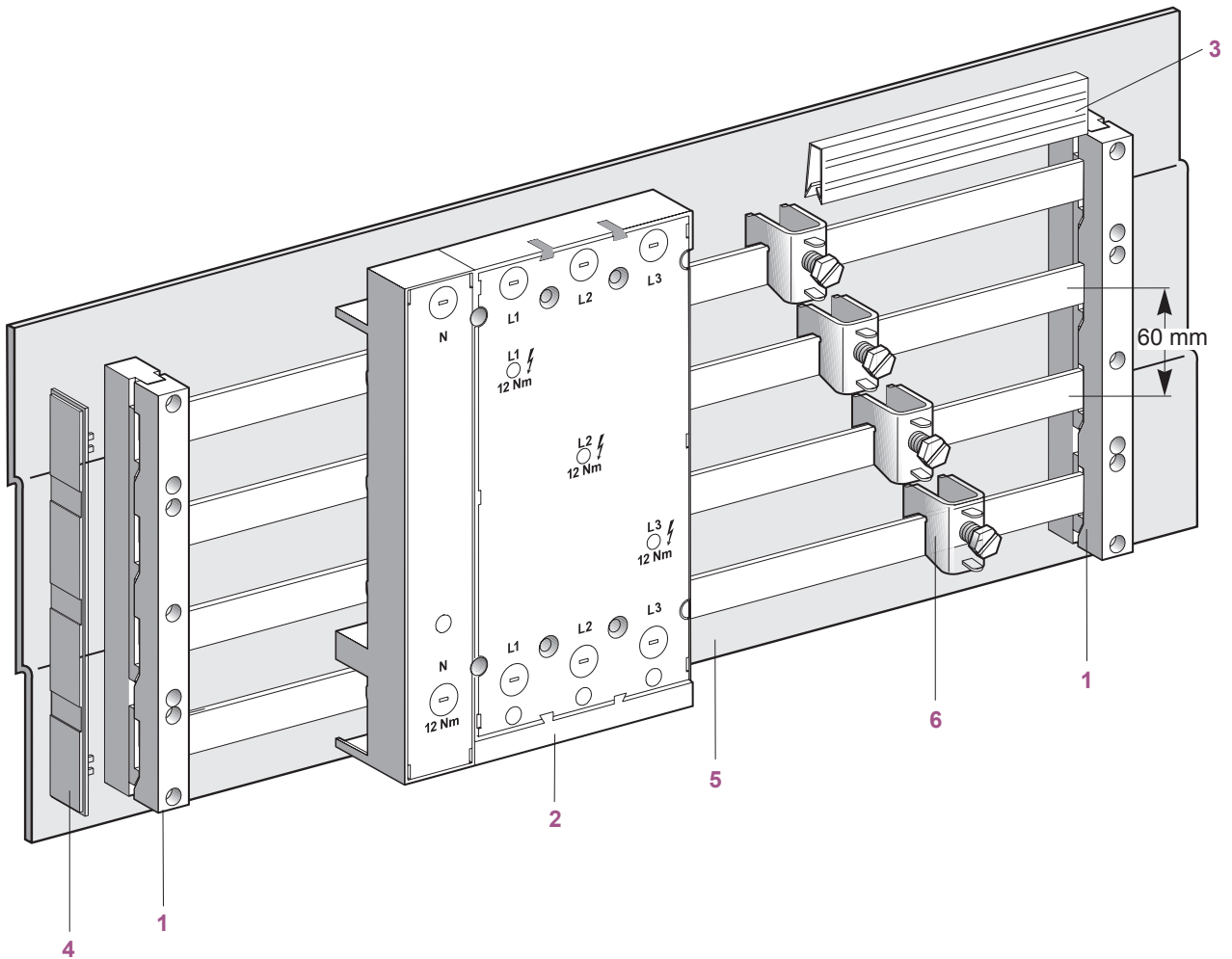
- A reliable electrical contact is ensured by copper blades
- The blue part locks the mounting plate on the busbar, compatibility is provided with the standard profiles:
 - Height 12, 15, 20, 25 or 30 mm,
 - Width 5 or 10 mm



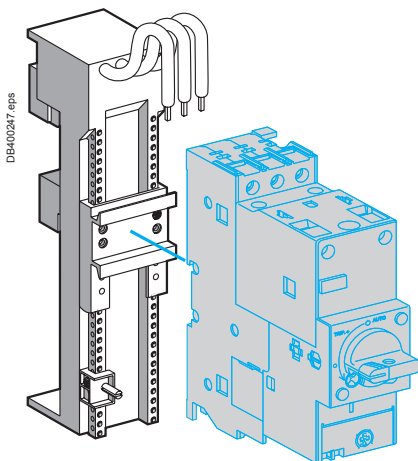
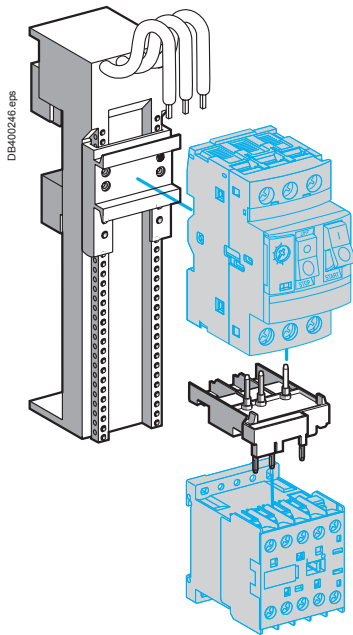
DE400244.eps



DE400245.eps



Lineryy BZ



Installation examples.

Description

The TeSys mounting plate system for busbars simplifies the installation of motor feeder components used in your electrical installations. Power distribution is performed by a busbar.

The mounting plates are fitted directly on this busbar, by snap-on mounting, thus implementing mechanical and electrical connection.

This system offers numerous benefits:

- space saving in cabinets
- fast, safe and reliable electrical and mechanical connection
- easy connection
- protection for users against electric shocks by direct contacts (IP20) by using busbars end covers
- equipment flexibility and modularity
- increased equipment availability: easier maintenance
- power supply without drilling (connectors) from 1.5 to 120 mm².

Busbars system

The busbar interaxis is 60 mm. Depending on the cross section of the bars, the busbar can withstand a maximum current of 630 A.

Note: The bars forming the busbar are not part of the TeSys LA9Z offer. They are not supplied by us. Their selection depends on the maximum current needed for your installation (see next page).

Support for 3P and 4P busbar (1)

These are available in 2 versions: three-pole and four-pole. For applications having to comply with the UL standard, use the LA9ZX01508 support (3P only).

The mounting plates (2)

These allow mounting of the power feeder components consisting of:

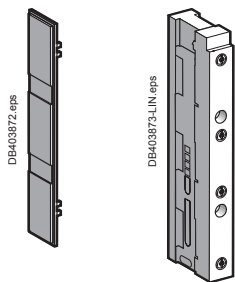
- a GV2 motor circuit breaker, mounted alone or in conjunction with a TeSys K or TeSys D contactor
- a GV3 motor circuit breaker, mounted alone or in conjunction with a TeSys D contactor
- a TeSys U starter-controller
- a TeSys GV7 motor circuit breaker
- an LD63 integral contactor-circuit breaker
- a NSX100-250 or NSX400-630 A circuit breaker
- H/J/L PowerPact circuit breaker frame.

Accessories

Accessories complete the offer:

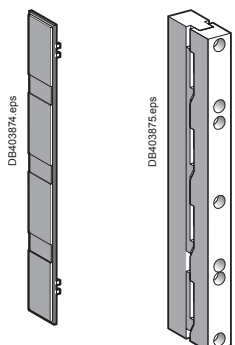
- covers (3) for 5 and 10 mm bars
- end covers (4)
- a base plate (5)
- 1P connectors (6)
- 3P connectors on mounting plate (7)
- a spring terminal 3P connection module (8).

Linery BZ




LA9ZX01573 LA9ZX01495

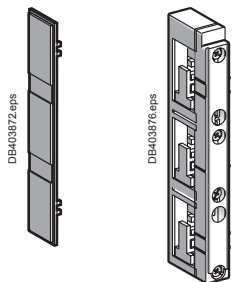
IEC busbar supports and accessories		Min. order qty	Unit reference
3-pole	For 12, 15, 20, 25, 30 x 5/10 mm busbars	10	LA9ZX01495
	End covers for 3-pole busbar support	10	LA9ZX01573
4-pole	For 12, 15, 20, 25, 30 x 5/10 mm busbars	10	LA9ZX01485
	End covers for 4-pole busbar support (5 left, 5 right)	10	LA9ZX01131



LA9ZX01131 LA9ZX01485

UL busbar supports and accessories		Min. order qty	Unit reference
3-pole	For 12, 20, 30 x 5/10 mm busbars	10	LA9ZX01508
	Base plate 240 x 700	2	LA9ZX01515
	End covers for busbar support	10	LA9ZX01573

Other accessories		Min. order qty	Unit reference
Covers, length 1 m			
 <p>DB401275.eps</p>	For 12-30 x 5 mm busbars	10	LA9ZX01244
	For 12-30 x 10 mm busbars	10	LA9ZX01245



LA9ZX01573 LA9ZX01508

Lineryy BZ



PB112427_R.eps

LA9ZA32627



PB103841_R.eps

LV429372



PB103841_R.eps

LA9ZA32600



PB112432_R.eps

LV432624

For TeSys integral contactor-circuit breakers

Operating current AC-3 440 V	Protection by contactor-circuit breaker	Mounting plate l x h x d	Min. order qty	Unit reference
Mounting plate, 1-way				
63 A	LD1, LD4 LD●	108 x 260 x 63	1	LA9ZA32627

For TeSys GV7 motor circuit breakers

Operating current AC-3 440 V	Protection by contactor-circuit breaker	Mounting plate l x h x d	Min. order qty	Unit reference
Mounting plate, 1-way				
80 A	GV7	104 x 190 x 63	1	LV429372

For Compact NSX circuit breakers

Ratings		Mounting plate l x h x d	Min. order qty	Unit reference
100-250 A	Mounting plate for 3P circuit breakers	104 x 190 x 63	1	LV429372
	Mounting plate for 4P circuit breakers	139 x 251 x 63	1	LV429373
400-630 A	Mounting plate for 3P circuit breakers	139 x 270 x 63	1	LV432623
	Mounting plate for 4P circuit breakers	184 x 284 x 63	1	LV432624

For PowerPact 3P circuit breakers

Ratings		Mounting plate l x h x d	Min. order qty	Unit reference
60-100-150 A	Mounting plate for H frame circuit breakers	104 x 190 x 63	1	LA9ZA32600
250 A	Mounting plate for J frame circuit breakers	104 x 190 x 63	1	LV429372
250-400-600 A	Mounting plate for L frame circuit breakers	139 x 270 x 63	1	LV432623

Characteristics of busbar mounting plates

Type of mounting plate	LA9ZA32621 LA9ZA32622	LA9ZA32427 LA9ZA32428 LA9ZA32434 LA9ZA32623 LA9ZA32442 LA9ZA32443	LA9ZA32624 LA9ZA32625 LA9ZA32626 LA9ZA32627	LV429372 LV429373	LV432623 LV432624	LA9ZA32600	
Degree of protection as per IEC 60529	IP	20					
Rated insulation voltage	V	690					
Permissible current	A	25	32	63	80-100-250	400-630	60-100-150
Peak rated current	kA	50	50 ⁽¹⁾	50	50	50	50
SCCR (UL) with Compact NSX circuit breaker protection	mm ²	The reinforced breaking capacity due to cascading in circuit breaker combination is maintained					
Conductor cross section (color: black)	mm ²	4	6	10	NA		
	AWG	12	10	8	NA		
Type of conductor insulating material	PVC	105°			NA		

(1) 35 kA with LUB12 for LA9ZA32427 and LA9ZA32428.

Power busbar systems

TeSys starters and bare devices

Choice of mounting plates

Linery BZ



LA9ZA32443, LA9ZA32621

LA9ZA32434,
LA9ZA32442

LA9ZA32622



LA9ZA32623



LA9ZA32427



LA9ZA32428



LA9ZA32624



LA9ZA32625



LA9ZA32626

For TeSys GV2 motor circuit breakers

Operating current AC-3 440 V	Protection by motor circuit breaker	For contactor	Mounting plate l x h x d	Min. order qty	Unit reference
Mounting plate, 1-way					
25 A	GV2 ME GV2 P GV2 LE	LC1 D LC1 K LP4 K06-K12	45 x 200 x 63	4	LA9ZA32621
32 A	GV2 LE		63 x 200 x 63	4	LA9ZA32443
Mounting plate, 2-way ⁽³⁾					
25 A	GV2 ME GV2 P GV2 LE	LC1 D LC1 K LP4 K06-K12	90 x 200 x 63	2	LA9ZA32622
32 A	GV2 ME GV2 P GV2 LE	LC1 D	45 x 200 x 63	4	LA9ZA32434
			54 x 200 x 63	4	LA9ZA32442
			90 x 200 x 63	2	LA9ZA32623

TeSys U starter-controllers

Operating current AC-3 440 V	Protection by power base	Mounting plate l x h x d	Min. order qty	Unit reference
Mounting plate, 1-way				
32 A	LUB12, LUB32	45 x 200 x 63	4	LA9ZA32427
Mounting plate, 2-way				
32 A	LUB12, LUB32	45 x 260 x 63	4	LA9ZA32428

For TeSys GV3 motor circuit breakers

Operating current AC-3 440 V	Protection by power base	For contactor	Mounting plate l x h x d	Min. order qty	Unit reference
Mounting plate, 1-way ⁽¹⁾					
63 A	GV3 P	–	54 x 200 x 63	4	LA9ZA32624
	GV3 P	LC1 D40A...65 A	54 x 260 x 63	4	LA9ZA32625
Mounting plate, 2-way ^{(1) (2)}					
63 A	GV3 P	LC2 D40A...65 A	117 x 260 x 63	4	LA9ZA32626

(1) Contactor-circuit breaker combination without additional part.

(2) Use the LAD 9R3 kit for the execution of changeover contactors.

(3) Use the LAD 9R1 or LAD 9R1V kit for the execution of changeover contactors.

Note: the mounting plate rails can be shifted vertically in 1.25 mm increments.

Linergy BZ



LA9ZX01285



LA9ZX01287



LA9ZX01413



LA9ZX01243



LA9ZX01563

Terminals

	I max	Set of	Unit reference
One-pole for flat bars, 5 mm	270 A Capacity 4-35 mm ²	50	LA9ZX01285
	400 A Capacity 16-70 mm ²	25	LA9ZX01287
3P cover, width 84 mm		10	LA9ZX01413

Terminals on mounting plate

	I max	Min. order qty	Unit reference
3P, on mounting plate + cover, for 12 x 5 to 30 x 10 busbars, width 81 mm	440 A Capacity 35-120 mm ²	1	LA9ZX01243
3P, on mounting plate + cover, for 20 x 5 to 30 x 10 busbars, width 135 mm	560 A Capacity 120-300 mm ²	1	LA9ZX01754

Connection module

	I max	Min. order qty	Unit reference
3P, spring terminal connection + cover, for 12 x 5 to 30 x 10 busbars, width 20 mm	80 A Capacity 1.5-16 mm ²	8	LA9ZX01563

Connection by connectors

		LA9ZX01285		LA9ZX01287		LA9ZX01243		LA9ZX01563		LA9ZX01754	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Flexible wire	mm ²	4	35	16	70	35	120	1.5	16	120	300
Multi-strand wire	mm ²	4	35	16	70	35	120	1.5	16	120	300
Rigid wire	mm ²	4	35	-	-	-	-	1.5	16	-	-
Tightening torque	N.m	... x 5		... x 5		... x 5-10		... x 5-10		... x 5-10	
Cover		LA9ZX01413		LA9ZX01413		Supplied without cover		Supplied without cover		Supplied without cover	

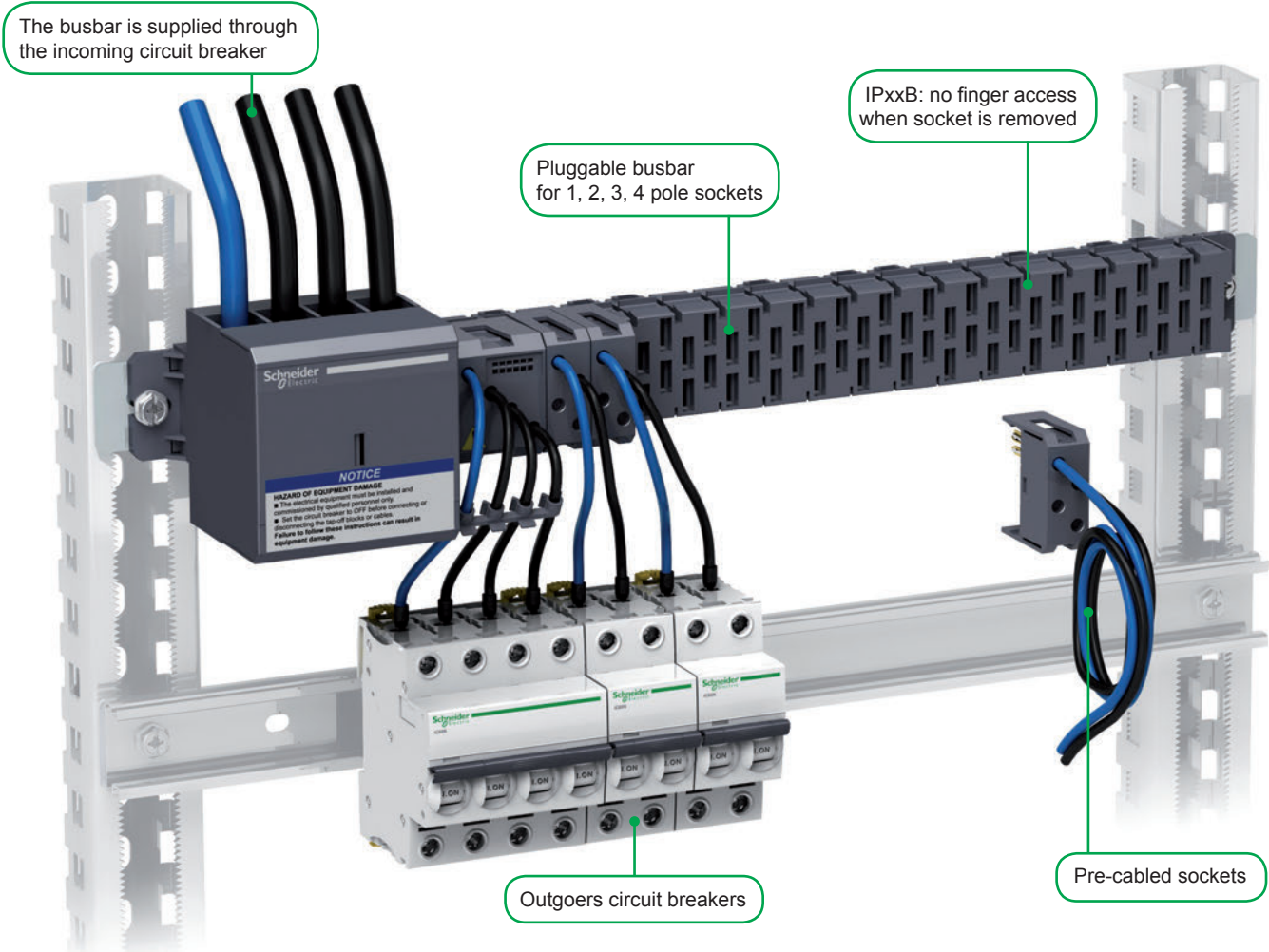
Lineryg HK, Multistandard hot-plug busbar system

Application: electrical distribution, up to 160 A

Lineryg HK



Hot-plug distribution: when continuity of service is required



Advantages

- Considerable time saving: stand alone busbar, fixed to the chassis with 2 screws
- Preserved continuity of service during modification: live connection, disconnection (off load)
- Wide adaptability: 6 busbar lengths from 344 to 1100 mm, 12 models of sockets
- Multi standard: conform to IEC and UL standards

Detailed view: pre cabled socket

- The assembling process and the technological choices ensure a long-lasting reliability
- Each wire is welded on a spring clip providing robustness to the socket and vibration resistant contacts



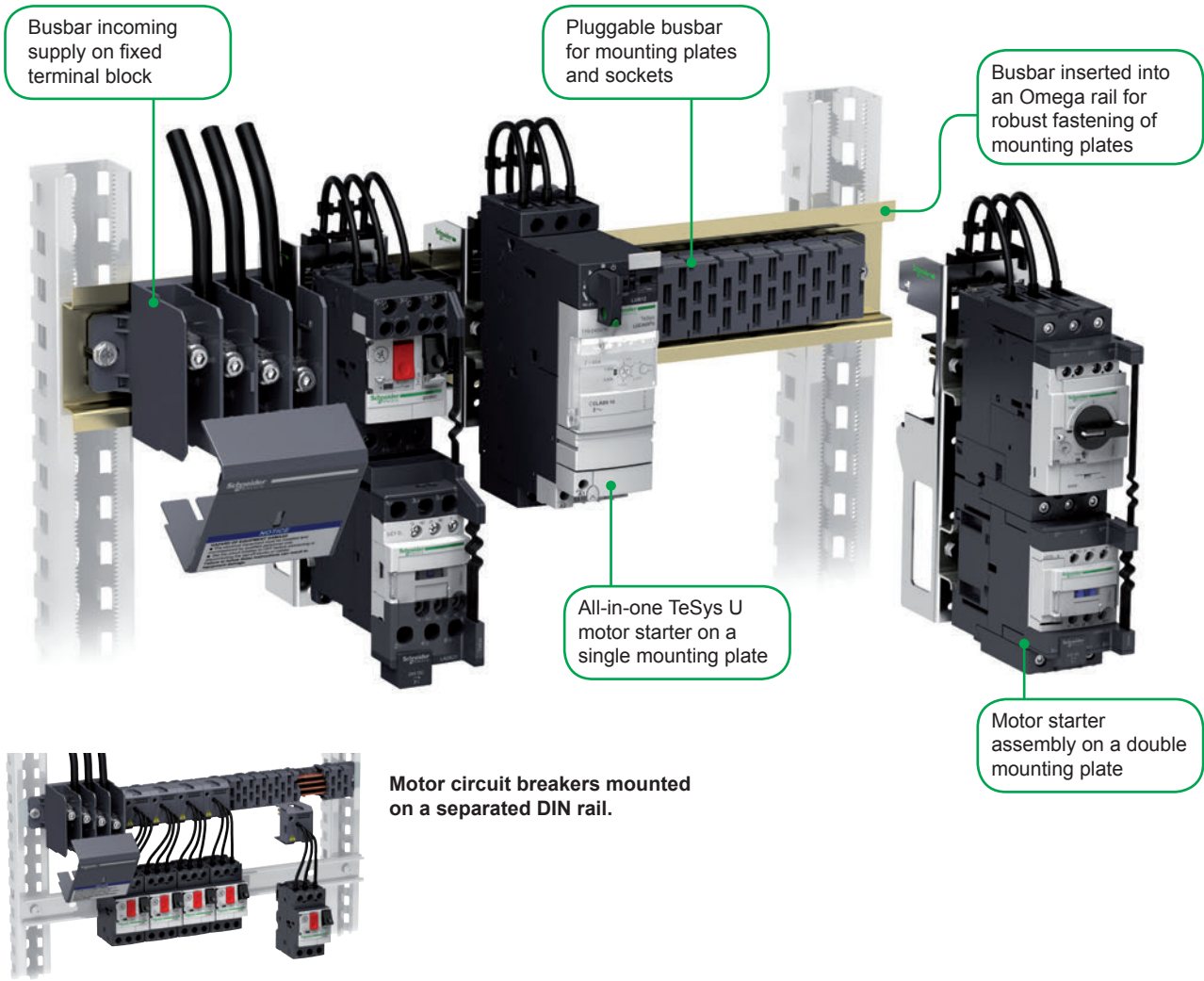
Linergy HK, Multistandard hot-plug busbar system

Application: electrical distribution to motor starters

Linergy HK

Power busbar systems

When compactness and continuity of service are required

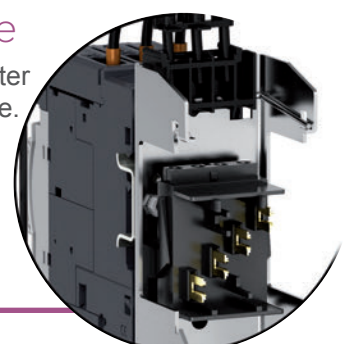


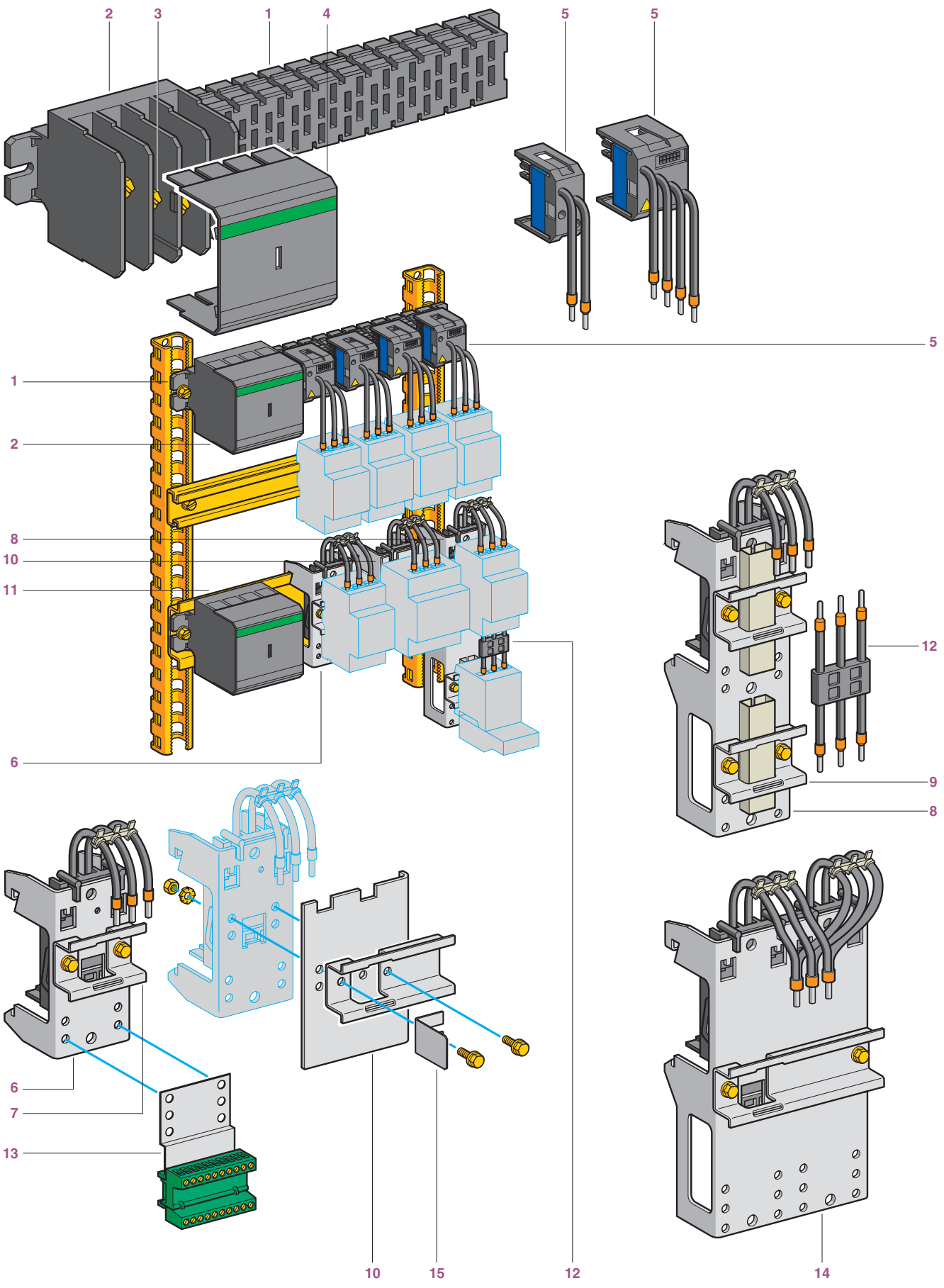
Advantages

- Space saving in compact enclosures: the total volume is reduced to that of the motor starter assemblies
- Preserved continuity of service during modification and maintenance: live connection, disconnection (off load)
- Wide adaptability: 6 busbar lengths from 344 to 1100 mm, 12 models of sockets, 23 mounting plates for motor starters up to 25 or 50 A

Detailed view: mounting plate back face

- Thanks to the plug and its pre-cabled wires the motor starter is safely assembled in the workshop, for immediate or later use.
- A piece of DIN profile rail is attached on the front face of the mounting plate for fastening the components.
- The metal mounting plate ensures a rigid and robust fastening on the omega rail.





Power distribution in control panels

Pre-assembled busbar system

Lineryg HK

The assembly of automated control and distribution panels requires the use of products that are not only safe but also simple and quick to mount and cable.

The Linergy HK pre-assembled busbar system meets all these criteria by incorporating prefabricated components which cater for 3 principal functions:

Carrying of electric current

By the pre-assembled 4-pole busbar system **1**, 160 A at 35 °C.

4-pole busbars can be used for 3-phase + Neutral or 3-phase + Common.

The busbars are available in 6 lengths: 344, 452, 560, 668, 992, 1100 mm.

An incoming supply terminal block **2** is located at the extreme left of the busbar.

"Knock-out" partitions allow connection of the power supply from above or below to connectors **3** which are protected by a removable cover **4**.

Upstream protection of the busbar is shown on page B1/20.

Current distribution

Tap-off units **5** (factory assembled) are available in 4 versions:

- 2-pole,
- 3-pole,
- 4-pole (3-phase + Neutral),
- 4-pole (3-phase + Common).

The tap-offs clip onto the busbar with instantaneous mechanical and electrical connection to the busbars.

2 ratings are available: 16 and 32 A.

The tap-off units ensure not only rapid mounting, but also a neat appearance for the power distribution system and complete safety when accessing under live circuit conditions.

Component mounting

Component mounting plates with incorporated tap-off allow mounting of and supply of power to components.

They are available in 25 A or 50 A ratings.

These mounting plates clip onto the mounting rail **11**, which also supports the busbar, and at the same time make electrical connection via the incorporated tap-off.

2 types of mounting plate are available:

- single plates **6** (height 105 mm), with bolt-on 35 mm wide rail **7**, which may be bolted on in one of two positions, allowing height adjustment of 10 mm.
- double plates **8** and **14** (height 190 mm), with two bolt-on, 35 mm wide rails **9** mounted on 100 mm fixing centres; each rail may be bolted on in one of 4 positions, allowing height adjustment in 10 mm steps. These plates are supplied with connectors **12** to allow wiring between control and protection devices.

Single mounting plates enable the following types of distribution:

- 2-pole (Ph + N) and (Ph + Ph)
- 3-pole,
- 4-pole (3 Ph + N or 3 Ph + common).

Double mounting plates enable the following types of distribution: 2-pole (Ph + N, Ph + Ph), 3-pole or 4-pole (3Ph+N and 3Ph + common).

Extension plates **10** can be bolted onto single and double mounting plates to enable mounting of wider components. Using a side stop **15** in conjunction with these extension plates also supports the Linergy HK busbar when used vertically.

A control terminal block **13** comprising a support plate bolted onto the single or double mounting plates and a 10-pole plug-in block, enables connection of the control circuit wires (c.s.a. 1.5 mm² max).

Power distribution in control panels

Pre-assembled busbar system

Linery HK



AK5 JB1●●

Busbars

The busbars can be screw-mounted onto any type of support. However, if it is to be used in conjunction with component mounting plates incorporating a tap-off, it is essential that it is mounted on the AM1 DL201 rail.

When mounting tap-offs, the rated operational current of the busbar should be taken into account: 160 A at 35 °C.

Number of conductors	Number of tap-offs at 18 mm intervals	Length	Suitable for mounting in enclosure width	Reference	Weight
		mm	mm		kg
4 ⁽¹⁾	12	344	600	AK5JB143	0.700
	18	452	800	AK5JB144	0.900
	24	560	800	AK5JB145	1.100
	30	668	800	AK5JB146	1.300
	48	992	1200	AK5JB149	1.900
	54	1100	1200	AK5JB1410	2.100

Removable power sockets

Use	Number of points used on the busbar system		Thermal current	Cable lengths	Min. order qty	Unit reference	
	Width	A	A	mm			
Single-phase +	1	9 mm	16	200	6 ⁽²⁾	AK5PC12	
			32	1000		AK5PC32L	
2-phase	1	18 mm	16	200	6 ⁽³⁾	AK5PC12PH	
			32	1000		AK5PC32LPH	
3-phase	2	18 mm	16	200	6	AK5PC13	
			32	250		6	AK5PC33
			1000	6		AK5PC33L	
3-phase +	2	18 mm	16	200	6	AK5PC14	
			32	250		6	AK5PC34
			1000	6		AK5PC34L	
3-phase +	2	18 mm	16	200	6	AK5PC131	
			10 (common)	32		250	6
common			32	250	6	AK5PC331	
			10 (common)				

Accessories

Description	Maximum no. of connections	C.s.a. mm ²	Sold in lots of	Unit reference
Cable guide	4	2.5 or 4	20	AK5GF1

(1) 4-pole: 3-phase + Neutral or 3-phase + Common.

(2) Total of 6 sockets supplied: 2 sockets (N + L1), 2 sockets (N + L2), 2 sockets (N + L3).

(3) Total of 6 sockets supplied: 2 sockets (L1 + L2), 2 sockets (L1 + L3), 2 sockets (L2 + L3).

(4) Cut and drill to suit use.



AK5 PC12



AK5 GF1

Power distribution in control panels

Pre-assembled busbar system

Lineryy HK



AK5 PA231



AK5 PA232



AM1DL201

Component mounting plates incorporating tap-off

Single plate (height 105 mm)

Use	No. of 18 mm points used on the busbar system	Phase	Thermal current A	Number of L rails for component support	Min. order qty	Reference
Single-phase + neutral	3 (54 mm width)	Ph1+N	25	1	1	AK5PA211N1
		Ph2+N	25	1	1	AK5PA211N2
		Ph3+N	25	1	1	AK5PA211N3
2-phase	3	Ph1+Ph2	25	1	1	AK5PA211PH12
		Ph1+Ph3	25	1	1	AK5PA211PH13
		Ph2+Ph3	25	1	1	AK5PA211PH23
3-phase	3	–	25	1	1	AK5PA231
3-phase + common	3	–	25	1	1	AK5PA2311
3-phase + neutral	3	–	25	1	1	AK5PA241

Double plate (height 190 mm)

Prefabricated 25 A connectors are supplied for connecting the 2 protection and control devices.

Single-phase + neutral	3	Ph1+N	25	2	1	AK5PA212N1
		Ph2+N	25	2	1	AK5PA212N2
		Ph3+N	25	2	1	AK5PA212N3
2-phase	3	Ph1+Ph2	25	2	1	AK5PA212PH12
		Ph1+Ph3	25	2	1	AK5PA212PH13
		Ph2+Ph3	25	2	1	AK5PA212PH23
3-phase	3	–	25	2	1	AK5PA232
	6 (108 mm width)	–	25	2	1	AK5PA232S
			50	1	1	AK5PA532
3-phase + neutral	3	–	25	2	1	AK5PA242
3-phase + common	3	–	25 (10 common)	2	1	AK5PA2312
	6	–	25 (10 common)	2	1	AK5PA2312S
			50 (10 common)	1	1	AK5PA5312
3-phase + neutral	6	–	50	1	1	AK5PA542

Omega rail, width 75 mm

This rail is designed to accommodate the busbar system when it is used with Lineryy HK mounting plates incorporating tap-offs. It supports the busbar system. The plates simply clip onto the rail.

Material and surface treatment	Depth	Length	Min. order qty	Reference	Weight
	mm	mm			kg
2 mm sheet steel	15	2000 ⁽⁴⁾	6	AM1DL201	3.000

Power distribution in control panels

Pre-assembled busbar system

Linergy HK

Extension plates

These plates bolt onto the equipment support plates, after having removed them from the rails, to be able to mount wider components.

Use		Number of tap-offs at 18 mm intervals	Reference
For mounting plates incorporating tap-off	Single	4	AK5PE17
	Double	4	AK5PE27

Side stop (AK5 JB mounted vertically)

Use	Set of	Reference
For extension plate (for AK5PA●●●)	50	AK5BT01

Control terminal blocks

Description	Thermal current A	Set of	Reference
10-pole terminal blocks, for screwing onto plate AK5 PA●●●			
	10	10	AK5SB1

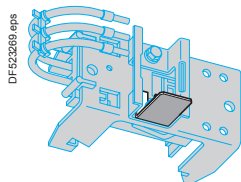
Accessories

Description	Marking	Set of	Reference
Strips of clip-in markers			
10 identical numbers, signs or capital letters per strip	0...9	25	AB1R● ⁽¹⁾
	+	25	AB1R12
	-	25	AB1R13
	A...Z	25	AB1G● ⁽¹⁾

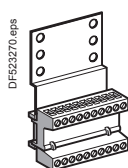
⁽¹⁾ Replace the ● in the selected reference with the number or letter required. Example: **AB1R1** or **AB1GA**.

Note:

- if the equipment is wider than the mounting plate, an extension plate can be used to increase the width of the support plate.
- for upstream protection, see page B1/20.



AK5 BT01



AK5 SB1

Technical Data for Designers

Contents

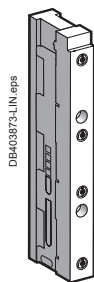
Lineryg BZ:

- > characteristicsB1/18
- > curvesB1/19

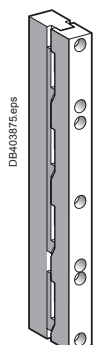
Lineryg HK:

- > characteristicsB1/20 and B1/21
- > dimensionsB1/22 and B1/23

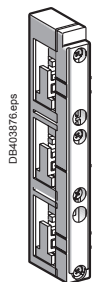
Linery BZ



LA9ZX01495



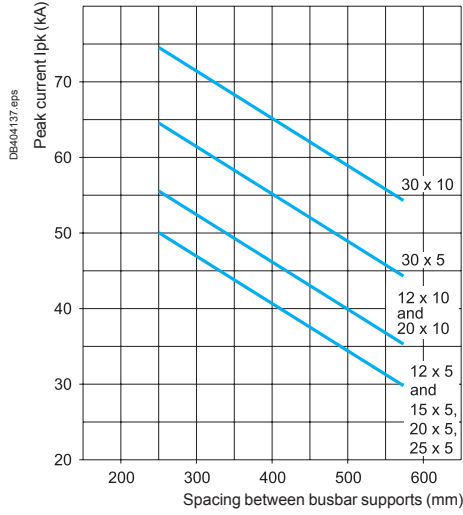
LA9ZX01485



LA9ZX01508

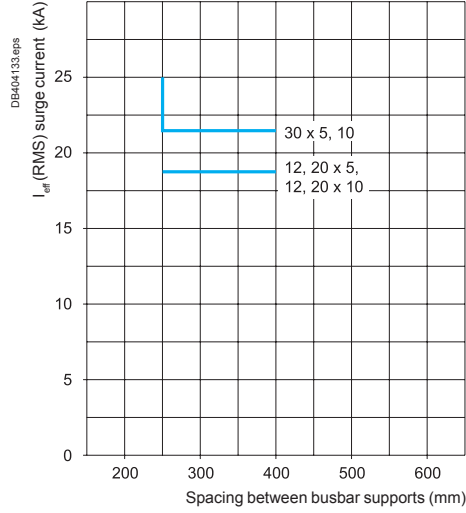
General characteristics									
		LA9ZX01495 and LA9ZX01485 (IEC 6.439-1)							
Bar dimensions compatibility	mm	12 x 5	15 x 5	20 x 5	25 x 5	30 x 5	12 x 10	20 x 10	30 x 10
Max. rated operating current	A	200	250	320	400	450	360	520	630
Min. peak permissible rated current	kA	30	30	30	30	45	35	35	53
Distance max. between 2 busbars supports	mm	570	570	570	570	570	570	570	570
Degree of protection	IP	20 (with cover LA9ZX01244 or LA9ZX01245)							
Thermal resistance	°C	125							
Rated current frequency	Hz	50/60							
Rated insulation voltage	V	690							
Rated operating voltage	V	690							
		LA9ZX01508 (UL) 508 A							
Bar dimensions compatibility	mm	12 x 5	20 x 5	30 x 5	12 x 10	20 x 10	30 x 10		
Rated operating current	A	150	362	500	300	564	630		
I _{eff} (RMS) surge current	kA	18	18	22 - 25	18	18	22 - 25		
SCCR (protected by Compact NSX circuit breaker)	250 A 480 V AC	65	-	-	65	-	-		
	250 A 600 V AC	25	-	-	25	-	-		
	400 A 480 V AC	-	65	65	-	65	65		
	400 A 600 V AC	-	35	35	-	35	35		
	500 A 480 V AC	-	-	65	-	-	65		
	600 A 600 V AC	-	-	35	-	-	-		
	600 A 480 V AC	-	-	50	-	-	50		
	600 A 600 V AC	-	-	25	-	-	25		
SCCR (protected by fuses Class J or T ...)	400 A 480 V AC	100	100	100	100	100	100		
	500 A 480 V AC	-	-	100	-	-	100		
	500 A 600 V AC	-	-	100	-	-	100		
Distance max. between 2 busbars supports (busbar protected)	mm	400	800	800	400	800	800		
Degree of protection	IP	20 (with cover LA9ZX01244 or LA9ZX01245)							
Thermal resistance	°C	125							
Rated current frequency	Hz	50/60							
Rated operating voltage	V	600							

Determining the spacing between busbar supports (LA9ZX01495 and LA9ZX01485), according to IEC 61439-1 ⁽¹⁾



(1) Depending on the short-circuit current.

Short-circuit strength diagram according to UL845 (LA9ZX01508)

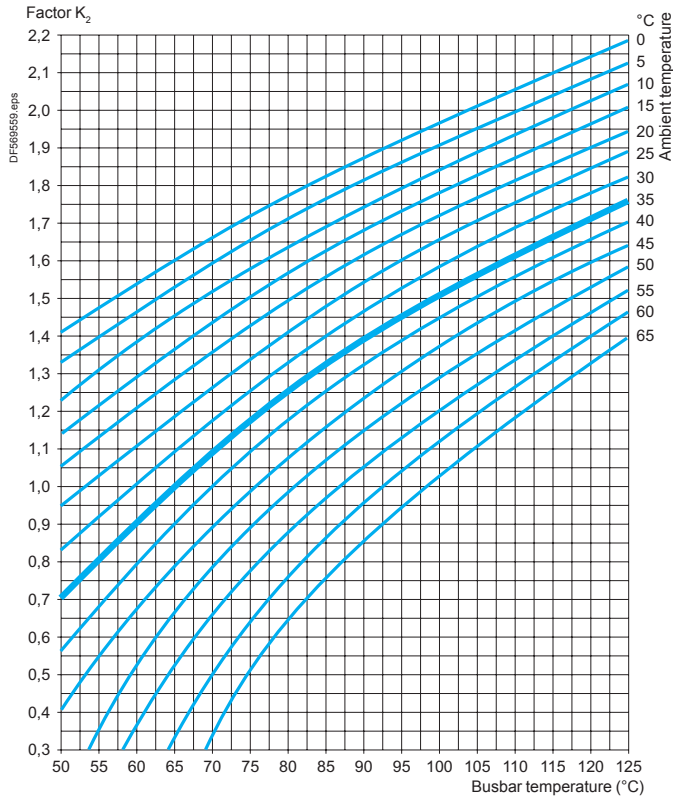


Load resistance of busbar assemblies in IEC applications

For an ambient temperature of 35 °C and a busbar temperature of 65 °C

Cross section	mm ²	12 x 5	15 x 5	20 x 5	25 x 5	30 x 5	12 x 10	20 x 10	30 x 10
Permissible current	A	200	250	320	400	450	360	520	630

In the event of changes in climatic conditions, the following curve indicates the correction factor K_2 to be applied.



Example: In normal operating conditions, a tinned busbar of 30 x 10 can permanently withstand 630 A.

For a load of 800 A, the correction factor K_2 to be applied will be 1.3 ($\frac{800 \text{ A}}{630 \text{ A}}$). As a result, the temperature rise in the busbars will reach 82.5 °C.

Power distribution in control panels

Pre-assembled busbar system

Lineryg HK

Busbar system characteristics

Conforming to standards		IEC 60439						
Product certifications		UL, CSA, DNV, LROS						
Degree of protection	Against access to live parts	IP XXB conforming to IEC 60529						
Flame resistance	Conforming to IEC 60695	°C	850 (incandescent wire)					
	Conforming to standard UL 94		V0					
Number of conductors	AK5 JB14●		4					
Supply current			~					
Rated operational frequency		Hz	50 or 60					
Rated operational current	Ambient temperature 35 °C	A	160					
	Coefficient K to be applied according to the ambient temperature	°C	35	40	45	50	55	60
		K	1	0.96	0.92	0.88	0.83	0.78
Rated insulation voltage	Conforming to IEC 60439-1	V	690					
	Conforming to UL and CSA	V	600					
Operational voltage	Off-load plugging-in and unplugging, with supply switched on							
	Conforming to IEC 60439-1	V	400					
	Conforming to UL, CSA	V	480					
	Plugging-in and unplugging, with supply switched off							
	Conforming to IEC 60439-1	V	690					
Conforming to UL, CSA		V	600					
Maximum permissible peak current		kA	25					
Maximum let-through energy		A²s	1 x 10 ⁷					
Upstream short-circuit ⁽¹⁾ and overload protection	Type of protection	Schneider Electric circuit-breaker			Fuses			
		NSX 160 N	NSX 160 H	aM	gF			
	Rating	A	160	160	160	160		
	Prospective short-circuit current	kA	36	70	100	100		
	Operational current	A	160	160	160	160		
Cabling	Maximum c.s.a.			Minimum c.s.a.				
	Flexible cable with cable end	mm²	70		2.5			
	Solid cable	mm²	70		2.5			
	Tightening torque	Nm	10					
Mounting position	Horizontal or vertical ⁽²⁾	Fixing with screws provided						

(1) For conditions where conditional short-circuit current exceeds 25 kA.
 (2) Using side stop AK5 BT01 on mounting plates AK5 PA.

Power distribution in control panels

Pre-assembled busbar system

Lineryg HK

Power busbar systems


Tap-off characteristics

Type		AK5 PC12	AK5 PC12PH	AK5 PC13	AK5 PC14	AK5 PC131	AK5 PC32L	AK5 PC32LPH	AK5 PC33 PC33L	AK5 PC34 PC34L	AK5 PC331	
Conforming to standards		IEC 60439										
Product certifications		UL, LROS, CSA, DNV										
Degree of protection		Against access to live parts: IP XXB conforming to IEC 529										
Polarity		Phase + Neutral	Phase + Phase	3-phase	3-phase + Neutral	3-phase + Common	Phase + Neutral	Phase + Phase	3-phase	3-phase + Neutral	3-phase + Common	
Conductor c.s.a. (UL cables)	mm ²	2 x 2.5	2 x 2.5	3 x 2.5	4 x 2.5	3 x 2.5 1 x 1.5	2 x 4	2 x 4	3 x 4	4 x 4	3 x 4 1 x 1.5	
Conductor colours		Black Blue (Neutral)	Black	Black	Black Blue (Neutral)	Black White	Black Blue (Neutral)	Black	Black	Black Blue (Neutral)	Black White (Common)	
Permissible current	A	16	16	16	16	16 10 (Common)	32	32	32	32	32 10 (Common)	
Rated insulation voltage	V	690 conforming to IEC 60439-1										
Rated peak current	kA	6										
Maximum let-through energy	A ² s	100 000						200 000				
Type of conductor insulation		PVC 105 °C										

Tap-off characteristics

Type		AK5 PA211N1 PA211N2 PA211N3 PA212N1 PA212N2 PA212N3	AK5 PA211PH12 PA211PH13 PA211PH23 PA212PH12 PA212PH13 PA212PH23	AK5 PA231 PA232 PA232S	AK5 PA241 PA242	AK5 PA2311 PA2312 PA2312S	AK5 PA532	AK5 PA542	AK5 PA5312	
Conforming to standards		IEC 60439								
Product certifications		UL, LROS, CSA, DNV								
Degree of protection		Against access to live parts: IP XXB conforming to IEC 60529								
Polarity		Phase + Neutral	Phase + Phase	3-phase	3-phase + Neutral	3-phase + Common	3-phase	3-phase + Neutral	3-phase + Common	
Conductor c.s.a. (UL cables)	mm ²	2 x 4	2 x 4	3 x 4	4 x 4	3 x 4 1 x 1.5	2 x (3 x 4)	2 x (4 x 4)	2 x (3 x 4) 1 x 1.5	
Permissible current	A	25	25	25	25	25 10 (Common)	50	50	50 10 (Common)	
Rated insulation voltage	V	690 conforming to IEC 60439-1								
Rated peak current	kA	6								
Maximum let-through energy	A ² s	200 000								
Type of conductor insulation		PVC 105 °C								

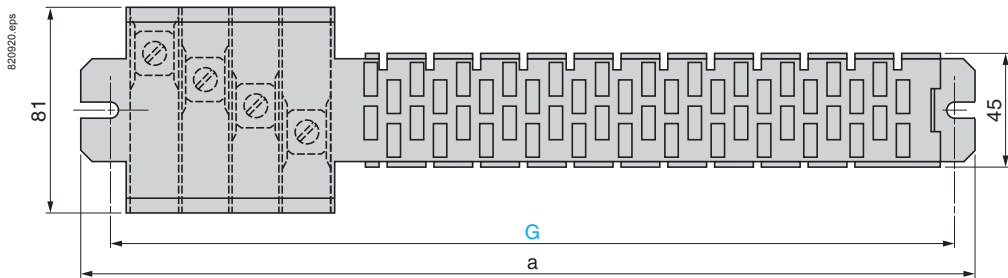
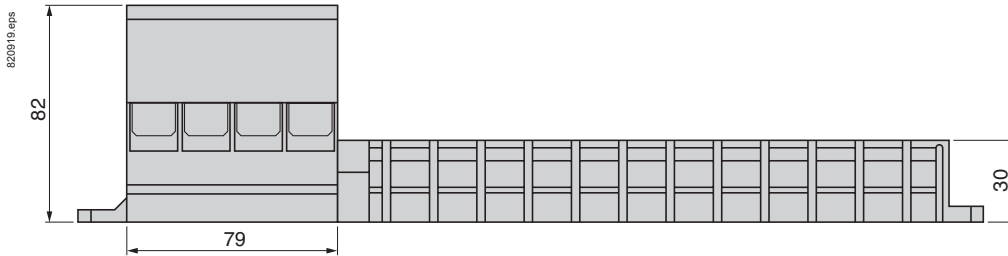
Characteristics of mounting rails AM1 DL201 and AM1 DL2017

Type		Omega  (width 75 mm, depth 15 mm)
Material		2 mm sheet steel
Surface treatment		Galvanized

Linery HK

Busbars

AK5 JB●●●

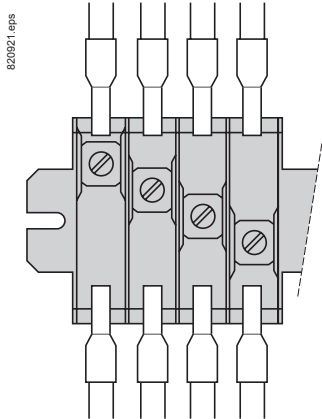





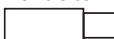
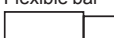
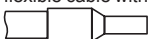
AK5	a	G	No. of 18 mm points
JB143	344	330	12
JB144	452	438	18
JB145	560	546	24
JB146	668	654	30
JB149	992	978	48
JB1410	1100	1086	54

Busbar feed units

AK5 JB●●●

Installation of AK5 JB●●● busbar systems

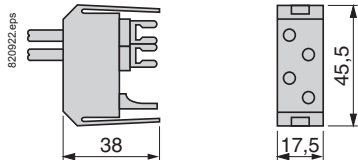


Connection	C.s.a. in mm ²	
	min	max
Flexible cable with or without cable end 	 1 x 2.5 2 x 2.5	 1 x 70 ⁽¹⁾ 2 x 35
Flexible bar 	–	2 x (9 x 4)
Flexible bar 	9 x 4 +	9 x 4 +
+ flexible cable with or without cable end 	1 x 2.5	1 x 35

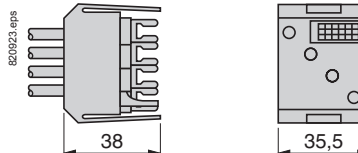
(1) Maximum c.s.a. or connection of conductor without cable end.

Removable power sockets 16 and 32 A

AK5 PC12●. AK5 PC32L●

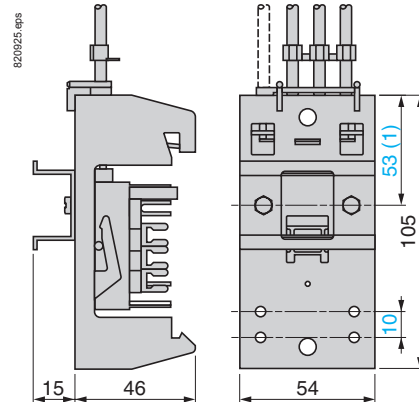


AK5 PC●3. AK5 PC33L AK5 PC●4. AK5 PC34L AK5 PC●31



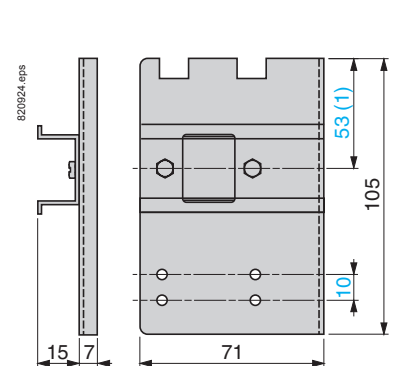
Mounting plates incorporating tap-offs, 25 A

AK5 PA2●1. AK5 PA2311. AK5 PA211●●●●



Single width extension plates

AK5 PE17

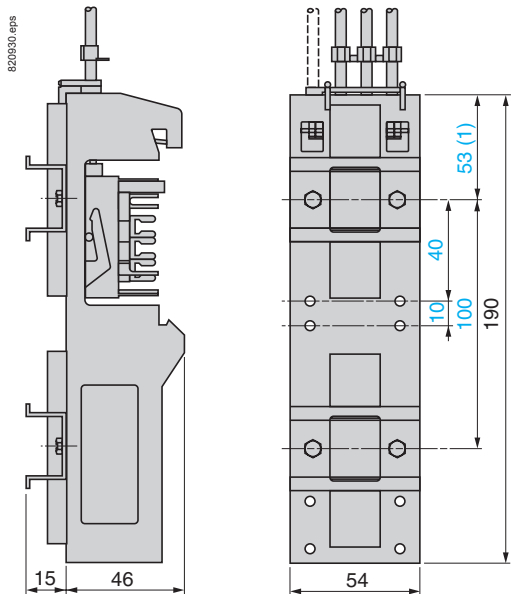


Note: It is recommended that the power sockets or the removable plates are connected as close as possible to the busbar feed unit.

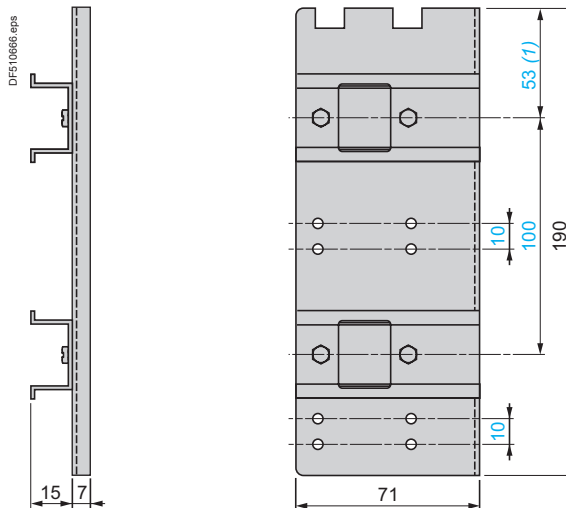
(1) Can be fixed at 43 mm.

Linery HK

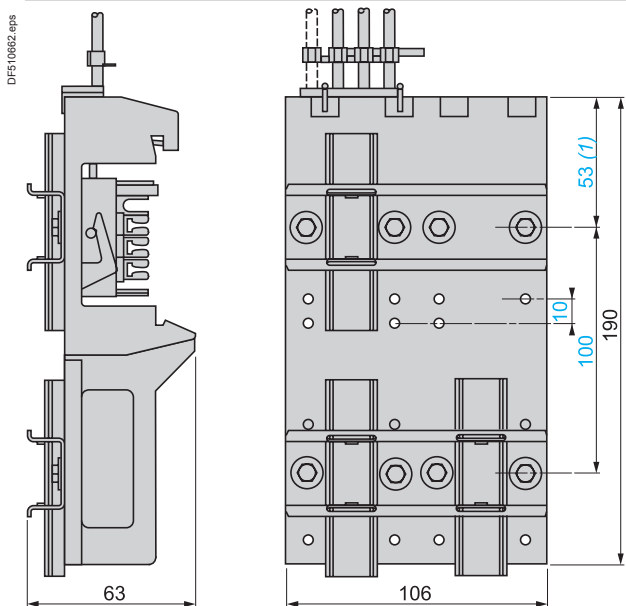
Component mounting plates incorporating tap-off
AK5 PA232. AK5 PA2312. AK5 PA242



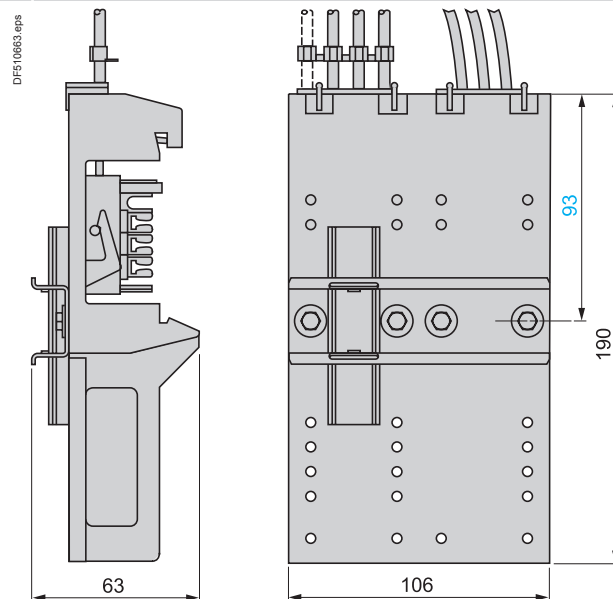
Double extension plate
AK5 PE27



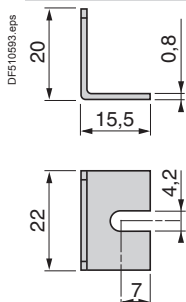
Component mounting plates incorporating tap-off
AK5 PA232S. AK5 PA2312S



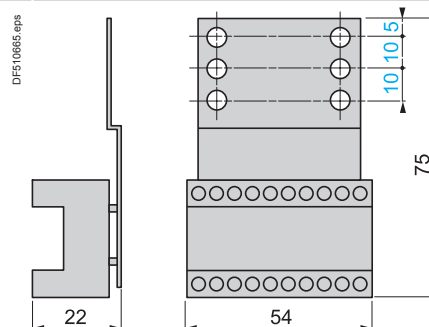
AK5 PA532. AK5 PA5312. AK5 PA542



Side stop
AK5 BT01



Control terminal block
AK5 SB1



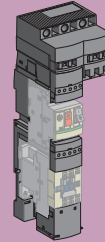
(1) Can be fixed at 43 mm.

Motor starter power circuit wiring - Connection systems

Type of product

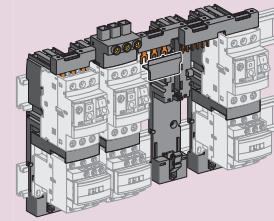
Pages

For circuit breaker + contactor, fuse carrier + contactor:
with screw clamp connection
TeSys GV



B2/2

For circuit breaker + contactor, fuse carrier + contactor:
spring terminals connection
TeSys LAD3



B2/4

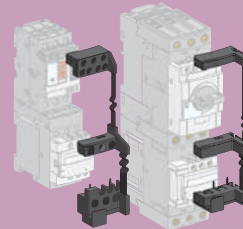
Motor starter control circuit wiring - RJ45 connection

Selection guide

Motor starters-to-PLC wiring architectures

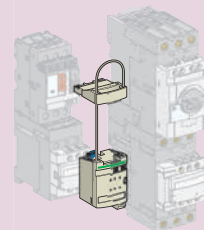
B2/6

RJ45 connection modules for circuit breakers + contactors
With screw clamp terminals TeSys SoLink



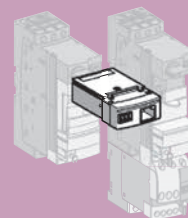
B2/8

RJ45 connection modules for circuit breakers + contactors
With spring terminals TeSys LAD9



B2/10

RJ45 connection module for TeSys U motor starter
Pluggable TeSys LUFC00

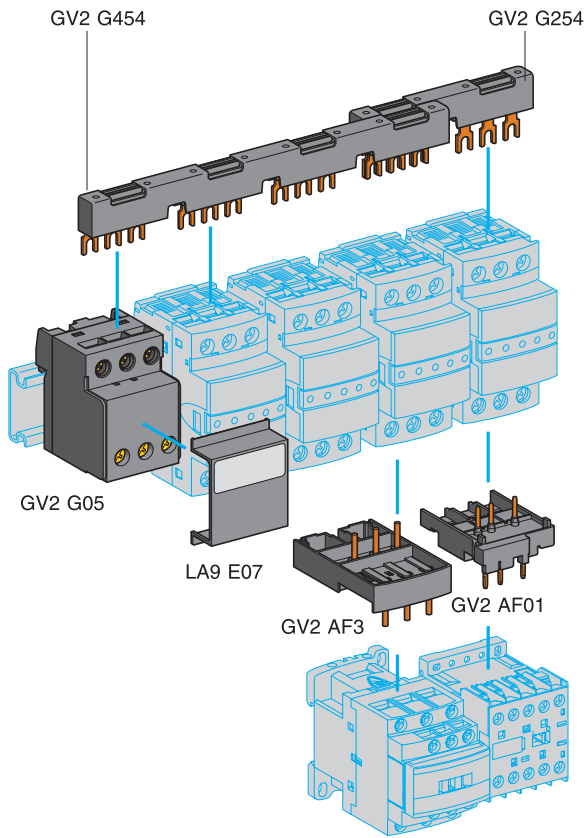


B2/12

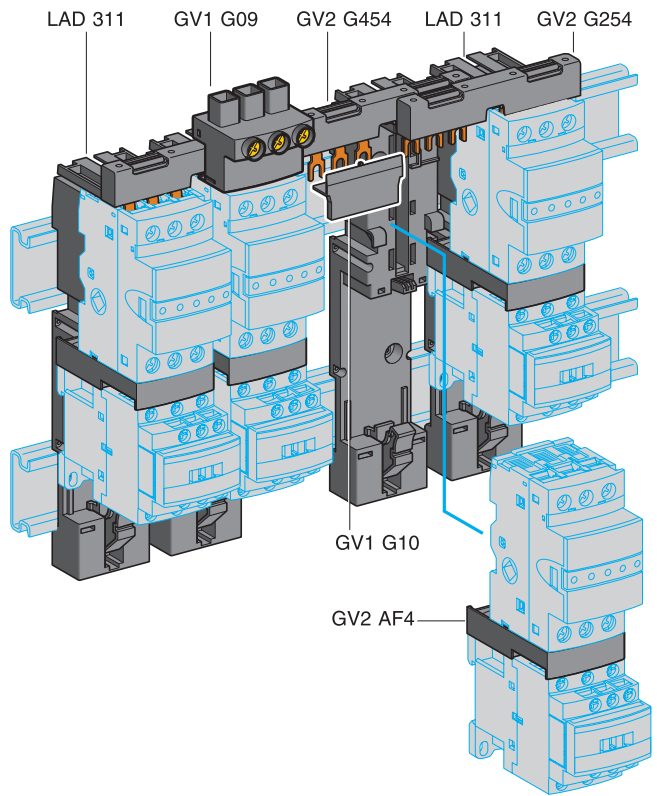
Technical Data for Designers

B2/15

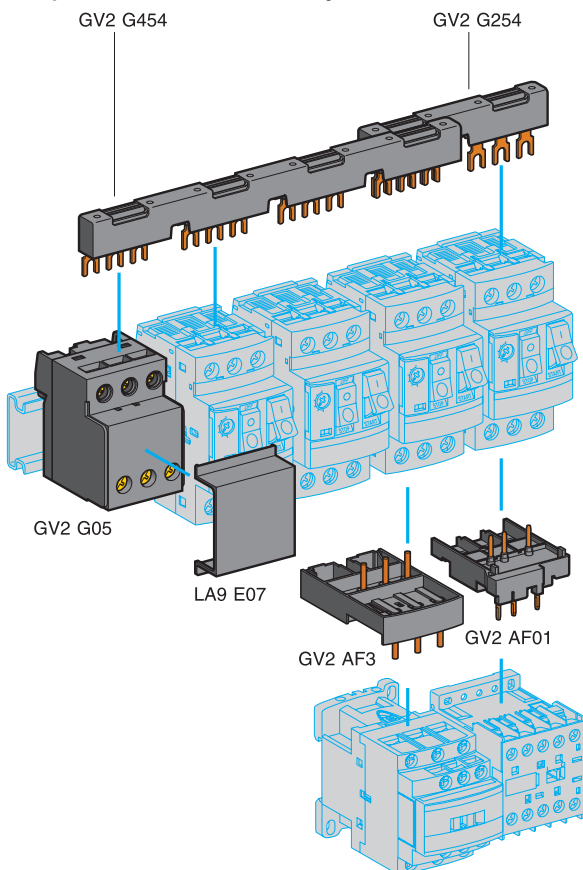
Group of fuse carriers directly mounted on DIN rail



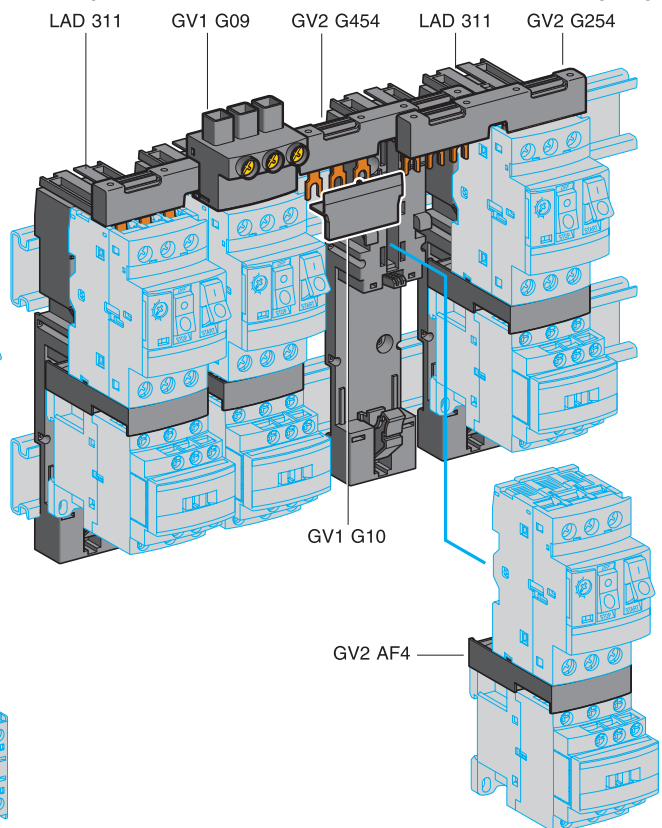
Group of fuse carriers + contactors mounted on adapter plates



Group of circuit breakers directly mounted on DIN rail



Group of circuit breakers + contactors mounted on adapter plates



Motor starter power circuit wiring

Connection systems

With screw clamps connection

This system is convenient when time and space savings are required.

The motor starter can be composed of:

- LS1 D323 fuse carrier + LC1 D contactor
- GV2 circuit breaker + LC1 D contactor.

Upstream busbars and terminals

Description	Application	Pitch (mm)	Unit reference
Sets of 3-pole 63 A busbars	2 tap-offs	45	GV2G245
		54	GV2G254
		72	GV2G272
	3 tap-offs	45	GV2G345
		54	GV2G354
	4 tap-offs	45	GV2G445
		54	GV2G454
		72	GV2G472
	5 tap-offs	54	GV2G554
Description	Application	Sold in lots of	Unit reference
Terminal block for supply to one or more GV2 G busbar sets	Connection from the top	1	GV1G09
	Can be fitted with current limiter GV1 L3 (GV2 ME and GV2 P)	1	GV2G05
Cover for terminal block	For mounting in modular panels	10	LA9E07
Protective end cover	For unused busbar outlets	5	GV1G10

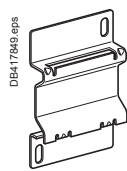
Assembling components

Description	Application	Sold in lots of	Unit reference
Combination blocks	Between GV2 and contactor LC1 K or LP1 K ⁽¹⁾	10	GV2AF01
	Between GV2 and contactor LC1 D09...D38 ⁽¹⁾	10	GV2AF3
	Between GV2 mounted on LAD 311 and contactor LC1 D09...D38	10	GV2AF4
Adapter plates	For mounting a GV2 ME or GV2 P and contactor LC1 D09...D38 with front faces aligned	1	LAD311
Height compensation plate	7,5 mm	10	GV1F03

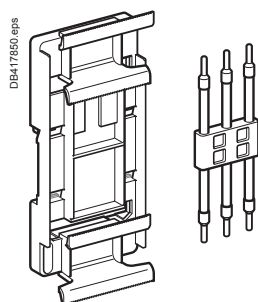
⁽¹⁾ Ensures both the connection and a rigid support to the contactor. No extra fixing mean required.

Accessories

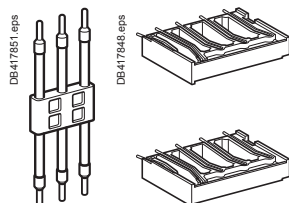
Description	Application	Sold in lots of	Unit reference
Adapter plates	For mounting a GV2 ME or GV2 LE by screw fixing	10	GV2AF02
Motor starter adapter plate	For mounting a GV2 and a contactor LC1 D09...D25. Item delivered with a GV1G02 flexible connection	1	GK2AF01
Flexible 3-pole connection for connecting a GV2 to a contactor LC1-D09...D25	Centre distance between mounting rails: 100...120 mm	10	GV1G02
Set of connections upstream/downstream	For connecting GV2 ME to a printed circuit board	10	GV2GA01
"Large Spacing" adapter UL 508 type E	For GV2 P●●H7 (except 32 A)	1	GV2GH7
Clip-in marker holders (supplied with each circuit breaker)	For GV2 P, GV2 L, GV2 LE and GV2 RT (8 x 22 mm)	100	LA9D92



GV2 AF02



GK2 AF01

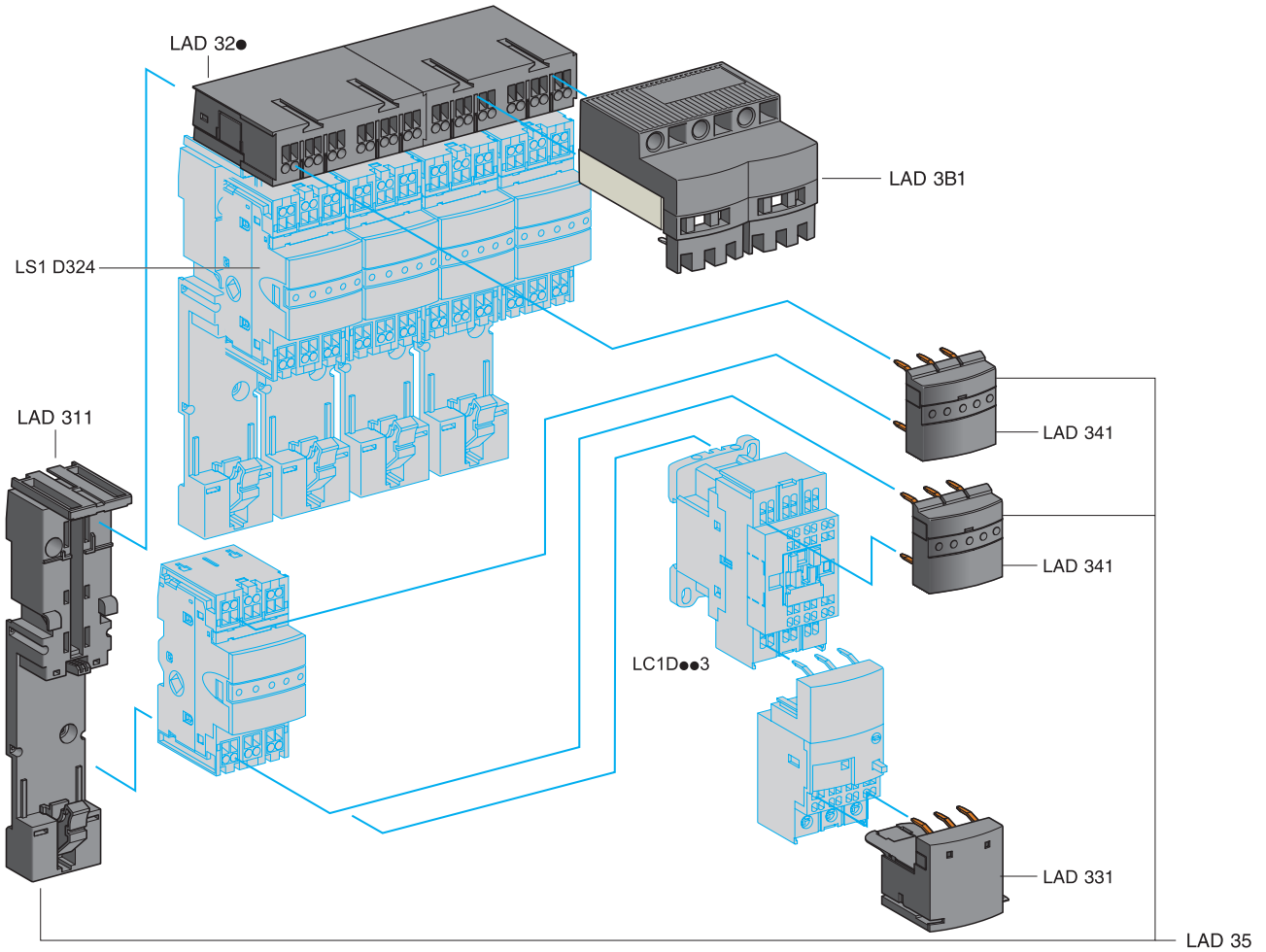


GV1 G02

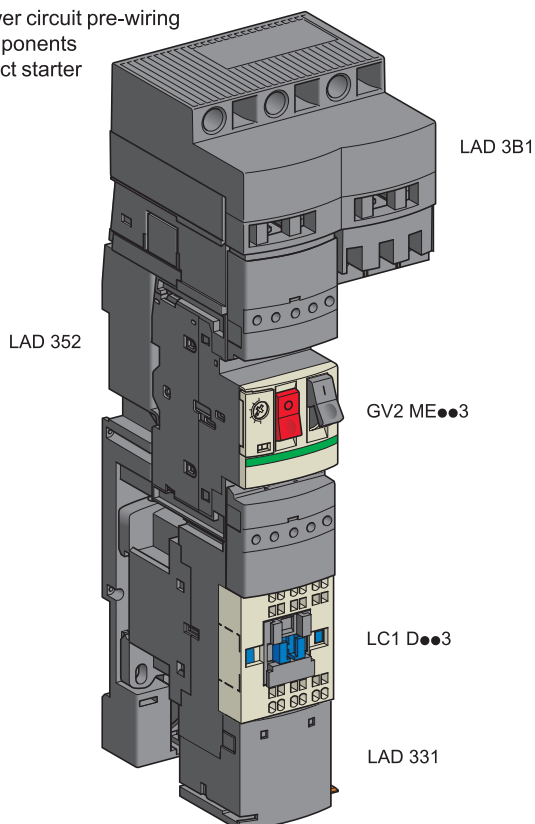
GV2 GA01

Group of fuse carriers + contactors mounted on adapter plates

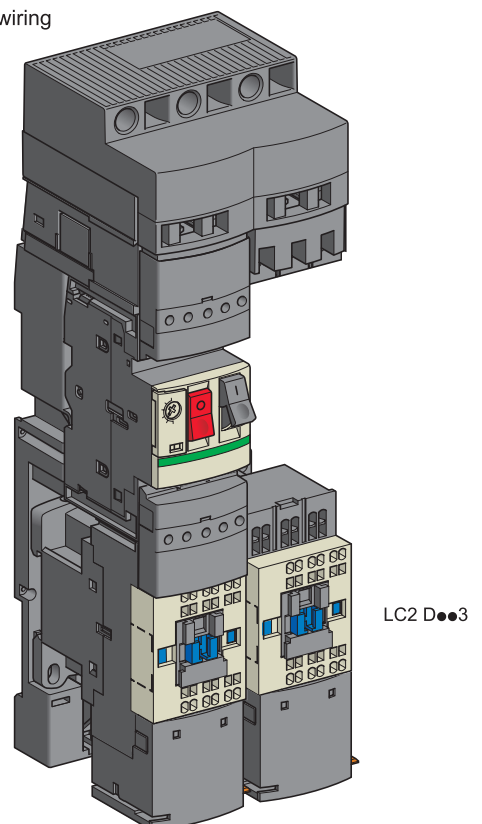
DE417652.eps



Power circuit pre-wiring components
Direct starter



Power circuit pre-wiring components
Reversing starter



Motor starter power circuit wiring

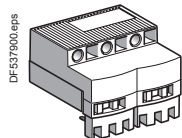
Connection systems

With spring terminals connection

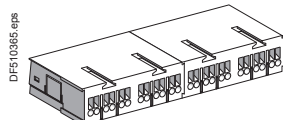
This system is convenient when time and space savings are required.

The motor starter can be composed of:

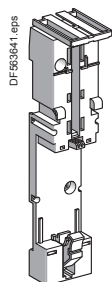
- LS1 D323 fuse carrier + LC1 D contactor.
- GV2 circuit breaker + LC1 D contactor



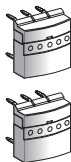
LAD 3B1



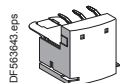
LAD 324



LAD 311



LAD 341



LAD 331

Upstream terminal and splitter blocks

Description	Maximum connection c.s.a.	Application	Sold in lots of	Reference
Upstream terminal block	16 mm ² ⁽¹⁾	Power supply of 1 or 2 power splitter boxes	1	LAD3B1

Description	Extension by	Number of starters	Reference
Power splitter box, 60 A	LAD 32●	2	LAD322
		3	LAD323
		4	LAD324

Assembling components

Description	Composition	Sold in lots of	Reference
Plate for mounting a GV2 ME circuit breaker and a contactor	For 1 starter	10	LAD311
Power connection module	For 1 starter	10	LAD341
Power connection kit for direct starter ⁽²⁾	1 plate LAD 311 for GV2 ME and 2 power connection modules LAD 341		LAD352

Downstream terminal and accessory

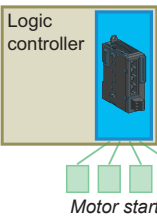
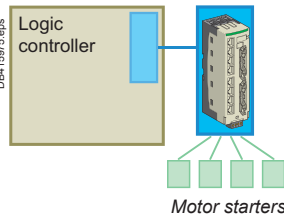
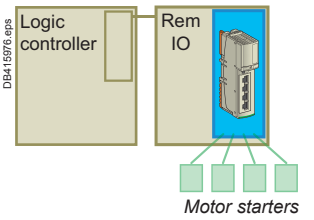
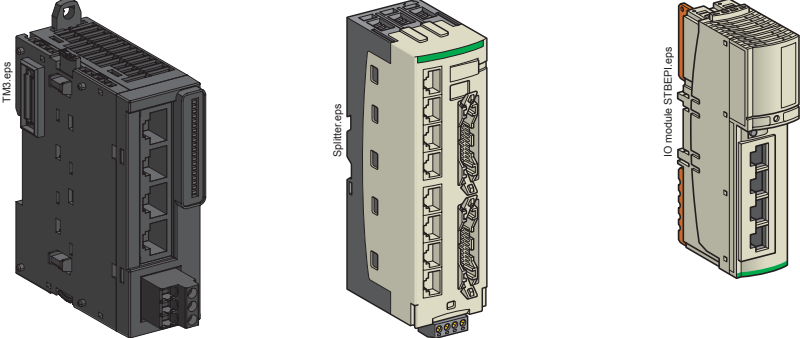
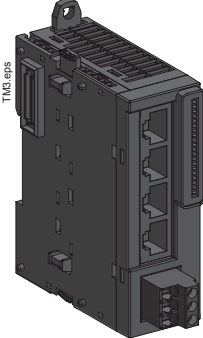
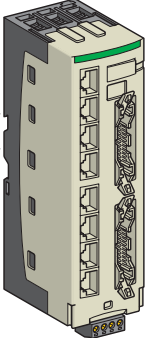
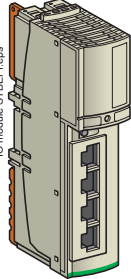
Description	Maximum connection c.s.a.	Application	Sold in lots of	Reference
Downstream terminal block	6 mm ²	Connection of motor cables	10	LAD331
Cable end reducer	-	For connection of conductors from 1 to 1.5 mm ²	20	LAD99

⁽¹⁾ Cables with one end pre-crimped are available to allow fast connection. References:
 1 set of 3 x 6 mm² cables (length 1 m: LAD 3B061, length 2 m: LAD 3B062 and length 3 m: LAD 3B063),
 1 set of 3 x 10 mm² cables (length 1 m: LAD 3B101, length 2 m: LAD 3B102 and length 3 m: LAD 3B103),
 1 set of 3 x 16 mm² cables (length 1 m: LAD 3B161, length 2 m: LAD 3B162 and length 3 m: LAD 3B163).

⁽²⁾ To build a reversing starter, order 2 kits LAD 352.

Motor starters-to-PLC wiring architectures

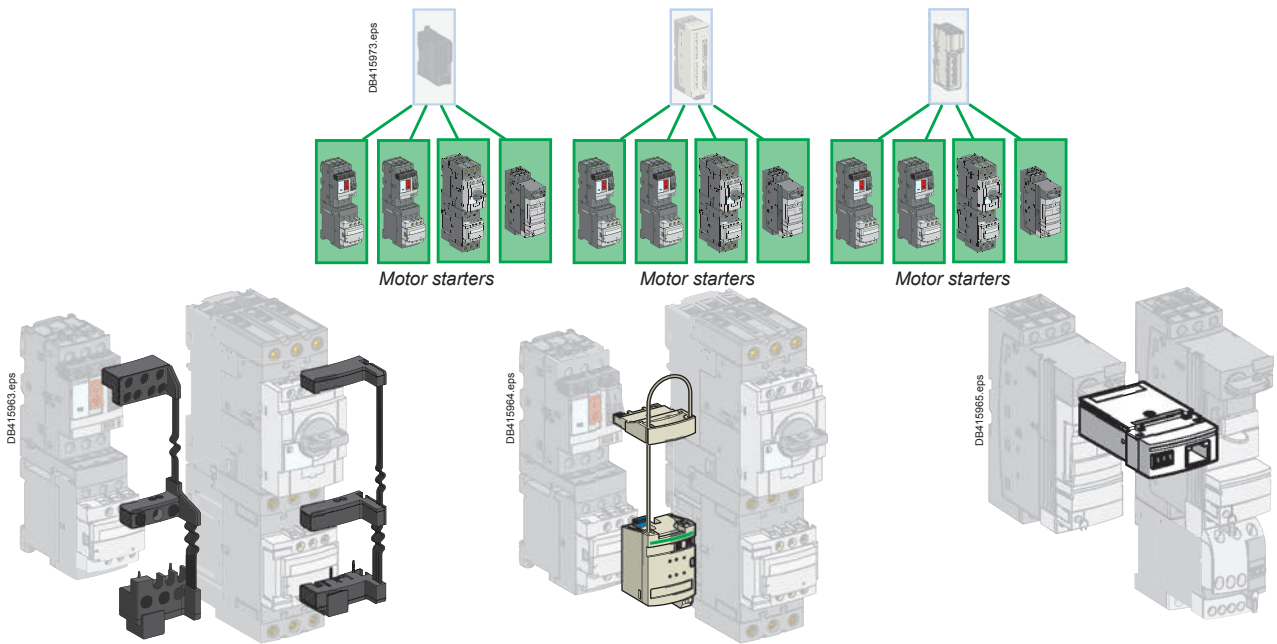
Automated control of multiple motor starters

Product type	Connection interfaces for a group of motor starters		
IO system name	Modicon TM3	Modicon Telefast	Modicon STB
Architecture			
			
Application	Control of single or multiple motor-starters assemblies by mean of a logic controller. Machines or processes requiring easy, fast cabling and replacement of motor starters.		
Function	IO module: Ensures the direct connection of up to 4 motor starters to logic controller (Modicon M221, M241, M251)	Splitter box: Ensures the connection of up to 8 motor starters to a logic controller via Modicon Telefast multiwire cable	IO module: Ensures the connection of up to 4 motor starters to a logic controller via an automation island (Modicon STB distributed IO architecture)
Upstream compatibility	With Modicon M221, M241, M251 logic controller, via logic controller internal bus	With any logic controller equipped with HE10 inputs/ outputs module	With Modicon STB automation island, via automation island internal bus
Upstream connectors	Backplane bus connector	HE10 connector	Backplane bus connector
Compatibility	Motor circuit breaker - Type Contactor - Type / Amp Motor circuit breaker + Contactor - terminals All types of motor starters equipped with RJ45 connection system		
Motor control	Reversing / Non reversing		
Number of motor starters	4	8	4
Downstream connector type	RJ45		
Reference	TM3XTYS4	LU9G02 / LU9G03	STBEPI2145K *
Pages	Refer to Modicon M221/M241/ M251 catalogue	TeSys U - page B2/12 and A3/32	Refer to IP20 distributed IO Modicon STB catalogue

* STBEPI2145K: GV2 + contactor D09 to D32, TeSys U only.

RJ45 connection components for motor starter

Common components for Modicon TM3, Modicon Telefast, Modicon STB systems



TeSys SoLink connection module:
ensures the compatibility of circuit breaker + contactor assemblies with screw-clamp terminals to the RJ45 connection system

Connection module:
ensures the compatibility of circuit breaker + contactor assemblies with spring terminals to the RJ45 connection system

Connection module:
ensures the compatibility TeSys U motor starters to the RJ45 connection system

TM3XTYS4 / LU9G02 / LU9G03 / STBEPI2145K

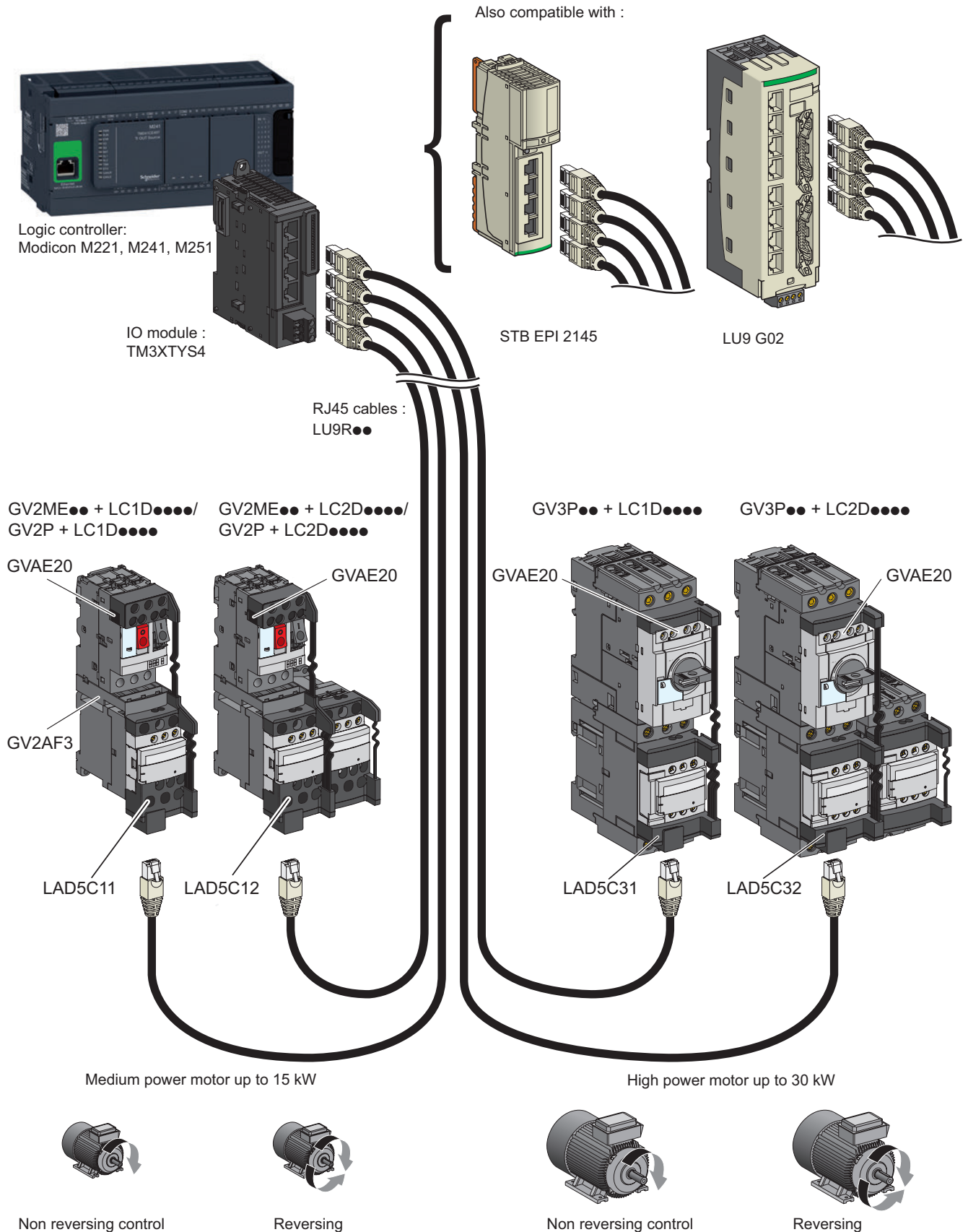
RJ45

GV2ME / GV2P		GV3P		GV2ME / GV3P		TeSys U 12 to 32 A	
TeSys D / 9 to 32 A		TeSys D / 40 to 65 A		TeSys D: 9 to 32 A (GV2ME), 40 to 65 A (GV3P)			
Screw-clamp				Spring		Screw-clamp	
Non reversing	Reversing	Non reversing	Reversing	Non reversing	Reversing	Reversing or Non reversing	
1							
Clamped pins				Plugin modules		Plugin module	
LAD5C11	LAD5C12	LAD5C31	LAD5C32	LAD9AP3●●		LUFC00	
B2/8				B2/10		B2/12	

Motor starter control circuit wiring - RJ45 connection

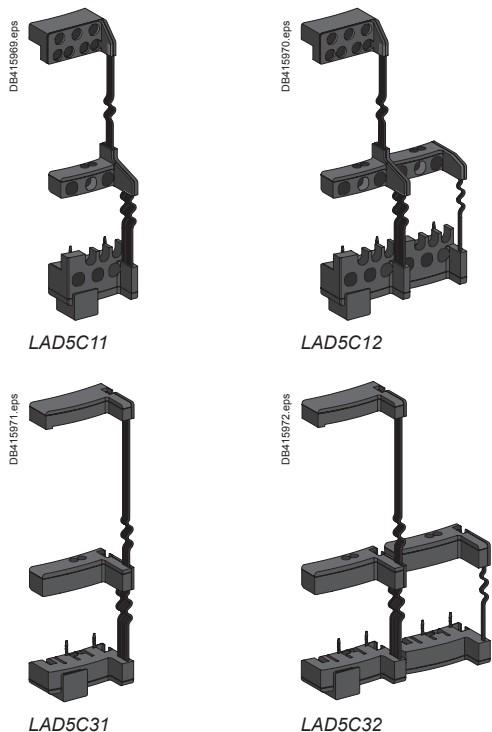
Architecture for motor starters with screw clamp terminals

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Motor starter control circuit wiring

RJ45 connection modules for circuit breakers + contactors with screw clamp terminals



Automated control of motor starters

Logic controller

Evolution makes motor control easier thanks to logic controller with specific IO modules or remote IO and programming with dedicated function blocks. This possibility is achievable with motor starters composed of conventional components such as motor-circuit breaker and contactor.

Complete solution

- Based on Modicon M221/241/251 logic controller, it is composed of:
- TM3XTYS4 logic controller I/O module for motor starters
 - LU9R●● precabled RJ45 cables (different lengths)
 - TeSys SoLink connection module for conventional motor components.

Control command functions

- For each port of the TM3XTYS4 logic controller I/O module (4 ports):
- Monitoring of 2 inputs: Ready, Running
 - Control of 2 outputs: ON/OFF, Forward/Reverse
- Inputs are connected to the auxiliary contacts of the motor starter. Outputs feed 24 V DC control coils.

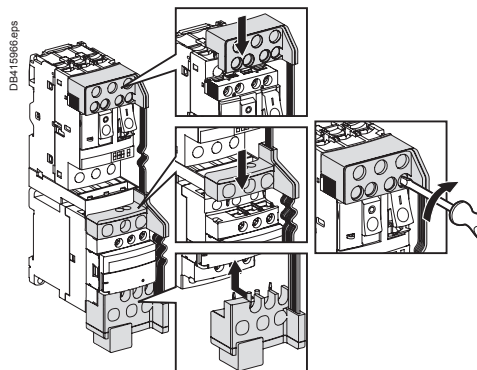
TeSys SoLink connection module for circuit breaker + contactor assemblies with screw clamp terminals

Simplified and error free wiring

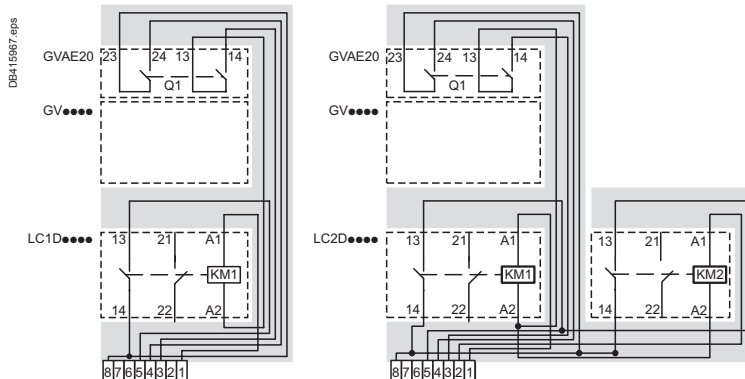
All the control and command terminals of the motor circuit breaker and contactor assembly are individually connected to the adaptor by means of pre-shaped pins. Once the pins inserted, the screw-clamp terminals must be normally tightened. The upstream liaison is carried out with a simple RJ45 pre-connectorized cable. The use of integrated NC contact of the contactor and 2 auxiliary contacts front blocks is preserved.

	Motor control	To be associated with circuit breaker + contactor ref.	Lots of	Reference
Connection module for control of motors up to 15 kW	Non reversing	GV2ME or GV2P LC1D09BL to LC1D32BL LC1D09BD to LC1D32BD	5	LAD5C11
	Reversing	GV2ME or GV2P LC2D09BL to LC2D32BL LC2D09BD to LC2D32BD	3	LAD5C12
Connection module for control of motors up to 30 kW	Non reversing	GV3P LC1D40ABD to LC1D65ABD	5	LAD5C31
	Reversing	GV3P LC2D40ABD to LC2D65ABD	3	LAD5C32

Design / Installation



Mounting principle.

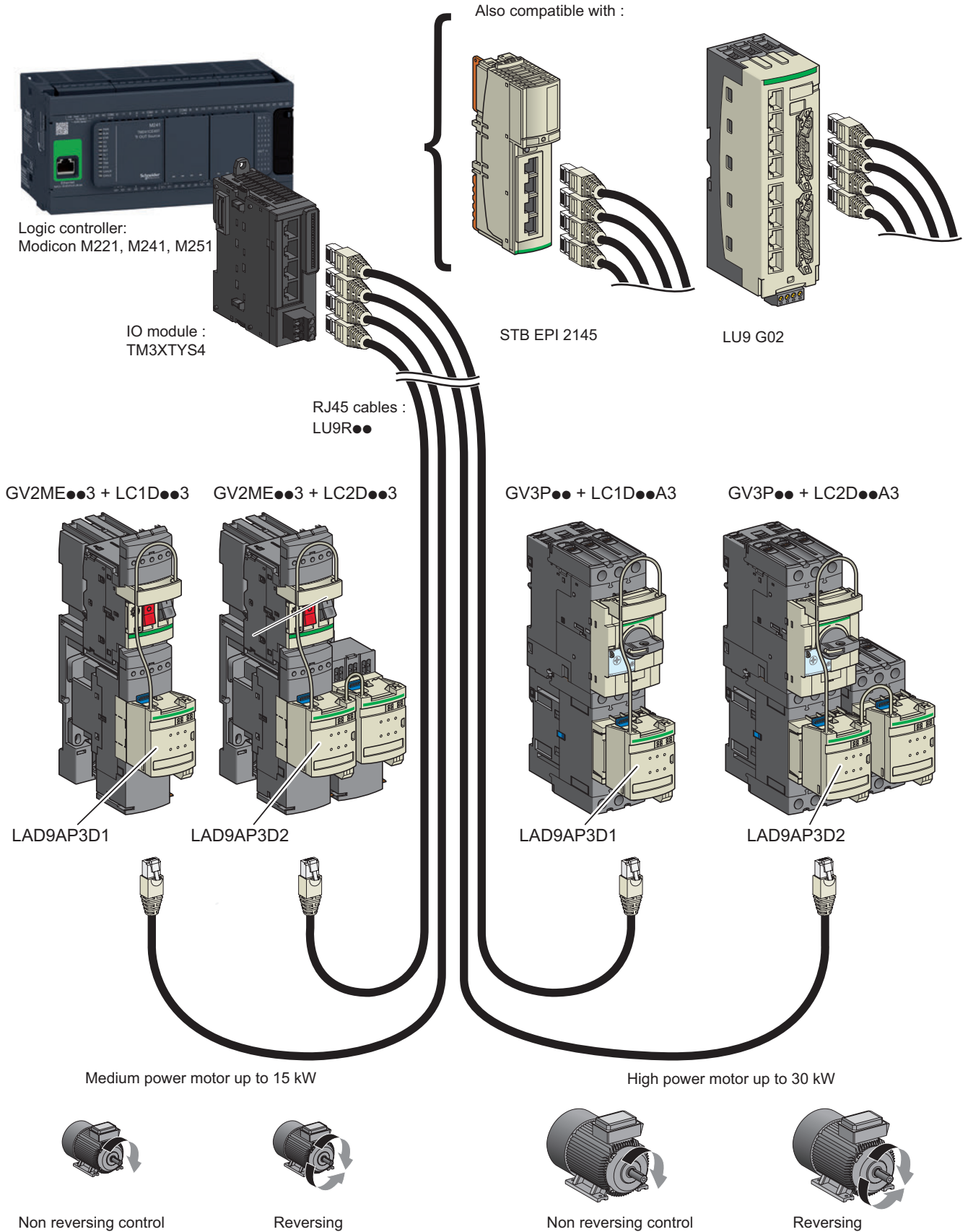


- Notes:**
- GV2AF3 combination block is required for GV2 circuit breaker / contactor assembling.
 - GVAE20 auxiliary contact block must be assembled on GV2 and GV3 circuit breaker before LAD5C.
 - GVAX undervoltage trip unit, GV●APN●● extended rotary handle cannot be used with LAD5C●● connection modules.
 - Depth of the motor starter assemblies with contactors up to 18 A, is increased by 14 mm, height is increased by 21 mm and respectively 14 and 17 mm with contactors up to 32 A.

Motor starter control circuit wiring - RJ45 connection

Architecture for motor starters with spring terminals

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Motor starter control circuit wiring

RJ45 connection modules for circuit breakers + contactors with spring terminals

LAD9AP3●● Connection module for circuit breaker + contactors

"Plug and play", for single or reverse motor starters

The connection module ① + ② provides a simple and safe solution for wiring control and monitoring terminals of a motor starter assembly. The connections to the terminals are grouped on a single (direct starter) or double (reverse starter) RJ45 connector. Thus, liaison to an IO module or splitter box is ensured by a straight preconnectorized RJ45 cable (LU9R●●).

Remote control of contactor coil, of any voltage

- The LAD9AP3● "Electromechanical" version is adapted for contactors with coil of any voltage, (12 to 230 V AC, or 5 to 130 V DC) thanks to an internal relay ensuring the voltage interfacing. An external control supply is needed.
- The LAD9AP3● "without relay" version is adapted for contactors with 24 V DC coil, the output voltage of the programmable logic controller IO or of the splitter box is directly applied to it.

Compatibility

- TeSys GV2ME circuit breaker + TeSys D contactors ratings up to 18 A with spring type control terminals + LAD311 mounting plate + LAD 341 power connection module.
- TeSys GV3P circuit breaker + LC1D●●● contactors up to 65 A with spring type control terminals.

① Circuit breaker plug: plugs directly into the auxiliary contacts terminals of a TeSys GV2 ME or TeSys GV3 P motor circuit breaker, in the location provided for the front-mounting block.

② and ③ Contactor block: The contactor block ensures the connection to the coil and auxiliary contacts of the contactor. 2 contactor blocks are linked for the reverse starter assembly. Each one is fitted with a RJ45 connector.

The mechanical locking onto the top and bottom of the contactor ensures a perfect connection, whatever the operating conditions (vibrations, knocks, etc.)

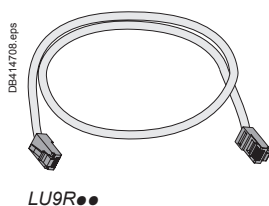
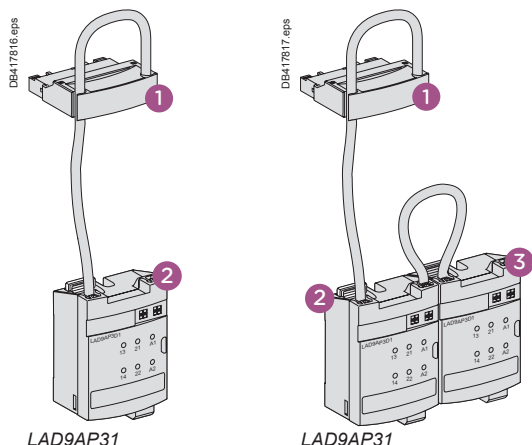
Control command pre-wiring components

Description	TeSys D coil voltage	Type of coil control relay	Type of starter	Reference
Control connection modules	~ 12...250 V	Electromechanical	Direct	LAD9AP31
	or --- 5...130 V		Reversing	LAD9AP32
	--- 24 V	Without relay	Direct	LAD9AP3D1
			Reversing	LAD9AP3D2

Connection cable

Between the control connection module and the splitter box
LU9G02 or STBEPI2145

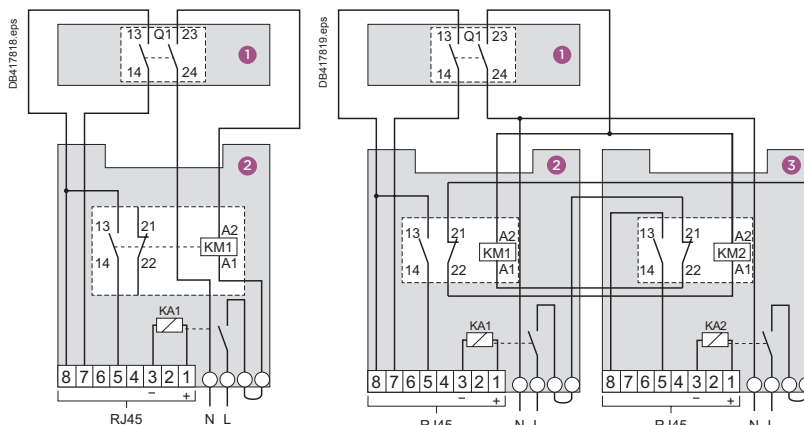
Connectors	Length (m)	Reference
2 x RJ45 connectors	0.3	LU9R03
	1	LU9R10
	3	LU9R30



- ① Plug connected to circuit breaker auxiliary contacts
- ② ③ Plug connected to contactor, to RJ45 and Aux. supply
- 1-3: 24 V DC control signal to the internal relay. It's contact sends the external source voltage to the contactor coil (KM1 or KM2).
- 7-8: circuit breaker status
- 5-8: contactor status
- The external link (red) can be replaced by an Emergency Stop pushbutton.

Note: GV2 circuit breaker + LC1D contactor assemblies must include the LAD311 back plate + LAD341 power connector.

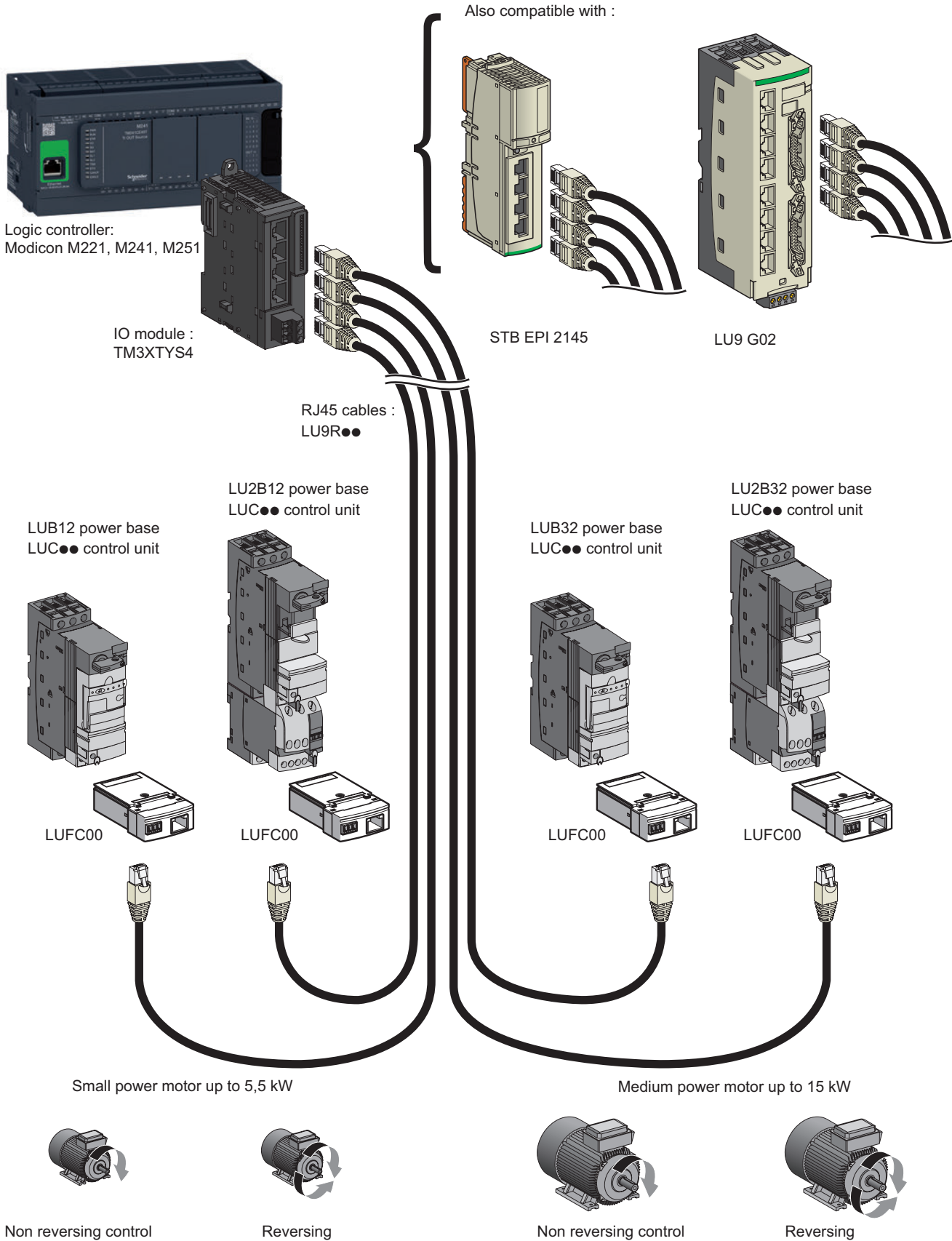
Design / Installation



Motor starter control circuit wiring - RJ45 connection

Architecture for TeSys U motor starters

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Motor starter control circuit wiring

RJ45 connection module for TeSys U motor starter

"Plug and play", for single or reversing motor starters

The LUF00 parallel connection module provides a simple and efficient solution for control and monitoring of a TeSys U direct or reverse motor starter.

Compact, fast cabling

The connection to the TeSys U power base is simply achieved by insertion of the module into it. The status and control signals are carried by a simple pre-connectorized RJ45 cable (LU9R●●) between an IO module or splitter box and TeSys U.

Features

- On / OFF / Reverse control.
- Handle position, power contacts position monitoring.

Compatibility

- 12 or 32 A direct motor starters: LUB12 or LUB32 TeSys U power base + LU9N11C connector + LUC●● control unit (coil code B)
- 12 or 32 A reversing motor starters: LU2B12 or LU2B32 TeSys U power base + LU9MRC connector + LUC●● control unit (coil code B)



LUF00



LU9BN11C



LU9MRC

TeSys U RJ45 connection module

Designation	Commercial ref
1 Parallel wiring module	LUF00

TeSys U coil connector

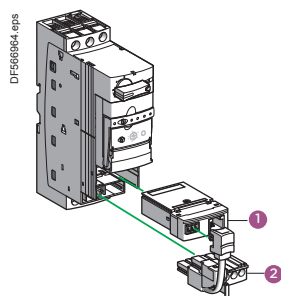
Designation	Commercial ref
2 Pre wired coil connector or LUB12 or LUB32 power base	LU9BN11C
3 Pre wired coil connector or LU2B12 or LU2B32 power base	LU9MRC

Design / Installation

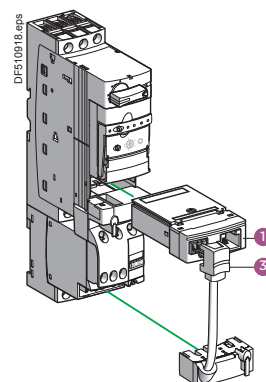
The LUF00 parallel (RJ45) connection module acts as a connection interface for controlling the coil and the monitoring of the auxiliary contacts. As a necessary complement, a pre wired connector is needed for carrying the signal to the coil and collecting:

- the status of the protection device (OK / Alarm) with LU9BN11C,
- the electrical interlock contacts with LU9MRC.

As the "reversing" is higher than the "direct" power base, the LU9MRC link is longer than the LU9BN11C.



Direct motor starter (LUB power base)



Reversing motor starter (LU2B power base)

Technical Data for Designers

Contents

Connection systems for motor starters,
power circuits with screw clamp terminals:

> Dimensions (GV2 + LAD311 assembly).....B2/16

> Dimensions (GV2G●●● busbars)B2/17

Connection systems for motor starters,
power and control circuits with spring terminals:

> PresentationB2/18

> CharacteristicsB2/19

> DimensionsB2/20

IO module, splitter box, for motor starters control circuits

> DimensionsB2/21

Connection systems for motor starters, power circuits

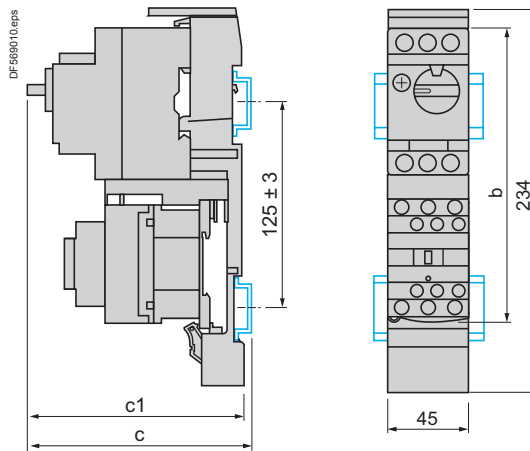
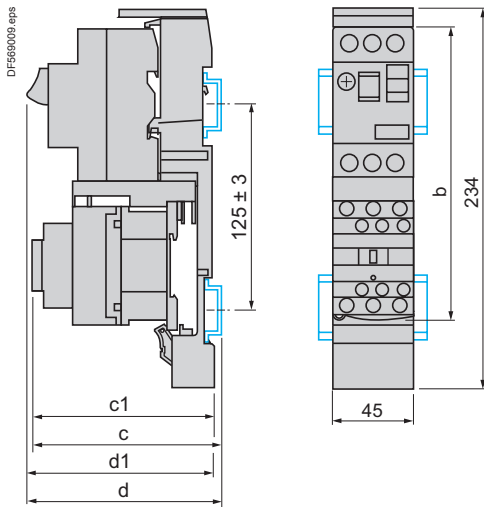
With screw clamp terminals

Dimensions

GV2 AF4 + LAD 311

Combination GV2 ME + TeSys d contactor

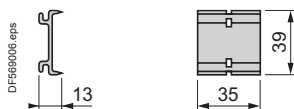
Combination GV2 P + TeSys d contactor



GV2 ME +	LC1 D09...D18	LC1 D25 and D32
b	176.4	186.8
c1	103.1	136.4
c	135.6	141.9
d1	107	107
d	112.5	112.5

GV2 P +	LC1 D09...D18	LC1 D25 and D32
b	176.4	186.8
c1	136.5	142.4
c	141.6	147.9

7.5 mm height compensation plate GV1 F03

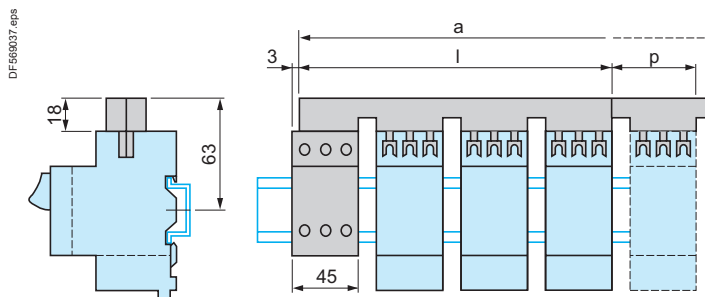


Connection systems for motor starters, power circuits

With screw clamp terminals

GV2 ME, GV2 P, GV2 L and GV2 LE

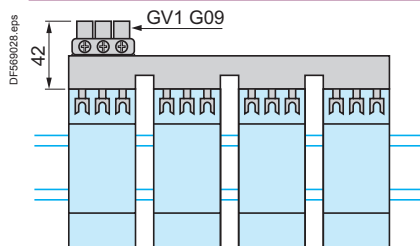
Sets of busbars GV2 G445, GV2 G454, GV2 G472, with terminal block GV2 G05



	l	p
GV2 G445 (4 x 45 mm)	179	45
GV2 G454 (4 x 54 mm)	206	54
GV2 G472 (4 x 72 mm)	260	72

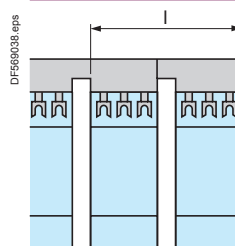
Number of tap-offs	a			
	5	6	7	8
GV2 G445	224	269	314	359
GV2 G454	260	314	368	422
GV2 G472	332	404	476	548

Sets of busbars GV2 G●●● with terminal block GV1 G09

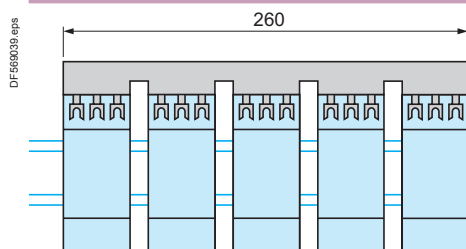


	l
GV2 G245 (2 x 45 mm)	89
GV2 G254 (2 x 54 mm)	98
GV2 G272 (2 x 72 mm)	116

Sets of busbars GV2 G245, GV2 G254, GV2 G272

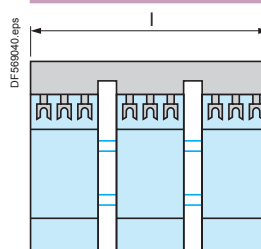


Sets of busbars GV2 G554



	l
GV2 G345 (3 x 45 mm)	134
GV2 G354 (3 x 54 mm)	152

Sets of busbars GV2 G345 and GV2 G354



Wiring systems

Connection systems for motor starters, power and control circuits

With spring terminals

It is a modular system which standardises and simplifies setting up of motor starters with its pre-wired control and power circuits.

Installation of a motor starter is therefore quick, simple, safe and flexible. In addition, this system:

- enables the motor starter to be customised at a later date,
- reduces maintenance time and
- optimises panel space by reducing the number of terminals and intermediate interfaces and the amount of ducting.

System for motor starters with spring terminals

Motor starters with TeSys GV2 ME circuit breakers

- From 0 to 18 A max.,
- TeSys GV2 ME circuit breakers combined with LC1 D contactors from 9 to 25 A (spring terminal version),
- pre-wired power and control connections.

Motor starters with TeSys GV3 P circuit breakers

- From 9 to 65 A max.,
- TeSys GV3 P circuit breakers combined with LC1 D contactors from 40 to 65 A (spring terminal version),
- pre-wired control connections only,
- For pre-wired power connections, use busbar sets from the TeSys D 40 to 65 A contactor range (see page B8/21).

This range comprises pre-wiring components for:

- the power circuits,
- the control circuits.

Power circuit pre-wiring components

(motor starters with TeSys GV2 circuit breakers only)

- a **power circuit connection kit** comprising, for each starter, a plate for mounting the contactor and the circuit breaker and two power connection modules,
- a **power splitter box** for 2 or 4 starters,
- an **upstream terminal block** for a power supply up to 60 A (16 mm²),
- an **outgoing terminal block** for connection of the motor power supply cables and the earth cables (6 mm²).

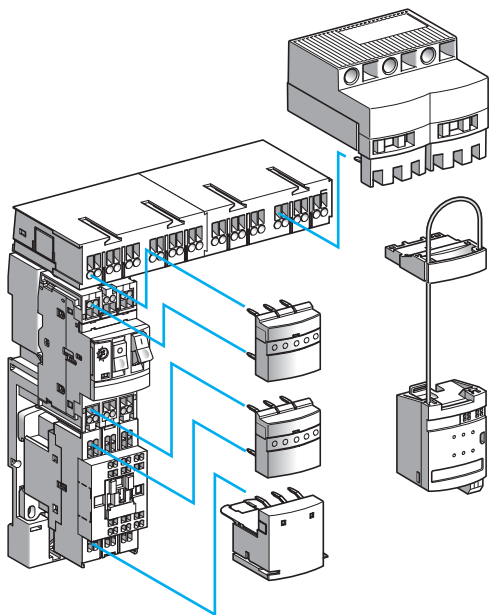
Note: with GV3 circuit breakers, no accessories are required for pre-wiring of the power circuit. The GV3 P●● outgoing terminal block can be removed. This circuit breaker is also sold with only one terminal block (reference: GV3 P●●1).

Control circuit pre-wiring components

(motor starters with TeSys GV2 and GV3 circuit breakers)

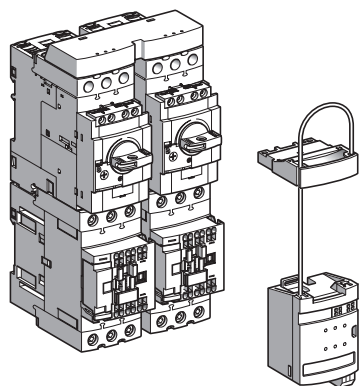
- a **control circuit connection module** which plugs directly into the contactor and the circuit breaker on each starter. This module incorporates status and control data for this motor starter.
- a **parallel wiring module** which concentrates the data of each motor starter:
 - **HE 10** connector, for centralised applications. Data is transmitted to the PLC via the Advantys Telefast pre-wired system.
 - **STB**, designed for decentralised automation architectures. This module is suitable for use in an Advantys STB configuration for connection to the PLC via a field bus.

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Motor starter with GV2 ME circuit breakers

DF50981.eps



Motor starter with GV3 P circuit breakers

Connection systems for motor starters, power and control circuits

With spring terminals

General environment

Type of control connection module			LAD 9AP3●●	
Standard				IEC 60439-1
Certifications				UL, CSA
Degree of protection		Conforming to IEC 60529		IP 40 (mounted assembly)
Resistance to incandescent wire		Conforming to IEC 60695-2-1	°C	960
Shock resistance		Conforming to IEC 60068-2-27		11 ms and 15 gn (half sine wave)
Vibration resistance		Conforming to IEC 60068-2-6 and BV/LR	gn	2...100 Hz: 4 and 3...100 Hz: 0.7
Resistance to electrostatic discharge		Conforming to IEC 61000-4-2		Level 3
Resistance to radiated fields		Conforming to IEC 61000-4-3	V/m	10 (26...1000 MHz)
Immunity to fast transient currents		Conforming to IEC 61000-4-4		Level 3
Surge withstand		Conforming to IEC 61000-4-5	kV	2 in common mode, 0.6 in differential mode Wave form: 1.2/50 μs - 8/20 μs
Immunity to radioelectric fields		Conforming to IEC 61000-4-6	V	10 (0.15...80 MHz)
Ambient air temperature		Operation in floor-standing enclosure	°C	-5...+60
		Operation in wall-mounted enclosure	°C	-5...+40
		Storage	°C	-40...+70
Space required around mounted assembly		For inserting cables and heat dissipation	mm	> 30
Degree of pollution				3
Assembly fixing (with TeSys GV2 circuit breakers only)				On 2 x 35 mm rails or with 2 x Ø5.5 mm screws on plate for GV2 ME
Suitable wire c.s.a.	Voltage supply for power	Number of wires		3
		Flexible cable with cable end	mm ²	16
		Flexible cable without cable end	mm ²	25
		Solid cable	mm ²	25
	Voltage supply for contactor coil control	Number of wires		2
		Flexible cable with cable end (max)	mm ²	1.5
		Flexible cable without cable end (max)	mm ²	2.5
		Solid cable (max)	mm ²	2.5

3-phase power circuit characteristics

Maximum current	Per power supply	Conforming to IEC 60439-1	A	60 (single power supply to one or more sub-bases or splitter boxes)
	Per sub-base	Conforming to IEC 60439-1	A	60
GV2 operating limit				80 % of I _{max} at 60 °C ambient temperature (see table on opposite page)
Maximum current per starter			A	18 (with an empty slot between two starters)
Insulation voltage			V	750
Operational voltage			V	690
U _{imp}			kV	6
Rated operational frequency			Hz	50-60
Rated short-circuit current conditional I _{sc} at 415 V		Conforming to IEC 60439-1	kA	50
Permissible short-time rating I _{cw}		Conforming to IEC 60439-1	kA	9.1 (for 70 ms)

Control circuit characteristics

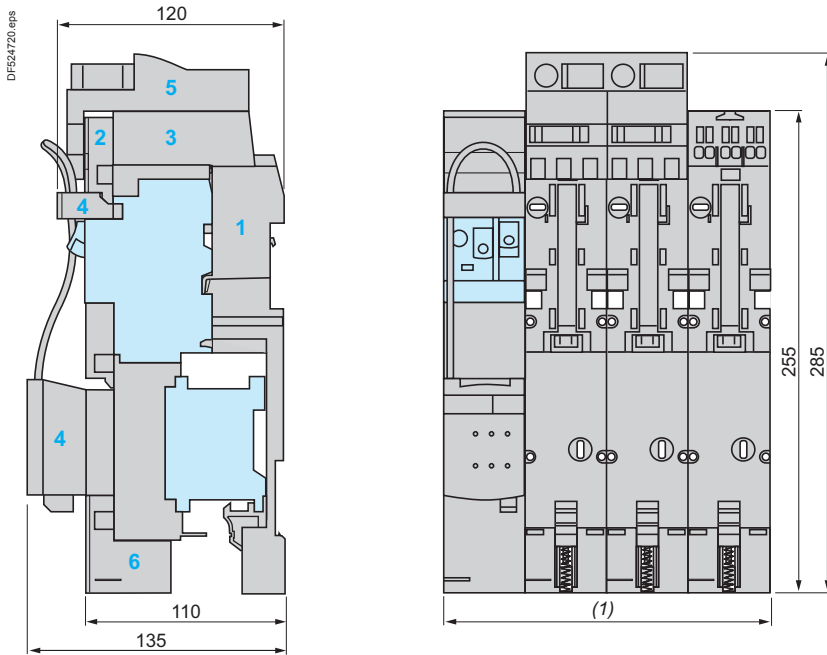
Contactor coil control voltage	V	~ 12...250 (with interface relay)
	V	~ 5...24 (without interface relay)
	V	~ 5...130 (with interface relay)

Connection systems for motor starters, power and control circuits

With spring terminals

Dimensions

Mounted assembly, with TeSys GV2 ME circuit breakers and TeSys D contactors



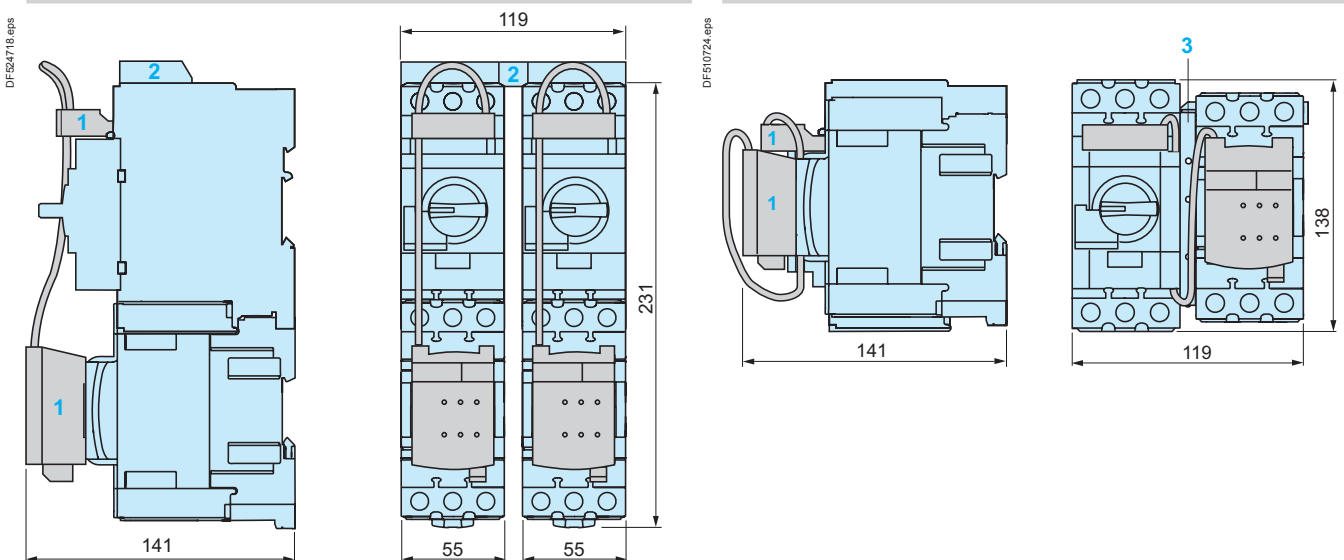
- 1 Circuit breaker and contactor support plate
- 2 Power connection module
- 3 Power splitter box
- 4 Control splitter box
- 5 Upstream terminal block
- 6 Outgoing terminal block

(1) 2 starters: 90 mm, 4 starters: 180 mm, 8 starters: 360 mm.

Mounted assembly with TeSys GV3 P circuit breakers and TeSys D contactors (LC1 D40A3... LC1 D65A3)

Vertical mounting

Side by side mounting



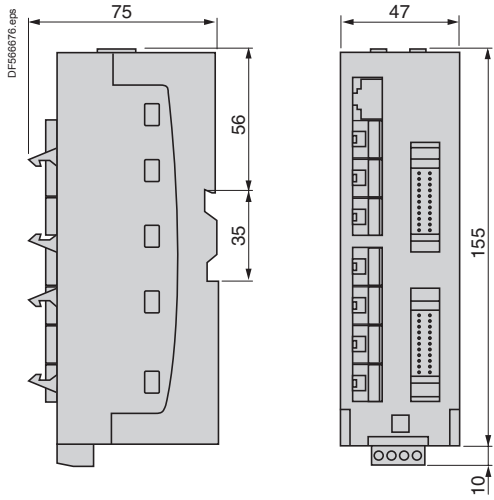
- 1 Control splitter box
- 2 Set of GV3 G264 busbars
- 3 Set of S-shape busbars GV3 S

IO module, splitter box, for motor starters control circuits

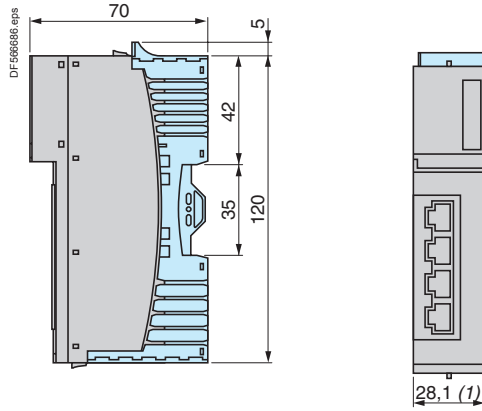
Dimensions

Parallel RJ45 wiring modules

Splitter box LU9 G02



Parallel wiring module Advantys STB EPI 2145



(1) Dimension to be multiplied by the number of STB EPI 2145 modules present in the configuration.

Door mounting isolation switch - mini Vario - Vario

Type of product	Range		Pages
Switch disconnectors mini-Vario	Up to 12 or 20 A		B3/2
Switch disconnectors, high performance applications Vario	From 12 to 175 A		B3/6
Accessories mini-Vario and Vario			B3/8

Technical Data for Designers

B3/17

- 3-pole rotary switch-disconnectors, 12 to 20 A
- Marking on operator $\text{O} \downarrow$.
- Padlockable operating handle (padlocks not supplied).
- Degree of protection IP 65.

Main and Emergency stop switch-disconnectors for door mounting

Operator	Front plate		Fixing	lth	Reference
Handle	mm	mm	mm	A	
Red, padlockable with up to 3 padlocks (Ø4 to Ø8)	Yellow	60 x 60	Ø22.5	12	VCDN12
				20	VCDN20

Main and Emergency stop switch-disconnectors for mounting at back of an enclosure ⁽¹⁾

Operator	Front plate		Fixing	lth	Reference
Handle	mm	mm	mm	A	
Red, padlockable with up to 3 padlocks (Ø4 to Ø8)	Yellow	60 x 60	Ø22.5	12	VCCDN12
				20	VCCDN20

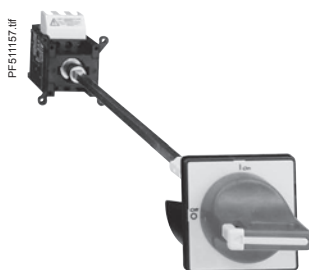
Main switch-disconnectors for door mounting

Operator	Front plate		Fixing	lth	Reference
Handle	mm	mm	mm	A	
Black, padlockable with up to 3 padlocks (Ø4 to Ø8)	Black	60 x 60	Ø22.5	12	VBDN12
				20	VBDN20

⁽¹⁾ Switches supplied with a shaft extension VZN 17 and a door interlock plate KZ 32 (see page B3/5).



VCDN 20

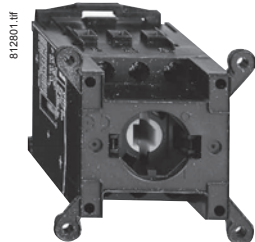


VCCDN 20



VBDN 20

Mini-Vario



812801.tif

VN 20



590586.tif

VZN 11



590587.tif

VZN 14



590588.tif

VZN 05



812805.tif

VZN 26



812806.tif

VZN 08

Switch bodies

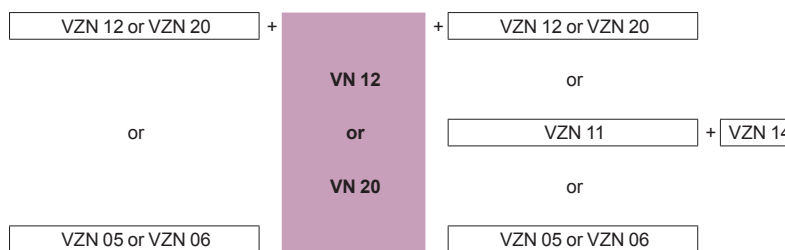
Description	Rating A	Reference
3-pole switch-disconnectors	12	VN12
	20	VN20

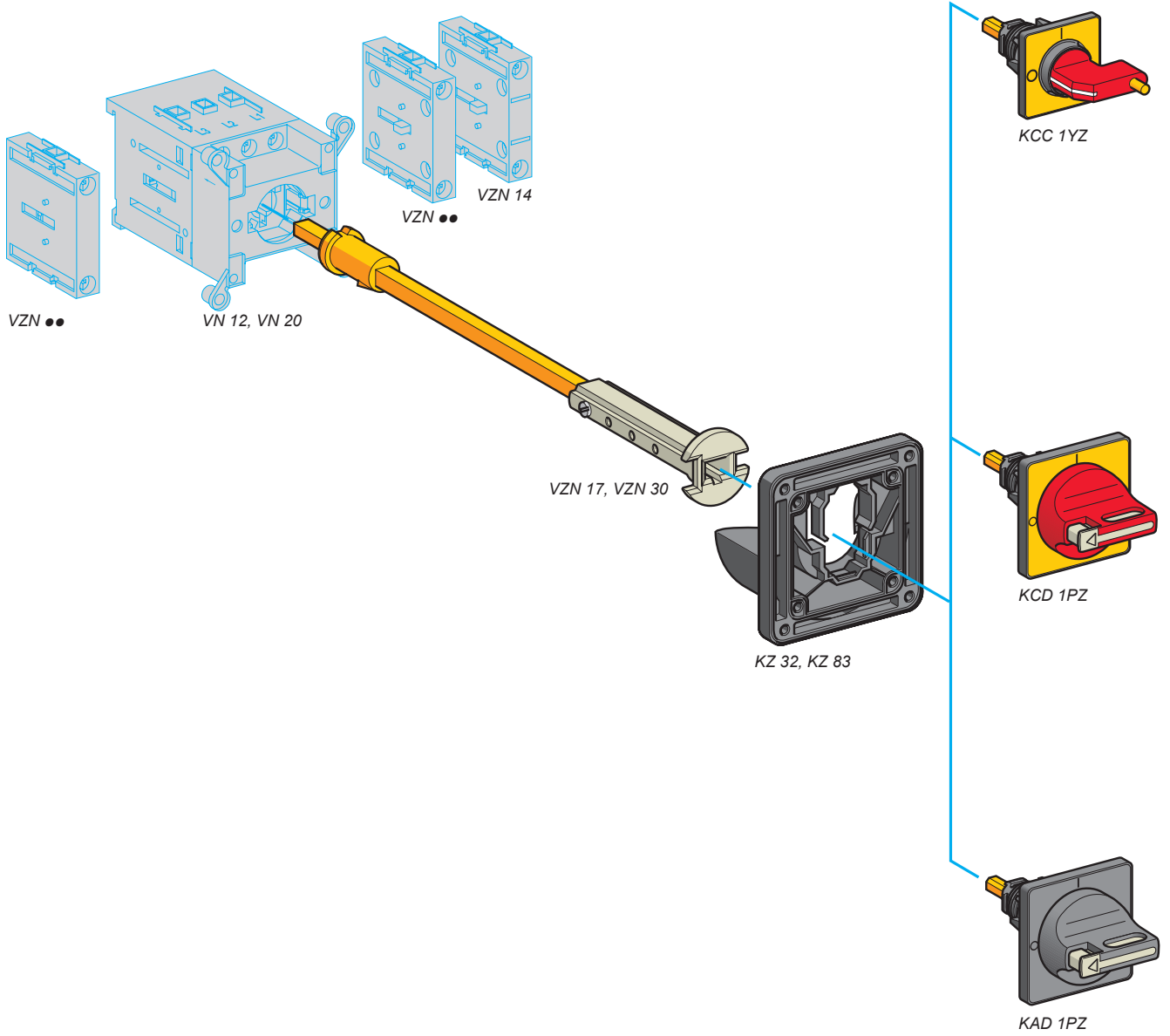
Add-on modules


Description	Rating A	Reference
Main pole modules	12	VZN12
	20	VZN20
Neutral pole module with early make and late break contacts	12 and 20	VZN11
Earthing module	12 and 20	VZN14
Auxiliary contact block modules	1 N/O late make contact	VZN05
	1 N/C early break contact	VZN06
Input terminal protection shrouds	For add-on pole modules or auxiliary contact block modules (single-pole shroud)	VZN26
	For switch bodies (3-pole shroud)	VZN08

Switch-disconnectors

Maximum number of add-on modules that can be fitted on a switch body





- Degree of protection IP 65.
- Marking on operator .
- Padlockable operating handle (padlocks not supplied).
- Operator fixing by 1 Ø22.5 hole; for other operators see pages B3/11 and B3/13.
- For other accessories and empty enclosures, see pages B3/14, B3/15 and A1/3.

Operators for main and Emergency stop switch-disconnectors

Handle	Front plate mm	Reference
Red, padlockable with 1 padlock (Ø4 to Ø6)	Yellow 45 x 45	KCC1YZ
Red, padlockable with up to 3 padlocks (Ø4 to Ø8)	Yellow 60 x 60	KCD1PZ

Operators for main switch-disconnectors

Handle	Front plate mm	Reference
Black, padlockable with up to 3 padlocks (Ø4 to Ø8)	Black 60 x 60	KAD1PZ

Accessories for door interlocking

For rear fixing switch-disconnectors mounted at the back of an enclosure, in addition to a direct operator

Description	Front plate mm	Distance enclosure back/door mm	Sold in lots of	Unit reference
Shaft extensions	–	300...330	1	VZN17
		400...430	1	VZN30
Door interlock plate	45 x 45 or 60 x 60	–	5	KZ32
Plate for door mounting	45 x 45 or 60 x 60	–	5	KZ83

- 3-pole rotary switch-disconnectors, 12 to 175 A
- Marking on operator $\circ \downarrow$.
- Padlockable operating handle (padlocks not supplied).
- Degree of protection IP 65.

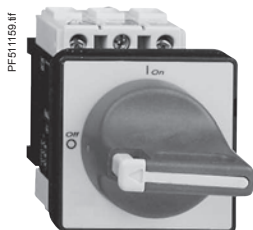
Main and Emergency stop switch-disconnectors for door mounting

Handle	Front plate mm	Fixing	Rating A	Reference	Weight kg
Red, padlockable with up to 3 padlocks ($\varnothing 4$ to $\varnothing 8$)	Yellow 60 x 60	$\varnothing 22.5$	12	VCD02	0.215
			20	VCD01	0.215
			25	VCD0	0.215
			32	VCD1	0.215
			40	VCD2	0.215
			4 screws		
20	VCF01	0.250			
25	VCF0	0.250			
32	VCF1	0.250			
40	VCF2	0.250			
63	VCF3	0.560			
80	VCF4	0.560			
Red, long, padlockable with up to 3 padlocks ($\varnothing 4$ to $\varnothing 8$)	Yellow 90 x 90	4 screws			
			175	VCF6	1.200

Main and Emergency stop switch-disconnectors for mounting at back of an enclosure ⁽¹⁾

Handle	Front plate mm	Fixing	Rating A	Reference	Weight kg
Red, padlockable with up to 3 padlocks ($\varnothing 4$ to $\varnothing 8$)	Yellow 60 x 60	$\varnothing 22.5$	12	VCCD02	0.392
			20	VCCD01	0.392
			25	VCCD0	0.392
			32	VCCD1	0.392
			40	VCCD2	0.392
			4 screws		
20	VCCF01	0.527			
25	VCCF0	0.527			
32	VCCF1	0.527			
40	VCCF2	0.527			
63	VCCF3	0.440			
80	VCCF4	0.680			
Red, long, padlockable with up to 3 padlocks ($\varnothing 4$ to $\varnothing 8$)	Yellow 90 x 90	4 screws			
			175	VCCF6	1.320

⁽¹⁾ Unit supplied with a shaft extension VZN 17 and a door interlock plate KZ 32 or KZ 74 (see page B3/14).



VCF 0



VCF 5



VCCF 0

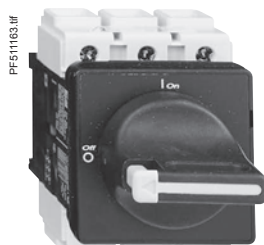
- 3-pole rotary switch-disconnectors, 12 to 175 A
- Marking on operator $\circ \downarrow$.
- Padlockable operating handle (padlocks not supplied).
- Degree of protection IP 65.

Main switch-disconnectors for door mounting

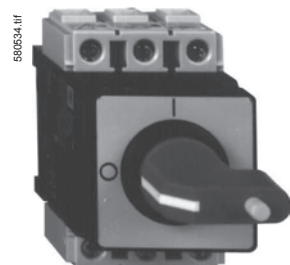
Handle	Front plate mm	Fixing	Rating A	Reference	Weight kg
Black, padlockable with up to 3 padlocks ($\varnothing 4$ to $\varnothing 8$)	Black 60 x 60	$\varnothing 22.5$	12	VBD02	0.215
			20	VBD01	0.215
			25	VBD0	0.215
			32	VBD1	0.215
			40	VBD2	0.215
4 screws			12	VBF02	0.250
			20	VBF01	0.250
			25	VBF0	0.250
			32	VBF1	0.250
			40	VBF2	0.250
			63	VBF3	0.560
			80	VBF4	0.560
			Red, long, padlockable with up to 3 padlocks ($\varnothing 4$ to $\varnothing 8$)	Black 90 x 90	4 screws
175	VBF6	1.200			



VBD 0



VBF 4



VVE 1

Main and Emergency stop switch-disconnectors

For mounting in an enclosure or for modular distribution boards

Handle	Front plate mm	Rating A	Reference	Weight kg
Red, padlockable with 1 padlock ($\varnothing 4$ to $\varnothing 6$)	Yellow 45 x 45	25	VVE0	0.250
		32	VVE1	0.250
		40	VVE2	0.250
		63	VVE3	0.530
		80	VVE4	0.530

Main switch-disconnectors

For mounting in an enclosure or for modular distribution boards

Handle	Front plate mm	Rating A	Reference	Weight kg
Black, not padlockable	Black 45 x 45	25	VVD0	0.250
		32	VVD1	0.250
		40	VVD2	0.250
		63	VVD3	0.560
		80	VVD4	0.560

TeSys protection components

VARIO switch-disconnectors
for high performance applications
Switch bodies, add-on modules, auxiliary
contacts (for customer assembly)

Vario

Switch bodies

Description	Rating A	Reference
3-pole switch-disconnectors ⁽¹⁾	12	V02
	20	V01
	25	V0
	32	V1
	40	V2
	63	V3
	80	V4
	125	V5
175	V6	

Add-on modules

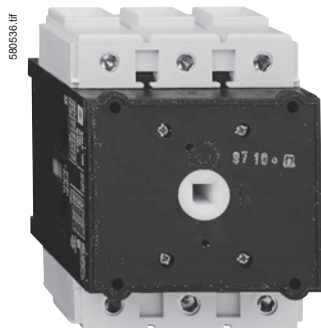
Description	Rating A	Reference
Main pole modules	12	VZ02
	20	VZ01
	25	VZ0
	32	VZ1
	40	VZ2
	63	VZ3
	80	VZ4
	Neutral pole modules with early make and late break contacts ⁽¹⁾	12 to 40
63 to 80		VZ12
125 and 175		VZ13
Earthing modules	12 to 40	VZ14
	63 and 80	VZ15
	125 and 175	VZ16

Auxiliary contact block modules

Description	Type	Reference
Auxiliary contact block modules with 2 auxiliary contacts	N/O + N/C ⁽²⁾	VZ7
	N/O + N/O	VZ20

⁽¹⁾ Protection shrouds are available if required: see page B3/14.

⁽²⁾ Late make N/O, early break N/C contacts



V5



VZ 0



VZ 11



VZ 15



VZ 20

TeSys protection components

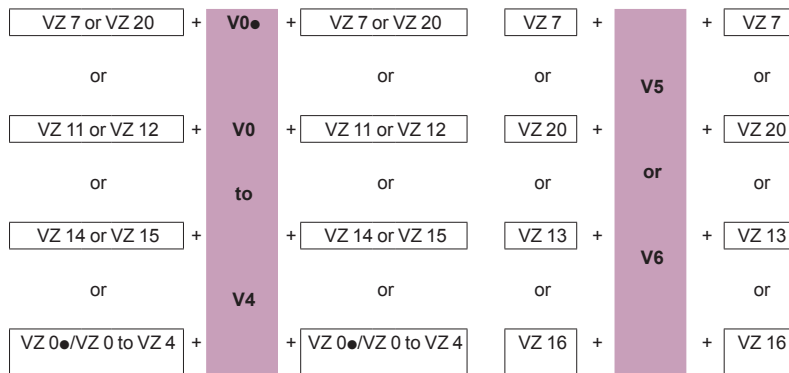
VARIO switch-disconnectors
for high performance applications

Switch bodies, add-on modules, auxiliary
contacts (for customer assembly)

Vario

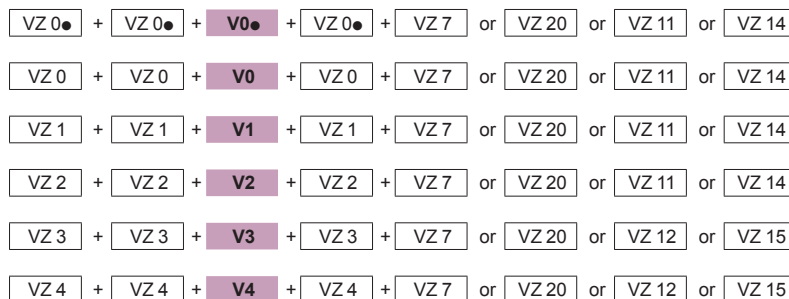
Maximum number of add-on modules that can be fitted on a switch body

1 add-on module on each side of the switch body



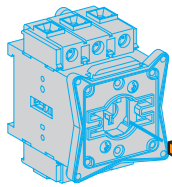
Switch-disconnectors

2 add-on modules on each side of the switch body

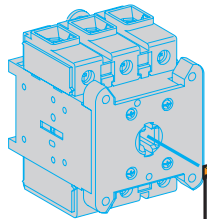


Note: The add-on modules mounted next to the switch body are main pole modules. Maximum of 3 main pole modules per switch body.

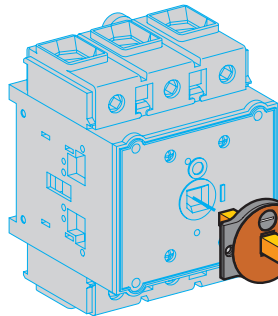
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VN 12, VN 20
V02...V2

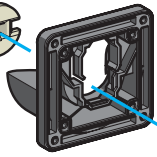


V3, V4



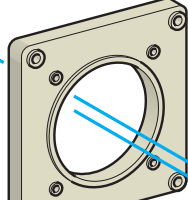
V5, V6

VZN 17,
VZN 30



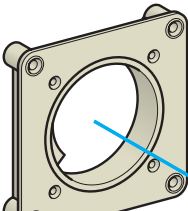
KZ 32, KZ 83

VZ 18, VZ 31



KZ 81

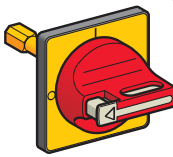
VZ 18, VZ 31



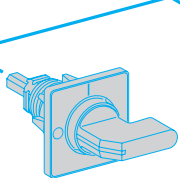
KZ 74



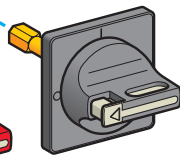
KC• 1YZ



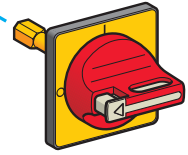
KC• 1PZ



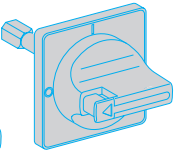
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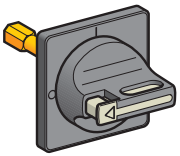
KA• 1PZ



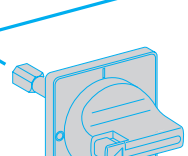
KCF 2PZ



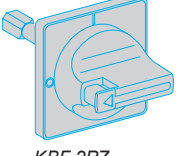
KB• 1PZ



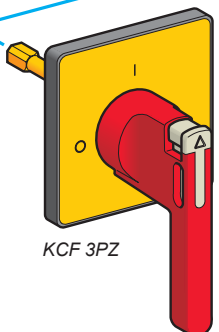
KAF 2PZ



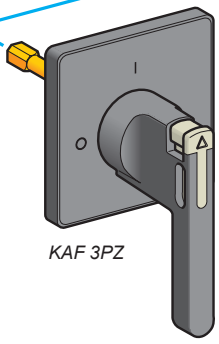
KDF 2PZ



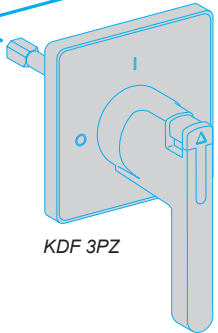
KBF 2PZ



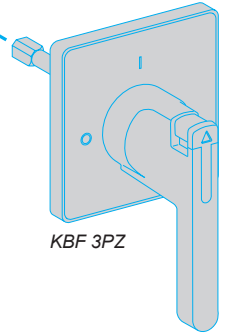
KCF 3PZ



KAF 3PZ



KDF 3PZ



KBF 3PZ

Protection components

Mini-VARIO and VARIO

switch-disconnectors

Operators, handles and front plates (for customer assembly)

Mini-Vario and Vario

- Marking on operator $\circ \downarrow$.
- Padlockable operating handle (padlocks not supplied).
- Degree of protection IP 65.

Handles and front plates for main and Emergency stop switch-disconnectors

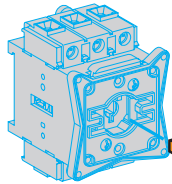
For switch body	Operator Handle	Front plate		Reference
		Dimensions	Fixing	
		mm		
VN 12, VN 20 V02...V2	Red, padlockable with 1 padlock (Ø4 to Ø6)	Yellow 45 x 45	Ø22.5 4 screws	KCC1YZ KCE1YZ
		Yellow 60 x 60	Ø22.5 4 screws	KCD1PZ KCF1PZ
V3 and V4	Red, padlockable with up to 3 padlocks (Ø4 to Ø8)	Yellow 60 x 60	4 screws	KCF2PZ
V5 and V6	Red, long, padlockable with up to 3 padlocks (Ø4 to Ø8)	Yellow 90 x 90	4 screws	KCF3PZ ⁽¹⁾

Handles and front plates for main switch-disconnectors

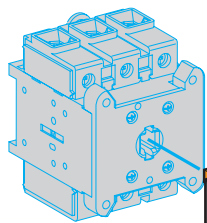
For switch body	Operator Handle	Front plate		Reference
		Dimensions	Fixing	
		mm		
VN 12, VN 20 V02...V2	Black, padlockable with up to 3 padlocks (Ø4 to Ø8)	Black 60 x 60	Ø22.5 4 screws	KAD1PZ KAF1PZ
		Black 60 x 60	4 screws	KAF2PZ
V3 and V4	Black, padlockable with up to 3 padlocks (Ø4 to Ø8)	Black 60 x 60	4 screws	KAF2PZ
V5 and V6	Black, long, padlockable with up to 3 padlocks (Ø4 to Ø8)	Black 90 x 90	4 screws	KAF3PZ ⁽¹⁾

⁽¹⁾ For door mounting of 63 and 80 A switch-disconnectors, adapter plate **KZ 106** must be ordered separately (see page B3/14).

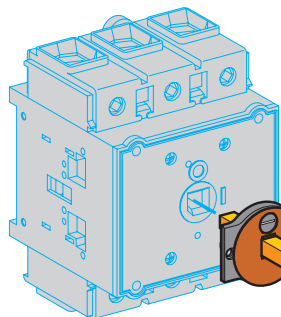
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VN 12, VN 20
V02...V2

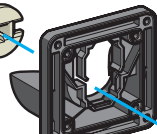


V3, V4



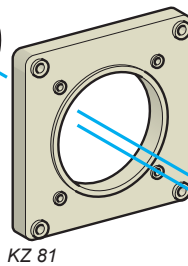
V5, V6

VZN 17,
VZN 30



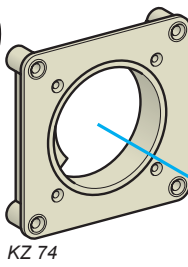
KZ 32, KZ 83

VZ 18, VZ 31

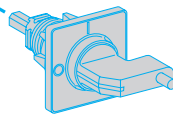


KZ 81

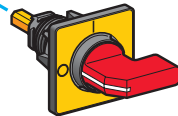
VZ 18, VZ 31



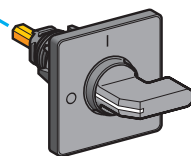
KZ 74



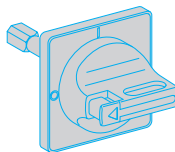
KC• 1YZ



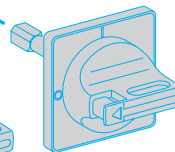
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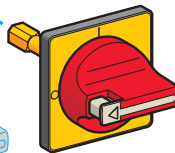
KA• 1BZ



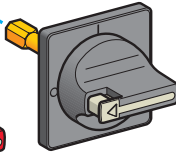
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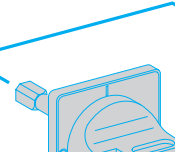
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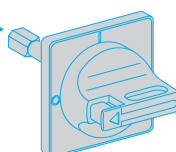
KD• 1PZ



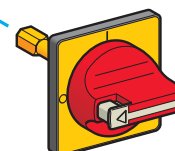
KB• 1PZ



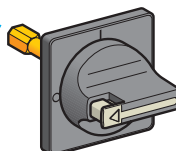
KCF 2PZ



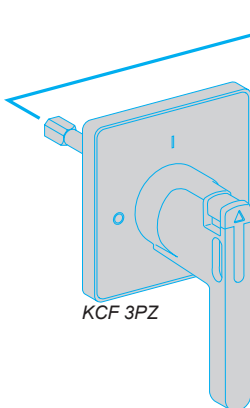
KAF 2PZ



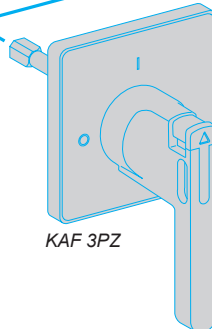
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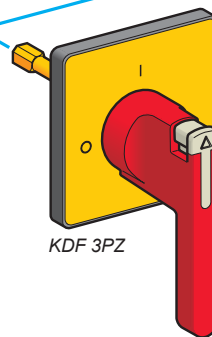
KBF 2PZ



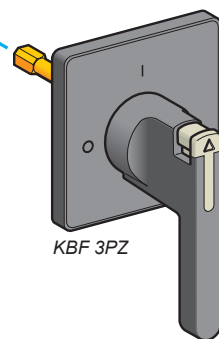
KCF 3PZ



KAF 3PZ



KDF 3PZ



KBF 3PZ

Protection components

Mini-VARIO and VARIO

switch-disconnectors

Operators, handles and front plates (for customer assembly)

Mini-Vario and Vario

- Marking on operator $\circ \downarrow$.
- Degree of protection IP 65.

Handles and front plates for Emergency stop switch-disconnectors

For switch body	Operator Handle	Front plate		Reference
		Dimensions	Fixing	
		mm		
VN 12, VN 20 V02...V2	Red, not padlockable	Yellow 45 x 45	Ø22.5	KCC1LZ
			4 screws	KCE1LZ
		Yellow 60 x 60	Ø22.5	KDD1PZ
			4 screws	KDF1PZ
V3 and V4	Red, long, not padlockable	Yellow 60 x 60	4 screws	KDF2PZ
V5 and V6	Red, long, not padlockable	Yellow 90 x 90	4 screws	KDF3PZ ⁽¹⁾

Handles and front plates for switch-disconnectors

For switch body	Operator Handle	Front plate		Reference
		Dimensions	Fixing	
		mm		
VN 12, VN 20 V02...V2	Black, not padlockable	Black 45 x 45	Ø22.5	KAC1BZ
			4 screws	KAE1BZ
		Black 60 x 60	Ø22.5	KBD1PZ
			4 screws	KBF1PZ
V3 and V4	Black, not padlockable	Black 60 x 60	4 screws	KBF2PZ
V5 and V6	Black, not padlockable	Black 90 x 90	4 screws	KBF3PZ ⁽¹⁾

⁽¹⁾ For door mounting of 63 and 80 A switch-disconnectors, adapter plate KZ 106 must be ordered separately (see next page).

Protection components

Mini-VARIO and VARIO switch-disconnectors

Accessories

Mini-Vario and Vario

590583.tif



VZ 8

590584.tif



VZ 26

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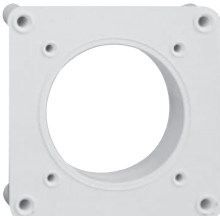
VZ 18

590585.tif



KZ 32

590627.tif



KZ 81

Input terminal protection shrouds

Description	For use on	Reference
For switch bodies (3-pole shroud)	V02...V2	VZ8
	V3 and V4	VZ9
	V5 and V6	VZ10
For add-on pole modules (single-pole shroud)	VZ 02...VZ 2, VZ 11, VZ 14	VZ26
	VZ 3, VZ 4, VZ 12, VZ 15	VZ27
	VZ 13, VZ 16	VZ28
For contact blocks with 2 auxiliary contacts	–	VZ29

Components for door interlocking

For rear fixing switch-disconnectors mounted at the back of an enclosure, in addition to a direct operator

Description	For use on	Distance enc. back/door mm	Sold in lots of	Unit reference
Shaft extensions	VN 12, VN 20 V02...V2	300...330	1	VZN17 ⁽¹⁾
		400...430	1	VZN30 ⁽¹⁾
	V02...V2	300...330	1	VZ17
		400...430	1	VZ30
	V3 and V4	300...320	1	VZ18
		400...420	1	VZ31
V5 and V6	330...350	1	VZ18	
	430...450	1	VZ31	
Door interlock plates	VN 12, VN 20 V02...V2	–	5	KZ32
	V3...V6	–	5	KZ74

Description	For use on	Front plate dimensions mm	Sold in lots of	Unit reference
Plates for door mounting of handles with 4 screw fixing	VN 12, VN 20 V02...V2	45 x 45 or 60 x 60	5	KZ83
	V3...V6	60 x 60 or 90 x 90	5	KZ81
Adapter plate for switch-disconnectors	V3 and V4	90 x 90	5	KZ106

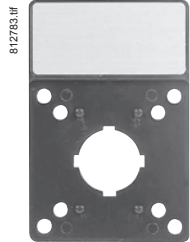
⁽¹⁾ Can be used with V02 to V2 switches.

Protection components

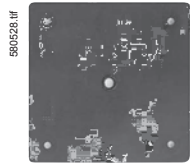
Mini-VARIO and VARIO switch-disconnectors

Accessories

Mini-Vario and Vario



KZ 15



KZ 67



Z01

Accessories for operators

Description	For use on	Front plate dimensions mm	Sold in lots of	Unit reference
Legend holder with silver coloured blank legend plate	Front plate	45 x 45	5	KZ13
		60 x 60	5	KZ15
		90 x 90	5	KZ103
Legend holders without legend plate	Front plate	45 x 45	20	KZ14
		60 x 60	10	KZ16
		90 x 90	5	KZ101
Silver coloured blank legend plates for engraving by customer	KZ 14	–	20	KZ76
	KZ 16	–	10	KZ77
	KZ 101	–	5	KZ100
Seals	VN 12, VN 20	45 x 45	5	KZ65
	V02...V2	60 x 60	5	KZ66
	V3 and V4	60 x 60	5	KZ62
	V3...V6	90 x 90	5	KZ67
Tightening tool	For operators with Ø22.5 fixing	–	5	Z01

Technical Data for Designers

Contents

CharacteristicsB3/18 to B3/21

Mini Vario:

> DimensionsB3/22 to B3/23

> SchemesB3/23

Vario:

> DimensionsB3/24 to B3/25

> SchemesB3/25

Safety control and protection solutions

Mini-VARIO and VARIO switch-disconnectors

Characteristics

Environment

Switch type (bare type)	VN 12 VZN 12	V02 VZ 02	VN 20 VZN 20	V01 VZ 01	V0 VZ 0	VVD 0 VVE 0	V1 VZ 1	VVD 1 VVE 1
Conforming to standards	IEC 60947-3							
Product certifications	UL, CSA, GL							
Protective treatment	"TC"							
Degree of protection with protection shroud	IP 20 conforming to IEC 60529							
Ambient air temperature	° C	-20...+50						
Flame resistance	° C	960 conforming to IEC 60695-2-1						
Shock resistance 1/2 sine wave = 11ms conforming to IEC60068-2-27	gn	15	30	15	30			
Vibration resistance 10...150 Hz conforming to IEC 60068-2-6	gn	5	1					

Electrical characteristics, a.c. operation

Switch type (bare type)	VN 12 VZN 12	V02 VZ 02	VN 20 VZN 20	V01 VZ 01	V0 VZ 0	VVD 0 VVE 0	V1 VZ 1	VVD 1 VVE 1
Rated operational voltage (Ue)	V	690						
Rated impulse withstand voltage (Uimp)	kV	6	8	6	8			
Conventional thermal currents in free air (Ith) and rated uninterrupted (lu)	A	12		20		25	32	
Conventional thermal current in enclosure (Ithe)	A	10		16		20	25	
Rated operational power and current	AC-21A/22A	230...690 V	A	12		20	25	32
	AC-23A	230 V	A/kW	10.6/3		14/4	19.7/5.5	
		240 V	A/kW	10.6/3		14/4	19.9/5.5	18.9/5.5
		400 V	A/kW	8.1/4		11/5.5	14.5/7.5	21.8/11
		415 V	A/kW	8.1/4		11/5.5	14/7.5	21/11
		500 V	A/kW	8.9/5.5		11.9/7.5	16.7/11	
690 V	A/kW	8.6/7.5		12.3/11	17.5/15			
Rated operational power	AC -3	230/240 V	kW	1.5		3	4	
		400/415 V	kW	3		4	5.5	7.5
		500 V	kW	4		5.5	7.5	
		690 V	kW	4	5.5	7.5	11	
Intermittent duty class		30						
Characteristics in normal operating conditions	Rated making capacity AC-21A/22A/23A (I rms)	A/400 V	120		200		250	320
	Rated breaking capacity AC-21A/22A/23A (I rms)	A/400 V	120		200		250	
Short-circuit characteristics	Permissible rms short time rating (Icw)	A/400V/1s	140	300	140	300		384
	Rated making capacity under short-circuit conditions (Icm) I peak	kA/400 V	0.5	1	0.5	1		
	Rated conditional short-circuit current (I rms) with aM/gG fuses	kA/400 V	6	10	6	10		
		A	12		20		25	35

V2 VZ 2	VVD 2 VVE 2	V3 VZ 3	VVD 3 VVE 3	V4 VZ 4	VVD 4 VVE 4	V5	V6	VZ7 VZ2 0	VZN 05 VZN 06
IEC 60947-3								IEC 60947-5	
UL, CSA, GL									
"TC"									
IP 20 conforming to IEC 60529									
-20...+50									
960 conforming to IEC 60695-2-1									
30								-	
1								-	




V2 VZ 2	VVD 2 VVE 2	V3 VZ 3	VVD 3 VVE 3	V4 VZ 4	VVD 4 VVE 4	V5	V6	VZ7 VZ2 0	VZN 05 VZN 06
690									
8								6	
40		63		80		125	175	12	6
32		50		63		100	140	10	4
40		63		80		125	160	le/AC-15	
25.8/7.5		50.3/15		61.2/18.5		71.9/22	96.6/30	6 A	
24.8/7.5		48.2/15		58.5/18.5		68/22	92.7/30	6 A	
29/15		41.5/22		57/30		68.5/37	83/45	4 A	
28/15		40/22		55/30		66/37	80/45	4 A	
28.5/18.5		44/30		54/37		64.5/45	79/55	2 A	
17.5/15		25/22		33/30		42/37	49/45	1 A	
5.5		11		15		22	30	-	
11		18.5		22		30	37	-	
15		22		30		37	45	-	
11		18.5				30	37	-	
30								-	
400		630		800		1250	1750	-	
320		500		640		1000	1400	-	
480		756		960		1500	2100	-	
1		2.1				2.8		-	
10								1	
50		63		80		125	200	16	1.6

Safety control and protection solutions

Mini-VARIO and VARIO switch-disconnectors

Characteristics

Electrical characteristics, d.c. operation

Switch type (bare type)			VN 12 VZN 12	V02 VZ 02	VN 20 VZN 20	V01 VZ 01	V0 VZ 0	VVD 0 VVE 0	V1 VZ 1	VVD 1 VVE 1
  	Rated operational current DC-1 (L/R = 1ms)	24 V	1 contact	A	12	20	25		32	
			2 contacts	A	12	20	25		32	
			3 contacts	A	12	20	25		32	
		48 V	1 contact	A	12	20	25		32	
			2 contacts	A	12	20	25		32	
			3 contacts	A	12	20	25		32	
		60 V	1 contact	A	12	20	25		32	
			2 contacts	A	12	20	25		32	
			3 contacts	A	12	20	25		32	
	110 V	1 contact	A	1.5	2	9		10		
		2 contacts	A	8	10	12		16		
		3 contacts	A	12	20	25		32		
	220 V	1 contact	A	1.5	2	2.5		3		
		2 contacts	A	7	8	10		12		
		3 contacts	A	10	14	16		20		
	250 V	1 contact	A	0.6	0.7	0.8		1		
		2 contacts	A	3	4	6		8		
		3 contacts	A	8	10	12		16		
Rated operational current DC-2 to DC-5 (L/R = 1ms)	24 V	1 contact	A	12	20	25		32		
		2 contacts	A	12	20	25		32		
		3 contacts	A	12	20	25		32		
	48 V	1 contact	A	12	20	25		32		
		2 contacts	A	12	20	25		32		
		3 contacts	A	12	20	25		32		
	60 V	1 contact	A	10	14	16		20		
		2 contacts	A	12	20	25		32		
		3 contacts	A	12	20	25		32		
	110 V	1 contact	A	1.5	2	2.5		3		
		2 contacts	A	3	4	5		6		
		3 contacts	A	12	20	25		32		
	220 V	1 contact	A	0.4	0.5	0.5		0.8		
		2 contacts	A	1.4	1.5	1.5		2		
		3 contacts	A	1	2	3		4		
	250 V	1 contact	A	0.3	0.4	0.5		0.8		
		2 contacts	A	0.4	0.6	0.8		1		
		3 contacts	A	1.2	2.4	1.6		2		

Other characteristics

Switch type (bare type)			VN 12 VZN 12	V02 VZ 02	VN 20 VZN 20	V01 VZ 01	V0 VZ 0	VVD 0 VVE 0	V1 VZ 1	VVD 1 VVE 1
Mechanical durability (millions of operating cycles)			0.05	0.1	0.05	0.1				
Electrical durability in cat. AC-21 (millions of operating cycles)			0.05	0.1	0.05	0.1				
Electrical durability in cat. DC-1 to 5 (operating cycles)			30000							
Suitable for isolation			Yes							
Cabling	Flexible cable + cable end	mm ²	4	6	4	6				
	Solid cable	mm ²	4	10	4	10				
Tightening torque		N.m	0.7	2.1	0.7	2.1				

V2 VZ 2	VVD 2 VVE 2	V3 VZ 3	VVD 3 VVE 3	V4 VZ 4	VVD 4 VVE 4	V5	V6	VZ7 VZ2 0	VZN 05 VZN 06
40		63		80		125	175	8 (le/DC-11)	
40		63		80		125	175	–	
40		63		80		125	175	–	
40		63		80		125	175	8 (le/DC-11)	
40		63		80		125	175	–	
40		63		80		125	175	–	
35		40		50		60	70	4 (le/DC-11)	
40		63		80		125	175	–	
40		63		80		125	175	–	
12		20		25		30	12	2 (le/DC-11)	
20		63		80		125	175	–	
40		63		80		125	175	–	
4		6		8		12	15	1 (le/DC-11)	
14		25		30		40	50	–	
25		30		40		80	100	–	
2		4		5		3	10	0.8 (le/DC-11)	
12		20		25		30	40	–	
20		30		40		50	61	–	
40		63		80		125	175	–	
40		63		80		125	175	–	
40		63		80		125	175	–	
40		63		80		125	175	–	
40		63		80		125	175	–	
40		63		80		125	175	–	
40		63		80		125	175	–	
25		40		50		60	70	–	
40		63		80		125	175	–	
40		63		80		125	175	–	
5		6		8		10	12	–	
8		10		20		22	24	–	
40		50		63		70	80	–	
1		1.5		2		2.2	2.4	–	
3		4		6		7	8	–	
7		10		15		16	13	–	
1		1.2		1.5		1.6	1.8	–	
2		3		6		7	8	–	
6		8		10		12	14	–	

V2 VZ 2	VVD 2 VVE 2	V3 VZ 3	VVD 3 VVE 3	V4 VZ 4	VVD 4 VVE 4	V5	V6	VZ7 VZ2 0	VZN 05 VZN 06
0.1		0.03						0.1	0.05
0.1		0.03						0.1 (AC-15)	0.05
30000								30000 (DC-11)	
Yes								–	
6		16				70		2 x 0.75...1.5	
10		25				95		2 x 1...2.5	
2.1		4				22.6		0.7	

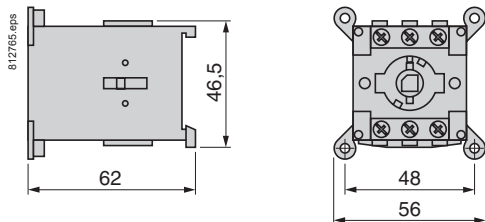
Safety control and protection solutions

Mini-VARIO switch-disconnectors, 12 and 20 A

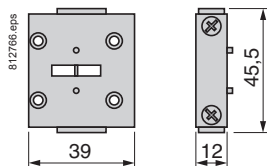
Dimensions

Switch-disconnectors

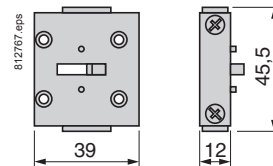
Switch bodies VN 12, VN 20



Add-on modules VZN 12, VZN 20



Add-on modules VZN 11, VZN 14 VZN 05 and VZN 06

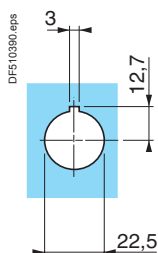
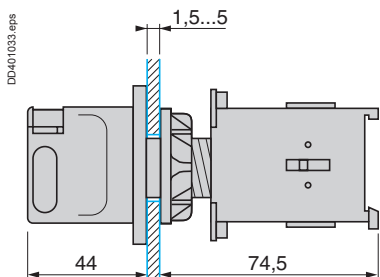


Mounting

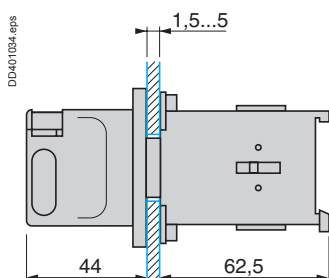
Switch-disconnector mounted on enclosure door

VN 12, VN 20

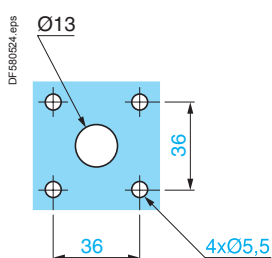
Single hole fixing



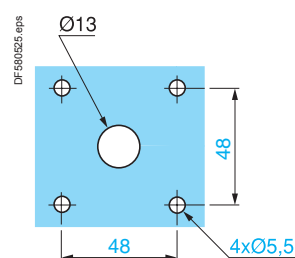
VN 12, VN 20
4 screw fixing



45 x 45 front plate



60 x 60 front plate



Safety control and protection solutions

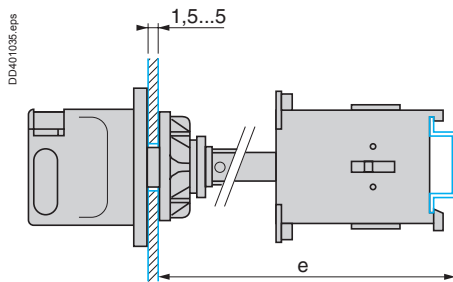
Mini-VARIO switch-disconnectors, 12 and 20 A

Mounting (continued)

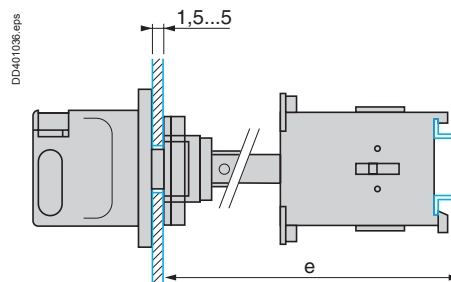
Switch-disconnector mounted at back of enclosure with shaft extension VZN 17 or VZN 30 (clip-on mounting on L rail)

VN 12, VN 20

Single hole fixing

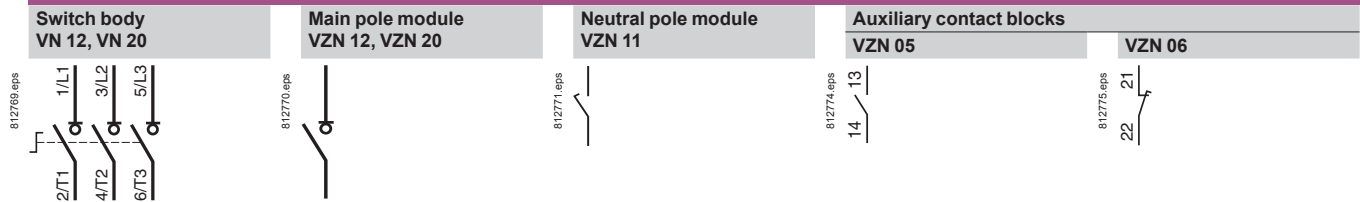


4 screw fixing



	Shaft extension	Distance (e) enclosure back/door mm
VN 12, VN 20	VZN 17	300...330
	VZN 30	400...430

Schemes



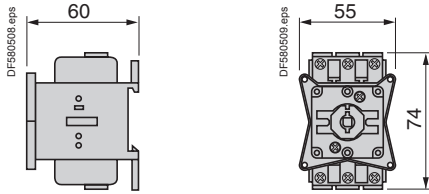
Safety control and protection solutions

VARIO switch-disconnectors, 12 to 175 A

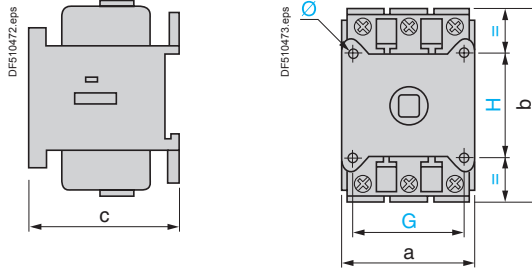
Dimensions

Switch-disconnectors

Switch bodies V0 \bullet , V0 to V2

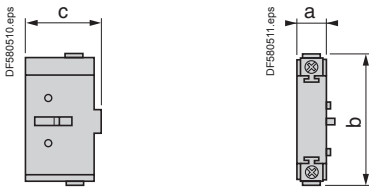


Switch bodies V3 to V6

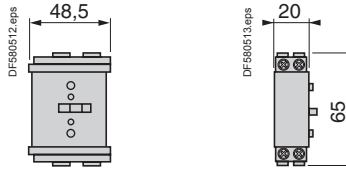


	a	b	c	G	H	Ø
V3, V4	60	83	65	48	48	5.5
V5, V6	90	125	90	68	68	5.5

Add-on modules VZ 02 to VZ 4 and VZ 11 to VZ 16



Add-on modules VZ 7, VZ 20

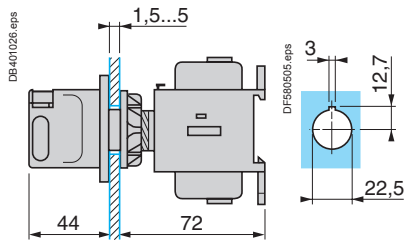


	a	b	c
VZ 02 and VZ 01, VZ 0 to VZ 2, VZ 11, VZ 14	16	74	35
VZ 3, VZ 4, VZ 12, VZ 15	20	83	46
VZ 13, VZ 16	30	125	63

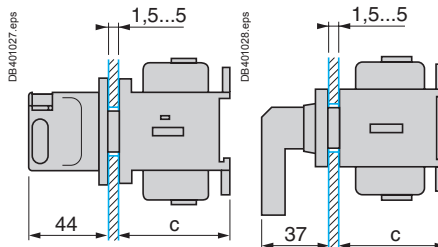
Mounting

Switch-disconnector mounted on enclosure door

Single hole fixing V0 \bullet , V0 to V2

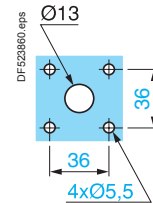


4 screw fixing V0 \bullet , V0 to V4

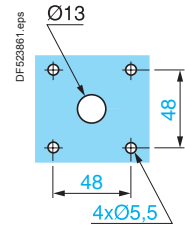


	c
V0 \bullet , V0 to V2	60
V3, V4	65

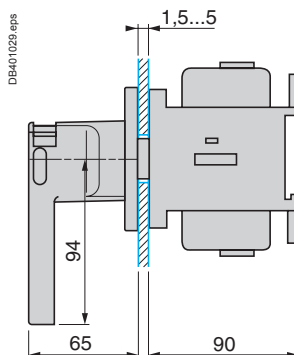
4 screw fixing 45 x 45 front plate V0 \bullet , V0 to V2



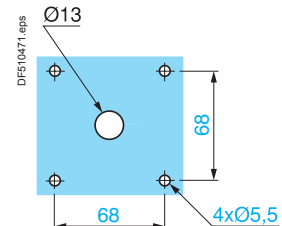
4 screw fixing 60 x 60 front plate V0 \bullet , V0 to V4



V5 and V6. 4 screw fixing



90 x 90 front plate




Safety control and protection solutions

VARIO switch-disconnectors, 12 to 175 A

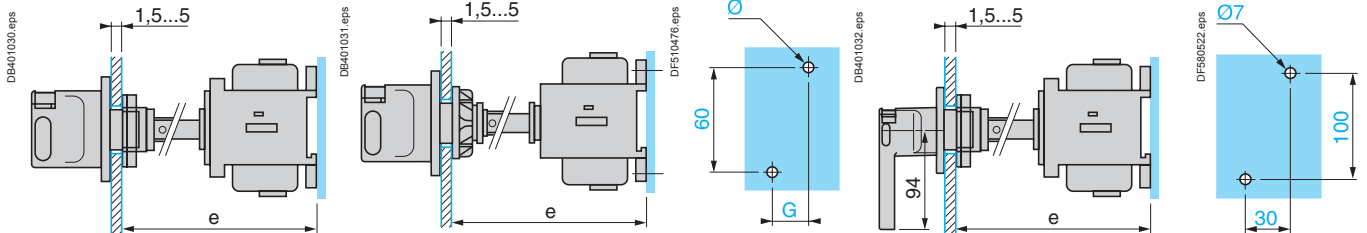
Mounting (continued)

Switch-disconnector mounted at back of enclosure

4 screw fixing
V0●, V0 to V2 with shaft extension VZ 17 or VZ 30 (clip-on mounting on  rail possible for V0● to V2)

Single hole fixing
V3 to V4 with shaft extension VZ 18 or VZ 31

V5 and V6 with shaft extension VZ 18 or VZ 31



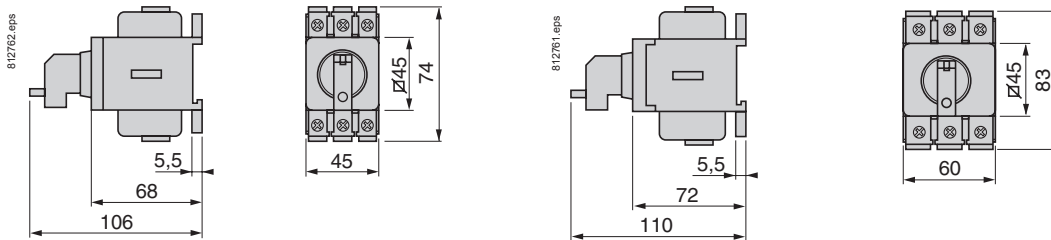
	Shaft extension	Distance (e) enc. back/door mm	Ø	G
V02 and V01	VZ 17	300...330	2 x 4.2	15
V0 to V2	VZ 30	400...430	2 x 4.2	15
V3 and V4	VZ 18	300...320	2 x 5	20
	VZ 31	400...420	2 x 5	20

	Shaft extension	Distance (e) enc. back/door mm
V5 and V6	VZ 18	300...350
	VZ 31	430...450

Switch-disconnectors for modular distribution boards

VV● 0 to VV● 2

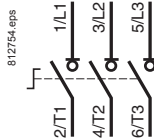
VV● 3 to VV● 4



Schemes

Switch body

V02 and V01
V0 to V6



Main pole module

VZ 02 and VZ 01
VZ 0 to VZ 4



Neutral pole module

VZ 11 to VZ 13



Auxiliary contact blocks

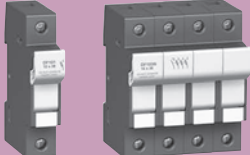
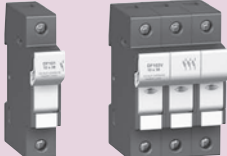

VZ 7



VZ 20



Fuse carriers - TeSys DF, LS, GK

Type of product	Range		Pages
For protection of control circuits or transformer TeSys DF and accessories	Up to 25, 32, 50 or 125 A		B4/2
For protection of control circuits or transformer TeSys DF - For North American market	Up to 30 A		B4/4
For protection of motors or transformers TeSys LS, GK and accessories	Up to 25, 32, 50 or 125 A		B4/5

Technical Data for Designers

B4/9

Fuse carriers

For protection of control circuits or transformers

TeSys DF

Fuse carriers ⁽¹⁾				
Conventional thermal current (Ith)	Size of cartridge fuse or link	Composition	Sold in lots of	Unit reference
A	mm			
25	8.5 x 31.5	1 P	12	DF81
		N	12	DF10N
		1 P + N ⁽²⁾	6	DF81N
		2 P	6	DF82
		3 P	4	DF83
		3 P + N ⁽²⁾	3	DF83N
32	10 x 38	1 P	12	DF101
		N	12	DF10N
		1 P + N ⁽²⁾	6	DF101N
		2 P	6	DF102
		3 P	4	DF103
		3 P + N ⁽²⁾	3	DF103N
50	14 x 51	1 P	6	DF141
		N	6	DF14N
		1 P + N ⁽²⁾	3	DF141N
		2 P	3	DF142
		3 P	2	DF143C ⁽³⁾
		3 P + N ⁽²⁾	1	DF143NC ⁽³⁾
125	22 x 58	1 P	6	DF221
		N	6	DF22N
		1 P + N ⁽²⁾	3	DF221N
		2 P	3	DF222
		3 P	2	DF223C ⁽³⁾
		3 P + N ⁽²⁾	1	DF223NC ⁽³⁾
Fuse carriers with "blown fuse" indicators (neon) ^{(1) (4)}				
Conventional thermal current (Ith)	Size of cartridge fuse or link	Composition	Sold in lots of	Unit reference
A	mm			
25	8.5 x 31.5	1 P	12	DF81V
		1 P + N ⁽²⁾	6	DF81NV
		2 P	6	DF82V
		3 P	4	DF83V
		3 P + N ⁽²⁾	3	DF83NV
		32	10 x 38	1 P
1 P + N ⁽²⁾	6			DF101NV
2 P	6			DF102V
3 P	4			DF103V
3 P + N ⁽²⁾	3			DF103NV
50	14 x 51			1 P
		1 P + N ⁽²⁾	3	DF141NV
		2 P	3	DF142V
		3 P	2	DF143VC ⁽³⁾
		3 P + N ⁽²⁾	1	DF143NVC ⁽³⁾
		125	22 x 58	1 P
1 P + N ⁽²⁾	3			DF221NV
2 P	3			DF222V
3 P	2			DF223VC ⁽³⁾
3 P + N ⁽²⁾	1			DF223NVC ⁽³⁾

⁽¹⁾ Each pole can be marked. A clip-in marker holder is provided for this purpose. Clip-in markers type AB1 R● or AB1 G● can also be used.

⁽²⁾ N: neutral pole fitted with a locked tubular link as standard.

⁽³⁾ A letter "C" in the reference indicates that the fuse carrier can be fitted with auxiliary early break, "blown fuse" signalling and "fuse present" signalling contacts.

⁽⁴⁾ Operational voltage of the blown fuse indicator: 110 V...690 V.



DF10 1



DF10 3N



DF14 1



DF14 3NC



DF22 1



DF22 3NC



DF10 1NV



DF10 3V



DF14 1NV



DF14 3VC



DF22 1NV

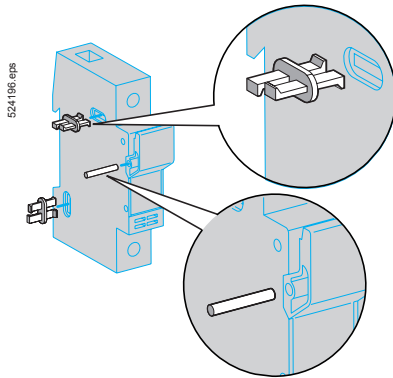
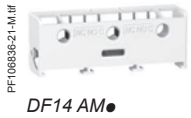


DF22 3VC

Fuse carriers

For protection of control circuits or transformers

TeSys DF



Detail of assembly clip and pin mounting

Accessories

Auxiliary early break and "blown fuse" signalling contacts ⁽¹⁾

Fuse carriers to be equipped	Size of cartridge fuse or link	Number of contacts	Sold in lots of	Unit reference
DF14 (3 P or 3 P + N)	14 x 51	1	1	DF14AM1
		2	1	DF14AM2
DF22 (3 P or 3 P + N)	22 X 58	1	1	DF22AM1
		2	1	DF22AM2

Fuse carrier assembly kits ⁽²⁾

Fuse carriers to be assembled	Size of cartridge fuse or link	Composition	Sold in lots of	Unit reference
DF8	8.5 x 31.5	1 pin,	12	DF10AP
DF10	10 x 38	2 clips		
DF14	14 x 51	1 pin, 3 clips	10	DF14AP
DF22	22 x 58	1 pin, 3 clips	10	DF22AP

Marking accessories

Description	Composition	Marking	Sold in lots of	Unit reference
Clip-in markers	Strip of 10 identical numbers or letters	0...9	25	AB1Re ⁽³⁾
		A...Z	25	AB1Ge ⁽³⁾

Substitution

Fuse carriers

Old range			New range	
Reference	Size of cartridge fuse or link	Composition	Reference w/o indicator	Reference with indicator
DF6 AB08	8.5 x 31.5	1 P	DF81	DF81V
DF6 AB10	10 x 38	1 P	DF101	DF101V
DF6 N10	8.5 x 31.5 or 10 x 38	1 N	DF10N	–
GK1 CC	8.5 x 31.5	1 P + N	DF81N	DF81NV
GK1 CD	8.5 x 31.5	2 P	DF82	DF82V
GK1 CF	8.5 x 31.5	3 P	DF83	DF83V
GK1 CH	8.5 x 31.5	3 P + N	DF83N	DF83NV
GK1 DC	10 x 38	1 P + N	DF101N	DF101NV
GK1 DD	10 x 38	2 P	DF102	DF102V
GK1 DF	10 x 38	3 P	DF103	DF103V
GK1 DH	10 x 38	3 P + N	DF103N	DF103NV
GK1 EB	14 x 51	1 P	DF141	DF141V
GK1 EN	14 x 51	1 N	DF14N	–
GK1 EC	14 x 51	1 P + N	DF141N	DF141NV
GK1 ED	14 x 51	2 P	DF142	DF142V
GK1 EF	14 x 51	3 P	DF143C	DF143VC
GK1 EH	14 x 51	3 P + N	DF143NC	DF143NVC
GK1 FB	22 x 58	1 P	DF221	DF221V
GK1 FN	22 x 58	1 N	DF22N	–
GK1 FC	22 x 58	1 P + N	DF221N	DF221NV
GK1 FD	22 x 58	2 P	DF222	DF222V
GK1 FF	22 x 58	3 P	DF223C	DF223VC
GK1 FH	22 x 58	3 P + N	DF223NC	DF223NVC

Fuse carrier assembly kits

Old range		New range
Reference	Size of cartridge fuse or link	Reference
GK1 AP2	8.5 x 31.5 or 10 x 38	DF10AP
GK1 AP3	8.5 x 31.5 or 10 x 38	DF10AP
	14 x 51	DF14AP
GK1 AP4	8.5 x 31.5 or 10 x 38	DF10AP
	22 x 58	DF22AP
GK1 AP5	14 x 51	DF14AP
GK1 AP6	14 x 51	DF14AP
	22 x 58	DF22AP
GK1 AP9	22 x 58	DF22AP

⁽¹⁾ These auxiliary contacts provide the following functions: early break, "blown fuse" signalling (if the fuse carrier is fitted with striker fuses) and "fuse present" signalling.

⁽²⁾ 1 pin and 2 clips are required to assemble two DF8 or DF10 fuse carriers together.
1 pin and 3 clips are required to assemble two DF14 or DF22 fuse carriers together.

⁽³⁾ When ordering, replace the ● in the reference with the number or letter required. Example: AB1-R1 or AB1-GA.

Fuse carriers for the North American market

For protection of control circuits or transformers

TeSys DF

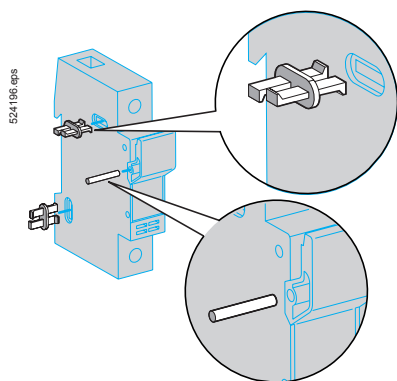
References



DFCC 1



DFCC 3V



Detail of assembly clip and pin mounting

Fuse carriers ⁽¹⁾

Conventional thermal current (Ith)	Size of cartridge fuse or link	Composition	Sold in lots of	Unit reference
A				
30	Class CC	1 P	12	DFCC1
		2 P	12	DFCC2
		3 P	6	DFCC3

Fuse carriers with "blown fuse" indicators (neon) ^{(1) (2)}

Conventional thermal current (Ith)	Size of cartridge fuse or link	Composition	Sold in lots of	Unit reference
A				
30	Class CC	1 P	12	DFCC1V
		2 P	6	DFCC2V
		3 P	6	DFCC3V

Fuse carrier assembly kits ⁽³⁾

Fuse carriers to be assembled	Size of cartridge fuse or link	Composition	Sold in lots of	Unit reference
DFCC	Class CC	1 pin, 2 clips	12	DF10AP

Marking accessories

Description	Composition	Marking	Sold in lots of	Unit reference
Clip-in markers	Strip of 10 identical numbers or letter	0...9	25	AB1R● ⁽⁴⁾
		A...Z	25	AB1G● ⁽⁴⁾

⁽¹⁾ Each pole can be marked. A clip-in marker holder is provided for this purpose.

Clip-in markers type AB1 R● or AB1 G● can also be used.

⁽²⁾ Operational voltage of the blown fuse indicator: 230 V...690 V.

⁽³⁾ 1 pin and 2 clips are required to assemble two DFCC fuse carriers together.

⁽⁴⁾ When ordering, replace the p in the reference with the number or letter required.
Example: AB1 R1 or AB1 GA.

TeSys LS, GK



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LS1 D323



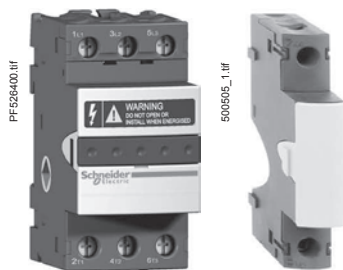
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LS1 D32



PF526401.tif

GK1 FK



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LS1 D32

+ LA8 D324

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3-pole basic blocks

Connection by spring terminals

Rating	Cartridge fuse size	Number of early break contacts ⁽¹⁾	Single-phase protection device ⁽²⁾	Reference ⁽³⁾	Weight kg
25 A	10 x 38	– ⁽⁴⁾	Without	LS1D323	0.270

Connection by screw clamp terminals or connectors

32 A	10 x 38	– ⁽⁴⁾	Without	LS1D32	0.300
50 A	14 x 51	1	Without	GK1EK	0.430
			With	GK1EV	0.470
			Without	GK1ES	0.470
			With	GK1EW	0.510
125 A	22 x 58	1	Without	GK1FK	0.860
			With	GK1FV	0.900
			Without	GK1FS	0.900
			With	GK1FW	0.940

4-pole basic blocks

Connection by screw clamp terminals or connectors

32 A	10 x 38	– ⁽⁴⁾	Without	LS1D32 + LA8D324 ⁽⁵⁾	0.300
50 A	14 x 51	1	Without	GK1EM	0.570
			With	GK1EY	0.600
			Without	GK1ET	0.610
			With	GK1EX	0.650
125 A	22 x 58	1	Without	GK1FM	1.090
			With	GK1FY	1.130
			Without	GK1FT	1.130
			With	GK1FX	1.160

Fuse carriers for the North American market

25 and 30 A basic blocks: please consult your Regional Sales Office.

- (1) With 1 or 2 early break contacts to be inserted in the contactor control circuit.
- (2) Fuse carriers with single-phase protection device must be fitted with striker fuses.
- (3) LS1 D: clips directly onto a 35 mm rail or screw fixing.
- GK1: clips directly onto a 35 mm rail or Telequick mounting plate.
- (4) Addition of add-on contact block, see page B4/6.
- (5) Can be mounted on left-hand or right-hand side of the basic block.

Fuse carriers

Operators and accessories

TeSys LS, GK

Add-on contact blocks

Description	For use on	Mounting	Maximum number	Type of contacts	Sold in lots of	Unit reference
Instantaneous auxiliary contacts (early break contacts)	LS1D32	Front	1	N/O + N/C	10	GVAE11
				N/O + N/O	10	GVAE20
	LS1D323	Front	1	N/O + N/C	10	GVAE113
				N/O + N/O	10	GVAE203

Operators

For fuse carrier		For mounting on	Reference
Rating	Number of poles		
Side handles			
125 A	3 or 4	Right-hand side	GK1AP07
		Left-hand side	GK1AP08

Front handles ⁽¹⁾

32 - 50 - 125 A	Fitted as standard
-----------------	--------------------

External handles

32 A	3 or 4	Right-hand side	LS1D32005 ⁽²⁾
		Left-hand side	LS1D32006
50 A	3 or 4	Right-hand side	GK1AP05
		Left-hand side	GK1AP06
125 A	3 or 4	Right-hand side	GK1AP07
		Left-hand side	GK1AP08

Padlocking devices ⁽³⁾

For fuse carrier			Reference
Rating	Number of poles	Single-phase protection device	
32 A	3 or 4	Without	integral
50 A	3	Without	GK1AV07
		With	GK1AV08
	4	Without	GK1AV08
		With	GK1AV09

Links

Tubular links			
For fuse carrier		Sold in lots of	Unit reference
Rating	Number of poles		
32 A	3 or 4	10	DK1CB92 ⁽⁴⁾
50 A	3 or 4	10	DK1EB92 ⁽⁵⁾
125 A	3 or 4	10	DK1FA92 ⁽⁵⁾

⁽¹⁾ Fitted as standard on 32, 50 and 125 A fuse carriers type GK1.

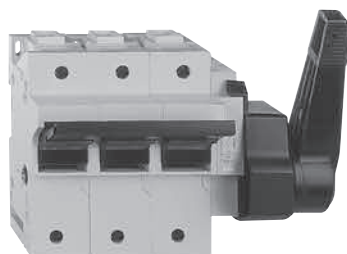
⁽²⁾ Reference LS1D32005 replaces reference DK1FB005.

⁽³⁾ For the 125 A rating, use side handles GK1AP07 or GK1AP08.

⁽⁴⁾ For use on a neutral circuit, the tubular link can be interlocked with special device LA8D25906 (sold in lots of 10).

⁽⁵⁾ 50 and 125 A fuse carriers type GK1 are fitted with an interlocked neutral tubular link as standard.

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GK1 FK + GK1 AP07

Accessories for LS1 D32 (screw clamp terminals)

Description	Application	Sold in lots of	Unit reference
Plate for mounting	LS1 D32 and contactor LC1 D09...D38 with front faces aligned	1	LAD311
Combination blocks	Between LS1 D32 and contactor LC1 K or LP1 K	10	GV2AF01
	Between LS1 D32 and contactor LC1 D09...D38	10	GV2AF3
	Between LS1 D32 mounted on LAD 311 and contactor LC1 D09...D38	10	GV2AF4

Description	Application	Pitch mm	Reference
Sets of 3-pole 63 A busbars	2 tap-offs	45	GV2G245
		54	GV2G254
		72	GV2G272
	3 tap-offs	45	GV2G345
		54	GV2G354
		72	GV2G372
	4 tap-offs	45	GV2G445
		54	GV2G454
		72	GV2G472
	5 tap-offs	54	GV2G554

Description	Application	Sold in lots of	Unit reference
Protective end cover	For unused busbar outlets	5	GV1G10
Terminal block Connection from the top	For supply to one or more GV2 G busbar sets	1	GV1G09
Cover for terminal block	For mounting in modular panels	10	LA9E07
Padlocking device	For use with up to 4 padlocks (not supplied) Ø6 mm shank max	1	GV2V03

Accessories for LS1 D323 (spring terminals)

Description	Application	Reference
Plate for mounting	LS1 D323 and contactor LC1 D09...D38 with front faces aligned	LAD311

Description	Extension by	Number of starters	Reference
Power splitter box, 63 A	LAD 32●	2	LAD322
		3	LAD323
		4	LAD324

Description	Kit contents	Reference
Assembly and power connection kit for LS1 D323 and LC1 D093...D323	1 LAD 311 plate for mounting LS1 D323 2 LAD 341 power connection modules - between LS1 D323 and power splitter box - between LS1 D323 and contactor	LAD352

Description	Maximum capacity	Application	Sold in lots of	Unit reference
Upstream terminal block	16 mm ²	Power supply to 1 or 2 power splitter boxes	1	LAD3B1
Downstream terminal block	16 mm ²	Connection of motor cables	1	LAD331
Cable end reducer	–	For connection of conductors from 1 to 1.5 mm ²	20	LAD99

Technical Data for Designers

Contents

TeSys DF:

- > Characteristics.....B4/10
- > Dimensions and schemes.....B4/11

TeSys DF for the North American market:

- > Characteristics.....B4/12
- > Dimensions and schemes.....B4/13

TeSys LS and GK:

- > SelectionB4/14
- > Characteristics.....B4/15
- > Dimensions.....B4/16
- > SchemesB4/17

Environment characteristics					
Fuse carrier type		DF8	DF10	DF14	DF22
Conforming to standards		IEC 60947-3, UL 512, CSA 22-2 n° 39			
Protective treatment		"TH"			
Degree of protection	Conforming to IEC 60529	IP 20			
Ambient air temperature	Storage	°C	-40...+80		
	For operation, with derating ⁽¹⁾	°C	-20...+60		
Operating positions		± 23° in relation to normal mounting plane			
Flame resistance	Conforming to IEC 60695-2-1	°C	960		

Pole characteristics										
Fuse size	mm	8.5 x 31.5	10 x 38	14 x 51	22 x 58					
Rated insulation voltage (Ui) with tubular links, a.c. or D.C. supply	V	500	690	690	690					
Rated impulse withstand voltage (Uimp)	kV	6	6	8	8					
Conventional thermal current (Ith) for ambient air temperature ≤ 40 °C ⁽¹⁾										
	With tubular links	A	25	32	50	125				
	With aM cartridge fuses	A	25	32	50	125				
With gG cartridge fuses	A	25	32	50	100					
Rated conditional short-circuit current Conforming to IEC 60947-3										
	400 V	kA	20	120	120	120				
	500 V	kA	–	120	120	120				
690 V	kA	–	–	80	80					
Peak withstand current (dynamic stress) Conforming to IEC 60269-1										
	With tubular links	kA	11	15	15	19				
Cabling (number of conductors x c.s.a.)										
	Solid cable	mm ²	1 x 1.5	1 x 16 2 x 6	1 x 1.5	1 x 16 2 x 6	1 x 2.5	1 x 25 2 x 10	1 x 2.5	1 x 35 2 x 25
	Flexible cable without cable end	mm ²	1 x 1.5	1 x 10 2 x 6	1 x 1.5	1 x 10 2 x 6	1 x 2.5	1 x 25 2 x 10	1 x 2.5	1 x 35 2 x 16
Flexible cable with cable end	mm ²	1 x 1.5	1 x 10 2 x 6	1 x 1.5	1 x 10 2 x 6	1 x 2.5	1 x 25 2 x 10	1 x 2.5	1 x 35 2 x 16	
Tightening torque	Nm	2.2			3.5		4			

Characteristics of early break and signalling contacts DF14 AM and DF22 AM					
Rated insulation voltage (Ui) a.c. supply	V	250			
Conventional thermal current (Ith) for ambient air temperature ≤ 40 °C ⁽¹⁾	A	5			
Rated operational current		24 V	48 V	127 V	240 V
	Category AC-15	A	4	4	3
Category DC-13	A	3	1	0.2	0.1
Definition of rated characteristics	Conforming to IEC 60947-5-1	B300			
Low load operating characteristics	Minimum voltage	V	10		
	Minimum current	mA	30		
Cabling		Faston connectors			

⁽¹⁾ For use in an installation with ambient temperature > 20 °C, apply a derating coefficient:

Maximum temperature	20 °C	30 °C	40 °C	50 °C	60 °C
Max. relative humidity	95 %	90 %	80 %	50 %	50 %
Current derating coefficient	1	0.95	0.9	0.8	0.7

TeSys DF

Dimensions

Modular fuse carriers 25 A and 32 A

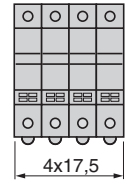
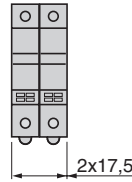
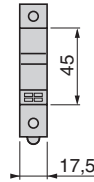
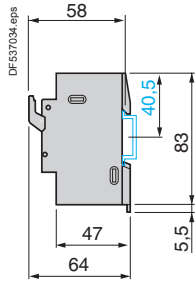
Mounting on 35 mm L rail

DF8 1 and DF8 1V
DF10 1 and DF10 1V
DF10 N

DF8 1N and DF8 1NV
DF8 2 and DF8 2V
DF10 1N and DF10 1NV
DF10 2 and DF10 2V

DF8 3 and DF8 3V
DF10 3 and DF10 3V

DF8 3N and DF8 3NV
DF10 3N and DF10 3NV



Modular fuse carriers 50 A

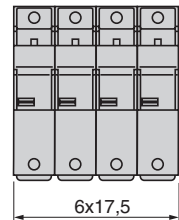
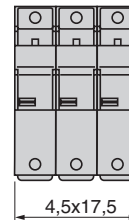
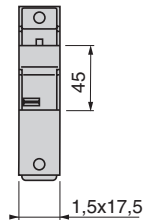
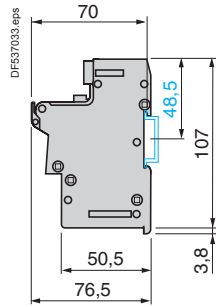
Mounting on 35 mm L rail

DF14 1 and DF14 1V
DF14 N

DF14 1N and DF14 1NV
DF14 2 and DF14 2V

DF14 3C and DF14 3VC

DF14 3NC and DF14 3NVC



Modular fuse carriers 125 A

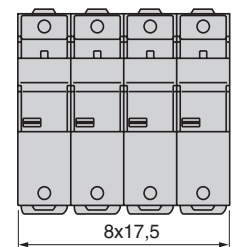
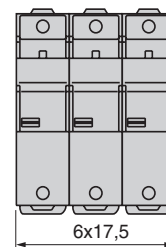
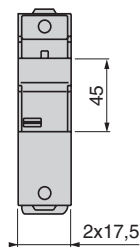
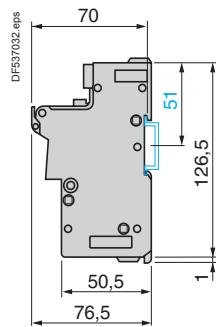
Mounting on 35 mm L rail

DF22 1 and DF22 1V
DF22 N

DF22 1N and DF22 1NV
DF22 2 and DF22 2V

DF22 3C and DF22 3VC

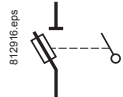
DF22 3NC and DF22 3NVC



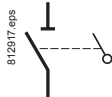
Schemes

Modular fuse carriers

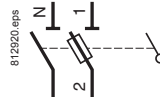
DF•1P



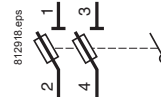
DF•N



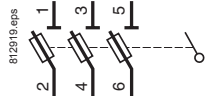
DF•1P + N



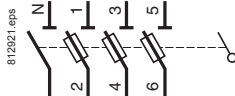
DF•2P



DF•3P



DF•3P + N



Environment characteristics			
Fuse carrier type		DFCC	
Conforming to standards		IEC 60947-3, UL 512, CSA 22-2 n° 39	
Protective treatment		"TH"	
Degree of protection	Conforming to IEC 60529	IP 20	
Ambient air temperature	Storage	°C	-40...+80
	For operation, with derating ⁽¹⁾	°C	-20...+60
Operating positions	Without derating	±23° in relation to normal vertical mounting plane	
Flame resistance	Conforming to IEC 60695-2-1	°C	960

Pole characteristics			
Fuse carrier type		DFCC	
Fuse size		Class CC	
Rated insulation voltage (U _i) with tubular links, a.c. supply	V	600	
Rated impulse withstand voltage (U _{imp})	kV	6	
Conventional thermal current (I _{th}) for ambient air temperature ≤ 40 °C ⁽¹⁾	With tubular links	A	30
	With aM cartridge fuses	A	30
	With gG cartridge fuses	A	30
Short-circuit current withstand With UL 248-4 Class CC fuses	Conforming to UL 512 at 600 V	kA	200
Cabling (number of conductors x c.s.a.)			
Solid cable	mm ²	1 x 1.5	1 x 16 2 x 6
Flexible cable without cable end	mm ²	1 x 1.5	1 x 10 2 x 6
Flexible cable with cable end	mm ²	1 x 1.5	1 x 10 2 x 6
Tightening torque	Nm	2.2	


⁽¹⁾ For use in an installation with ambient temperature > 20 °C, apply a derating coefficient:

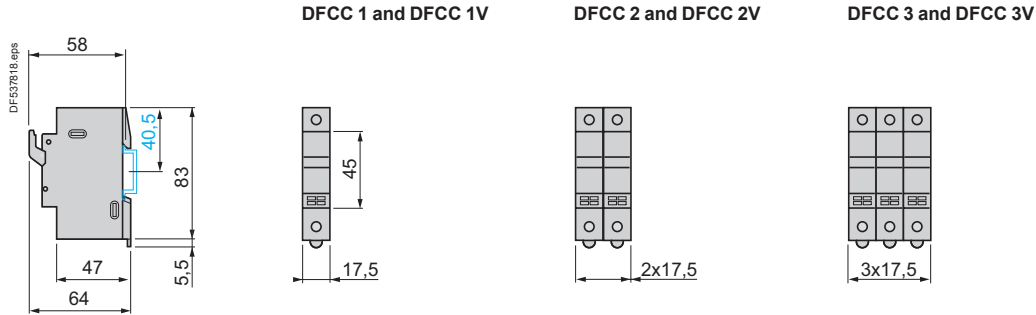
Maximum temperature	20 °C	30 °C	40 °C	50 °C	60 °C
Max. relative humidity	95 %	90 %	80 %	50 %	50 %
Current derating coefficient	1	0.95	0.9	0.8	0.7

TeSys DF

Dimensions

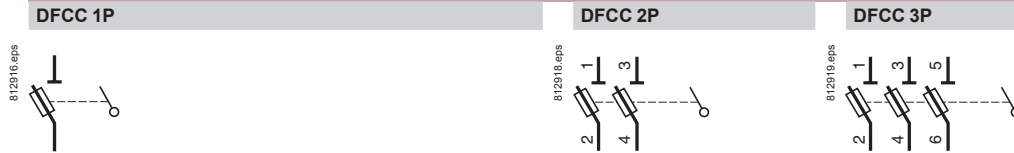
Modular fuse carriers 30 A

Mounting on 35 mm  rail



Schemes

Modular fuse carriers



Operation: safety

The fuse carrier performs two basic functions:

- it isolates the downstream circuit by means of a visible break and wide opening contacts,
- it holds the cartridge fuses designed to protect the installation against short-circuits.

The type of cartridge fuse needed to protect the circuit must be determined before selecting the fuse carrier.

Cartridge fuse selection (type, rating, size)

Type

Application	<ul style="list-style-type: none"> ■ Motor protection. ■ Transformer protection.
Solution	<ul style="list-style-type: none"> ■ aM type fuses. These fuses are designed to withstand high current peaks of a very short duration. They must be combined with a thermal overload relay coupled with a contactor.
Application	<ul style="list-style-type: none"> ■ Lighting circuit protection. ■ Supply line protection. ■ Furnace protection.
Solution	<ul style="list-style-type: none"> ■ gG type fuses, which are more widely used but whose limiting capacity is weaker than that of aM type fuses.

Rating

gG fuses
aM fuses

See standard NF C 15-100.
Table 53 A paragraph 532-2-1 and table 52 C paragraph 523-1.

Motors 3 x 220 V		Motors 3 x 400 V		Cartridge fuses type aM		Fuse carrier
P	in	P	in	Size	Rating	
kW	A	kW	A	A		
9	32	15	28.5	10 x 38	32	LS1 D32
11	39	22	44	14 x 51	50	GK1 EK
22	75	37	73	22 x 58	80	GK1 FK
30	103	55	105	22 x 58	125	GK1 FK

Size

Use the "fuse characteristics" table opposite to select the correct fuse size according to:

- the nominal current of the circuit to be protected,
- the operational voltage.

Fuse carrier selection

Application	Isolation of a circuit for safety reasons only.
Solution	The fuse carrier may be fitted with links. The maximum permissible current is indicated in the "pole characteristics" table opposite.
Application	Isolation of a circuit and its protection against short-circuits.
Solution	Select a fuse carrier according to: <ul style="list-style-type: none"> ■ the type of cartridge fuse required, ■ the maximum permissible current in the fuse carrier poles (see "pole characteristics" table opposite). If the operational current is greater than the maximum permissible current in the poles of the fuse carrier corresponding to the cartridge fuse size selected, select the fuse carrier the next size up. The safety provided by using a fuse carrier can be increased by adding a padlocking device with up to three padlocks.

Recommendations for use

The fuse carrier conforms to utilisation category AC-21A/22A of standard IEC 60947-3. It is therefore recommended that the fuse carrier early break auxiliary contacts always be inserted in the coil circuit of the contactor with which it is in series. If the fuse carrier is not associated with a contactor, it is essential to ensure that it will be operated off-load.

TeSys LS, GK

Environment					
Fuse carrier type		LS1 D32	LS1 D323	GK1 E●	GK1 F●
Conforming to standards	NF EN 60947-3	●		●	●
	IEC 60947-3	●		●	●
Product certifications		BV, UR		–	–
Protective treatment		“TH”		“TC”	“TC”
Ambient air temperature for operation with links without derating	°C	-50...+70		-50...+70	-50...+70
Maximum tilt in relation to normal vertical mounting plane		±23°		±23°	±23°

Pole characteristics						
Fuse size		10 x 38	10 x 38	14 x 51	22 x 58	
Rated operational voltage with links. a.c. supply	V	690	690	690	690	
Maximum continuous current at ambient temperature ≤ 40 °C ⁽¹⁾ (Min. cable Ø/le)						
	With tubular links	mm ² /A	6/32 or 4/25 or 2.5/16	4/25 or 2.5/16	10/50 or 6/40	35/125 or 25/100
	With aM fuses	mm ² /A	6/32 or 4/22 or 2.5/20	4/25 or 2.5/20	10/50 or 6/35	35/125 or 25/100
With gG fuses	mm ² /A	4/25 or 2.5/20 or 1.5/16	2.5/20 or 1.5/16	10/40 or 6/32	25/100 or 16/80	

Early break contact characteristics					
Rated operational voltage	V	~ 250. --- 60	~ 250. --- 60	~ 500. --- 440	~ 500. --- 220
Conventional thermal current	A	2.5	2.5	6	6

Cartridge fuse characteristics							
Fuse size		10 x 38	10 x 38	14 x 51	22 x 58		
Type aM	~ 400 V	A	32 ⁽²⁾	25	50	125	
	~ 500 V	A	20	20	40	80	
	~ 660 V	A	–	–	25	50	
	Type gG	~ 400 V	A	25 ⁽²⁾	25	40	100
		~ 500 V	A	25	25	40	80
		~ 660 V	A	–	–	25	50
Maximum power dissipated by fuse	W	3	3	8.5	18		

Cabling											
Connection by screw clamp terminals or connectors											
Number and c.s.a. of conductors		mm ²	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
			Solid cable	2 x 1	2 x 6	–	–	1 x 2.5	1 x 25	1 x 16	1 x 70
			Flexible cable without cable end	2 x 1.5	2 x 6	–	–	1 x 2.5	1 x 25	1 x 16	1 x 50
Flexible cable with cable end	mm ²	2 x 1	2 x 4	–	–	1 x 2.5	1 x 16	1 x 16	1 x 25		
Connection			Screw clamp terminals		–	–	Connector		Connector		
Tightening torque	Nm	1.7	–	–	2	–	–	2	–		

Connection by spring terminals										
Number and c.s.a. of conductors		mm ²	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
			Solid cable	–	–	2 x 1 ⁽³⁾	2 x 4	–	–	–
Flexible cable without cable end	mm ²	–	–	2 x 1.5 ⁽¹⁾	2 x 4	–	–	–	–	

(1) For use in an installation with ambient temperature > 55 °C, apply a derating coefficient equivalent to $\sqrt{\frac{120 - \text{ambient temperature}}{80}}$

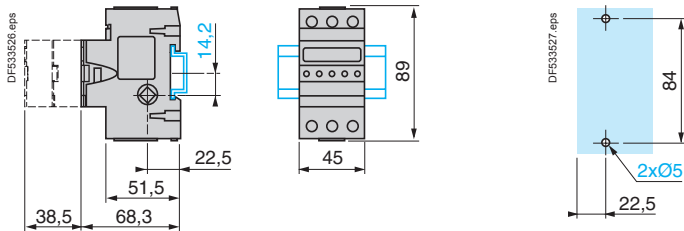
(2) These values are for fuse carriers mounted side by side with a gap of 10 mm between them or mounted with sets of busbars GV2 ●54. If mounted side by side without a gap, use the following fuse sizes: aM fuse: 25 A and gG fuse: 20 A.

(3) For cross-sections 1 to 1.5 mm², the use of an LA9 D99 cable end reducer is recommended.

LS1 D32

Mounting on rail AM1 DP200

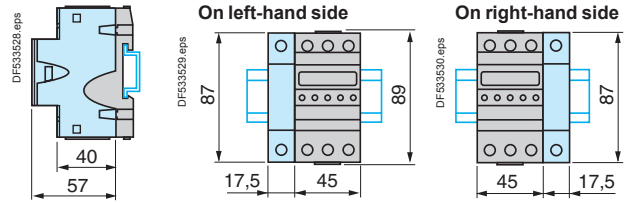
Panel mounting



LS1 D32 + LA8 D324

Mounting on rail AM1 DP200

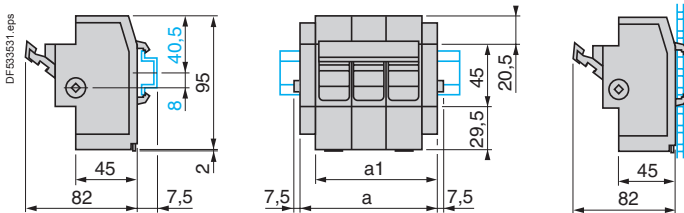
Mounting of 4th pole



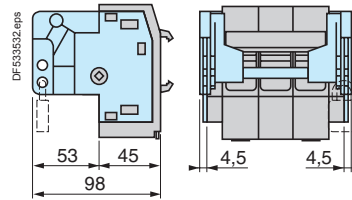
GK1 EK, EM, ES, ET, EV, EW, EX, EY

Mounting on rail AM1 DP200

Mounting on pre-slotted plate AM 1P



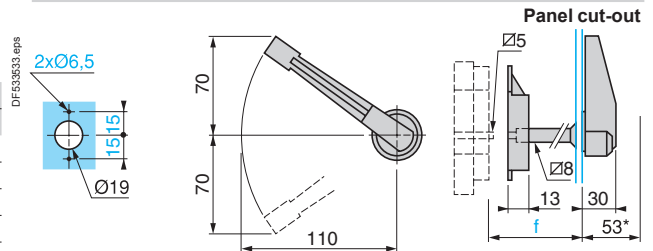
GK1 E + GK1 AV (padlocking device)



a: with single-phase protection device.
a1: without single-phase protection device.

GK1	a		a1	
	3 P	4 P	3 P	4 P
EK	-	-	88	-
EM	-	-	-	114
ES	-	-	97	-
ET	-	-	-	123
EV	106	-	-	-
EW	115	-	-	-
EX	-	141	-	-
EY	-	132	-	-

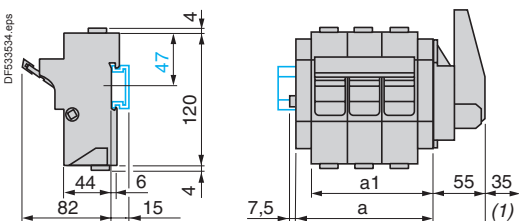
External operator GK1 AP05 right-hand, GK1 AP06 left-hand



External operator, RH or LH side	f
GK1 EK, EM, ES, ET	29...114
GK1 EV, EW, EX, EY	29...114

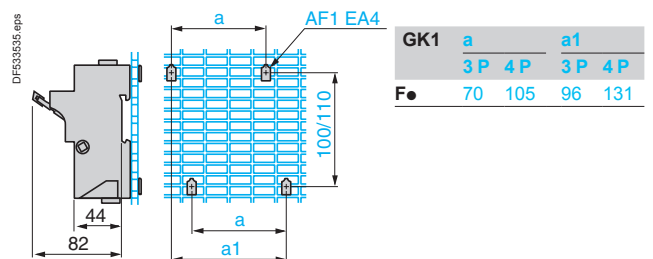
GK1 F● + GK1 AP07 (internal right-hand control)

Mounting on rail AM1 DE or ED



(1) Padlocking device (up to 3 padlocks)

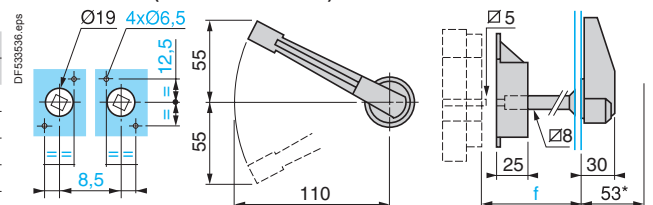
Mounting on pre-slotted plate AM1PA



GK1	a		a1	
	3 P	4 P	3 P	4 P
F●	70	105	96	131

Internal or external control GK1 AP07 RH, AP08LH

Panel cut-out (for external control)



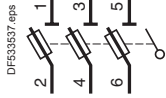
External operator, RH or LH side	f
GK1 FK, FM, FS, FT	35...114
GK1 FV, FW, FX, FY	35...114

TeSys LS, GK

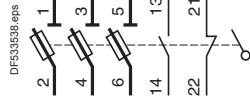
Fuse carriers without single-phase protection device

3-pole

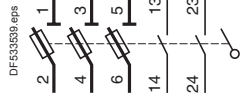
LS1 D32, D323



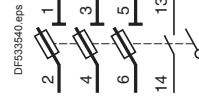
LS1 D32, D323 + GV AE11●



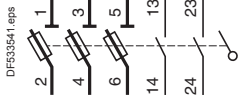
LS1 D32, D323 + GV AE20●



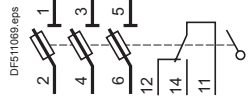
GK1 EK



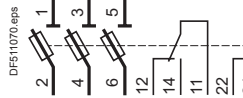
GK1 ES



GK1 FK

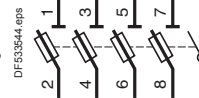


GK1 FS



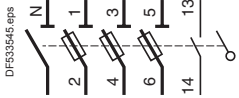
4-pole

LS1 D32 + LA8 D324

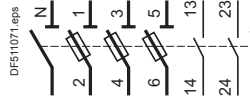


3-pole + Neutral

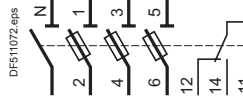
GK1 EM



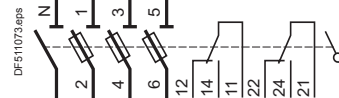
GK1 ET



GK1 FM



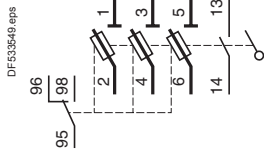
GK1 FT



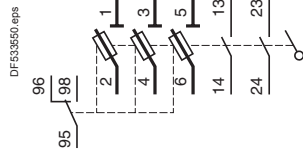
Fuse carriers with single-phase protection device

3-pole

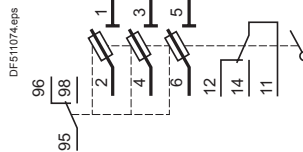
GK1 EV



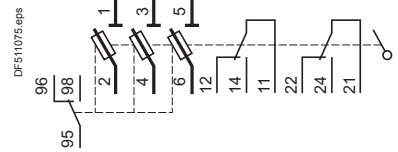
GK1 EW



GK1 FV

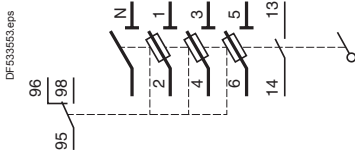


GK1 FW

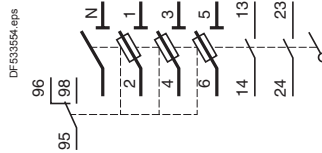


3-pole + Neutral

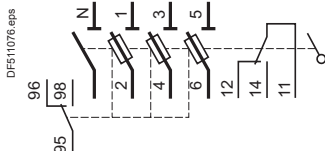
GK1 EY



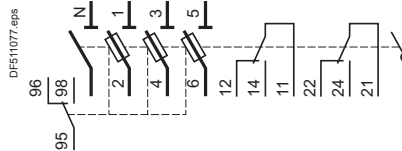
GK1 EX



GK1 FY



GK1 FX



Presentation			B5/2
Switch-disconnector fuses - TeSys GS			
Type of product	Range		Pages
IEC - Switch-disconnector fuses For NFC / DIN fuses	From 32 to 1250 A		B5/4
IEC - Switch-disconnector fuses For BS fuses	From 32 to 1250 A		B5/6
UL - Switch-disconnector fuses For CC / J fuses	From 30 to 800 A		B5/8
NFC - Cartridge fuses Type aM, gG	From 0.16 to 125 A		B5/10
DIN - Cartridge fuses Type aM, gG	From 10 to 1250 A		B5/11
Auxiliary contacts for IEC and UL switch-disconnector fuses	From 32 to 1250 A		B5/12
Handles	From 32 to 1250 A		B5/13
Other accessories	From 32 to 1250 A		B5/14
Technical Data for Designers			B5/15

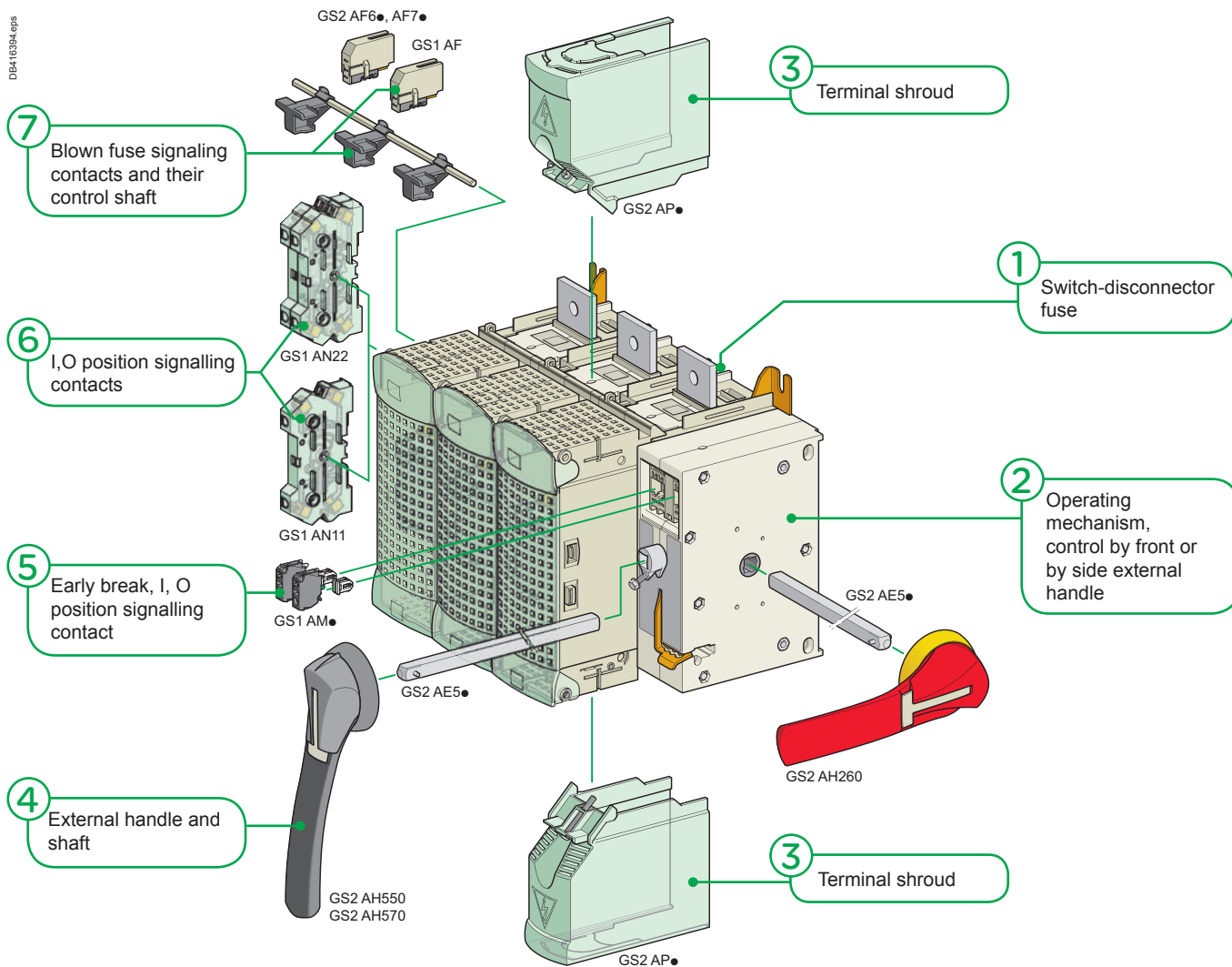
Switch-disconnector fuses and accessories

Discover the components

TeSys GS

A customizable functional block

Whatever its rating, the switch-disconnector fuse fits the need: particular position of the handle, triggering of an automatic control before full opening, enhanced protection of terminals...



Customizable

GS2 630 A switch-disconnector fuse

- 1 Switch-disconnector fuse**
 - NFC/DIN or BS fuse compatible
 - Enhanced isolation between poles
 - On-load making/breaking with double break isolation of the power circuit
- 2 Operating mechanism**
 - For one front or side external handle, right or left side
 - Cavity for early-break contacts
- 3 Terminal shrouds**
 - For use when the switch-disconnector fuse is installed outside an enclosure or when the operating voltage is over 500 V AC
- 4 Operating handle**
 - Padlockable in open position
- 5 GS1AN●● Position signalling contacts**
 - Synchronized with the poles operation
- 6 GS1AM●●● Early-break signalling contacts**
 - Activated before the poles are opened
- 7 GS1AF●● Blown fuse signalling contacts**
 - A missing fuse is also indicated

Switch-disconnector fuses and accessories

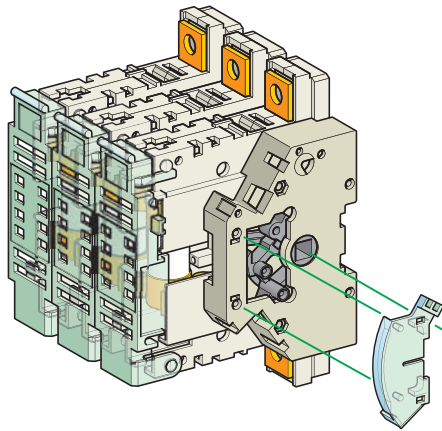
Discover the operating by direct and remote external handles

TeSys GS

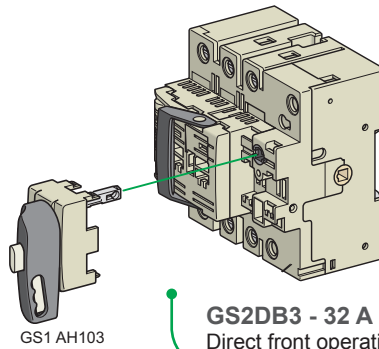
Simplicity of the direct operating

The mounting of an operating handle directly on the side of the switch-disconnector fuse is a simple operation. This handle will be for use by qualified personnel only. As the mechanical design is simplified, the manoeuvre will be immediately understood by the operator. Each handle can be padlocked in open position. Locking device for 3 padlocks.

DB416395 eps



DB416396 eps



Position of the handle, a free choice

GS2DB3 - 32 A switch-disconnector fuse
Direct front operating

GS1JD3 - 100 A switch-disconnector fuse
Direct lateral operating

GS1 AH01
GS1 AH02

Switch-disconnectors/fuses

Performance remote operating

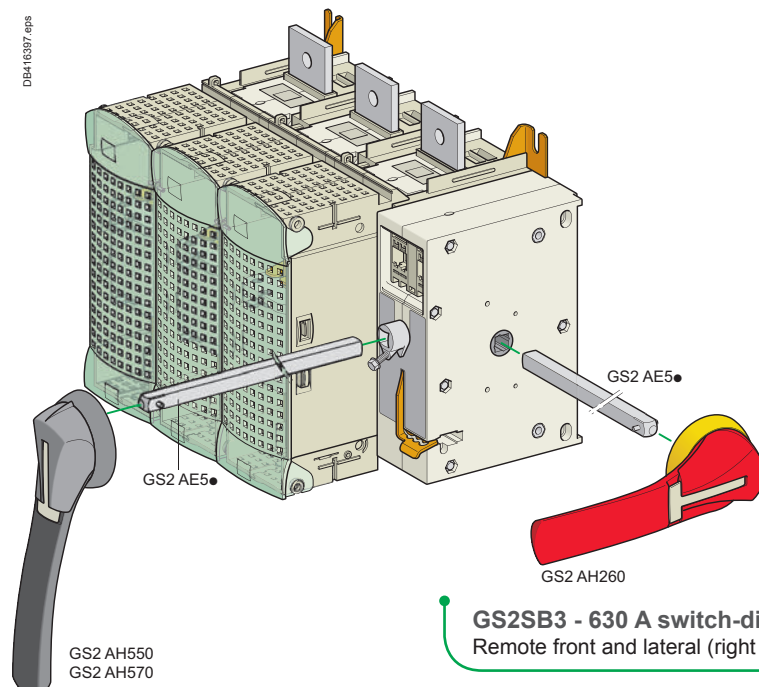
Located on the front or side panel of an enclosure, the operating handle provide complementary features:

- simple (IP55) or reinforced (IP65) protection against dust
- intermediate "Test" position
- door interlock when the handle is in "Close" position, opening by mean of a special tool is needed for opening.
- optional key-operated handle lock



The handles are available in different lengths. They are chosen according the operating effort which depends on the rating of the switch-disconnector fuse. The drive shaft can be cut to the ideal length. The choice of a red and yellow handle (CNOMO standard) will identify an "Emergency Stop handle" among others handles, generally black and gray.

DB416397 eps



GS2SB3 - 630 A switch-disconnector fuse
Remote front and lateral (right only) operating

GS2 AH550
GS2 AH570

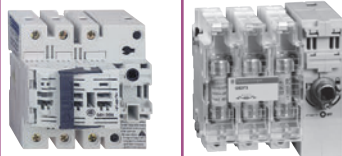
Selection table

From 32 to 1 250 A

TeSys GS

IEC Switch-disconnector fuses - TeSys GS

For NFC / DIN fuses



Rating	A	32	50	63	100	125
Number of poles		3 3+N	3 4	3 4	3 4	3 4
Fuse size		10 x 38	14 x 51	Size 000	22 x 58	22 x 58

For direct operators

Switch-disconnector fuses reference	GS1DD3	GS1DD4	GS1FD3	GS1FD4	GS1GD3	GS1GD4	GS1JD3	GS1JD4	GS1KD3	GS1KD4
Handle Black	GS1AH103		GS1AH01				GS1AH02			
Auxiliary contacts O/I + Test	1NO + 1NC		GS1AN11							
	2NO + 2NC		GS1AN22							
O/I + early break	GS1AM111 (1 OF)		GS1AM1 (1 OF)							
	GS1AM211 (2 OF)		GS1AM2 (2 OF)							
Blown fuse	-		GS1AF1		-		GS1AF23	GS1AF24	GS1AF23	GS1AF24

For external left hand side-mounted operators

Switch-disconnector fuses reference	GS1DD3	GS1DD4	GS2FG3	GS2FG4	GS2GG3	GS2GG4	GS2JG3	GS2JG4	GS2KG3	GS2KG4
Handle Black/Grey IP65	GS2AH310						GS2AH330			
Red/Yellow IP65	GS2AH320						GS2AH340			
Auxiliary contacts O/I + Test	1NO + 1NC		GS1AN11G							
	2NO + 2NC		GS1AN22G							
O/I + early break 1NO	GS1AM110									
	2NO		GS1AM101							
Blown fuse	-		GS1AF1		-		GS1AF23	GS1AF24	GS1AF23	GS1AF24

For external front-mounted and right-hand side-mounted operators

Switch-disconnector fuses reference	GS1DD3	GS1DD4	GS2F3	GS2F4	GS2G3	GS2G4	GS2J3	GS2J4	GS2K3	GS2K4
Front-mounted handle Black/Grey IP55	GS2AH515						GS2AH535			
Black/Grey IP65	GS2AH510						GS2AH530			
Red/Yellow IP65	GS2AH520						GS2AH540			
Front-mounted handle Black/Grey IP65	GS2AHT510						GS2AHT530			
Red/Yellow IP65	GS2AHT520						GS2AHT540			
RH side-mounted handle Black/Grey IP55	GS2AH215						GS2AH235			
Black/Grey IP65	GS2AH210						GS2AH230			
Red/Yellow IP65	GS2AH220						GS2AH240			
Auxiliary contacts O/I + Test	1NO + 1NC		GS1AN11							
	2NO + 2NC		GS1AN22							
	1NO + 1NC + test		GS1ANT11							
	2NO + 2NC + test		GS1ANT22							
O/I + Test + early break 1NO	-		GS1AM110							
	1NC		GS1AM101							
Blown fuse	-		GS1AF1		-		GS1AF23	GS1AF24	GS1AF23	GS1AF24

Accessories

Shaft for external handle (mm)	200	GS2AE82	GS2AE22	
	320	GS2AE8	GS2AE2	
	400	GS2AE81	GS2AE21	
Terminal shroud		Integrated		GS1AP33 (3P), GS1AP34 (4P)

Dimensions



Direct front-mounted version [page B5/23](#) [page B5/24](#)
External front-mounted version [page B5/23](#) [page B5/25](#)

Handles



TeSys GS



125		160		250		400		630		1250			
3	4	3	4	3	4	3	4	3	4	3	4		
Size 00		Size 00		Size 0		Size 1		Size 2		Size 3		Size 4	

GS1KKD3	GS1KKD4	GS1LLD3	GS1LLD4	GS1LD3	GS1LD4	GS1ND3	GS1ND4	GS1QQD3	GS1QQD4	GS2S3	GS2S4	GS2V3	GS2V4
GS1AH02										GS2AH104		GS2AH105	
GS1AN11													
GS1AN22													
GS1AM1 (1 OF)												GS1AM110 (1 NO)	
GS1AM2 (2 OF)												GS1AM101 (1 NC)	
-				GS1AF33	GS1AF34	GS1AF43	GS1AF44	GS1AF43	GS1AF44	GS2AF63	GS2AF64	GS2AF73	GS2AF74

GS2KKG3	GS2KKG4	GS2LLG3	GS2LLG4	GS2LG3	GS2LG4	GS2NG3	GS2NG4	GS2QQG3	GS2QQG4	GS2SG3	GS2SG4	GS2VG3	GS2VG4
GS2AH330										GS2AH350		GS2AH360	
GS2AH340										GS2AH360			
GS1AN11G													
GS1AN22G													
GS1AM110													
GS1AM101													
-				GS1AF33	GS1AF34	GS1AF43	GS1AF44	GS1AF43	GS1AF44	GS2AF63	GS2AF64	GS2AF73	GS2AF74

GS2KK3	GS2KK4	GS2LL3	GS2LL4	GS2L3	GS2L4	GS2N3	GS2N4	GS2QQ3	GS2QQ4	GS2S3	GS2S4	GS2V3	GS2V4
GS2AH535										-			
GS2AH530										GS2AH550		GS2AH570	
GS2AH540										GS2AH560		GS2AH580	
GS2AHT530										-			
GS2AHT540										-			

GS2AH235													
GS2AH230												GS2AH250	
GS2AH240												GS2AH260	
GS1AN11													
GS1AN22													
GS1ANT11												-	
GS1ANT22												-	
GS1AM110												-	
GS1AM101												-	
-				GS1AF33	GS1AF34	GS1AF43	GS1AF44	GS1AF43	GS1AF44	GS2AF63	GS2AF64	GS2AF73	GS2AF74

GS2AE22												GS2AE52			
GS2AE2												GS2AE5			
GS2AE21												GS2AE51			
GS1AP33 (3P), GS1AP34 (4P)								GS1AP43 (3P), GS1AP44 (4P)				GS2AP73	GS2AP64	GS2AP83	GS2AP84

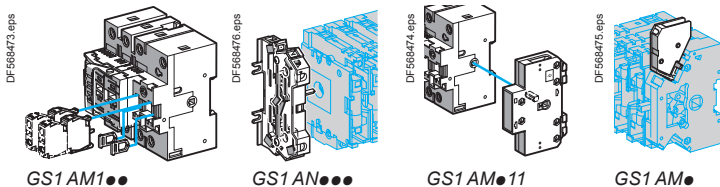
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page B5/27

Auxiliary contacts



See details on auxiliary contacts, page B5/12.

Maximal number of auxiliary contacts

Switch rating (A)	Standard configuration	With additional bracket	Reference of additional bracket
32	4	4	GS1AD10
50...400	4	4	GS2AD20
200...400	8	8	GS2AD20
630...1250	8	-	-

Switch-disconnectors/fuses

From 32 to 1 250 A

TeSys GS



Number of poles	3	3+N	3	4	3	4	3	4	3	4	3	4
Fuse size	A1		A1		A2-A3		A4		A4		B1-B2	

For direct operators

Switch-disconnector fuses reference	GS1DDB3	GS1DDB4	-
Handle	Black	GS1AH103	-
Auxiliary contacts	O/I + Test	1NO + 1NC	-
		2NO + 2NC	-
	O/I + early break	GS1AM111 (1 OF)	-
		GS1AM211 (2 OF)	-

For external front-mounted and right-hand side-mounted operators

Switch-disconnector fuses reference	GS1DDB3	GS1DDB4	GS2DB3	GS2DB4	GS2GB3	GS2GB4	GS2JB3	GS2JB4	GS2LLB3	GS2LLB4	GS2LB3	GS2LB4
Front-mounted handle	Black/Grey	IP55	GS2AH515				GS2AH535					
	Black/Grey	IP65	GS2AH510				GS2AH530					
	Red/Yellow	IP65	GS2AH520				GS2AH540					
Front-mounted handle + Test position	Black/Grey	IP65	GS2AHT510				GS2AHT530					
	Red/Yellow	IP65	GS2AHT520				GS2AHT540					
RH side-mounted handle	Black/Grey	IP55	GS2AH215				GS2AH235					
	Black/Grey	IP65	GS2AH210				GS2AH230					
	Red/Yellow	IP65	GS2AH220				GS2AH240					
Auxiliary contacts	O/I + Test	1NO + 1NC	-				GS1AN11					
		2NO + 2NC	-				GS1AN22					
	1NO + 1NC + test	-				GS1ANT11						
		2NO + 2NC + test	-				GS1ANT22					
	O/I + Test + early break	1NO	GS1AM110 - max 4 contacts									
	1NC	GS1AM101 - max 4 contacts										

Accessories

Shaft for external handle (mm)	200	GS2AE82	GS2AE22
	320	GS2AE8	GS2AE2
	400	GS2AE81	GS2AE21
Terminal shroud	Integrated		GS1AP33 (3P), GS1AP34 (4P)

Dimensions

	Direct front-mounted version	page B5/23	page B5/24
	External front-mounted version	page B5/23	page B5/25

TeSys GS

3		4		3		4		3		4		3		4			
B1-B2		B1...B3		B1...B3		B1...B4		C1-C2		C1...C3		D1					
-																	
-																	
-																	
-																	
-																	
-																	
-																	
GS2MMB3	GS2MMB4	GS2NB3	GS2NB4	GS2PPB3	GS2PPB4	GS2QQB3	GS2QQB4	GS2SB3	GS2SB4	GS2TB3	GS2TB4	GS2VB3	GS2VB4				
GS2AH535								-									
GS2AH530								GS2AH550				GS2AH570					
GS2AH540								GS2AH560				GS2AH580					
GS2AHT530								-									
GS2AHT540								-									
GS2AH235								-									
GS2AH230								GS2AH250									
GS2AH240								GS2AH260									
GS1AN11																	
GS1AN22																	
GS1ANT11								-									
GS1ANT22								-									
GS1AM110 - max 8 contacts																	
GS1AM101 - max 8 contacts																	
GS2AE22								GS2AE52									
GS2AE2								GS2AE5									
GS2AE21								GS2AE51									
GS1AP43 (3P), GS1AP44 (4P)								GS2AP73 (3P), GS2AP64 (4P)				GS2AP83				GS2AP84	
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page B5/25								page B5/27									

Switch-
disconnectors/
fuses

UL Switch-disconnector fuses - TeSys GS

For CC and J fuses



PB112395_NB_eps



PB112396_NB_eps

Rating		30 Compact		30		60	100
Number of poles		3		3		3	3
Fuse size		CC	J	CC	J	J	J
For direct operators							
Switch-disconnector fuses reference		GS1DDU3	GS1DU3	-			
Handle	Black	GS1AH106		-			
Auxiliary contacts	O/I + Test	1NO + 1NC		-			
		2NO + 2NC		-			
O/I + early break	1NO	GS1AM110 + GS1AD10		-			
	1NC	GS1AM101 + GS1AD10		-			
For external front-mounted operators							
Switch-disconnector fuses reference		GS1DDU3	GS1DU3	GS2EEU3	GS2EU3N	GS2GU3N	GS2JU3N
Front-mounted handle	Black/Grey	1,3R, 12	GS2AH110	GS2AH130			
		4, 4X	GS2AH410	GS2AH430			
	Red/Yellow	1,3R, 12	GS2AH120	GS2AH140			
		4, 4X	GS2AH420	GS2AH440			
Front-mounted handle + Test position	Black/Grey	1,3R, 12	GS2AHT110	GS2AHT130			
		4, 4X	GS2AHT410	GS2AHT430			
	Red/Yellow	1,3R, 12	GS2AHT120	GS2AHT140			
		4, 4X	GS2AHT420	GS2AHT440			
Auxiliary contacts	O/I + Test	1NO + 1NC	-	GS1AN11			
		2NO + 2NC	-	GS1AN22			
	1NO + 1NC + test	2NO + 2NC	-	GS1ANT11			
		2NO + 2NC + test	-	GS1ANT22			
O/I + Test + early break	1NO	GS1AM110 - max 4 contacts ⁽¹⁾		GS1AM110 - max 4 contacts ⁽¹⁾			
	1NC	GS1AM101 - max 4 contacts ⁽¹⁾		GS1AM101 - max 4 contacts ⁽¹⁾			
Accessories							
Shaft for external handle (mm)	320	GS2AE8		GS2AE2			
	400	GS2AE81		GS2AE21			
Terminal shroud	Integrated						
Dimensions							
	Direct front-mounted version	page B5/23				page B5/24	
	External front-mounted version	page B5/23				page B5/25	

(1) 4 more contacts allowed with GS1AD10 additional bracket.

TeSys GS



PB112397_NE.eps

	200	400	600	800
	3	3	3	3
	J	J	J	J
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	GS2MU3N	GS2QU3N	GS2SU3	GS2TU3
	GS2AH130		-	
	GS2AH430		GS2AH150	
	GS2AH140		-	
	GS2AH440		GS2AH160	
	GS2AHT130		-	
	GS2AHT430		-	
	GS2AHT140		-	
	GS2AHT440		-	
	GS1AN11			
	GS1AN22			
	GS1ANT11		-	
	GS1ANT22		-	
	GS1AM110 - max 8 contacts ⁽¹⁾		GS1AM110 - max 8 contacts only	
	GS1AM101 - max 8 contacts ⁽¹⁾		GS1AM101 - max 8 contacts only	
	GS2AE2		GS2AE5	
	GS2AE21		GS2AE51	
	GS1AP43	GS1AP53	GS2AP73	
	page B5/24		page B5/26	
	page B5/25		page B5/27	

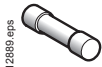
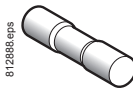
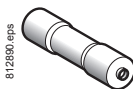
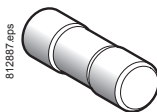
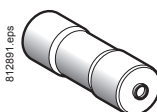
Switch-disconnectors/fuses

NFC Cartridge fuses

Fuse type aM, type gG

From 32 to 1 250 A

TeSys GS

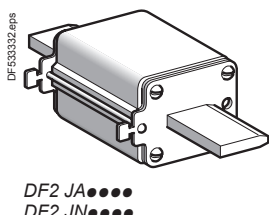
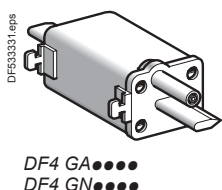
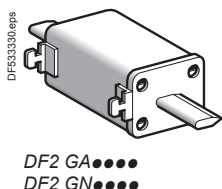
NFC fuse									
Fuse type	Maximum rated voltage	Rating	Sold in lots of	Fuses without striker		Fuses with striker			
				Unit reference		Unit reference			
				aM	gG	aM	gG		
 Cylindrical 8.5 x 31.5 DF2 CA●●● DF2 CN●●	400	1	10	DF2BA0100	DF2BN0100	-	-		
		2	10	DF2BA0200	DF2BN0200	-	-		
		4	10	DF2BA0400	DF2BN0400	-	-		
		6	10	DF2BA0600	DF2BN0600	-	-		
		8	10	DF2BA0800	DF2BN0800	-	-		
		10	10	DF2BA1000	DF2BN1000	-	-		
		12	10	-	DF2BN1200	-	-		
		16	10	-	DF2BN1600	-	-		
		20	10	-	DF2BN2000	-	-		
		 Cylindrical 10 x 38 DF2 EA●●● DF2 EN●●	500	0.16	10	DF2CA001	-	-	-
0.25	10			DF2CA002	-	-	-		
0.50	10			DF2CA005	-	-	-		
1	10			DF2CA01	-	-	-		
2	10			DF2CA02	DF2CN02	-	-		
4	10			DF2CA04	DF2CN04	-	-		
6	10			DF2CA06	DF2CN06	-	-		
8	10			DF2CA08	DF2CN08	-	-		
10	10			DF2CA10	DF2CN10	-	-		
12	10			DF2CA12	DF2CN12	-	-		
16	10			DF2CA16	DF2CN16	-	-		
20	10			-	DF2CN20	-	-		
 Cylindrical 14 x 51 DF3 EA●● DF3 EN●●	400			20	10	DF2CA20	-	-	-
				25	10	DF2CA25	DF2CN25	-	-
		32	10	DF2CA32	DF2CN32	-	-		
		0.25	10	DF2EA002	-	-	-		
		0.50	10	DF2EA005	-	-	-		
		 Cylindrical 14 x 51 DF2 FA●● DF2 FN●●	500	1	10	DF2EA01	-	-	-
2	10			DF2EA02	-	DF3EA02	-		
4	10			DF2EA04	DF2EN04	DF3EA04	DF3EN04		
6	10			DF2EA06	DF2EN06	DF3EA06	DF3EN06		
8	10			DF2EA08	-	DF3EA08	-		
10	10			DF2EA10	DF2EN10	DF3EA10	DF3EN10		
12	10			DF2EA12	-	DF3EA12	-		
16	10			DF2EA16	DF2EN16	DF3EA16	DF3EN16		
20	10			DF2EA20	DF2EN20	DF3EA20	DF3EN20		
25	10			DF2EA25	DF2EN25	DF3EA25	DF3EN25		
32	10			DF2EA32	DF2EN32	DF3EA32	DF3EN32		
40	10			DF2EA40	DF2EN40	DF3EA40	DF3EN40		
50	10			DF2EA50	DF2EN50	DF3EA50	-		
 Cylindrical 22 x 58 DF3 FA●● DF3 FN●●	690			4	10	DF2FA04	-	DF3FA04	-
		6	10	DF2FA06	-	DF3FA06	-		
		8	10	DF2FA08	-	DF3FA08	-		
		10	10	DF2FA10	DF2FN10	DF3FA10	DF3FN10		
		16	10	DF2FA16	-	DF3FA16	-		
		20	10	DF2FA20	DF2FN20	DF3FA20	DF3FN20		
		25	10	DF2FA25	DF2FN25	DF3FA25	DF3FN25		
		32	10	DF2FA32	DF2FN32	DF3FA32	DF3FN32		
		40	10	DF2FA40	DF2FN40	DF3FA40	DF3FN40		
		50	10	DF2FA50	DF2FN50	DF3FA50	DF3FN50		
400	63	10	DF2FA63	DF2FN63	DF3FA63	DF3FN63			
	80	10	DF2FA80	DF2FN80	DF3FA80	DF3FN80			
	100	10	DF2FA100	DF2FN100	DF3FA100	DF3FN100			
400	125	10	DF2FA125	-	DF3FA125	-			



For protection of equipment with current peaks
 For protection of circuits without significant current peaks

From 32 to 1250 A

TeSys GS



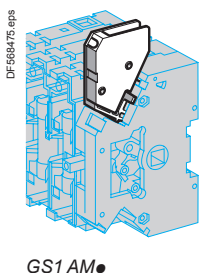
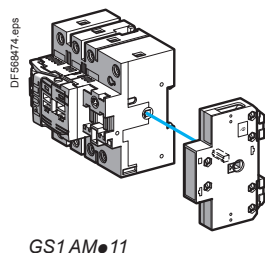
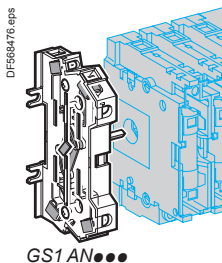
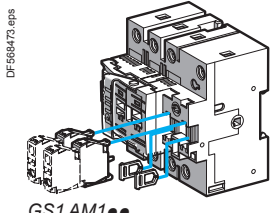
DIN fuse									
Fuse type	Maximum rated voltage	Rating	Sold in lots of		Fuses without striker		Fuses with striker		
			aM	gG	Unit reference		Unit reference		
	V ~	A			aM	gG	aM	gG	
Blade size 000	690	10	-	10	-	DF2FGN10	-	-	
		16	3	10	DF2FGA16	DF2FGN16	-	-	
		20	3	10	DF2FGA20	DF2FGN20	-	-	
		25	3	10	DF2FGA25	DF2FGN25	-	-	
		32	3	10	DF2FGA32	DF2FGN32	-	-	
		40	3	10	DF2FGA40	DF2FGN40	-	-	
		50	3	10	DF2FGA50	DF2FGN50	-	-	
		63	3	10	DF2FGA63	DF2FGN63	-	-	
		80	-	10	-	DF2FGN80	-	-	
Blade size 00	690	80	3	-	DF2FGA80	-	-	-	
		100	3	10	DF2FGA100	DF2FGN100	-	-	
		125	3	10	DF2FGA125	DF2FGN125	-	-	
Blade size 0	500	160	-	10	-	DF2FGN160	-	-	
		690	50	3	3	DF2GA1051	DF2GN1051	-	-
Blade size 0	690	63	3	3	DF2GA1061	DF2GN1061	-	-	
		80	3	3	DF2GA1081	DF2GN1081	-	-	
		100	3	3	DF2GA1101	DF2GN1101	-	-	
		125	3	3	DF2GA1121	DF2GN1121	DF4GA1121	-	
		160	3	3	DF2GA1161	DF2GN1161	DF4GA1161	-	
		500	125	-	3	-	-	-	DF4GN1121
			160	-	3	-	-	-	DF4GN1161
200	3		-	DF2GA1201	-	DF4GA1201	-		
Blade size 1	690	160	3	3	DF2HA1161	DF2HN1161	-	-	
		200	3	3	DF2HA1201	DF2HN1201	DF4HA1201	DF4HN1201	
		250	3	-	DF2HA1251	-	DF4HA1251	-	
		500	250	-	3	-	DF2HN1251	-	DF4HN1251
Blade size 1	690	315	3	-	DF2HA1311	-	DF4HA1311	-	
		250	3	3	DF2JA1251	DF2JN1251	-	-	
		315	3	3	DF2JA1311	DF2JN1311	DF4JA1311	DF4JN1311	
		400	3	-	DF2JA1401	-	DF4JA1401	-	
		500	400	-	3	-	DF2JN1401	-	DF4JN1401
Blade size 2	690	500	3	-	DF2JA1501	-	DF4JA1501	-	
		400	3	-	DF2KA1401	-	-	-	
		500	3	3	DF2KA1501	-	DF4KA1501	DF4KN1501	
		500	500	-	3	-	DF2KN1501	-	-
Blade size 2	690	630	3	3	DF2KA1631	DF2KN1631	DF4KA1631	DF4KN1631	
		800	1	3	DF2LA1801	-	DF4LA1801	DF4LN1801	
		1000	1	-	DF2LA1101	-	DF4LA1101	-	
Blade size 3	690	800	-	1	-	DF2LN1801	-	-	
		1000	-	1	-	DF2LN1101	-	DF4LN1101	
		1250	1	1	DF2LA1251	DF2LN1251	DF4LA1251	DF4LN1251	

Switch-disconnectors fuses

 For protection of equipment with current peaks
For protection of circuits without significant current peaks

From 32 to 1 250 A

TeSys GS

**Auxiliary early break and/or O, I and Test position signalling contacts** ^{(1) (2) (3)}

Switch rating	Contact type	Type of operator	Rated operating current I _e (A)		Reference
			< 24 V DC	< 240 V AC	
A (CEI) 32...1250	A (UL) 30 Compact	1 N/O	2.8	3	GS1AM110
	30...800	1 N/C	2.8	3	GS1AM101

Auxiliary O, I and Test position signalling contacts ^{(3) (5)}

Switch rating	Contact type	Type of operator	Rated operating current I _e (A)		Reference
			< 24 V DC	< 240 V AC	

Auxiliary O and I position signalling contacts

50...1250	30...800	1 N/C + 1 N/O	External, front or RH side-mounted	Direct	–	10	GS1AN11
			External, LH side		–	10	GS1AN11G*
		2 N/C + 2 N/O	External, front or RH side-mounted	Direct	–	10	GS1AN22
			External, LH side		–	10	GS1AN22G*

Auxiliary O, I and Test position signalling contacts ⁽³⁾

50...400	30...400	1 N/C + 1 N/O	External, front side-mounted	–	–	10	GS1ANT11
		2 N/C + 2 N/O	External, front side-mounted	–	–	10	GS1ANT22

Auxiliary early break and O and I position signalling contacts

Switch rating	Contact type	Type of operator	Rated operating current I _e (A)		Reference
			< 24 V DC	< 240 V AC	
A (CEI) 32	1 C/O	–	12	4	GS1AM111*
	2 C/O	–	12	4	GS1AM211*
50...400	1 C/O	Direct, RH side	12	4	GS1AM1*
	2 C/O	Direct, RH side	12	4	GS1AM2*

Auxiliary “blown fuse” signalling contacts for use with NF C and DIN fuses ⁽⁶⁾

Contact type	Switch rating	Fuse size	Number of poles	Rated operating current I _e (A)		Reference		
				< 24 V DC	< 240 V AC			
1 st C/O	50	14 x 51	3 or 4	12	4	GS1AF1*		
		100 and 125	22 x 58	3	12	4	GS1AF23*	
				4	12	4	GS1AF24*	
		160	Size 0	3	12	4	GS1AF33*	
				4	12	4	GS1AF34*	
		250 and 400	Size 1 and Size 2	3	12	4	GS1AF43*	
			4	12	4	GS1AF44*		
	630	Size 3		3	12	4	GS2AF63*	
				4	12	4	GS2AF64*	
		1250	Size 4		3	12	4	GS2AF73*
					4	12	4	GS2AF74*
					3	12	4	GS1AF*
				4	12	4	GS1AF*	
2 nd C/O	50...1250	–	3 or 4	12	4	GS1AF*		

(*) Not for UL switch-disconnector.

(1) For 32 A (CEI), 30 (UL) switch-disconnector-fuses, these auxiliary contacts allow:

- early break and O and I position signalling,
- O and I position signalling,
- O, I and Test position signalling,
- Test position signalling.

For 50 to 400 A (CEI), 30-400 A (UL) switch-disconnector-fuses, they allow:

- early break,
- O and I position signalling,
- O, I and Test position signalling,
- Test position signalling.

For 630 and 1250 A (CEI), 630 and 800 A (UL) switch-disconnector-fuses, they allow:

- early break and O and I position signalling,

(2) Maximum number of auxiliary contacts:

Switch rating	Contact type	Standard	With additional bracket	Reference of additional bracket
32	A (CEI) 30 Compact	CC	4 + 4	GS1AD10
		J	2 + 4	GS1AD10
50...160	30...100	4	4 + 4	GS2AD20
200...400	200 and 400	8	8 + 4	GS2AD20
630...1250	600 and 800	8	8	–

(3) The Test position allows testing of the control circuits off-load. Auxiliary contacts GS1 AM110, GS1 AM101 and GS1 ANT●● only allow the text function with external handles GS2 AHT●●.

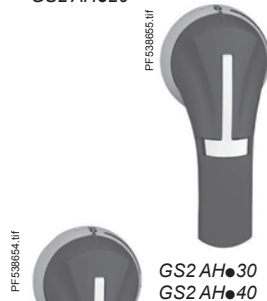
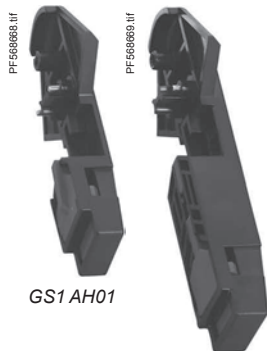
(4) These auxiliary contacts can also be used with 630, 800 and 1250 A switch-disconnector-fuses fitted with a direct front-mounted operator.

(5) Reversible add-on attachments for converting an N/C contact to an N/O contact and vice versa.

(6) For striker fuses (BS fuses are not available with striker).

From 32 to 1250 A

TeSys GS



Handles for direct operators

Switch rating	Type of operator	Handle colour	Reference
A (CEI)	A (UL)		
Handles for direct operators, padlockable			
-	30 Compact	Front-mounted	Black
32	-	Front	Black
50 and 63	-	RH side	Black
100...400	-	RH side	Black
-	600 and 800	Front-mounted	Black
630 and 800	-	Front	Black
1250	-	Front	Black

Handles for external operator

Switch rating	Handle colour	Degree of protection	Protection index Nema	Reference
A (CEI)	A (UL)			
Handles for front-mounted external operators, padlockable and lockable in position O⁽¹⁾				
Door interlock in I position⁽²⁾				
32...63	-	Black/Grey	IP 65	-
		Red/Yellow	IP55	-
		Red/Yellow	IP 65	-
100...400	-	Black/Grey	IP 65	-
		Red/Yellow	IP55	-
		Red/Yellow	IP 65	-
630 and 800	-	Black/Grey	IP65	-
		Red/Yellow	IP65	-
1250	-	Black/Grey	IP65	-
		Red/Yellow	IP65	-
-	30 Compact	Black/Grey	-	1, 3R, 12
		Red/Yellow	-	1, 3R, 12
		Black/Grey	-	1, 3R, 4, 4X, 12
		Red/Yellow	-	1, 3R, 4, 4X, 12
-	30...400	Black/Grey	-	1, 3R, 12
		Red/Yellow	-	1, 3R, 12
		Black/Grey	-	1, 3R, 4, 4X, 12
		Red/Yellow	-	1, 3R, 4, 4X, 12
-	600 and 800	Black/Grey	-	1, 3R, 12
		Red/Yellow	-	1, 3R, 12

Handles for front-mounted external operators with test facility⁽³⁾, padlockable and lockable in "O" position⁽¹⁾. Door interlock in "I" position⁽²⁾

32...63	-	Black/Grey	IP 65	-
		Red/Yellow	IP65	-
100...400	-	Black/Grey	IP65	-
		Red/Yellow	IP65	-
-	30 Compact	Black/Grey	-	1, 3R, 12
		Red/Yellow	-	1, 3R, 12
		Black/Grey	-	1, 3R, 4, 4X, 12
		Red/Yellow	-	1, 3R, 4, 4X, 12
-	30...400	Black/Grey	-	1, 3R, 12
		Red/Yellow	-	1, 3R, 12
		Black/Grey	-	1, 3R, 4, 4X, 12
		Red/Yellow	-	1, 3R, 4, 4X, 12

Handles for external right-hand side-mounted operators, padlockable and lockable in "O" position⁽¹⁾

32...63	-	Black/Grey	IP 65	-
		Red/Yellow	IP55	-
		Red/Yellow	IP65	-
100...400	-	Black/Grey	IP65	-
		Red/Yellow	IP55	-
		Red/Yellow	IP65	-
630...1250	-	Black/Grey	IP65	-
		Red/Yellow	IP65	-

Handles for external left-hand side-mounted operators, padlockable and lockable in "O" position⁽¹⁾

32...63	-	Black/Grey	IP 65	-
		Red/Yellow	IP65	-
100...400	-	Black/Grey	IP65	-
		Red/Yellow	IP65	-
630...1250	-	Black/Grey	IP65	-
		Red/Yellow	IP65	-

(1) Lockable with device **GS2AX1**, to be ordered separately.

(2) Door interlock override by means of a tool.

(3) The Test facility allows testing of the control circuits off-load, by using auxiliary contacts **GS1AM110**, **GS1AM101** or **GS1ANT00**. In the "Test" position, the enclosure door can be opened.

From 32 to 1 250 A

TeSys GS

GS2AE1_AE5.pptd



GS2 AE5

GS2AE2_pptd



GS2 AE2 - GS2 AE21

GS2AE8_AE81.pptd



GS2 AE8 - GS2 AE81

Shafts for external operators

Switch rating		Shaft length mm	Shaft cross section mm	Reference
A (CEI)	A (UL)			
32	30 Compact	200	5 x 5	GS2AE82
		320	5 x 5	GS2AE8
		400	5 x 5	GS2AE81
50...400	30...400	200	10 x 10	GS2AE22
		320	10 x 10	GS2AE2
		400	10 x 10	GS2AE21
630...1250	600 and 800	200	12 x 12	GS2AE52
		320	12 x 12	GS2AE5
		40	12 x 12	GS2AE51

Terminal protection shrouds for upstream or downstream connector plates

Switch rating		Number of poles	Reference
A (CEI)	A (UL)		
50 and 63	30 Compact, 30...60 (3P)	3 or 4	(1)
100...160	100	3	GS1AP33
	–	4	GS1AP34
200...400	200	3	GS1AP43
	–	4	GS1AP44
–	400	3	GS1APU53
	630...800	3	GS2AP73
1250	–	4	GS2AP64
	–	3	GS2AP83
–	–	4	GS2AP84

Devices for locking fuse covers in "I" position (2)

Switch rating A	Fuse size	Number of poles	Reference
50	14 x 51	3 or 4	(3)
63	Size 00C	3 or 4	GS1AV1
100...160	22 x 58, Size 00	3 or 4	GS1AV2
		3	GS1AV33
160	Size 0	3	GS1AV33
		4	GS1AV34
250	Size 1	3	GS1AV53
		4	GS1AV54
400	Size 2	3	GS1AV73
		4	GS1AV74

Cage terminals for connection of bare cables (without lug)

Switch rating A	Number of poles	Reference
50 and 63	3 or 4	(4)
100...160	3	GS1AW33
	4	GS1AW34
200...250	3	GS1AW43
	4	GS1AW44

External handle locking device

Switch rating A	Description	Reference
32...1250	Device for RONIS EL11AP keylock (lock to be ordered separately).	GS2AX1

Height compensation plate for external handles

Switch rating A (CEI)	A (UL)	Description	Degree of protection	Reference
32...1250	30 Compact, 30...400	Allows a new GS2●● handle to be fitted on existing cut-outs	IP 65	GS2AH001

Flat mounting kit

Switch rating A	Description	Reference
50...400	The kit, for use with a front-mounted external handle, includes: <ul style="list-style-type: none"> ■ a 200 mm shaft, cross section 10 x 10 mm, ■ an adapter plate 	GS2ADL2

(1) For these ratings, the switch-disconnector-fuses are fitted with terminal covers as standard.

(2) For NF C and DIN switch-disconnector-fuses fitted with right-hand mounted direct operator.

(3) For this rating, switch-disconnector-fuses are fitted with a cover locking device as standard.

(4) For these ratings, switch-disconnector-fuses are fitted with cage terminals as standard.

Technical Data for Designers

Contents

Characteristics:

- > switch-disconnector fusesB5/16 to B5/21
- > auxiliary contactsB5/22

DimensionsB5/23 to B5/31

SchemesB5/31

From 32 to 1 250 A

TeSys GS

Switch-disconnector-fuse characteristics						
Type		GS1 DD	GS● F	GS● G	GS● J	
Environment						
Conforming to standards	Switch-disconnector-fuses		IEC 60947-3			
	Circuit breakers		IEC 60269-1 and 2			
Product certifications			ASEFA/LOVAG, LROS (pending)			
Degree of protection conforming to IEC 60529	On front panel with terminal covers		IP 20			
Ambient air temperature around the device	Storage	°C	-40...+80			
	Operation	°C	-20...+70			
Flame resistance conforming to IEC 60695-2-1	Body	°C	960	960		
	Fuse cover	°C	–	850		
Pole characteristics						
Conventional thermal current (I _{th}) for ambient temperature ≤ 40 °C		A	32	50	63	100
Fuse size			10 x 38	14 x 51	T00C	22 x 58
Rated insulation voltage (U _i)		V	800	750	750	750
Rated impulse withstand voltage (U _{imp})		kV	8	8	8	8
Rated operational current (I _e)	Cat. AC-23A/B ⁽¹⁾ ~ 400 V	A	32	50	63	100
	~ 500 V	A	32	50	63	100
	~ 690 V	A	32	50	63	100 ⁽³⁾
	Cat. DC-23A/B ⁽¹⁾ ≡ 440 V ⁽²⁾	A	20	40	40	100
Rated operational power	Cat. AC-23A/B ⁽¹⁾ ~ 400 V	kW	15	25	30	51
	~ 500 V	kW	18.5	33	40	63
	~ 690 V	kW	25	45	55	90
Rated conditional short-circuit current	I _{rms} at ~ 400 V with protection by gG (gl) fuses	kA	100	100	100	100
	Rating of associated fuses	A	32	50	63	100
Peak value of permissible current (dynamic short-circuit withstand)	Conforming to ~ 400 V IEC 60269-1	kA	5.5	7.6	10.6	20
Rated making capacity	I _{rms} at 400 V Cat. AC-23B	A	320	500	630	1000
Rated breaking capacity	I _{rms} at 400 V Cat. AC-23B	A	256	400	500	800
Mechanical durability	Number of operating cycles		20000	10000	10000	10000
Electrical durability	Number of operating cycles cat. AC/DC-23A/B ⁽¹⁾		1500/300	1500/300	1500/300	1500/300
Cabling	Cable (c.s.a. min/max)	mm²	2.5/16	6/25	10/25	25/95
	Bars (max width)	mm	–	–	–	20
Tightening torque		N.m	3	3.2	3.2	12

(1) Category "A": frequent operating cycles, category "B": infrequent operating cycles.
 (2) 2 poles in series per phase.
 (3) With terminal covers.
 (4) Poles not juxtaposed.

TeSys GS

	GS● K	GS● KK	GS● LL	GS● L	GS● N	GS● QQ	GS2 S	GS2 V
	IEC 60947-3							
	IEC 60269-1 and 2							
	ASEFA/LOVAG, LROS (pending)							
	IP 20							
	-40...+80							
	-20...+70							
	960							
	850							
	125	125	160	160	250	400	630	1250
	22 x 58	T00	T00	T0	T1	T2	T3	T4
	750	750	750	750	750	800	1000	1000
	8	8	8	8	8	8	12	12
	125	125	160	160	250	400	630	1000
	125	125	160	160	250	315	500	800
	100 ⁽³⁾	100 ⁽³⁾	125 ⁽³⁾	125 ⁽³⁾	250 ⁽³⁾	250/315	315/400	630
	100	100	125	125	200	200/315 ⁽⁴⁾	400/630 ⁽⁴⁾	1000
	63	63	80	80	132	220	355	560
	90	90	110	110	160	220	355	560
	80	80	110	110	220	220/295	295/400	400/475
	100	100	100 (50)	100	100	50	100	100
	125	125	125 (160)	160	250	400	630	1250
	20	20	22.7	20	32.5	40	70	90
	1250	1250	1600	1600	2500	4000	6300	10 000
	1000	1000	1280	1280	2000	3200	5040	8000
	10000	10000	10000	10000	10000	10000	8000	5000
	1000/200	1000/200	1000/200	1000/200	1000/200	1000/200	1000/200	500/100
	35/95	35/95	50/95	50/95	95/240	185/240	2 x 150 / 2 x 300	- / 4 x 185
	20	20	20	20	32	45	63	80
	12	12	12	12	25	25	44	44

Switch-
disconnectors/
fuses

From 32 to 1 250 A

TeSys GS

Switch-disconnector-fuse characteristics								
Type		GS1 DDB	GS2 DB	GS2 GB	GS2 JB			
Environment								
Conforming to standards	Switch-disconnector-fuses		IEC 60947-3					
	Circuit breakers		IEC 60269-1 and 2					
Product certifications			ASEFA/LOVAG, LROS (pending)					
Degree of protection conforming to IEC 60529	On Front panel, with terminal covers		IP 20					
Ambient air temperature around the device	Storage	°C	-40...+80					
	Operation	°C	-20...+70					
Flame resistance conforming to IEC 60695-2-1	Body	°C	960					
	Fuse cover	°C	–		850			
Pole characteristics								
Conventional thermal current (I _{th}) for ambient temperature ≤ 40 °C		A	32	32	63	100		
Fuse size			A1	A1	A2-A3	A4 Ø ≤ 31 mm		
Rated insulation voltage (U _i)		V	800	750	750	750		
Rated impulse withstand voltage (U _{imp})		kV	8	8	8	8		
Rated operational current (I _e)	Cat. AC-23A/B ⁽¹⁾ ~ 400 V	~ 500 V	A	32	32	63	100	
		~ 690 V	A	32	32	63	100 ⁽⁴⁾	
		Cat. DC-23A/B ⁽¹⁾ ≍ 440 V ⁽²⁾	A	20	20	40	100	
	Rated operational power	Cat. AC-23A/B ⁽¹⁾ ~ 400 V	~ 500 V	kW	15	15	30	51
			~ 690 V	kW	18.5	18.5	40	63
~ 690 V			kW	25	25	55	90	
Rated conditional short-circuit current	I rms at ~ 400 V with protection by gG (gl) fuses	kA	80	80	80	80		
	Rating of associated fuses	A	32	32	63	100		
Peak value of permissible current (dynamic short-circuit withstand)	Conforming to IEC 60269-1 ~ 400 V	kA	5.5	9	10.6	20		
Rated making capacity	I rms at 400 V Cat. AC-23B	A	320	320	630	1000		
Rated breaking capacity	I rms at 400 V Cat. AC-23B	A	256	256	500	800		
Mechanical durability	Number of operating cycles		20000	10000	10000	10000		
Electrical durability	Number of operating cycles cat. AC/DC-23A/B ⁽¹⁾		1500/300	1500/300	1500/300	1500/300		
Cabling	Cable (c.s.a. min/max)	mm²	2.5/16	6/25	10/25	25/95		
	Bars (max width)	mm	–	–	–	20		
Tightening torque		N.m	3	3.2	3.2	12		

(1) Category "A": frequent operating cycles, category "B": infrequent operating cycles.
 (2) 2 poles in series per phase.
 (3) Fit switch-disconnector-fuses **GS2 LB** with B1 or B2 fuses and **GS2 LLB** with A4 fuses.
 (4) With terminal covers.
 (5) Poles not juxtaposed.

TeSys GS

	GS2 LB or LLB ⁽³⁾	GS2 MMB	GS2 NB	GS2 PPB	GS2 QQB	GS2 SB	GS2 TB	GS2 VB
	IEC 60947-3							
	IEC 60269-1 and 2							
	ASEFA/LOVAG, LROS (pending)							
	IP 20							
	-40...+80							
	-20...+70							
	960							
	850							
	160	200	250	315	400	630	800	1250
	A4. B1-B2 ⁽³⁾	B1-B2	B1...B3	B1...B3	B1...B4	C1-C2	C1...C3	D1
	750	750	750	800	800	1000	1000	1000
	8	8	8	8	8	12	12	12
	160	200	250	315	400	630	800	1000
	160	200	250	315	315	500	630	800
	125 ⁽⁴⁾	200/160 ⁽⁴⁾	250 ⁽⁴⁾	250/315 ⁽⁴⁾	250/315	315/400	630	630
	125	200	200	200	200/315 ⁽⁵⁾	400/630 ⁽⁵⁾	800	1000
	80	100	132	150	220	355	450	560
	110	140	160	220	220	355	450	560
	110	150/185	220	220/295	220/295	295/400	400	400/475
	80	80	80	80	80	80	80	80
	160	200	250	315	400	630	800	1250
	22.7	32.5	32.5	40	40	70	80	90
	1600	2000	2500	3150	4000	6300	8000	10 000
	1280	1600	2000	2520	3200	5040	6400	8000
	10000	10000	10000	10000	10000	8000	8000	5000
	1000/200	1000/200	1000/200	1000/200	1000/200	1000/200	500/100	500/100
	50/95	95/240	95/240	185/240	185/240	2 x 150 / 2 x 300	2 x 185 / 2 x 300	- / 4 x 185
	20	32	32	45	45	63	63	80
	12	25	25	25	25	44	44	44

UL, CSA, IEC switch-disconnector-fuses

For use with CC and J fuses

Switch-disconnector-fuse characteristics							
Type			GS1 DDU3	GS1 DU3	GS2 EEU3	GS2 EU3N	
Environment							
Conforming to standards	Switch-disconnector-fuses		UL 489, CSA 22.2 n°5, IEC 60947-3		UL 98, CSA 22.2 n°4, IEC 60947-3		
	Circuit breakers		IEC 60969-1 and 2				
Degree of protection conforming to IEC 60529	With terminal covers		IP 20				
Ambient air temperature around the device	Storage	°C	-40...+80				
	Operation	°C	-20...+70				
Flame resistance conforming to IEC 60695-2-1	Body	°C	960	960	960		
	Fuse cover	°C	–	–	850		
Pole characteristics							
Conventional thermal current (I _{th}) for ambient temperature ≤ 40 °C		A	30	30	30	30	
Fuse size			CC	J	CC	J	
Rated insulation voltage (U _i)		V	800	800	750	750	
Rated impulse withstand voltage (U _{imp})		kV	8	8	8	8	
Rated operational current (I _e)	Cat. AC-23A/B ⁽¹⁾ ~ 400 V	A	32	32	32	32	
		A	32	32	32	32	
		A	32	32	32	32	
Rated operational power	Cat. AC-23A/B ⁽¹⁾ ~ 400 V	kW	15	15	15	15	
		kW	18.5	18.5	18.5	18.5	
		kW	25	25	25	25	
Prospective short-circuit current withstand	Conforming to UL 98 / UL 489	~ 600 V	kA	100	100	200	200
Peak value of permissible current (dynamic short-circuit withstand)	Conforming to IEC 60269-1	~ 400 V	kA	5.5	5.5	7.6	17.6
Rated making capacity	I rms at 400 V Cat. AC-23B		A	300	300	300	300
Rated breaking capacity	I rms at 400 V Cat. AC-23B		A	240	240	240	240
Mechanical durability	Number of operating cycles			10000	10000	10000	10000
Electrical durability	Number of operating cycles Cat. AC/DC-23A/B ⁽¹⁾			1500/300	1500/300	1500/300	1500/300
Cabling	Cable (c.s.a. min/max)		mm²	2.5	2.5	6	6
	Bars (max width)		mm	16	32	25	50
Tightening torque			N.m	3 (for wire)	3 (for wire)	5.5 (for wire)	6.6 (for wire)

(1) Category "A": frequent operating cycles, category "B": infrequent operating cycles.

TeSys GS

	GS2 GU3N	GS2 JU3N	GS2 MU3N	GS2 QU3N	GS2 SU3	GS2 TU3
	UL 98, CSA 22.2 n°4, IEC 60947-3					
	IEC 60269-1 and 2					
	IP 20					
	-40...+80					
	-20...+70					
	960					
	850					
	60	100	200	400	600	800
	J	J	J	J	J	L
	750	750	750	800	1000	1000
	8	8	8	8	12	12
	63	100	200	400	630	800
	63	100	200	315	630	630
	63	100	200	250	630	630
	30	51	100	220	355	450
	40	63	140	220	450	560
	55	90	185	220	600	600
	100	200	200	200	200	200
	17.6	22	32	36	80	80
	600	1000	2000	4000	6000	8000
	480	800	1600	3200	4800	6400
	10000	10000	8000	6000	5000	5000
	1500/300	1500/300	1000/200	1000/200	1000/200	500/100
	6	25	95	185	2 x 150	–
	50	20	32	45	100	100
	3.5 (for wire)	4 (for wire)	18 (for lug)	35 (for lug)	35 (for lug)	35 (for lug)

From 32 to 1 250 A

TeSys GS

GS1 AM●11, GS1 AM1 and GS1 AM2 early break and signalling contact characteristics

Conventional thermal current (I _{th}) for ambient temperature ≤ 40 °C		A	16
Rated operational current (I _e)	Cat. AC-15	A	127 V: 5 - 230 V: 4 - 400 /415 V: 3 - 440 V: 2
	Cat. DC-13	A	24 V: 12 - 48 V: 2 - 110 V: 0.6 - 220 V: 0.4
Durability	Number of operating cycles		Mechanical: 1000000 Electrical: cat. AC-15: 30000
Fuse protection	gG	A	6 max
Cabling		mm	Faston connectors: 1 x 6.35 or 2 x 2.8

GS1 AN and GS1 ANT signalling contact characteristics

Conventional thermal current (I _{th}) for ambient temperature ≤ 40 °C		A	20
Rated operational current (I _e)	Cat. AC-15	A	127 V: 12 - 230 V: 10 - 400/415 V: 8 - 440 V: 6
	Cat. DC-13	A	48 V: 4 - 110 V: 1.2 - 220 V: 1
Durability	Number of operating cycles		Mechanical: 30000 Electrical: cat. AC-15: 30000
Fuse protection	gG	A	16 max
Cabling	Cable (c.s.a. min/max)	mm²	Min: 1.5 - max: 10

GS1 AM110 and GS1 AM101 early break and signalling contact characteristics

Conventional thermal current (I _{th}) for ambient temperature ≤ 40 °C		A	10
Rated operational current (I _e)	Cat. AC-15	A	120 V: 6 - 240 V: 3 - 400 V: 1.8 - 480 V: 1.5
	Cat. DC-13	A	24 V: 2.8 - 48 V: 1.4 - 125 V: 0.55 - 250 V: 0.27 - 400 V: 0.15
Durability	Number of operating cycles		Mechanical: 5000000 Electrical: cat. AC-15: 1000000
Cabling	Cable (c.s.a. min/max)	mm²	Min: 1 x 0.22 - max: 2 x 2.5

GS● AF "blown fuse" signalling contact characteristics

Conventional thermal current (I _{th}) for ambient temperature ≤ 40 °C		A	16
Rated operational current (I _e)	Cat. AC-15	A	230 V: 4 - 400 V: 3
	Cat. DC-13	A	24 V: 12 - 48 V: 2 - 110 V: 0.6 - 220 V: 0.4
Durability	Number of operating cycles		Mechanical: 30000 Electrical: cat. AC-15: 30000
Cabling		mm	Faston connectors: 1 x 6.35

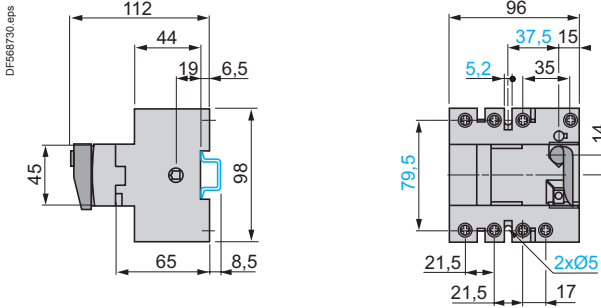
From 32 to 1250 A

TeSys GS

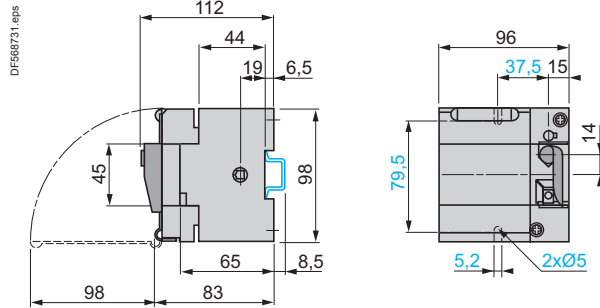
GS1 ●● (32 A)

Direct front-mounted operator

GS1 DD

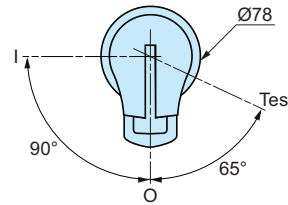
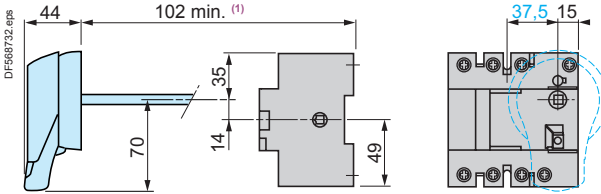


GS1 DDB

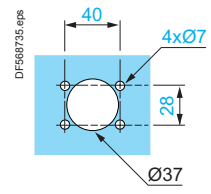


External front-mounted operator

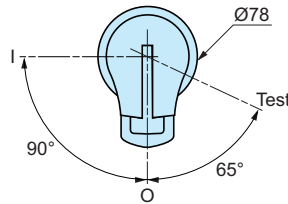
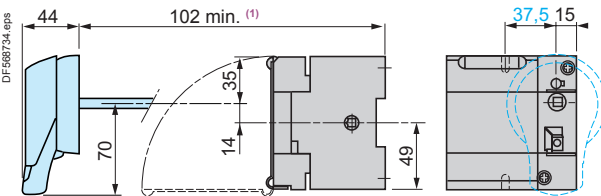
GS1 DD



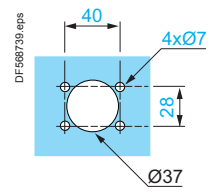
Door cut-out



GS1 DDB



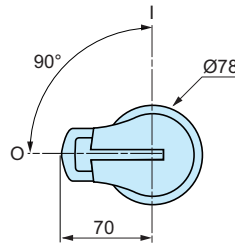
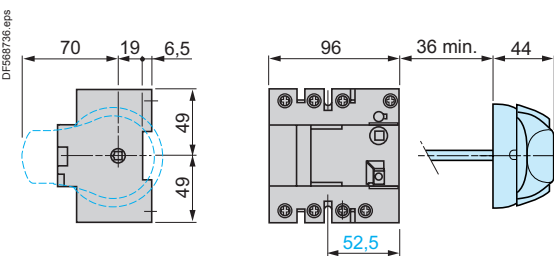
Door cut-out



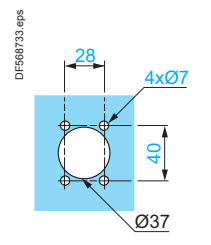
- (1) With 1 or 2 auxiliary contacts GS1 AM1●●: 130 mm.
- (2) With 3 or 4 auxiliary contacts GS1 AM1●●: 155 mm.

External right-hand side-mounted operator

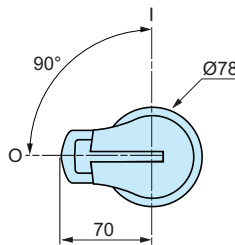
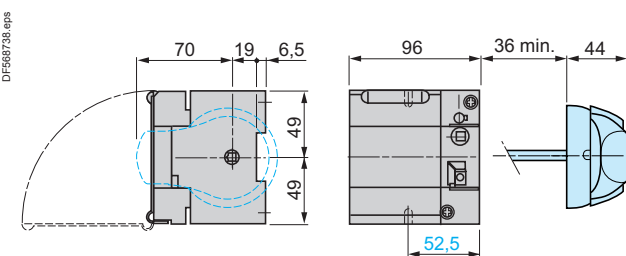
GS1 DD



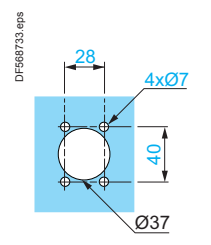
Door cut-out



GS1 DDB



Door cut-out



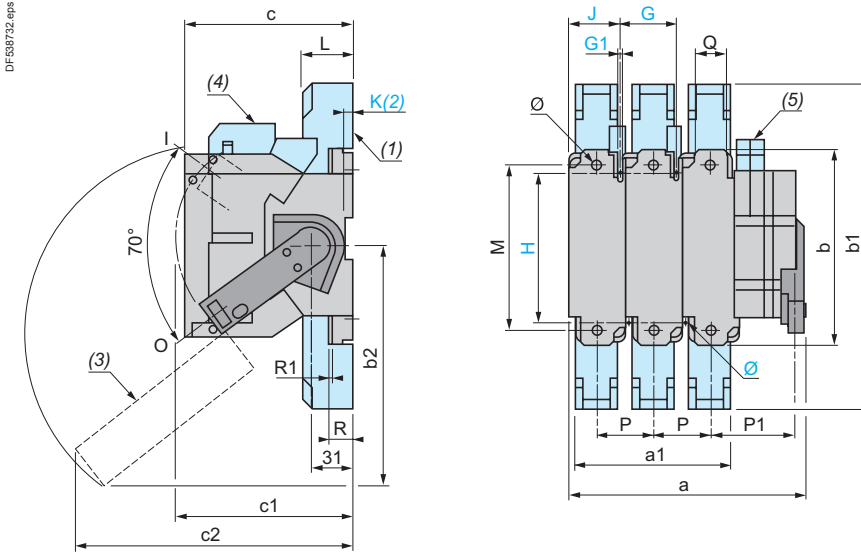
From 32 to 1 250 A

TeSys GS

GS1 ●● (50...400 A)

Direct right-hand side-mounted operator

GS1 FD (50 A), GD (63 A), JD (100 A), KD, KKD (125 A), LD, LLD (160 A), ND (250 A) and QQD (400 A)



GS1	a	a1	b	b1	b2	c	c1	c2	G	G1	H	J	K	Ø	L	M	P	P1	Q	R	R1	Ø	
FD	3P	118	—	118	—	87	134	—	27	5.4	106	31	6.5	5	—	—	27	33.5	—	—	—	—	
	4P	145	—	118	—	87	134	—	27	5.4	106	31	6.5	5	—	—	27	33.5	—	—	—	—	
GD	3P	133	—	118	—	159	116.5	134	32	5.4	106	36	6.5	5	—	—	32	36	—	—	—	—	
	4P	165	—	118	—	159	116.5	134	32	5.4	106	36	6.5	5	—	—	32	36	—	—	—	—	
JD, KD	3P	150	108	162	268	—	116	173	—	36	5.4	127	40	—	5	44	141	36	38	20	19.5	2.5	8.5
	4P	186	144	162	268	—	116	173	—	36	5.4	127	40	—	5	44	141	36	38	20	19.5	2.5	8.5
KKD, LLD	3P	150	108	162	268	141	126.5	173	36	5.4	127	40	—	5	44	141	36	38	20	19.5	2.5	8.5	
	4P	186	144	162	268	141	126.5	173	36	5.4	127	40	—	5	44	141	36	38	20	19.5	2.5	8.5	
LD	3P	192	136	162	268	174	136.5	173	50	5.4	140	54	—	5	44	141	50	45	20	19.5	2.5	8.5	
	4P	242	172	162	268	174	136.5	173	50	5.4	140	54	—	5	44	141	50	45	20	19.5	2.5	8.5	
ND	3P	253	180	195	345	185	146	173	251	60	6.4	162	64	—	6	65	166	60	81	32	19.5	2.5	11
	4P	313	240	195	345	185	146	173	251	60	6.4	162	64	—	6	65	166	60	81	32	19.5	2.5	11
QQD	3P	271	192	205	355	200	149	173	260	66	6.4	172	70	—	6	65	175	66	86	50	20	3	11
	4P	337	258	205	355	200	149	173	260	66	6.4	172	70	—	6	65	175	66	86	50	20	3	11

- (1) Terminal cover.
- (2) Mounting on rail only for GS1 FD and GS1 GD (50 and 63 A).
- (3) Protective screen, lockable in I position.
- (4) 1 or 2 auxiliary contacts GS1 AF●●.
- (5) 1 or 2 auxiliary contacts GS1 AM●.

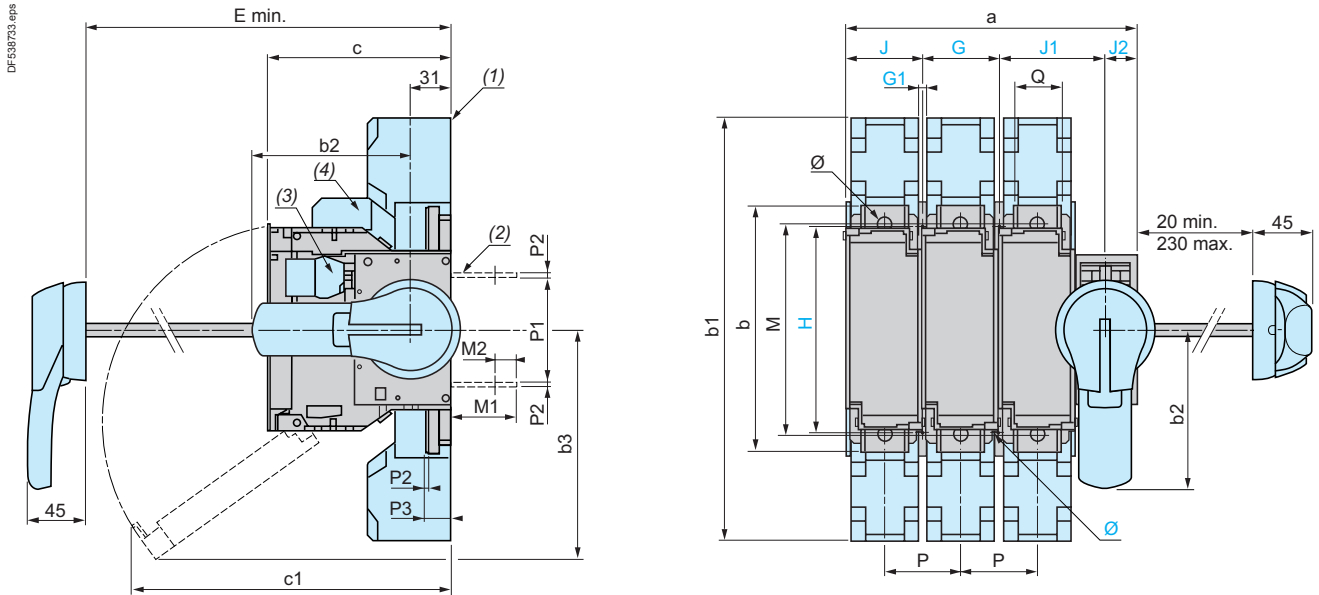
IEC switch-disconnector-fuses GS2 ●● (32...400 A)

TeSys GS

GS2 ●● (32...400 A)

External front and right-hand side-mounted operator

GS2 DB (32 A), F (50 A), G, GB, JB (63 A), J (100 A), K, KK (125 A), L, LL, LB, LLB (160 A), MMB (200 A), N, NB (250 A), PPB (315 A), QQ and QQB (400 A)

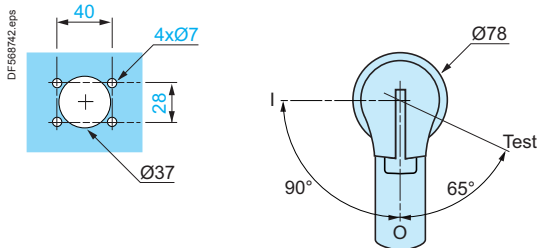


GS2	a	b	b1	b2	b3	c	c1	E min.	G	G1	H	J	J1	J2	Ø	M	M1	M2	P	P1	P2	P3	Q	Ø	
F, DB	3P	121	118	-	70	85	87 ⁽⁵⁾	153	100 ⁽⁵⁾	27	5.4	106	31	45	18	5	-	15	6	27	59	2	-	12	-
	4P	148	118	-	70	85	87 ⁽⁵⁾	153	100 ⁽⁵⁾	27	5.4	106	31	45	18	5	-	15	6	27	59	2	-	12	-
G, GB	3P	136	118	-	70	159	116.5 ⁽⁶⁾	145	125	32	5.4	106	36	50	18	5	-	15	6	32	59	2	-	12	-
	4P	168	118	-	70	159	116.5 ⁽⁶⁾	145	125	32	5.4	106	36	50	18	5	-	15	6	32	59	2	-	12	-
J, JB, K	3P	148	162	268	125	141	116 ⁽⁶⁾	187	135	36	5.4	127	40	54	18	5	141	41	8	36	62	2.5	19.5	20	8.5
	4P	184	162	268	125	141	116 ⁽⁶⁾	187	135	36	5.4	127	40	54	18	5	141	41	8	36	62	2.5	19.5	20	8.5
KK, LL	3P	148	162	268	125	141	126.5 ⁽⁶⁾	193	135	36	5.4	127	40	54	18	5	141	41	8	36	62	2.5	19.5	20	8.5
	4P	184	162	268	125	141	126.5 ⁽⁶⁾	193	135	36	5.4	127	40	54	18	5	141	41	8	36	62	2.5	19.5	20	8.5
L, LB, LLB	3P	190	162	268	125	174	136.5	229	145	50	5.4	140	54	64	18	5	141	41	8	50	62	2.5	19.5	20	8.5
	4P	240	162	268	125	174	136.5	229	145	50	5.4	140	54	64	18	5	141	41	8	50	62	2.5	19.5	20	8.5
MMB, NB, N	3P	234	195	345	125	185	146	251	154	60	6.4	162	64	86	25	6	166	52	17	60	84	2.5	19.5	32	11
	4P	294	195	345	125	185	146	251	154	60	6.4	162	64	86	25	6	166	52	17	60	84	2.5	19.5	32	11
PPB, QQB, QQ	3P	252	205	355	125	200	149	260	157	66	6.4	172	70	91	25	6	175	54	14.5	66	84	3	20	50	11
	4P	318	205	355	125	200	149	260	157	66	6.4	172	70	91	25	6	175	54	14.5	66	84	3	20	50	11

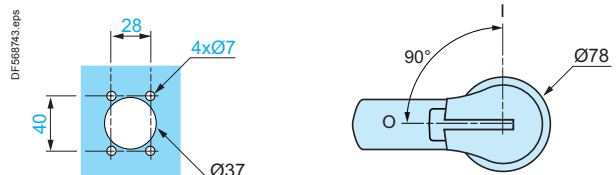
- (1) Terminal cover.
- (2) Rear access connector plates (option).
- (3) 1 to 8 auxiliary contacts GS1 AM1●●.
- (4) 1 or 2 auxiliary contacts GS1 AF●●.
- (5) 1 auxiliary contact GS1 AM1●●: + 23.5 mm, 2 auxiliary contacts GS1 AM1●●: + 47 mm.
- (6) 132 mm with 2 auxiliary contacts GS1 AM1●●.

Door cut-out

For external front-mounted operator



For external right-hand side-mounted operator



Switch-disconnectors fuses

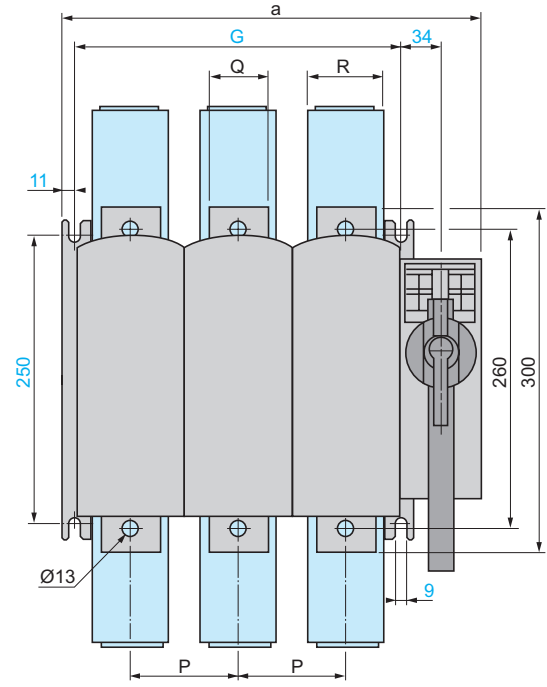
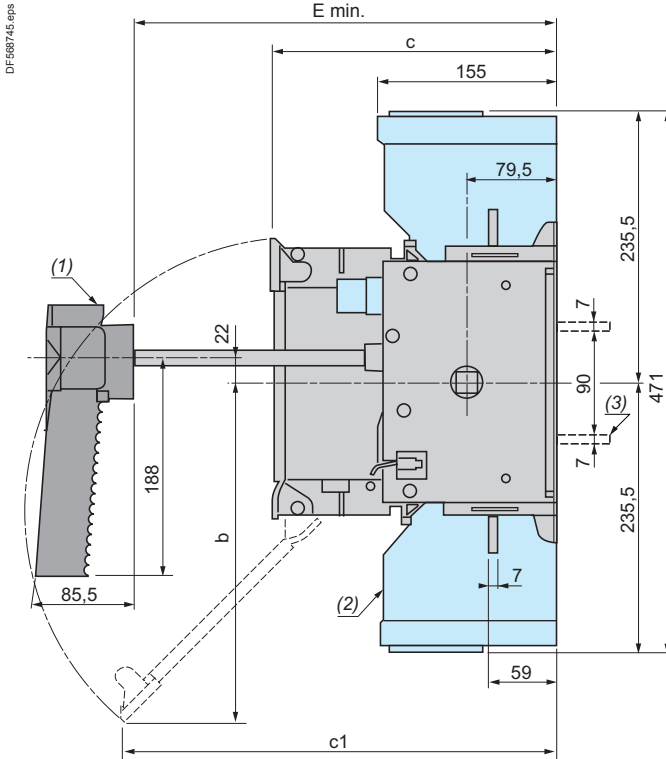
From 32 to 1250 A

TeSys GS

GS2 ●● (630...1250 A)

Direct front-mounted operator

GS2 S, SB (630 A), TB (800 A), V and VB (1250 A)

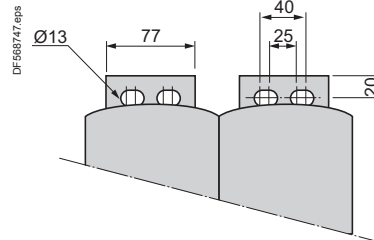
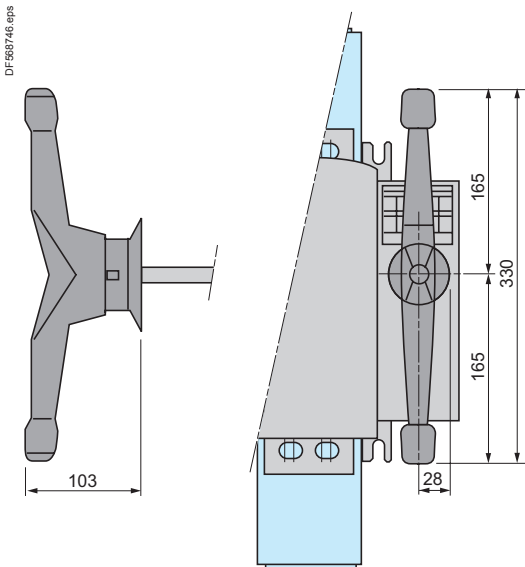


GS2		a	b	c	c1	E min.	G	P	Q	R
S, SB, TB	3P	364	300	250	380	265	284	94	51	65
	4P	458	300	250	380	265	378	94	51	65
V, VB	3P	442	355	289	295	304	362	120	77	88
	4P	562	355	289	295	304	482	120	77	88

- (1) Handle GS2 AH104 for GS2S, GS2 SB and GS2 TB.
- (2) Terminal cover.
- (3) Rear access connector plates (GS2 V and GS2 VB).

Handle GS2 AH105 for GS2 V and GS2 VB
(direct front-mounted operator)

Connector plates for GS2 V and GS2 VB



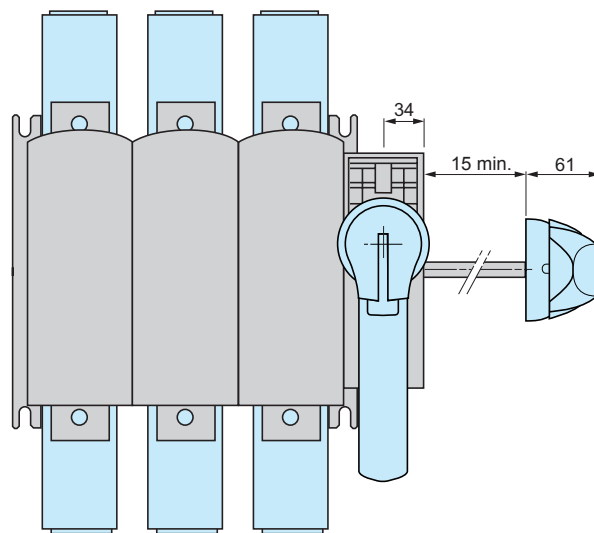
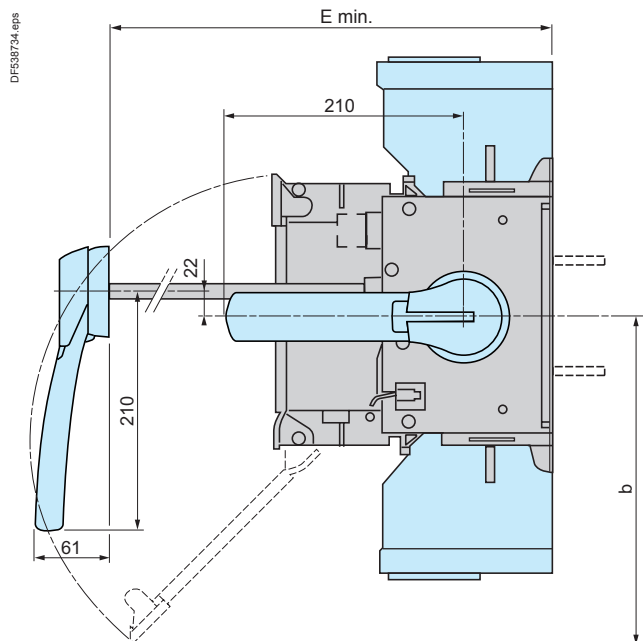
IEC switch-disconnector-fuses GS2 ●● (630...1250 A)

TeSys GS

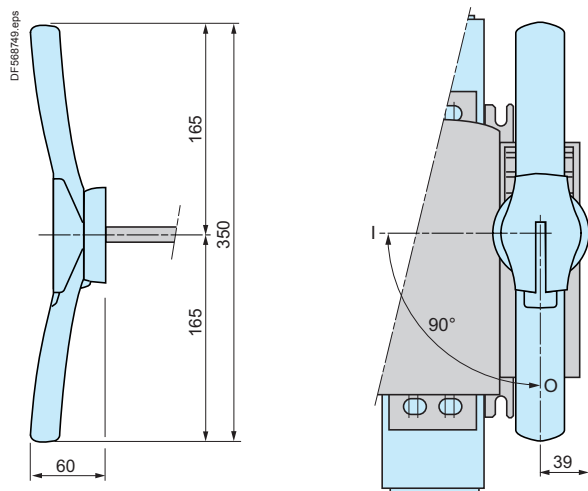
GS2 ●● (630...1250 A)

External front and right-hand side-mounted operator

GS2 S, SB (630 A), TB (800 A), V and VB (1250 A)



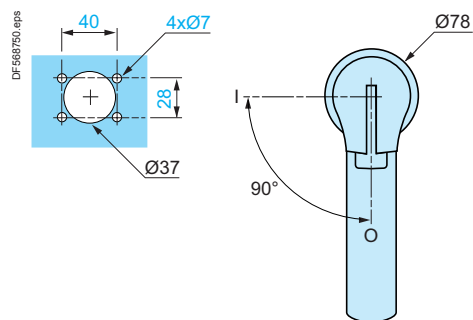
Handle GS2 AH570 or GS2 AH580 for GS2 V and GS2 VB
(external front-mounted operator)



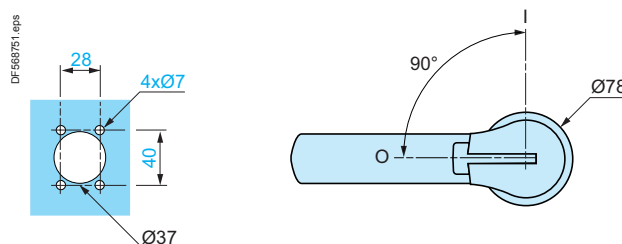
GS2		b	E min.
S, SB, TB	3P	297	265
	4P	297	265
V, VB	3P	350	304
	4P	350	304

Door cut-out

For external front-mounted operator



For external right-hand side-mounted operator



Switch-
disconnectors/
fuses

Dimensions

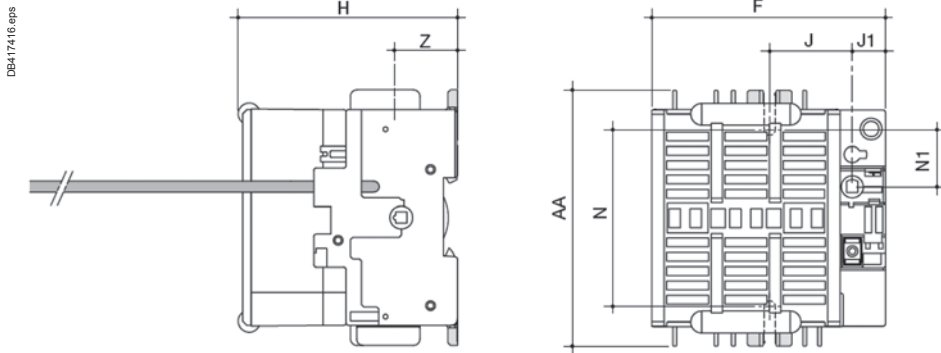
From 30 to 800 A

TeSys GS

UL, CSA, IEC switch-disconnector-fuses GS1 ●● and GS2 ●● (30 and 60 A)

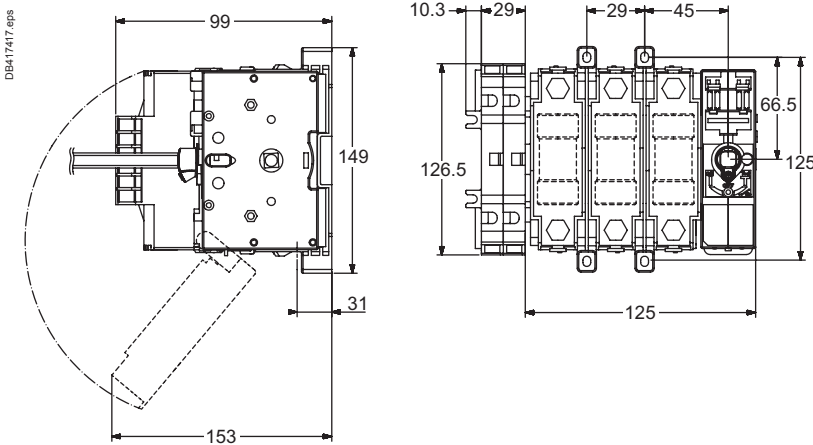
Switch-disconnectors-fuses, 30 and 60 A

GS1DU3 (30 A) class CC fuses, GS1DDU3 (30 A) class J fuses

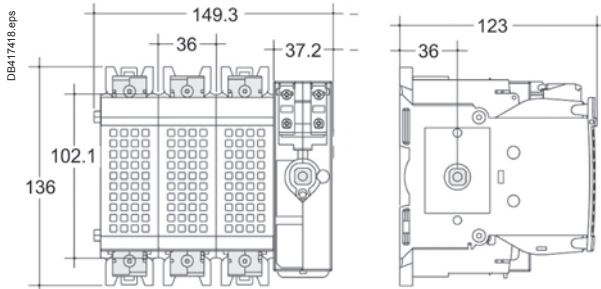


Rating	F	H	J	J1	N	N1	AA	Z
30 / CC	96	83.5	37.5	15	79.5	25.5	116	28.5
30 / J	105	99	37.5	15	79.5	25.5	116	28.5

GS2EU3 (30 A) class CC fuses



GS2EU3N, GS2GU3N (60 A) class J fuses



Accessories

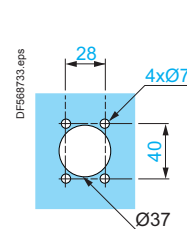
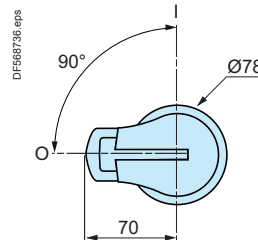
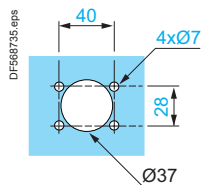
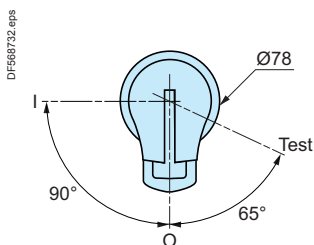
Handle for 30 and 60 A switch-disconnector-fuses

External front handle

Door cut-out

External side handle

Door cut-out

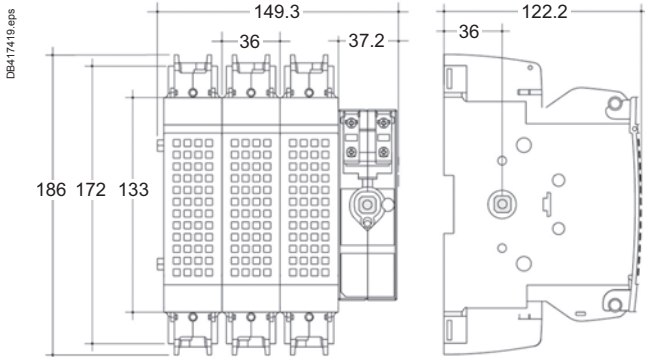


UL, CSA, IEC switch-disconnector-fuses GS2 ●● (100...400 A)

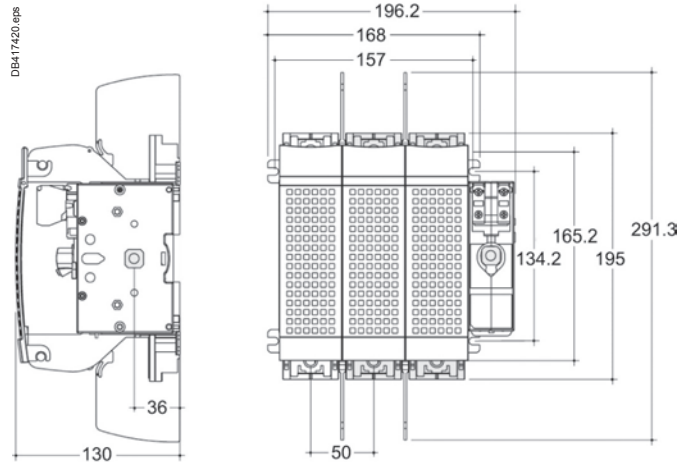
TeSys GS

Switch-disconnectors, 100 to 400 A

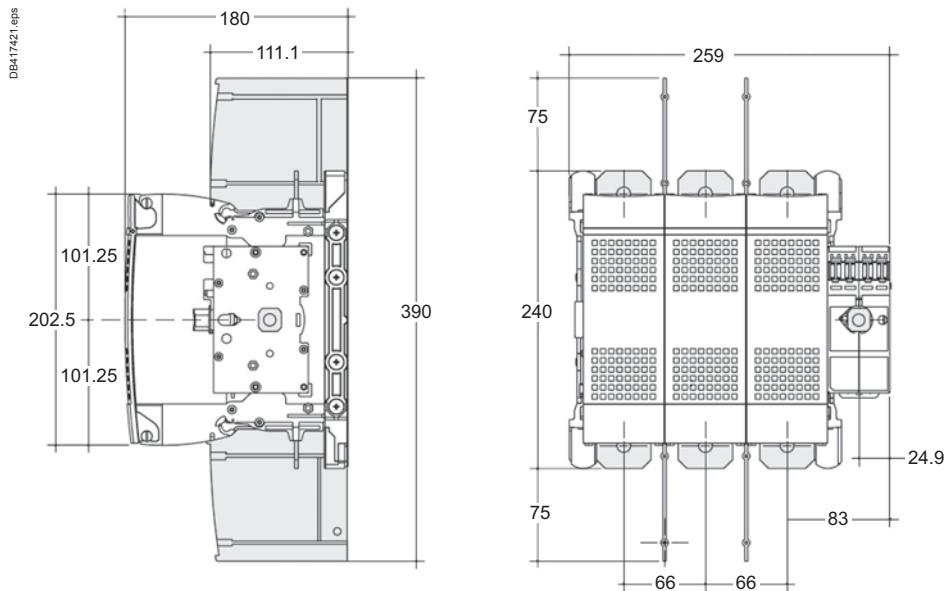
GS2JU3N (100 A) class J fuses



GS2MU3N (200 A) class J fuses



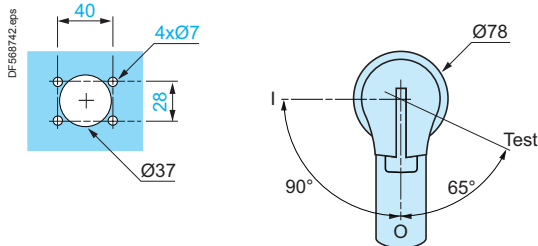
GS2QU3N (400 A) class CC fuses



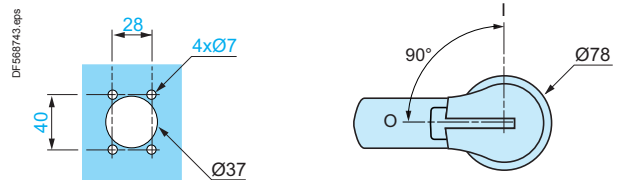
Accessories

Handle for 100, 200 and 400 A switch-disconnector-fuses

For external front-mounted operator



For external right-hand side-mounted operator



Switch-disconnectors
fuses

Dimensions

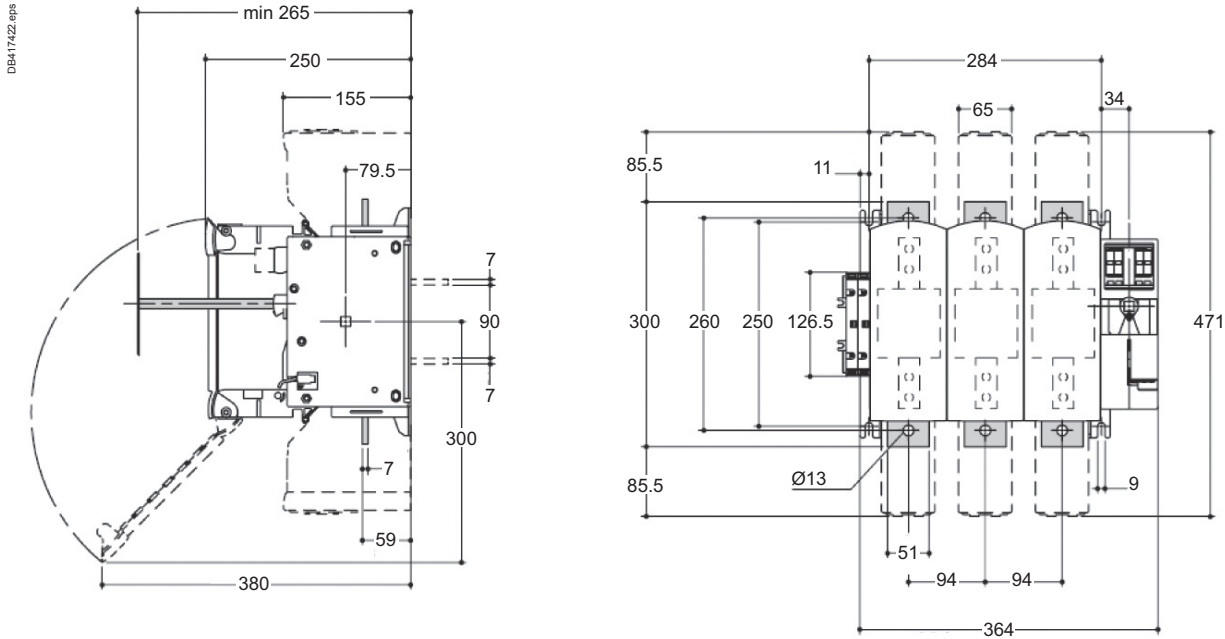
From 30 to 800 A

TeSys GS

UL, CSA, IEC switch-disconnector-fuses GS2 ●● (600 and 800 A)

Switch-disconnectors, 600 and 800 A

GS2SU3 (600 A), GS2TU3 (800 A) class J fuses

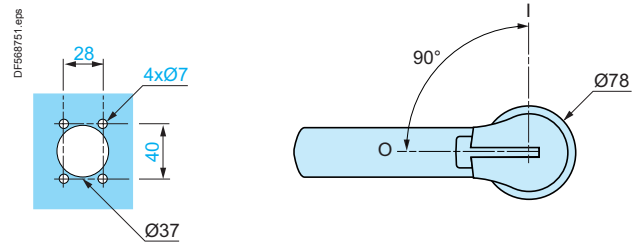
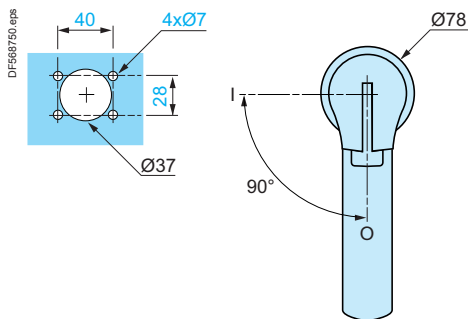


Accessories

Handle for 600 and 800 A switch-disconnector-fuses

For external front-mounted operator

For external right-hand side-mounted operator



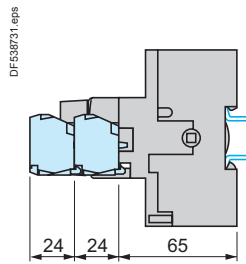
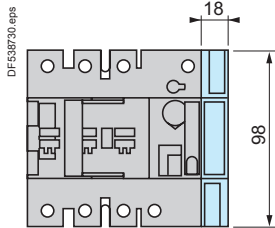
From 32 to 1250 A

TeSys GS

Auxiliary contacts

GS1 AM111, GS1 AM211

GS1 AM110, GS1 AM101

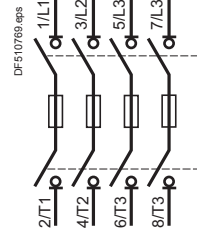
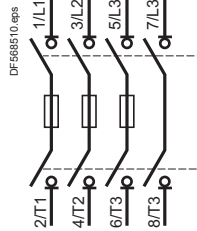
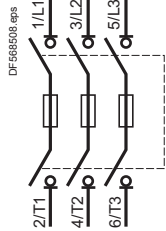


Schemes

3-pole GS
32 to 1250 A

4-pole GS
32 A

50 to 1250 A



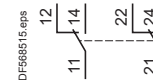
Auxiliary contacts

GS1 AM110
1 N/O

GS1 AM101
1 N/C

GS1 AM111 and GS1 AM1
1 C/O

GS1 AM211 and GS1 AM2
2 C/O

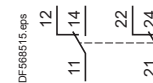
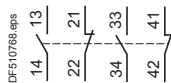


GS1 AN●●
1 N/C + 1 N/O

2 N/C + 2 N/O

GS1 AF●
1 C/O

2 C/O



Circuit breakers - TeSys GV, GB

Type of product	Range		Pages
Magnetic circuit breakers for motors TeSys GV	Up to 15, 30 kW		B6/2
Thermal magnetic circuit breakers for motors TeSys GV	Up to 15, 37 or 110 kW		B6/4
Add-on blocks, accessories, for motor circuit breakers			B6/10
Thermal magnetic circuit breakers for control circuits, Solenoid valves or transformers TeSys GB, GV	From 0.5 to 23 A		B6/26

DF526144.8f



GV2 LE10

Magnetic motor circuit breakers from 0.06 to 15 kW												
GV2 LE: control by rocker lever, connection by screw clamp terminals												
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Magnetic protection rating	Tripping current I _d ± 20 %	Use in association with thermal overload relay	Reference
400/415 V			500 V			690 V						
P	I _{cu}	I _{cs} ⁽¹⁾	P	I _{cu}	I _{cs} ⁽¹⁾	P	I _{cu}	I _{cs} ⁽¹⁾	A	A		
kW	kA		kW	kA		kW	kA					
0.06	*	*	-	-	-	-	-	-	0.4	5	LR2 K0302	GV2LE03
0.09	*	*	-	-	-	-	-	-	0.4	5	LR2 K0304	GV2LE03
0.12	*	*	-	-	-	0.37	*	*	0.63	8	LR2 K0304	GV2LE04
0.18	*	*	-	-	-	-	-	-	0.63	8	LR2 K0305	GV2LE04
-	-	-	-	-	-	0.55	*	*	1	13	LR2 K0305	GV2LE05
0.25	*	*	-	-	-	-	-	-	1	13	LR2 K0306	GV2LE05
-	-	-	-	-	-	0.75	*	*	1	13	LR2 K0306	GV2LE05
0.37	*	*	0.37	*	*	-	-	-	1	13	LR2 K0306	GV2LE05
0.55	*	*	0.55	*	*	1.1	*	*	1.6	22.5	LR2 K0307	GV2LE06
-	-	-	0.75	*	*	-	-	-	1.6	22.5	LR2 K0307	GV2LE06
0.75	*	*	1.1	*	*	1.5	3	75	2.5	33.5	LR2 K0308	GV2LE07
1.1	*	*	-	-	-	-	-	-	2.5	33.5	LR2 K0308	GV2LE07
1.5	*	*	1.5	*	*	3	3	75	4	51	LR2 K0310	GV2LE08
-	-	-	2.2	*	*	-	-	-	4	51	LR2 K0312	GV2LE08
2.2	*	*	3	50	100	4	3	75	6.3	78	LR2 K0312	GV2LE10
3	*	*	4	10	100	5.5	3	75	10	138	LR2 K0314	GV2LE14
4	*	*	5.5	10	100	-	-	-	10	138	LR2 K0316	GV2LE14
-	-	-	-	-	-	7.5	3	75	10	138	LRD 14	GV2LE14
-	-	-	-	-	-	9	3	75	14	170	LRD 16	GV2LE16
5.5	15	50	7.5	6	75	11	3	75	14	170	LR2 K0321	GV2LE16
7.5	15	50	9	6	75	15	3	75	18	223	LRD 21	GV2LE20
9	15	40	11	4	75	18.5	3	75	25	327	LRD 22	GV2LE22
11	15	40	15	4	75	-	-	-	25	327	LRD 22	GV2LE22
15	10	50	18.5	4	75	22	3	75	32	416	LRD 32	GV2LE32

(1) As % of I_{cu}.

* > 100 kA.



GV2 L10



GV3 L65

Motor circuit breakers from 0.09 to 30 kW

GV2 L: Control by rotary knob, connection by screw clamp terminals

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Magnetic protection rating	Tripping current I _d ± 20 %	Use in association with thermal overload relay (class 10 A)	Reference
400/415 V			500 V			690 V						
P	I _{cu}	I _{cs} ⁽¹⁾	P	I _{cu}	I _{cs} ⁽¹⁾	P	I _{cu}	I _{cs} ⁽¹⁾				
kW	kA		kW	kA		kW	kA		A	A		
0.09	*	*	-	-	-	-	-	-	0.4	5	LRD 03	GV2L03
0.12	*	*	-	-	-	0.37	*	*	0.63	8	LRD 04	GV2L04
0.18	*	*	-	-	-	-	-	-	0.63	8	LRD 04	GV2L04
-	-	-	-	-	-	0.55	*	*	1	13	LRD 05	GV2L05
0.25	*	*	-	-	-	-	-	-	1	13	LRD 05	GV2L05
-	-	-	-	-	-	0.75	*	*	1	13	LRD 06	GV2L05
0.37	*	*	0.37	*	*	-	-	-	1	13	LRD 05	GV2L05
0.55	*	*	0.55	*	*	1.1	*	*	1.6	22.5	LRD 06	GV2L06
-	-	-	0.75	*	*	-	-	-	1.6	22.5	LRD 06	GV2L06
0.75	*	*	1.1	*	*	1.5	4	100	2.5	33.5	LRD 07	GV2L07
1.1	-	-	-	-	-	-	-	-	-	-	LRD 08	GV2L08
1.5	*	*	1.5	*	*	3	4	100	4	51	LRD 08	GV2L08
-	-	-	-	-	-	-	-	-	-	-	LRD 08	GV2L08
2.2	*	*	3	*	*	4	4	100	6.3	78	LRD 10	GV2L10
3	*	*	4	10	100	5.5	4	100	10	138	LRD 12	GV2L14
4	-	-	-	-	-	-	-	-	-	-	LRD 14	GV2L14
-	-	-	-	-	-	7.5	4	100	10	138	LRD 14	GV2L14
-	-	-	-	-	-	9	4	100	14	170	LRD 16	GV2L16
5.5	50	50	7.5	10	75	11	4	100	14	170	LRD 16	GV2L16
7.5	50	50	9	10	75	15	4	100	18	223	LRD 21	GV2L20
9	50	50	11	10	75	18.5	4	100	25	327	LRD 22	GV2L22
11	50	50	15	10	75	-	-	-	25	327	LRD 22	GV2L22
15	50	50	18.5	10	75	22	4	100	32	416	LRD 32	GV2L32

GV3 L: control by rotary knob, connection by EverLink® BTR screw connectors

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Magnetic protection rating	Tripping current I _d ± 20 %	Use in association with thermal overload relay (class 10 A)	Reference
400/415 V			500 V			690 V						
P	I _{cu}	I _{cs} ⁽¹⁾	P	I _{cu}	I _{cs} ⁽¹⁾	P	I _{cu}	I _{cs} ⁽¹⁾				
kW	kA		kW	kA		kW	kA		A	A		
11	100	100	15	12	50	18.5	6	50	25	350	LRD 325	GV3L25
15	100	100	18.5	12	50	22	6	50	32	448	LRD 332	GV3L32
18.5	50	100	22	12	50	37	6	50	40	560	LRD 340	GV3L40
22	50	100	30	12	50	45	6	50	50	700	LRD 350	GV3L50
30	50	100	37	12	50	55	6	50	65	910	LRD 365	GV3L65

Connection by EverLink® BTR screw connectors, for assembly with a contactor

To assemble a **GV3 L25** to **L65** circuit breaker with an **LC1 D40A** to **D65A** contactor, it is possible to use the circuit breaker supplied without downstream EverLink® power terminal block. To order this product, add the digit **1** to the end of the references selected above. Example: **GV3 L65** becomes **GV3 L651**.

Connection by lugs

To order these circuit breakers with connection by lugs, add the digit **6** to the end of reference selected above. Example: **GV3 L32** becomes **GV3 L326**.

⁽¹⁾ As % of I_{cu}. Associated current limiter or fuses, where required. See characteristics page B6/33.

* > 100 kA.

TeSys protection components

Thermal-magnetic motor circuit breakers

GV2 ME

TeSys GV

DFE26134-1f



GV2 ME10

Motor circuit breakers from 0.06 to 15 kW / 400 V, with screw clamp terminals

GV2 ME with pushbutton control

Standard power ratings of 3-phase motors
50/60 Hz in category AC-3

400/415 V			500 V			690 V			Setting range of thermal trips ⁽²⁾	Magnetic tripping current Id ± 20 %	Reference
P	Icu	Ics ⁽¹⁾	P	Icu	Ics ⁽¹⁾	P	Icu	Ics ⁽¹⁾			
kW	kA	%	kW	kA	%	kW	kA	%	A	A	
-	-	-	-	-	-	-	-	-	0.1...0.16	1.5	GV2ME01
0.06	*	*	-	-	-	-	-	-	0.16...0.25	2.4	GV2ME02
0.09	*	*	-	-	-	-	-	-	0.25...0.40	5	GV2ME03
0.12	*	*	-	-	-	0.37	*	*	0.40...0.63	8	GV2ME04
0.18	*	*	-	-	-	-	-	-			
0.25	*	*	-	-	-	0.55	*	*	0.63...1	13	GV2ME05
0.37	*	*	0.37	*	*	-	-	-	1...16	22.5	GV2ME06
0.55	*	*	0.55	*	*	0.75	*	*			
-	-	-	0.75	*	*	1.1	*	*	1.6...2.5	33.5	GV2ME07
0.75	*	*	1.1	*	*	1.5	3	75			
1.1	*	*	1.5	*	*	2.2	3	75	2.5...4	51	GV2ME08
1.5	*	*	2.2	*	*	3	3	75			
2.2	*	*	3	50	100	4	3	75	4...6.3	78	GV2ME10
3	*	*	4	10	100	5.5	3	75	6...10	138	GV2ME14
4	*	*	5.5	10	100	7.5	3	75			
5.5	15	50	7.5	6	75	9	3	75	9...14	170	GV2ME16
-	-	-	-	-	-	11	3	75			
7.5	15	50	9	6	75	15	3	75	13...18	223	GV2ME20
9	15	40	11	4	75	18.5	3	75	17...23	327	GV2ME21
11	15	40	15	4	75	-	-	-	20...25	327	GV2ME22 ⁽³⁾
15	10	50	18.5	4	75	22	3	75	24...32	416	GV2ME32

Motor circuit breakers from 0.06 to 15 kW / 400 V, with lugs

To order thermal magnetic circuit breakers with connection by lugs, add the digit **6** to the end of reference selected above.

Example: **GV2 ME08** becomes **GV2 ME086**.

Thermal magnetic circuit breakers GV2 ME with built-in auxiliary contact block

With instantaneous auxiliary contact block (composition, see page B6/11):

- GV AE1, add suffix **AE1TQ** to the motor circuit breaker reference selected above.
Example: **GV2 ME01AE1TQ**.
- GV AE11, add suffix **AE11TQ** to the motor circuit breaker reference selected above.
Example: **GV2 ME01AE11TQ**.
- GV AN11, add suffix **AN11TQ** to the motor circuit breaker reference selected above.
Example: **GV2 ME01AN11TQ**.

These circuit breakers with built-in contact block are sold in lots of 20 units in a single pack.

(1) As % of Icu.

(2) The thermal trip setting must be within the range marked on the graduated knob.

(3) Maximum rating which can be mounted in enclosures **GV2 MC** or **MP**, please consult your Regional Sales Office.

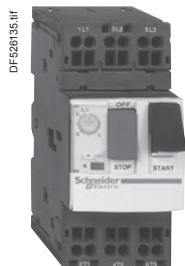
* > 100 kA.

TeSys protection components

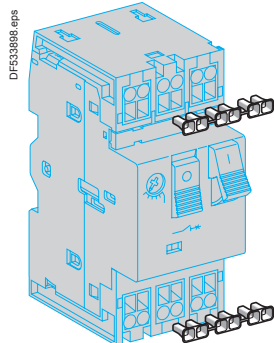
Thermal-magnetic motor circuit breakers

GV2 ME

TeSys GV



GV2 ME●●3



LA9 D99

Motor circuit breakers from 0.06 to 11 kW, with spring terminal connections

GV2 ME ⁽¹⁾ with pushbutton control

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3						Setting range of thermal trips ⁽³⁾	Magnetic tripping current I _d ± 20 %	Reference
400/415 V			500 V					
P	I _{cu}	I _{cs} ⁽²⁾	P	I _{cu}	I _{cs} ⁽²⁾			
kW	kA	%	kW	kA	%	A	A	
-	-	-	-	-	-	0.1...0.16	1.5	GV2ME013
0.06	*	*	-	-	-	0.16...0.25	2.4	GV2ME023
0.09	*	*	-	-	-	0.25...0.40	5	GV2ME033
0.12	*	*	-	-	-	0.40...0.63	8	GV2ME043
0.18	*	*	-	-	-	0.63...1	13	GV2ME053
0.25	*	*	0.37	*	*	0.63...1	13	GV2ME053
0.37	*	*	0.37	*	*	1...1.6	22.5	GV2ME063
0.37	*	*	0.55	*	*	1...1.6	22.5	GV2ME063
0.55	*	*	0.75	*	*	1...1.6	22.5	GV2ME063
0.75	*	*	1.1	*	*	1.6...2.5	33.5	GV2ME073
1.1	*	*	1.5	*	*	2.5...4	51	GV2ME083
1.5	*	*	2.2	*	*	2.5...4	51	GV2ME083
2.2	*	*	3	50	100	4...6.3	78	GV2ME103
3	*	*	4	10	100	6...10	138	GV2ME143
4	*	*	5.5	10	100	6...10	138	GV2ME143
5.5	15	50	7.5	6	75	9...14	170	GV2ME163
7.5	15	50	9	6	75	13...18	223	GV2ME203
9	15	40	11	4	75	17...23	327	GV2ME213
11	15	40	11	4	75	17...23	327	GV2ME213
11	15	40	15	4	75	20...25	327	GV2ME223

Contact blocks

Description	Mounting	Maximum number	Type of contacts	Sold in lots of	Unit reference
Instantaneous auxiliary contacts	Front	1	N/O + N/C	10	GVAE113
	LH side	2	N/O + N/O	10	GVAE203
			N/O + N/C	1	GVAN113
			N/O + N/O	1	GVAN203

Accessory

Description	Application	Sold in lots of	Unit reference
Cable end reducer	For connection of conductors from 1 to 1.5 mm ²	20	LA9D99

(1) For connection of conductors from 1 to 1.5 mm², the use of an LA9 D99 cable end reducer is recommended.

(2) Maximum rating which can be mounted in enclosures GV2 MC or MP, please consult your Regional Sales Office

(3) The thermal trip setting must be within the range marked on the graduated knob.

* > 100 kA.

TeSys protection components

Thermal-magnetic motor circuit breakers GV2 P, GV3 P and GV3 ME80

TeSys GV



GV2 P10



GV3 P65



GV3 P651

Motor circuit breakers from 0.06 to 37 kW / 400 V

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3									Setting range of thermal trips (2)	Magnetic tripping current I _d ± 20 %	Reference
400/415 V			500 V			690 V					
P	I _{cu}	I _{cs} (1)	P	I _{cu}	I _{cs} (1)	P	I _{cu}	I _{cs} (1)			
kW	kA	%	kW	kA	%	kW	kA	%	A	A	
GV2 P: control by rotary knob											
Screw clamp terminals											
–	–	–	–	–	–	–	–	–	0.1...0.16	1.5	GV2P01
0.06 *	*	*	–	–	–	–	–	–	0.16...0.25	2.4	GV2P02
0.09 *	*	*	–	–	–	–	–	–	0.25...0.40	5	GV2P03
0.12 *	*	*	–	–	–	0.37 *	*	*	0.40...0.63	8	GV2P04
0.18 *	*	*	–	–	–	–	–	–	–	–	–
0.25 *	*	*	–	–	–	0.55 *	*	*	0.63...1	13	GV2P05
0.37 *	*	*	0.37 *	*	*	–	–	–	1...1.6	22.5	GV2P06
0.55 *	*	*	0.55 *	*	*	0.75 *	*	*	–	–	–
0.75 *	*	*	1.1 *	*	*	1.5	8	100	1.6...2.5	33.5	GV2P07
1.1 *	*	*	1.5 *	*	*	2.2	8	100	2.5...4	51	GV2P08
2.2 *	*	*	3 *	*	*	4	6	100	4...6.3	78	GV2P10
3 *	*	*	5	50	100	5.5	6	100	6...10	138	GV2P14
5.5 *	*	*	7.5	42	75	9	6	100	9...14	170	GV2P16
–	–	–	–	–	–	11	6	100	–	–	–
7.5	50	50	9	10	75	15	4	100	13...18	223	GV2P20
9	50	50	11	10	75	18.5	4	100	17...23	327	GV2P21
11	50	50	15	10	75	–	–	–	20...25	327	GV2P22
15	50	50	18.5	10	75	22	4	100	24...32	416	GV2P32

GV3 P: control by rotary knob

Connection by EverLink® BTR screw connectors (3)											
5.5	100	100	7.5	12	50	11	6	50	9...13	182	GV3P13
7.5	100	100	9	12	50	15	6	50	12...18	252	GV3P18
11	100	100	15	12	50	18.5	6	50	17...25	350	GV3P25
15	100	100	18.5	12	50	22	6	50	23...32	448	GV3P32
18.5	50	100	22	12	50	37	6	50	30...40	560	GV3P40
22	50	100	30	12	50	45	6	50	37...50	700	GV3P50
30	50	100	45	12	50	55	6	50	48...65	910	GV3P65

Connection by EverLink® BTR screw connectors, for assembly with a contactor

To assemble a **GV3 P13** to **P65** circuit breaker with an **LC1 D40A** to **D65A** contactor, it is possible to use the circuit breaker supplied without downstream EverLink® power terminal block. To order this product, add the digit 1 to the end of the references selected above. Example: **GV3 P65** becomes **GV3 P651**.

Connection by lugs

To order thermal magnetic circuit breakers with connection by lugs, add the digit **6** to the end of reference selected above. Example: **GV3 P18** becomes **GV3 P186**.

GV3 ME80: pushbutton control, screw clamp terminals

37	15	50	45	4	100	55	2	100	56...80		GV3ME80 (4)
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Motor circuit breakers up to 50 hp / 600 V, UL 508 type E

GV2 (5)

To obtain a **GV2 P** motor circuit breaker, UL 508 type E, use the following with the circuit breaker:

- a "Large Spacing" adapter **GV2 GH7**.

GV3 (6)

To obtain a motor-circuit breaker **GV3 P**, UL 508 type E, use the following with the circuit breaker:

- a "Large Spacing" cover **GV3 G66**,
- a short-circuit signalling contact **GV AM11**.

GV3 with connection by lugs (6)

To obtain a motor-circuit breaker **GV3 P**, UL 508 type E, with connection by lugs, add the digit **6** to the end of reference selected above and use the following with the circuit breaker:

- two IP 20 covers **LAD 96570**,
- a short-circuit signalling contact **GV AM11**.

(1) As % of I_{cu}.

(2) The thermal trip setting must be within the range marked on the graduated knob.

(3) BTR screws: hexagon socket head. Require use of an insulated Allen key, in compliance with local wiring regulations.

(4) Recommended for use in association with a contactor.

(5) Accessory: see page B6/13.

(6) Accessories: see page B6/17.

* > 100 kA.

TeSys protection components

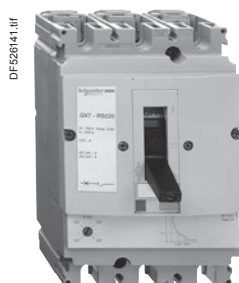
Thermal-magnetic motor circuit breakers

GV7 R

TeSys GV



GV7 RE40



GV7 RS220

Thermal-magnetic circuit breakers GV7 R with screw clamp terminals up to 110 kW											Reference	Weight	
Control by rocker lever											Setting range of thermal trips	Reference	Weight
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3													
400/415 V			500 V			660/690 V							
P	Icu	Ics ⁽¹⁾	P	Icu	Ics ⁽¹⁾	P	Icu	Ics ⁽¹⁾	A			kg	
kW	kA	%	kW	kA	%	kW	kA	%					
7.5	36	100	9	18	100	11	8	100	12...20		GV7RE20	2.010	
9	36	100	11	18	100	15	8	100					
7.5	70	100	9	50	100	11	10	100	12...20		GV7RS20	2.010	
9	70	100	11	50	100	15	10	100					
9	36	100	11	18	100	15	8	100	15...25		GV7RE25	2.010	
11	36	100	15	18	100	18.5	8	100					
9	70	100	11	50	100	15	10	100	15...25		GV7RS25	2.010	
11	70	100	15	50	100	18.5	10	100					
18.5	36	100	18.5	18	100	22	8	100	25...40		GV7RE40	2.010	
			22	18	100								
18.5	70	100	18.5	50	100	22	10	100	25...40		GV7RS40	2.010	
22	36	100	30	18	100	30	8	100	30...50		GV7RE50	2.015	
22	70	100	30	50	100	30	10	100	30...50		GV7RS50	2.015	
37	36	100	45	18	100	55	8	100	48...80		GV7RE80	2.040	
			55	18	100								
37	70	100	45	50	100	55	10	100	48...80		GV7RS80	2.040	
			55	50	100								
45	36	100	-	18	100	75	8	100	60...100		GV7RE100	2.040	
45	70	100	-	50	100	75	10	100	60...100		GV7RS100	2.040	
55	35	100	75	30	100	90	8	100	90...150		GV7RE150	2.020	
75	35	100	90	30	100	110	8	100					
55	70	100	75	50	100	90	10	100	90...150		GV7RS150	2.020	
75	70	100	90	50	100	110	10	100					
90	35	100	110	30	100	160	8	100	132...220		GV7RE220	2.350	
110	35	100	132	30	100	200	8	100					
			160	30	100								
90	70	100	110	50	100	160	10	100	132...220		GV7RS220	2.350	
110	70	100	132	50	100	200	10	100					
			160	50	100								

(1) As % of Icu.

Circuit breakers

DF526142.M



GV2 RT

For motors with high current peak on starting							
Control by rocker lever							
Standard power ratings of 3-phase motors 50/60 Hz in category AC-3					Setting range of thermal trips (1)	Magnetic tripping current I _d ± 20 %	Reference
220/ 230 V	400/ 415 V	440 V	500 V	690 V			
kW	kW	kW	kW	kW	A	A	
0.06	0.09	0.09 0.12	–	–	0.25...0.40	8	GV2RT03
–	0.12 0.18	0.18	–	0.37	0.40...0.63	13	GV2RT04
0.09 0.12	0.25 0.37	0.25 0.37	0.37	0.55	0.63...1	22	GV2RT05
0.18 0.25	0.37 0.55	0.37 0.55	0.37 0.55 0.75	0.75 1.1	1...1.6	33	GV2RT06
0.37	0.75	0.75 1.1	1.1	1.5	1.6...2.5	51	GV2RT07
0.55 0.75	1.1 1.5	1.5	1.5 2.2	2.2 3	2.5...4	78	GV2RT08
1.1	2.2	2.2 3	3	4	4...6.3	138	GV2RT10
1.5 2.2	3 4	4	4 5.5	5.5 7.5	6...10	200	GV2RT14
2.2 3	5.5	5.5 7.5	7.5	9 11	9...14	280	GV2RT16
4	7.5	7.5 9	9	15	13...18	400	GV2RT20
5.5	9 11	11	11	18.5	17...23	400	GV2RT21

(1) The thermal trip setting must be within the range marked on the graduated knob.

DF526142.fr



GV2 RT

For primaries of 3-phase transformers

Control by rocker lever

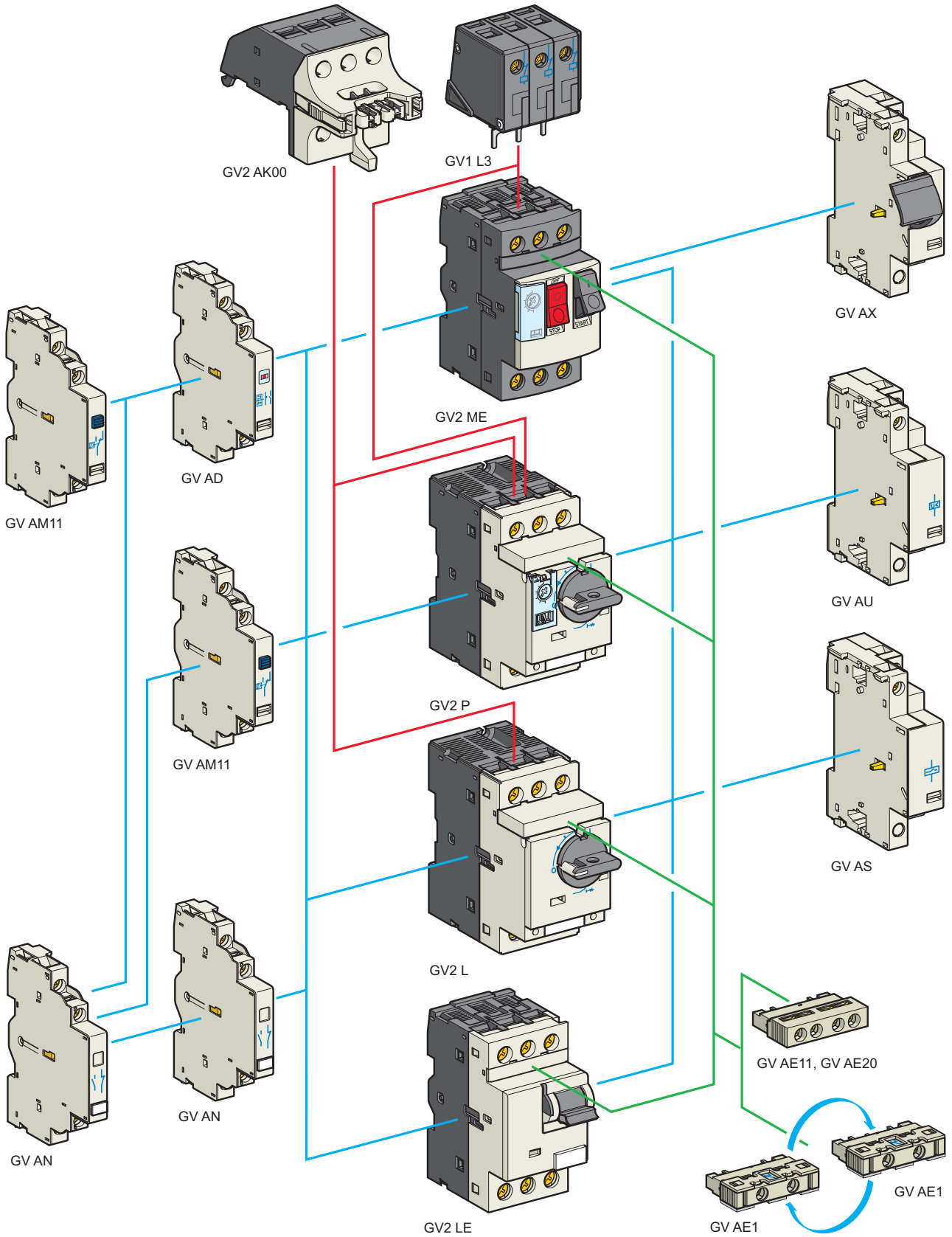
Standard power ratings					Setting range of thermal trips ⁽¹⁾	Magnetic tripping current Id ± 20 %	Reference
230/240 V	400/415 V	440 V	500 V	690 V			
kW	kW	kW	kW	kW	A	A	
–	–	–	–	–	0.25...0.40	8	GV2RT03
–	–	–	–	–	0.40...0.63	13	GV2RT04
–	–	0.63	0.63	1	0.63...1	22	GV2RT05
0.4	0.63	1	1	–	1...1.6	33	GV2RT06
0.63	1	–	1.6	1.6 2	1.6...2.5	51	GV2RT07
1	1.6 2	1.6 2	2 2.5	2.5	2.5...4	78	GV2RT08
1.6 2	2.5	2.5 4	4	4 5 6.3	4...6.3	138	GV2RT10
2.5	4 5	5	5 6.3	–	6...10	200	GV2RT14
4	6.3	6.3	–	10 12.5	9...14	280	GV2RT16
5 6.3	10	10	10 12.5	10	13...18	400	GV2RT20

Accessory ⁽²⁾

Description	Reference
Padlockable external operator (IP 54) black handle, blue legend plate	GV2AP03

⁽¹⁾ The thermal trip setting must be within the range marked on the graduated knob.

⁽²⁾ Other accessories such as mounting, cabling and marking accessories are identical to those used for GV2 ME motor circuit breakers, see page B6/13.



TeSys protection components

Thermal-magnetic and magnetic motor circuit breakers GV2 with screw clamp connections

Add-on blocks and accessories

Contact blocks

Description	Mounting	Maximum number	Type of contacts	Sold in lots of	Unit reference	
Instantaneous auxiliary contacts	Front ⁽¹⁾	1	N/O or N/C ⁽²⁾	10	GVAE1	
			N/O + N/C	10	GVAE11	
			N/O + N/O	10	GVAE20	
Fault signalling contact + instantaneous auxiliary contact	Side (LH)	2	N/O + N/C	1	GVAN11	
			N/O + N/O	1	GVAN20	
			N/C (fault)	+ N/O	1	GVAD1010
				+ N/C	1	GVAD1001
Short-circuit signalling contact	Side (LH)	1	C/O common point	+ N/O	1	GVAD0110
				+ N/C	1	GVAD0101

Electric trips

Mounting	Voltage		Reference
Undervoltage or shunt trips⁽⁴⁾			
Side (1 block on RH side of circuit breaker)	24 V	50 Hz	GVA●025
		60 Hz	GVA●026
	48 V	50 Hz	GVA●055
		60 Hz	GVA●056
	100 V	50 Hz	GVA●107
	100...110 V	60 Hz	GVA●107
	110...115 V	50 Hz	GVA●115
		60 Hz	GVA●116
	120...127 V	50 Hz	GVA●125
	127 V	60 Hz	GVA●115
	200 V	50 Hz	GVA●207
	200...220 V	60 Hz	GVA●207
	220...240 V	50 Hz	GVA●225
		60 Hz	GVA●226
	380...400 V	50 Hz	GVA●385
		60 Hz	GVA●386
415...440 V	50 Hz	GVA●415	
415 V	60 Hz	GVA●416	
440 V	60 Hz	GVA●385	
480 V	60 Hz	GVA●415	
500 V	50 Hz	GVA●505	
600 V	60 Hz	GVA●505	

Undervoltage trip, INRS (can only be mounted on GV2 ME)

Safety device for dangerous machines conforming to INRS and VDE 0113

Side (1 block on RH side of circuit breaker GV2 ME)	110...115 V	50 Hz	GVAX115
		60 Hz	GVAX116
	127 V	60 Hz	GVAX115
	220...240 V	50 Hz	GVAX225
		60 Hz	GVAX226
	380...400 V	50 Hz	GVAX385
		60 Hz	GVAX386
	415...440 V	50 Hz	GVAX415
	440 V	60 Hz	GVAX385

Add-on contact blocks

Description	Mounting	Maximum number	Reference
Visible isolation block ⁽⁵⁾	Front ⁽¹⁾	1	GV2AK00 ⁽⁶⁾
Limiters	At top (GV2 ME and GV2 P)	1	GV1L3
	Independent	1	LA9LB920

(1) Mounting of a GVAE contact block or a GV2AK00 visible isolation block on GV2 P and GV2 L.

(2) Choice of N/C or N/O contact operation, depending on which way round the reversible block is mounted.

(3) The GVAD is always mounted next to the circuit breaker.

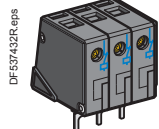
(4) To order an undervoltage trip: replace the dot (●) in the reference with a U, example: GVAU025.

To order a shunt trip: replace the dot (●) in the reference with an S, example: GVAS025.

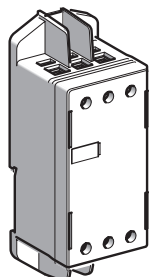
(5) Visible isolation of the 3 poles upstream of circuit breaker GV2 P and GV2 L.

Visible isolation block GV2AK00 cannot be used with motor circuit breakers GV2 P32 and GV2 L32 (Ith max = 25 A).

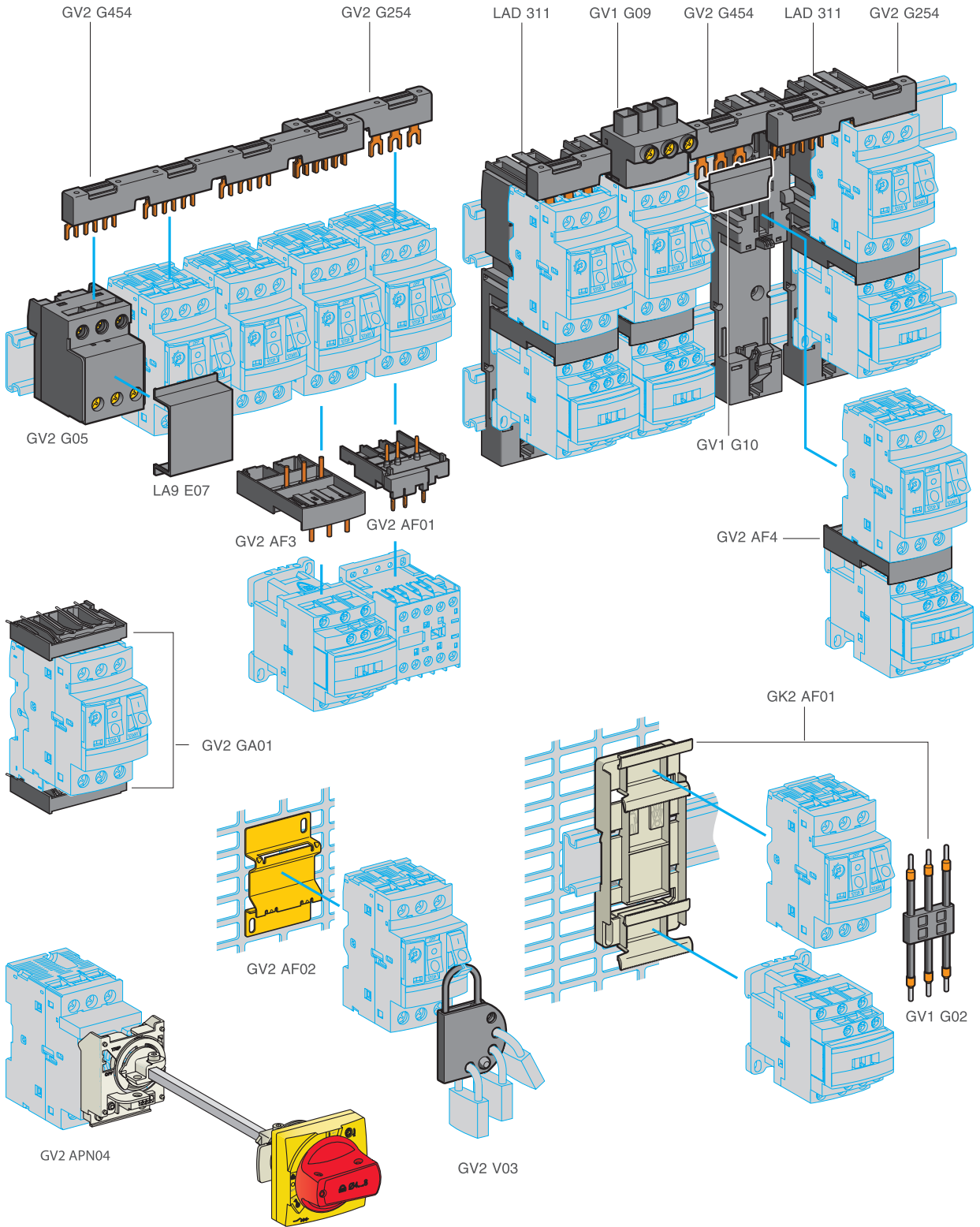
(6) Ie Max = 32 A.



GV1L3



LA9LB920



TeSys protection components

Thermal-magnetic and magnetic motor circuit breakers GV2 with screw clamp connections

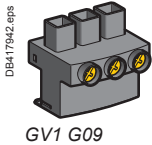
Accessories

TeSys GV

Accessories			
Description	Application	Sold in lots of	Unit reference
Adapter plates	For mounting a GV2 ME or GV2 LE by screw fixing	10	GV2AF02
	For mounting a GV2 ME or GV2 P and contactor LC1 D09...D38 with front faces aligned	1	LAD311
Height compensation plate	7.5 mm	10	GV1F03
Combination blocks	Between GV2 and contactor LC1 K or LP1 K	10	GV2AF01
	Between GV2 and contactor LC1 D09...D38	10	GV2AF3
	Between GV2 mounted on LAD 311 and contactor LC1 D09...D38	10	GV2AF4
Motor starter adapter plate	With 3-pole connection for mounting a GV2 and a contactor LC1 D09...D25	1	GK2AF01

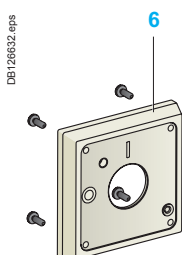
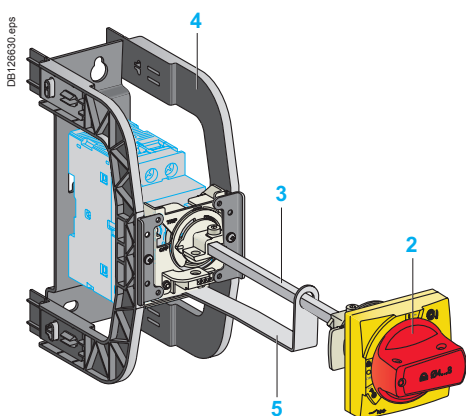
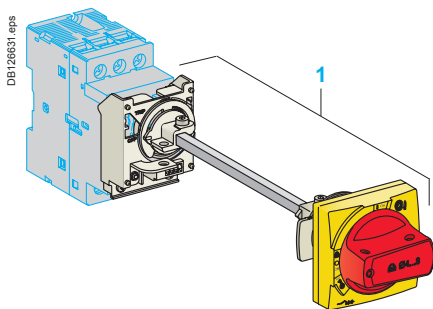
Description	Application	Pitch mm	Reference
Sets of 3-pole 63 A busbars	2 tap-offs	45	GV2G245
		54	GV2G254
		72	GV2G272
	3 tap-offs	45	GV2G345
		54	GV2G354
		72	GV2G372
	4 tap-offs	45	GV2G445
		54	GV2G454
		72	GV2G472
	5 tap-offs	54	GV2G554

Description	Application	Sold in lots of	Unit reference
Protective end cover	For unused busbar outlets	5	GV1G10
Terminal block for supply to one or more GV2 G busbar sets	Connection from the top	1	GV1G09
	Can be fitted with current limiter GV1 L3 (GV2 ME and GV2 P)	1	GV2G05
Cover for terminal block	For mounting in modular panels	10	LA9E07
Flexible 3-pole connection for connecting a GV2 to a contactor LC1-D09...D25	Centre distance between mounting rails: 100...120 mm	10	GV1G02
Set of connections upstream/downstream	For connecting GV2 ME to a printed circuit board	10	GV2GA01
"Large Spacing" adapter UL 508 type E	For GV2 P●●H7 (except 32 A)	1	GV2GH7
Clip-in marker holders (supplied with each circuit breaker)	For GV2 P, GV2 L, GV2 LE and GV2 RT (8 x 22 mm)	100	LA9D92



TeSys protection components

Thermal-magnetic and magnetic motor circuit breakers GV2 with screw clamp connections



Extended Rotary Handle

Allows a circuit breaker or a starter-controller installed in back of an enclosure to be operated from the front of the enclosure.

A rotary handle can be black or red/yellow, IP54 or IP65. It includes a function for locking the circuit breaker or the starter in the O (Off) or I (On) position (depending of the type of rotary handle) by means of up to 3 padlocks with a shank diameter of 4 to 8 mm. The extended shaft must be adjusted to use in different size enclosures. The IP54 rotary handle is fixed with a nut (Ø22) to make easier the assembling. The new Laser Square tool brings the accuracy to align the circuit breaker and the rotary handle.

Padlockable external operators for GV2P and GV2L

Description

- 1 Kit handle + mounting system
- 2 Universal handle
- 3 Shaft
- 4 Bracket
- 5 Shaft support plate for deep enclosure
- 6 Retrofit accessory
- 7 Laser Square accessory

Kit handle + mounting system

Description	Item Reference
For GV2 P/L	
Black handle, front plate, with trip status, IP 54	1 GV2APN01
Red handle, front plate, with trip status, IP 54	1 GV2APN02
Red handle, front plate, without trip status, IP 65	1 GV2APN04
For GV2 LE	
Padlocking in "On" and "Off" position	- GV2AP03
Black handle, blue front plate, IP 54	

Universal handle

For GV2 P/L	
Black handle, IP 54	2 GVAPB54
Red handle, IP 54	2 GVAPR54
Red handle, IP 65	2 GVAPR65

Shaft

For GV2 P/L	L = 315 mm	3	GVAPA1
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Bracket

For GV2 P/L	4	GVAPH02
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Shaft support plate for deep enclosure

For GV2 P/L	Depth ≥ 250 mm	5	GVAPK11
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Retrofit accessory

For GV2 P/L	6	GVAPP1
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Laser Square accessory

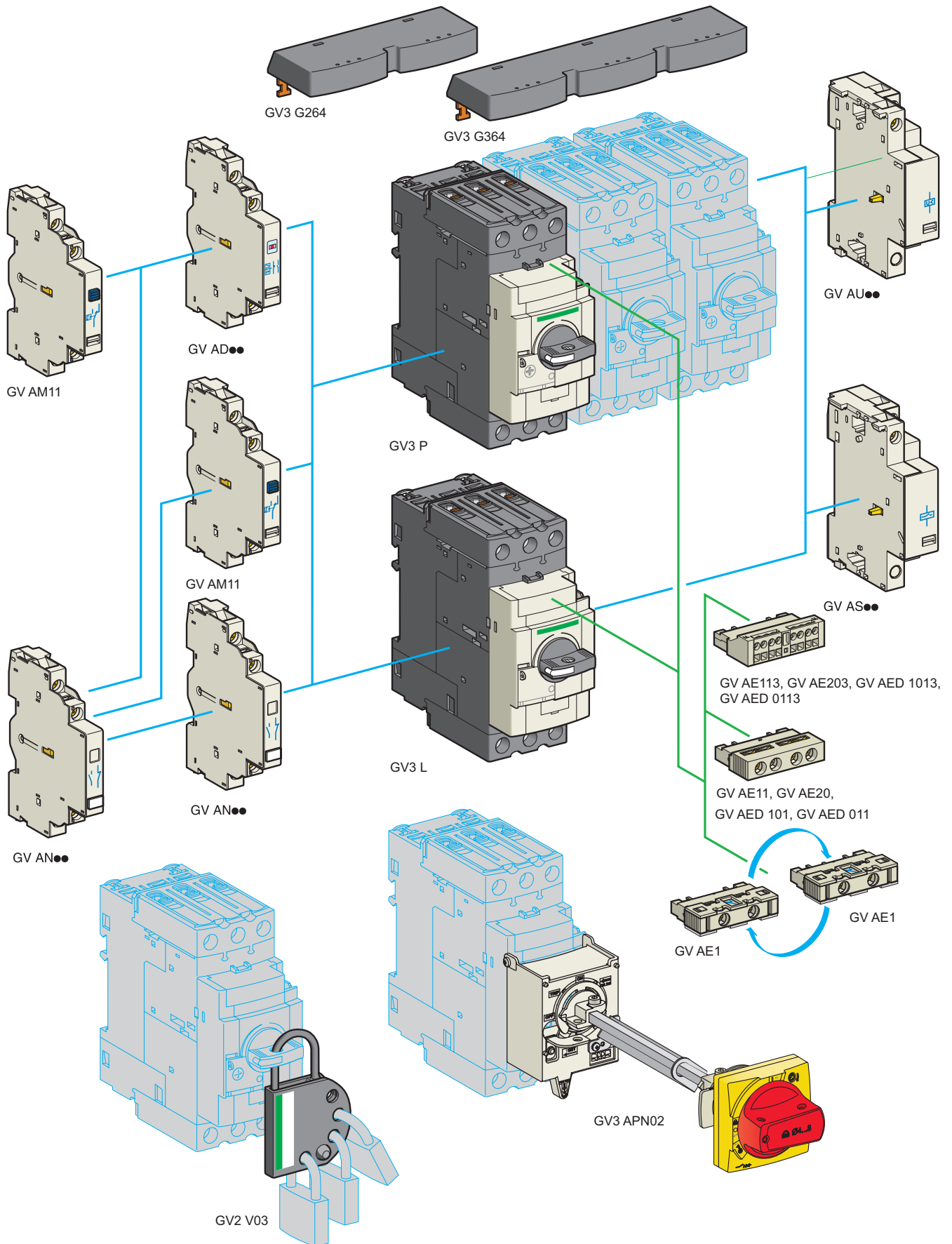
For GV2 P/L	7	GVAPL01
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Sticker

Warning label		Sold in lots of	
For French	10	-	GVAPSFR
For English	10	-	GVAPSEN
For German	10	-	GVAPSDE
For Spanish	10	-	GVAPSES
For Chinese	10	-	GVAPSCN
For Portuguese	10	-	GVAPSPT
For Russian	10	-	GVAPSRU
For Italian	10	-	GVAPSIT

Padlocking device

Description	Reference	
For all GV2 device	For use with up to 4 padlocks, Ø6 mm shank max. (padlocks not included)	GV2V03



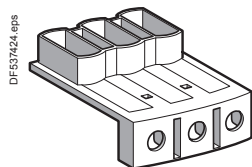
TeSys protection components

Thermal-magnetic motor circuit breakers

GV3 P and GV3 L

Add-on blocks and accessories

TeSys GV



GV3 G66

Contact blocks						
Description	Mounting	Maximum number	Type of contacts	Sold in lots of	Unit reference	
Instantaneous auxiliary contacts	Front	1	N/O or N/C ⁽¹⁾	10	GVAE1	
			N/O + N/C	10	GVAE11 ⁽²⁾	
			N/O + N/O	10	GVAE20 ⁽²⁾	
	Side (LH)	2	N/O + N/C	1	GVAN11 ⁽²⁾	
			N/O + N/O	1	GVAN20 ⁽²⁾	
Fault signalling contact + instantaneous auxiliary contact	Front	1	N/O (fault) + N/O	1	GVAED101 ⁽²⁾	
			N/O (fault) + N/C	1	GVAED011 ⁽²⁾	
	Side ⁽³⁾ (LH)	1	N/O (fault) + N/O	1	GVAD1010	
			+ N/C	1	GVAD1001	
			N/C (fault) + N/O	1	GVAD0110	
			+ N/C	1	GVAD0101	
Short-circuit signalling contact	Side (LH)	1	C/O common point	1	GVAM11	

Electric trips - undervoltage or shunt ⁽⁴⁾			
Mounting	Voltage		Reference
Side (1 block on RH side of circuit breaker)	24 V	50 Hz	GVA●025
		60 Hz	GVA●026
	48 V	50 Hz	GVA●055
		60 Hz	GVA●056
	100	50 Hz	GVA●107
	100...110 V	60 Hz	GVA●107
	110...115 V	50 Hz	GVA●115
		60 Hz	GVA●116
	120...127 V	50 Hz	GVA●125
	127 V	60 Hz	GVA●115
	200 V	50 Hz	GVA●207
	200...220 V	60 Hz	GVA●207
	220...240 V	50 Hz	GVA●225
		60 Hz	GVA●226
	380...400 V	50 Hz	GVA●385
		60 Hz	GVA●386
	415...440 V	50 Hz	GVA●415
	415 V	60 Hz	GVA●416
	440 V	60 Hz	GVA●385
	480 V	60 Hz	GVA●415
500 V	50 Hz	GVA●505	
600 V	60 Hz	GVA●505	

Accessories			
Description			Reference
Sets of 3-pole 115 A busbars Pitch: 64 mm	2 tap-off	GV3 P●● and GV3 L●●	GV3G264
	3 tap-off	GV3 P●● and GV3 L●●	GV3G364
Cover "Large Spacing" UL 508 type E (Only one cover required on supply side)		GV3 P●●	GV3G66

(1) Choice of N/C or N/O contact operation, depending on which way round the reversible block is mounted.

(2) Contact blocks available in version with spring terminal connections. Add a figure 3 at the end of the references selected above.
Example: **GV AED101** becomes **GV AED1013**.

(3) The **GVAD●●** is always mounted next to the circuit breaker.

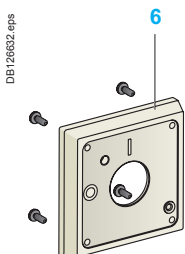
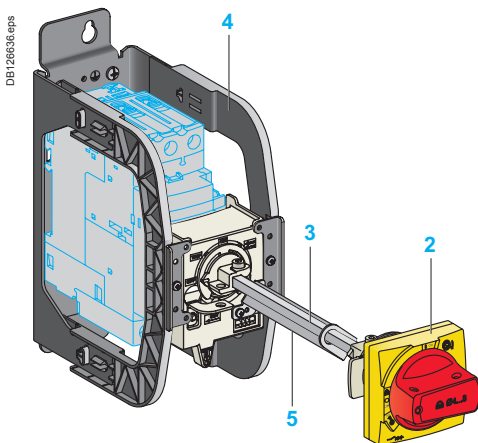
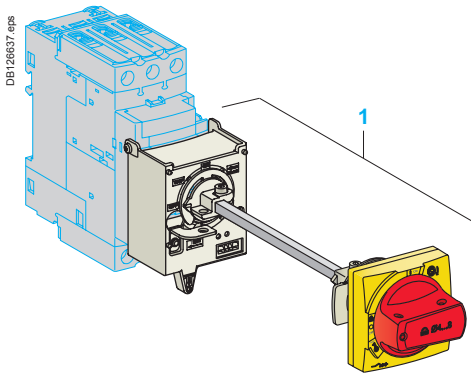
(4) To order an undervoltage trip: replace the dot (●) in the reference with a U, example: **GV AU025**.
To order a shunt trip: replace the dot (●) in the reference with an S, example: **GV AS025**.

TeSys protection components

Thermal-magnetic motor circuit breakers

GV3 P and GV3 L

TeSys GV



Extended Rotary Handle

Allows a circuit breaker or a starter-controller installed in back of an enclosure to be operated from the front of the enclosure.

A rotary handle can be black or red/yellow, IP54 or IP65. It includes a function for locking the circuit breaker or the starter in the O (Off) or I (On) position (depending of the type of rotary handle) by means of up to 3 padlocks with a shank diameter of 4 to 8 mm. The extended shaft must be adjusted to use in different size enclosures. The IP54 rotary handle is fixed with a nut (Ø22) to make easier the assembling. The new Laser Square tool brings the accuracy to align the circuit breaker and the rotary handle.

Padlockable external operators for GV3 and GV3L

Description

- 1 Kit handle + mounting system
- 2 Universal handle
- 3 Shaft
- 4 Bracket
- 5 Shaft support plate for deep enclosure
- 6 Retrofit accessory
- 7 Laser Square accessory

Kit handle + mounting system

Description	Item Reference
For GV3 P/L Black handle, front plate, with trip status, IP 54	1 GV3APN01
Red handle, front plate, with trip status, IP 54	1 GV3APN02
Red handle, front plate, without trip status, IP 65	1 GV3APN04

Universal handle

For GV3 P/L Black handle, IP 54	2 GVAPB54
Red handle, IP 54	2 GVAPR54
Red handle, IP 65	2 GVAPR65

Shaft

For GV3 P/L L = 315 mm	3 GVAPA1
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Bracket

For GV3 P/L	4 GVAPH03
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Shaft support plate for deep enclosure

For GV3 P/L Depth ≥ 300 mm	5 GVAPK12
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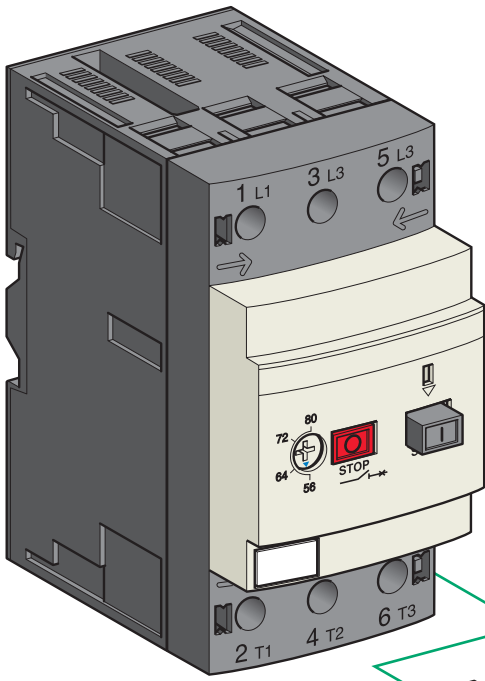
Retrofit accessory

For GV3 P/L	6 GVAPP1
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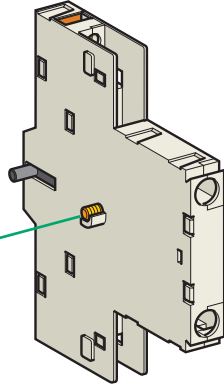
Laser Square accessory

For GV3 P/L	7 GVAPL01
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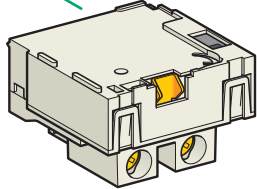
Sticker	Sold in lots of			
Warning label	For French	10	-	GVAPSEFR
	For English	10	-	GVAPSEEN
	For German	10	-	GVAPSEDE
	For Spanish	10	-	GVAPSEES
	For Chinese	10	-	GVAPSECN
	For Portuguese	10	-	GVAPSEPT
	For Russian	10	-	GVAPSERU
	For Italian	10	-	GVAPSEIT



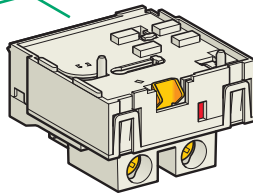
GV3 ME80



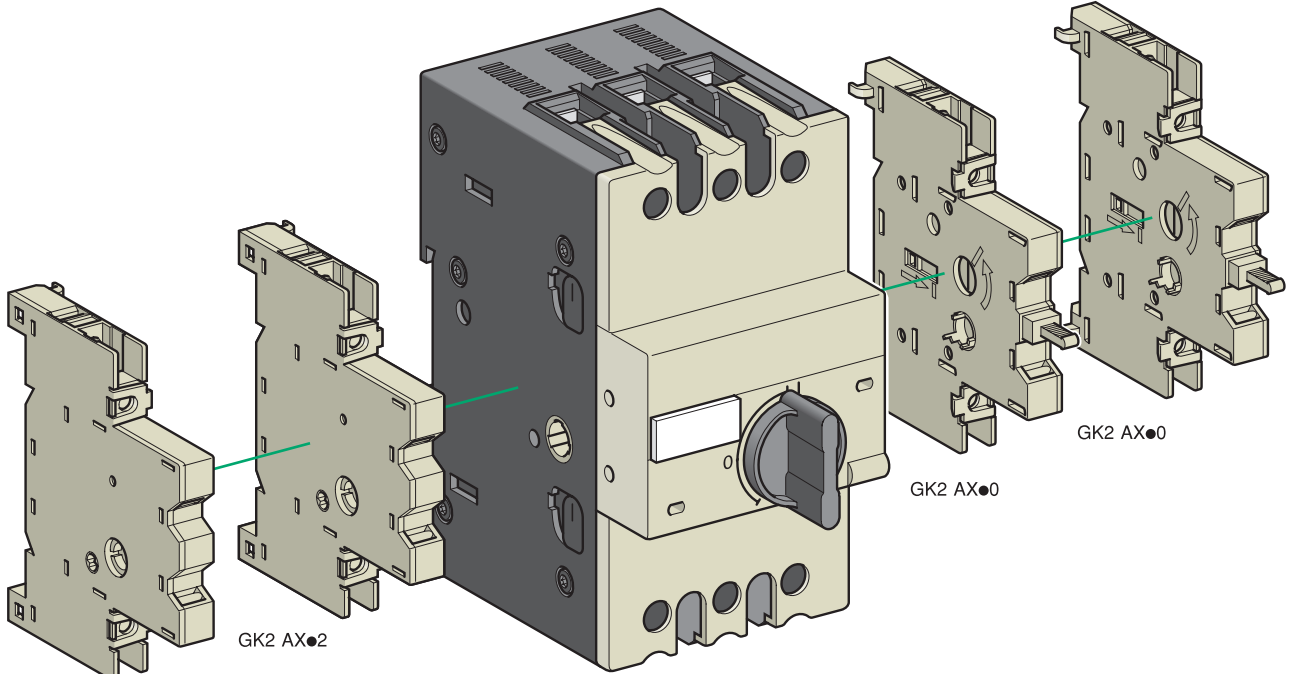
GV3 A01...A07



GV3 B ●●
GV3 D ●●



GV3 A08
GV3 A09



GK2 AX●2

GK2 AX●2

GK3 EF80

GK2 AX●0

GK2 AX●0

TeSys protection components

Motor circuit breakers GV3 ME80 and GK3 EF80

Add-on blocks and accessories

TeSys GV

For thermal-magnetic motor circuit breakers GV3 ME80

Contact blocks

Description	Type of standard early break contacts	Reference
Instantaneous auxiliary contact blocks (1 per circuit breaker)	N/C + N/O	GV3A01
	N/O + N/O	GV3A02
	N/C + N/O + N/O	GV3A03
	N/O + N/O + N/O	GV3A05
	N/O + N/O + 2 volt-free terminals	GV3A06
	N/C + N/O + 2 volt-free terminals	GV3A07
Fault signalling contacts ⁽¹⁾	N/C	GV3A08
	N/O	GV3A09

Electric trips

Description	Voltages		Reference
	50 Hz	60 Hz	
Undervoltage trips ⁽¹⁾	110, 120, 127 V	120, 127 V	GV3B11
	220, 240 V	277 V	GV3B22
	380, 415 V	440 V, 480 V	GV3B38
Shunt trips ⁽¹⁾	110, 120, 127 V	120, 127 V	GV3D11
	220, 240 V	277 V	GV3D22
	380, 415 V	440 V, 480 V	GV3D38

Accessory

Description	Sold in lots of	Unit reference
Padlocking device, for locking the Start button (on open-mounted product)	5	GV1V02

For magnetic circuit breaker GK3 EF80

Contact blocks

Description	Number of poles	Reference
Auxiliary contact blocks for On-Off signalling and "control circuit test" function (1 or 2 blocks per device) mounted on RH side of GK3 EF80	N/O	GK2AX10
	N/O + N/O	GK2AX20
	N/C + N/O	GK2AX50
Instantaneous fault signalling contact blocks (1 or 2 blocks per device) mounted on LH side of GK3 EF80	N/O	GK2AX12
	N/O + N/O	GK2AX22
	N/C + N/O	GK2AX52

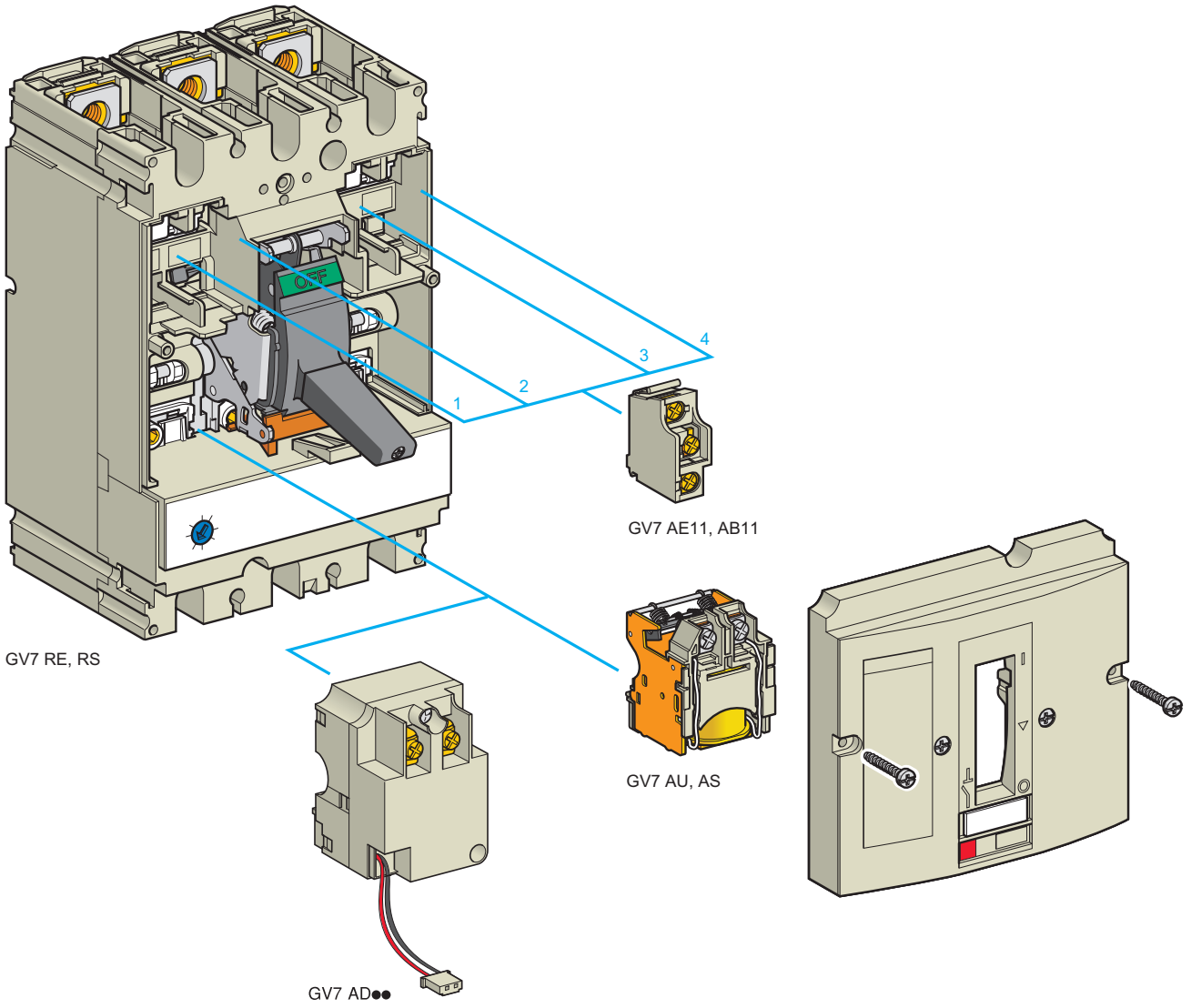
Accessories

Description	Reference
Padlocking device for padlocking the operator, using up to 3 padlocks (padlocks to be ordered separately)	GK3AV01
External operator for mounting on enclosure door. Red Ø40 knob on yellow plate, padlockable in position O (with up to 3 padlocks). Door locked when knob in position I, and when knob padlocked in position O.	GK3AP03

⁽¹⁾ 1 voltage trip **OR** 1 fault signalling contact to be fitted inside the motor circuit breaker.

Other versions

24 to 690 V, 50 or 60 Hz voltage trips for circuit breakers **GV3 ME80**. Please consult your Regional Sales Office.



TeSys protection components

Thermal-magnetic motor circuit breakers

GV7 R with screw clamp connections

Add-on blocks and accessories

TeSys GV

Add-on auxiliary contacts

These allow remote indication of the circuit breaker contact states. They can be used for signalling, electrical locking, relaying, etc. They are available in two versions: standard and low level. They include a terminal block and the auxiliary circuits leave the circuit breaker through a hole provided for this purpose.

They perform the following functions, depending on where they are located in the circuit breaker:

Location	Function	Application
1 and/or 4	C/O contact	Indicates the position of the circuit breaker poles
2	Trip indication	Indicates that the circuit breaker has tripped due to an overload, a short-circuit, a differential fault or the operation of a voltage trip (undervoltage or shunt trip), or of the "push to trip" test button. It resets when the circuit breaker is reset.
3	Electrical fault indication	Indicates that the circuit breaker has tripped due to an overload, a short-circuit or a differential fault. It resets when the circuit breaker is reset.

Type	Reference
Standard	GV7AE11
Low level	GV7AB11

Fault discrimination devices

These make it possible to:

- either differentiate a thermal fault from a magnetic fault,
- or open the contactor only in the event of a thermal fault.

Voltage	Reference
~ 24...48 and ≡ 24...72 V	GV7AD111 ⁽¹⁾
≈ 110...240 V	GV7AD112 ⁽¹⁾

Electric trips

These allow the circuit breaker to be tripped via an electrical control signal.

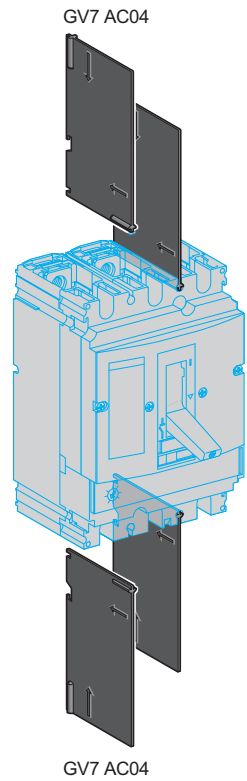
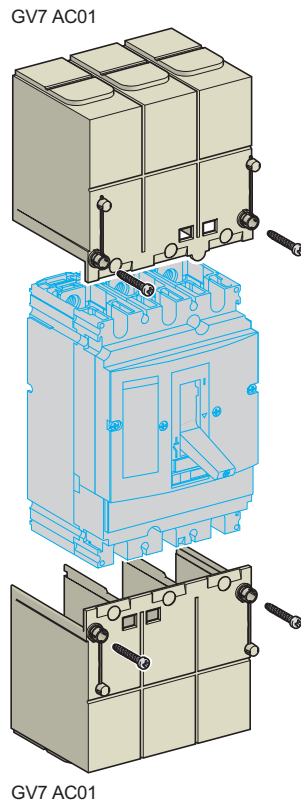
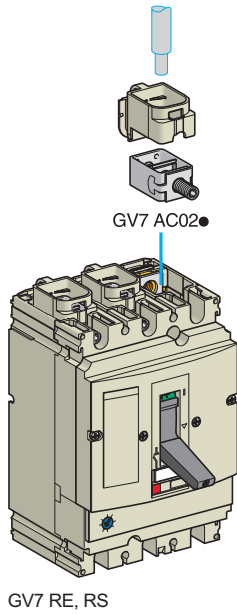
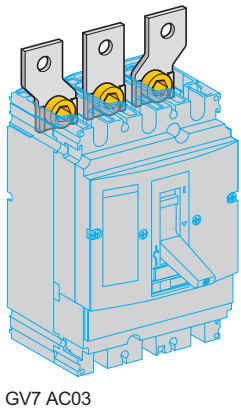
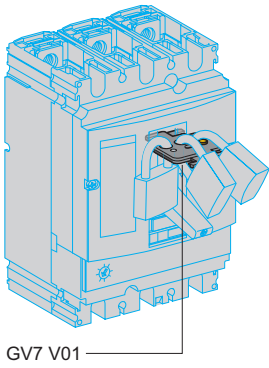
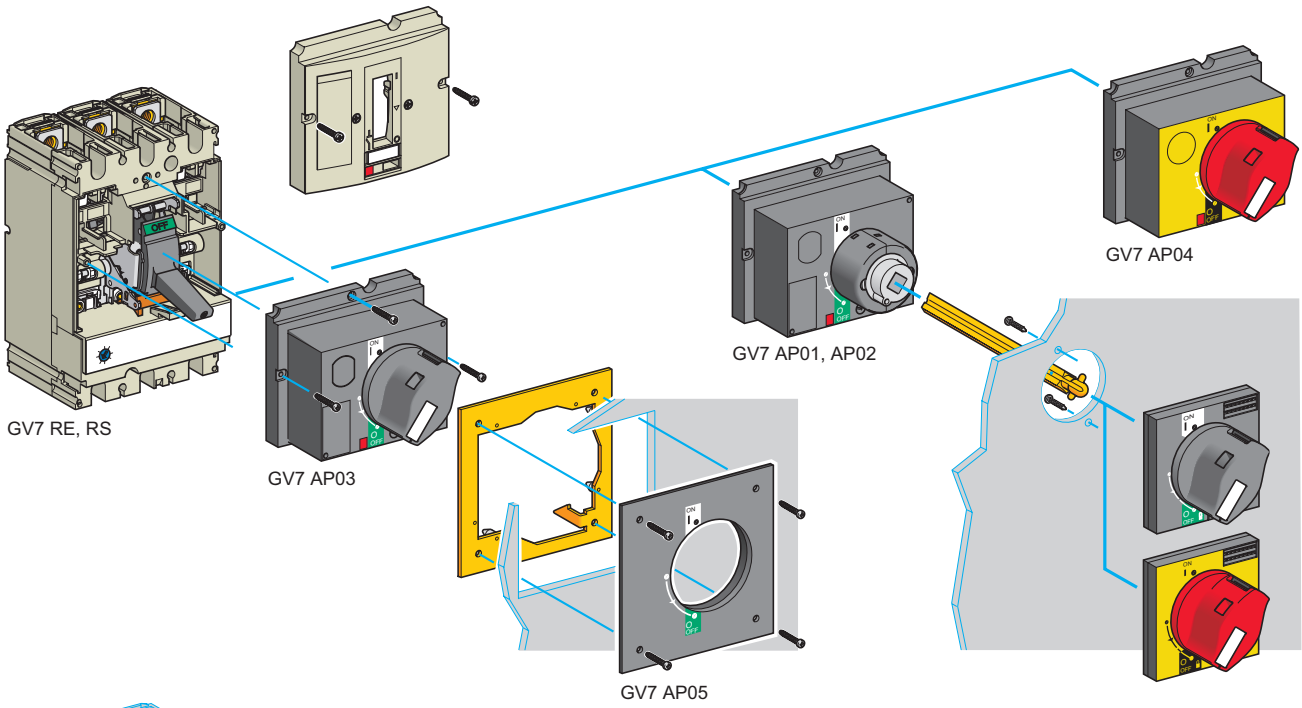
- Undervoltage trip GV7 AU
 - Trips the circuit breaker when the control voltage drops below the tripping threshold, which is between 0.35 and 0.7 times the rated voltage.
 - Circuit breaker closing is only possible if the voltage exceeds 0.85 times the rated voltage.
- Circuit breaker tripping by a GV7 AU trip meets the requirements of IEC 60947-2.

- Shunt trip GV7 AS
 - Trips the circuit breaker when the control voltage rises above 0.7 times the rated voltage.

- Operation (GV7 AU or GV7 AS)
 - When the circuit breaker has been tripped by a GV7 AU or AS, it must be reset either locally or by remote control. (For remote control, please consult your Regional Sales Office).
 - Tripping has priority over manual closing: if a tripping instruction is present, manual action does not result in closing, even temporarily, of the contacts.
 - Durability: 50 % of the mechanical durability of the circuit breaker.

Type	Voltage	Reference
Undervoltage trip	48 V, 50/60 Hz	GV7AU055 ⁽¹⁾
	110...130 V, 50/60 Hz	GV7AU107 ⁽¹⁾
	200...240 V, 50/60 Hz	GV7AU207 ⁽¹⁾
	380...440 V, 50/60 Hz	GV7AU387 ⁽¹⁾
	525 V, 50 Hz	GV7AU525 ⁽¹⁾
Shunt trip	48 V, 50/60 Hz	GV7AS055 ⁽¹⁾
	110...130 V, 50/60 Hz	GV7AS107 ⁽¹⁾
	200...240 V, 50/60 Hz	GV7AS207 ⁽¹⁾
	380...440 V, 50/60 Hz	GV7AS387 ⁽¹⁾
	525 V, 50 Hz	GV7AS525 ⁽¹⁾

⁽¹⁾ For mounting of a GV7 AD or a GV7 AU or AS.



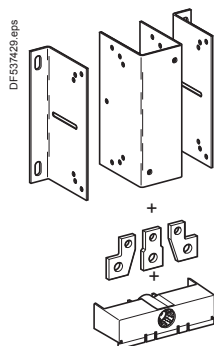
TeSys protection components

Thermal-magnetic motor circuit breakers

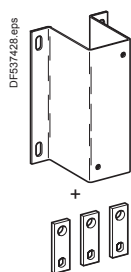
GV7 R with screw clamp connections

Accessories

TeSys GV



GV7 AC07



GV7 AC08

Cabling accessories

Description	Application	For use on contactors	Sold in lots of	Unit reference
Clip-on connectors for GV7 R	Up to 150 A, 1.5...95 mm ²	–	3	GV7AC021
	Up to 220 A, 1.5...185 mm ²	–	3	GV7AC022
Spreader 3-pole ⁽¹⁾	To increase the pitch to 45 mm	–	1	GV7AC03
Terminal shields IP 405 ⁽¹⁾	Supplied with sealing accessory	–	1	GV7AC01
Phase barriers	Safety accessories used when fitting of shields is impossible	–	2	GV7AC04
Insulating screens	Ensure insulation between the connections and the backplate	–	2	GV7AC05
Kits for combination with contactor ⁽²⁾	Allowing link between the circuit breaker and the contactor. The cover provides protection against direct finger contact	LC1 F115...F185	1	GV7AC06
		LC1 F225 and F265	1	GV7AC07
		LC1 D115 and D150	1	GV7AC08

Direct rotary handle

Replaces the circuit breaker front cover; secured by screws. It includes a device for locking the circuit breaker in the O (Off) position by means of up to 3 padlocks with a shank diameter of 5 to 8 mm (padlocks not included). A conversion accessory allows the direct rotary handle to be mounted on the enclosure door. In this case, the door cannot be opened if the circuit breaker is in the "ON" position. Circuit breaker closing is inhibited if the enclosure door is open.

Description	Type	Degree of protection	Reference
Direct rotary handle	Black handle, black legend plate	IP 40	GV7AP03
	Red handle, yellow legend plate	IP 40	GV7AP04
Adapter plate ⁽³⁾	Four mounting direct rotary handle on enclosure door	IP 43	GV7AP05

Extended rotary handle

Allows a circuit breaker installed in the back of an enclosure to be operated from the front of the enclosure. It comprises:

- a unit which screws onto the front cover of the circuit breaker,
- an assembly (handle and front plate) to be fitted on the enclosure door,
- an extension shaft which must be adjusted (distance between the mounting surface and the door: 185 mm minimum, 600 mm maximum). It includes a device for locking the circuit breaker in the O (Off) position by means of up to 3 padlocks with a shank diameter of 5 to 8 mm (padlocks not included). This prevents the enclosure door from being opened.

Description	Type	Degree of protection	Reference
Extended rotary handle	Black handle, black legend plate	IP 55	GV7AP01
	Red handle, yellow legend plate	IP 55	GV7AP02

Locking device

Allows circuit breakers not fitted with a rotary handle to be locked in the O (Off) position by means of up to 3 padlocks with a shank diameter of 5 to 8 mm (padlocks not included).

Description	Application	Reference
Locking device	For circuit breaker not fitted with a rotary handle	GV7V01

⁽¹⁾ Terminal shields cannot be used together with spreaders.

⁽²⁾ The kit comprises links, a protective shield and a depth adjustable metal bracket for the breaker.

⁽³⁾ This conversion accessory makes it impossible to open the door if the device is closed and prevents the device from being closed if the door is open.

Protection components

Thermal-magnetic circuit breakers TeSys GB2 for the protection of industrial equipment control circuits

TeSys GB

DF526243.tif



GB2 CB●●

DF526244.tif



GB2 CD●●

DF526245.tif



GB2 DB●●

Circuit breakers with magnetic tripping threshold: 12 to 16 In

Single-pole

Conventional rated thermal current I _{th} ⁽¹⁾	Magnetic tripping current I _d ± 20 %	Sold in lots of	Unit reference
A	A		
0.5	6.6	6	GB2CB05
1	14	6	GB2CB06
2	26	6	GB2CB07
3	40	6	GB2CB08
4	52	6	GB2CB09
5	66	6	GB2CB10
6	83	6	GB2CB12
8	108	6	GB2CB14
10	138	6	GB2CB16
12	165	6	GB2CB20
16	220	6	GB2CB21
20	270	6	GB2CB22

Single-pole + neutral

Conventional rated thermal current I _{th} ⁽¹⁾	Magnetic tripping current I _d ± 20 %	Sold in lots of	Unit reference
A	A		
0.5	6.6	6	GB2CD05
1	14	6	GB2CD06
2	26	6	GB2CD07
3	40	6	GB2CD08
4	52	6	GB2CD09
5	66	6	GB2CD10
6	83	6	GB2CD12
8	108	6	GB2CD14
10	138	6	GB2CD16
12	165	6	GB2CD20
16	220	6	GB2CD21
20	270	6	GB2CD22

2-pole

Conventional rated thermal current I _{th} ⁽¹⁾	Magnetic tripping current I _d ± 20 %	Sold in lots of	Unit reference
A	A		
0.5	6.6	3	GB2DB05
1	14	3	GB2DB06
2	26	3	GB2DB07
3	40	3	GB2DB08
4	50	3	GB2DB09
5	66	3	GB2DB10
6	83	3	GB2DB12
8	108	3	GB2DB14
10	138	3	GB2DB16
12	165	3	GB2DB20
16	220	3	GB2DB21
20	270	3	GB2DB22

(1) Conforming to IEC 60947-1.

Protection components

Thermal-magnetic circuit breakers TeSys GB2 for the protection of industrial equipment control circuits

TeSys GB

Circuit breakers with magnetic tripping threshold: 5 to 7 In



GB2 CS●●

Single-pole			
Conventional rated thermal current Ith ⁽¹⁾	Magnetic tripping current Id ± 20 %	Sold in lots of	Unit reference
A	A		
0.5	3.3	6	GB2CS05
1	6	6	GB2CS06

⁽¹⁾ Conforming to IEC 60947-1.

Accessories for circuit breakers GB2-CB, DB and CS

Description	Sold in lots of	Unit reference
Busbar set for supply to 10 GB2 DB or 20 GB2 CB or GB2 CS with 2 connectors	1	GB2G210
Supply connector	10	GB2G01

Technical Data for Designers

Contents

Magnetic motor circuit breakers - TeSys GV:

- > characteristics.....B6/30 to B6/33
- > curves.....B6/34 to B6/42
- > dimensions.....B6/43 to B6/47
- > schemes.....B6/48

Thermal magnetic motor circuit breakers - TeSys GV:

- > presentation.....B6/49 and B6/50
- > characteristics.....B6/51 to B6/56
- > curves.....B6/57 to B6/69
- > dimensions.....B6/70 to B6/81
- > schemes.....B6/82 and B6/83

Thermal magnetic motor circuit breakers - TeSys GB:

- > presentation and selection.....B6/84
- > characteristics.....B6/85 to B6/87
- > dimensions and schemes.....B6/88

Auxiliary contacts characteristics.....B6/89 to B6/94

TeSys protection components

Magnetic motor circuit breakers

GV2 LE and GV2 L

TeSys GV

Environment						
Circuit breaker type		GV2 LE		GV2 L		
Conforming to standards		IEC 60947-1, 60947-2, EN 60204, NF C 63-650, NF C63-120, 79-130, VDE 0113, 0660.				
Product certifications		CSA, CCC		CSA, CCC, BV, DNV, GL, LROS, RINA		
Protective treatment		"TH"		"TH"		
Shock resistance	Conforming to IEC 60068-2-27	30 gn		30 gn		
Vibration resistance	Conforming to IEC 60068-2-6	5 gn (5 to 150 Hz)		5 gn (5 to 150 Hz)		
Ambient air temperature	Storage	°C	-40...+80		-40...+80	
	Operation	°C	-20...+60		-20...+60	
Flame resistance	Conforming to IEC 60695-2-1	°C	960		960	
Maximum operating altitude		m	2000			
Operating position						
Connection (Max. number of conductors x c.s.a)	Solid cable	mm ²	Min. 2 x 1	Max. 2 x 6	Min. 2 x 1	Max. 2 x 6
	Flexible cable without cable end	mm ²	2 x 1.5	2 x 6	2 x 1.5	2 x 6
	Flexible cable with cable end	mm ²	2 x 1	2 x 4	2 x 1	2 x 4
Tightening torque		N.m	1.7		1.7	
Suitable for isolation	Conforming to IEC 60947-1 § 7-1-6		Yes		Yes	
Resistance to mechanical impact		J	0.5		0.5	
Technical characteristics						
Utilisation category	Conforming to IEC 60947-2		A		A	
	Conforming to IEC 60947-4-1		AC-3		AC-3	
Rated operational voltage (U _e)	Conforming to IEC 60947-2	V	690		690	
Rated insulation voltage (U _i)	Conforming to IEC 60947-2	V	690		690	
Rated operational frequency	Conforming to IEC 60947-2	Hz	50/60		50/60	
Rated impulse withstand voltage (U _{imp})	Conforming to IEC 60947-2	kV	6		6	
Total power dissipated per pole		W	1.8		1.8	
Mechanical durability (C.O.: Closing, Opening)	For AC-3 duty	C.O.	100 000		100 000	
Electrical durability for AC-3/415V duty (C.O.: Closing, Opening)		C.O.	100 000		100 000	
Duty class (maximum operating rate)		C.O./h	40		40	
Rated duty	Conforming to IEC 60947-4-1		Continuous duty		Continuous duty	

TeSys protection components

Magnetic motor circuit breakers

GV2 LE and GV2 L

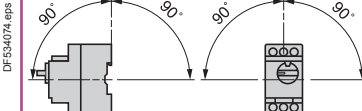
TeSys GV

Circuit breaker type			GV2 LE										GV2 L									
			03 to 06	07	08	10	14	16	20	22	32	03 to 05	06 & 07	08	10	14	16	20	22	32		
Rating		A	0.4 to 1.6	2.5	4	6.3	10	14	18	25	32	0.4 to 1	1.6 to 2.5	4	6.3	10	14	18	25	32		
Breaking capacity conforming to IEC 60947-2	230/240 V	Icu	kA	*	*	*	*	*	*	*	50	50	*	*	*	*	*	*	*	50	50	
		Ics % ⁽¹⁾		*	*	*	*	*	*	*	100	100	*	*	*	*	*	*	*	100	100	
	400/415 V	Icu	kA	*	*	*	*	*	15	15	15	10	*	*	*	*	*	50	50	50	50	
		Ics % ⁽¹⁾		*	*	*	*	*	50	50	40	50	*	*	*	*	*	50	50	50	50	
	440 V	Icu	kA	*	*	*	50	15	8	8	6	6	*	*	*	*	20	20	20	20	20	
		Ics % ⁽¹⁾		*	*	*	100	100	50	50	50	50	*	*	*	*	75	75	75	75	75	
	500 V	Icu	kA	*	*	*	50	10	6	6	4	4	*	*	*	*	10	10	10	10	10	
		Ics % ⁽¹⁾		*	*	*	100	100	75	75	75	75	*	*	*	*	100	75	75	75	75	
	690 V	Icu	kA	*	3	3	3	3	3	3	3	3	*	4	4	4	4	4	4	4	4	
		Ics % ⁽¹⁾		*	75	75	75	75	75	75	75	75	*	100	100	100	100	100	100	100	100	
Associated fuses (if required) if Ics > breaking capacity Icu conforming to IEC 60947-2 amendment 1	230/240 V	aM	A	*	*	*	*	*	*	*	80	80	*	*	*	*	*	*	*	100	100	
		gG	A	*	*	*	*	*	*	*	100	100	*	*	*	*	*	*	*	125	125	
	400/415 V	aM	A	*	*	*	*	*	63	63	80	80	*	*	*	*	*	80	100	100	100	
		gG	A	*	*	*	*	*	80	80	100	100	*	*	*	*	*	100	125	125	125	
	440 V	aM	A	*	*	*	50	50	50	50	63	63	*	*	*	*	50	63	80	80	80	
		gG	A	*	*	*	63	63	63	63	80	80	*	*	*	*	63	80	100	100	100	
	500 V	aM	A	*	*	*	50	50	50	50	50	50	*	*	*	*	50	50	50	50	50	
		gG	A	*	*	*	63	63	63	63	63	63	*	*	*	*	63	63	63	63	63	
	690 V	aM	A	*	16	25	32	32	40	40	40	40	*	20	25	40	40	50	50	50	50	
		gG	A	*	20	32	40	40	50	50	50	50	*	25	32	50	50	63	63	63	63	
Cable protection against thermal stress in the event of short-circuit (PVC insulated copper cables) Minimum c.s.a. protected at 40 °C and at Isc max.	1 mm ²	kA	●	●	●	≤10	≤6	(2)	(2)	(2)	(2)	●	●	●	≤10	≤6	(2)	(2)	(2)	(2)		
	1.5 mm ²	kA	●	●	●	≤20	≤10	(2)	(2)	(2)	(2)	●	●	●	≤20	≤10	(2)	(2)	(2)	(2)		
	2.5 mm ²		●	●	●	●	●	●	●	●	(2)	●	●	●	●	●	●	●	●	●	(2)	
	4...6 mm ²		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		

* > 100 kA.
 ● Cable c.s.a. protected.
 (1) As % of Icu.
 (2) Cable c.s.a. not protected.

Circuit breakers

TeSys GV

Environment							
Circuit breaker type		GV3 L					
Conforming to standards		IEC/EN 60947-1, 60947-2					
Protective treatment		"TH"					
Degree of protection (front face)	Conforming to IEC 60529	IP20 against finger direct contact					
Shock resistance	Conforming to IEC 60068-2-27	On : 15 gn -11 ms Off : 30 gn -11 ms					
Vibration resistance	Conforming to IEC 60068-2-6	4 gn (5...300 Hz)					
Flame resistance	Conforming to IEC 60695-2-1	°C	960				
Ambient air temperature	Storage	°C	-40...+80				
	Operation	°C	-20...+60 ⁽¹⁾				
Maximum operating altitude		m	3000				
Operating position Without derating, in relation to normal vertical mounting plane ⁽²⁾							
Connection (Max. number of conductors x c.s.a)	Solid cable	mm ²	<table border="1"> <thead> <tr> <th>Min.</th> <th>Max.</th> </tr> </thead> <tbody> <tr> <td>2 x 1</td> <td>1 x 25 1 x 35</td> </tr> </tbody> </table>	Min.	Max.	2 x 1	1 x 25 1 x 35
	Min.	Max.					
	2 x 1	1 x 25 1 x 35					
	Flexible cable without cable end	mm ²	2 x 1	1 x 25 1 x 35			
Flexible cable with cable end	mm ²	2 x 1	1 x 25 1 x 35				
Tightening torque		N.m	5	5 : 25 mm ² 8 : 35 mm ²			
Suitable for isolation conforming to IEC 60947-1 § 7-1-6			Yes				

Technical characteristics			
Rated insulation voltage (U _i)	Conforming to IEC 60947-2	V	690
Rated impulse withstand voltage (U _{imp})	Conforming to IEC 60947-2	kV	6
Rated operational voltage (U _e)	Conforming to IEC 60947-2	V	690
Rated operational frequency		Hz	50/60
Electrical durability for AC-3/415V duty (C.O.: Close - Open)		C.O.	50 000
Mechanical durability (C.O.: Closing, Opening)		C.O.	50 000
Maximum operating rate		C.O./h	25
Operating threshold of magnetic trips			14 I max
Utilisation category	Conforming to IEC 60947-2		A

- (1) Leave a space of 9 mm between 2 circuit breakers: either an empty space or side-mounting add-on contact blocks. Side by side mounting is possible up to 40 °C.
 (2) When mounting on a vertical rail, fit a stop to prevent any slippage.

TeSys protection components

Magnetic motor circuit breakers

GV3 L

TeSys GV

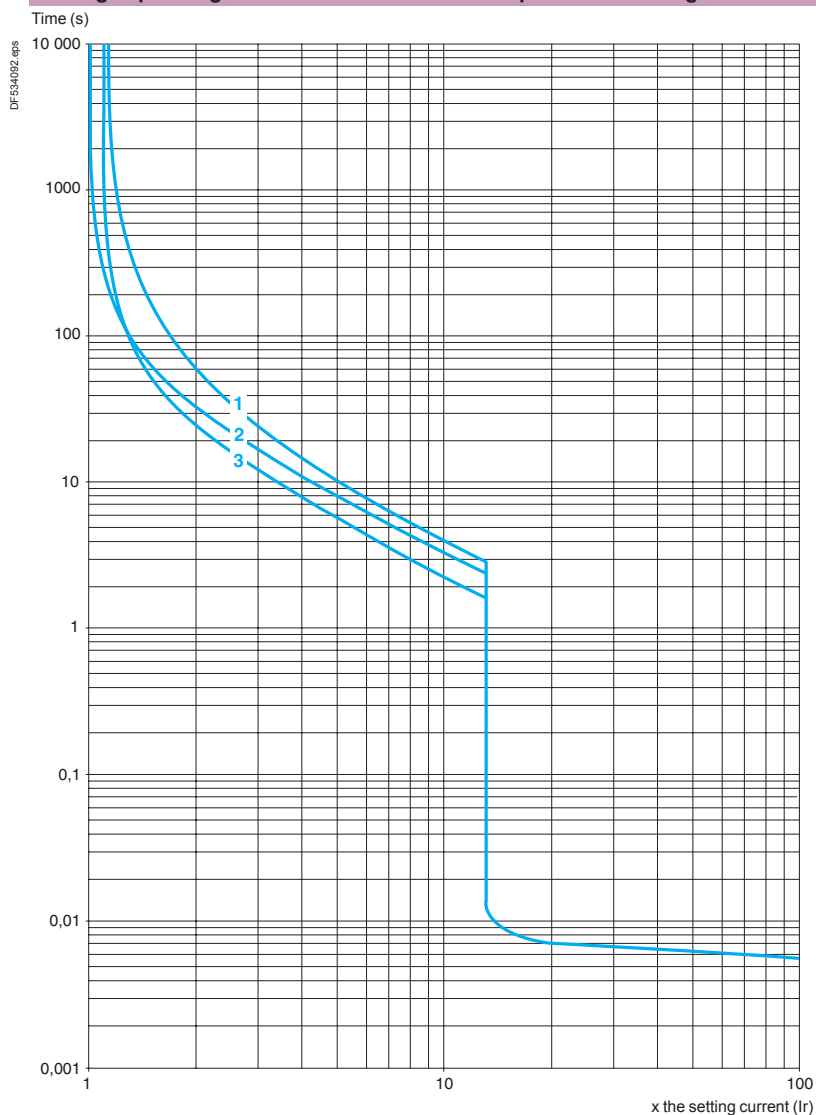
Breaking capacity of GV3 L

Type				GV3 L25	GV3 L32	GV3 L40	GV3 L50	GV3 L65	
Breaking capacity of the circuit-breaker only or of the circuit-breaker combined with a thermal overload relay	230/240 V	Icu	kA	100	100	100	100	100	
		Ics % ⁽¹⁾		100	100	100	100	100	
	400/415 V	Icu	kA	100	100	50	50	50	
		Ics % ⁽¹⁾		100	100	100	100	100	
	440 V	Icu	kA	50	50	50	50	50	
		Ics % ⁽¹⁾		100	100	100	100	100	
500 V	Icu	kA	12	12	12	12	12		
	Ics % ⁽¹⁾		50	50	50	50	50		
690 V	Icu	kA	6	6	6	6	6		
	Ics % ⁽¹⁾		50	50	50	50	50		
Associated fuses (if required) for use with circuit breaker only or circuit breaker combined with a thermal overload relay if Ics > breaking capacity	230/240 V	aM	A	*	*	*	*	*	
		gG	A	*	*	*	*	*	
	415 V	aM	A	*	*	*	*	125	
		gG	A	*	*	*	*	160	
	440 V	aM	A	63	80	125	125	125	
		gG	A	80	100	160	160	160	
	500 V	aM	A	63	63	63	63	80	
		gG	A	80	80	80	80	100	
	690 V	aM	A	50	50	50	50	63	
		gG	A	63	63	63	63	80	
	Use of circuit breakers without fuses			Minimum cable length (in metres) limiting the maximum short-circuit current to 35 kA maximum, so enabling breakers GK3 EF80 to be used without fuses					
	Cable c.s.a.			mm ²	≤ 25	35	50	70	95
Isc (rms) 3-phase, incoming (Ue = 415 V)	50 kA	m	5	6	8	10	13		
	45 kA	m	5	5	7	8	10		
	40 kA	m	5	5	5	5	8		
	37 kA	m	5	5	5	5	5		

* Fuse not required: breaking capacity Icn > Isc.
 (1) As % of Icu.

Tripping curves for GV2 L or LE combined with thermal overload relay LRD or LR2 K

Average operating times at 20 °C related to multiples of the setting current



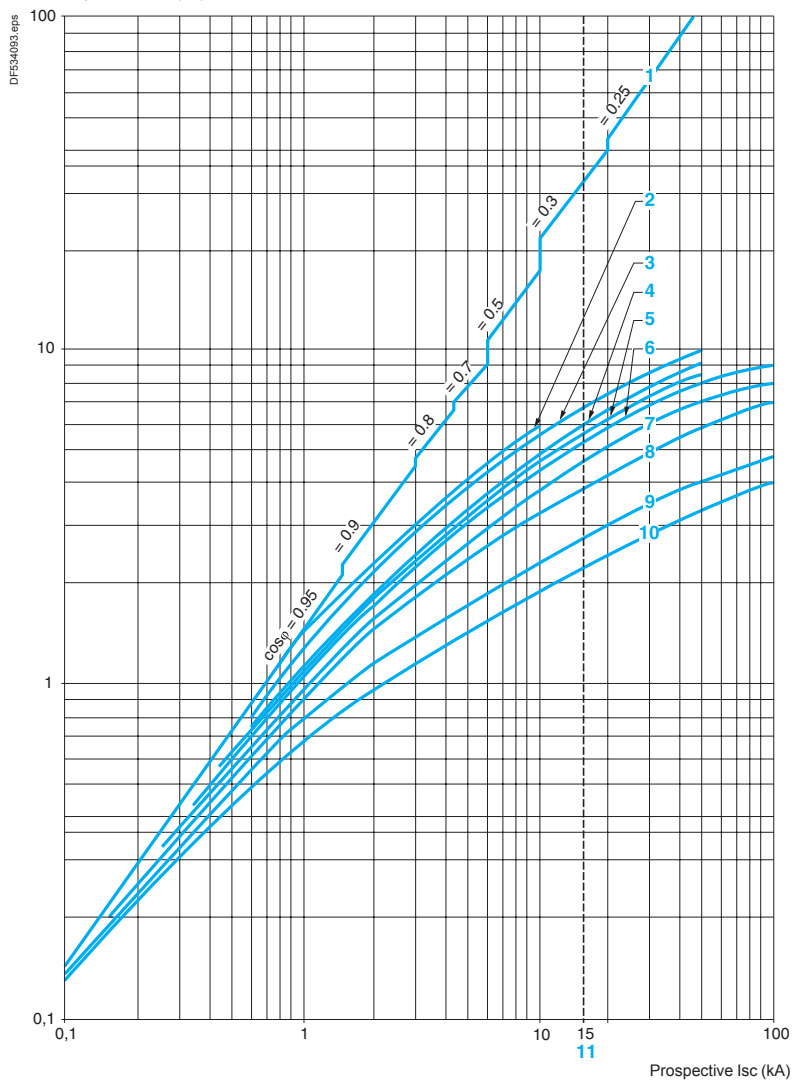
- 1 3 poles from cold state
- 2 2 poles from cold state
- 3 3 poles from hot state

Current limitation on short-circuit for GV2 L and GV2 LE only (3-phase 400/415 V)

Dynamic stress

$I_{peak} = f(\text{prospective } I_{sc}) \text{ at } 1.05 U_e = 435 \text{ V}$

Limited peak current (kA)



1 Maximum peak current

2 32 A

3 25 A

4 18 A

5 14 A

6 10 A

7 6.3 A

8 4 A

9 2.5 A

10 1.6 A

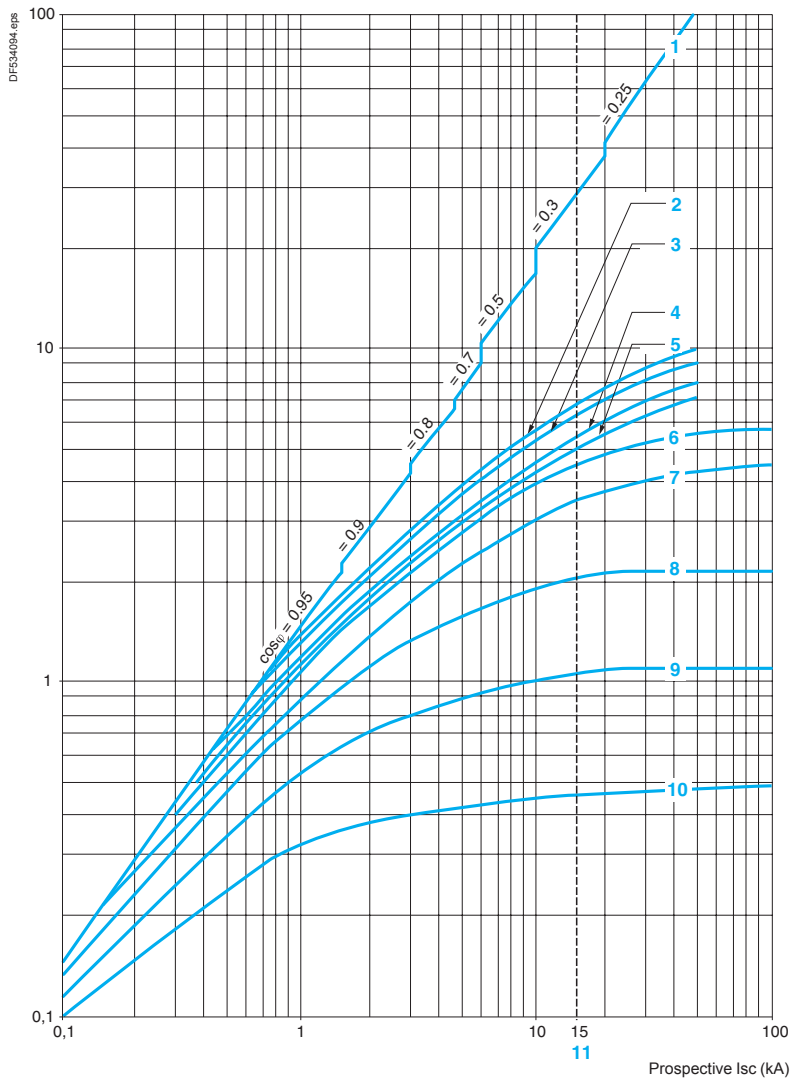
11 Limit of rated ultimate breaking capacity on short-circuit of GV2 LE (14, 18, 23 and 25 A ratings).

Current limitation on short-circuit for GV2 L and GV2 LE + thermal overload relay LRD or LR2 K (3-phase 400/415 V)

Dynamic stress

$I_{peak} = f(\text{prospective } I_{sc}) \text{ at } 1.05 U_e = 435 \text{ V}$

Limited peak current (kA)

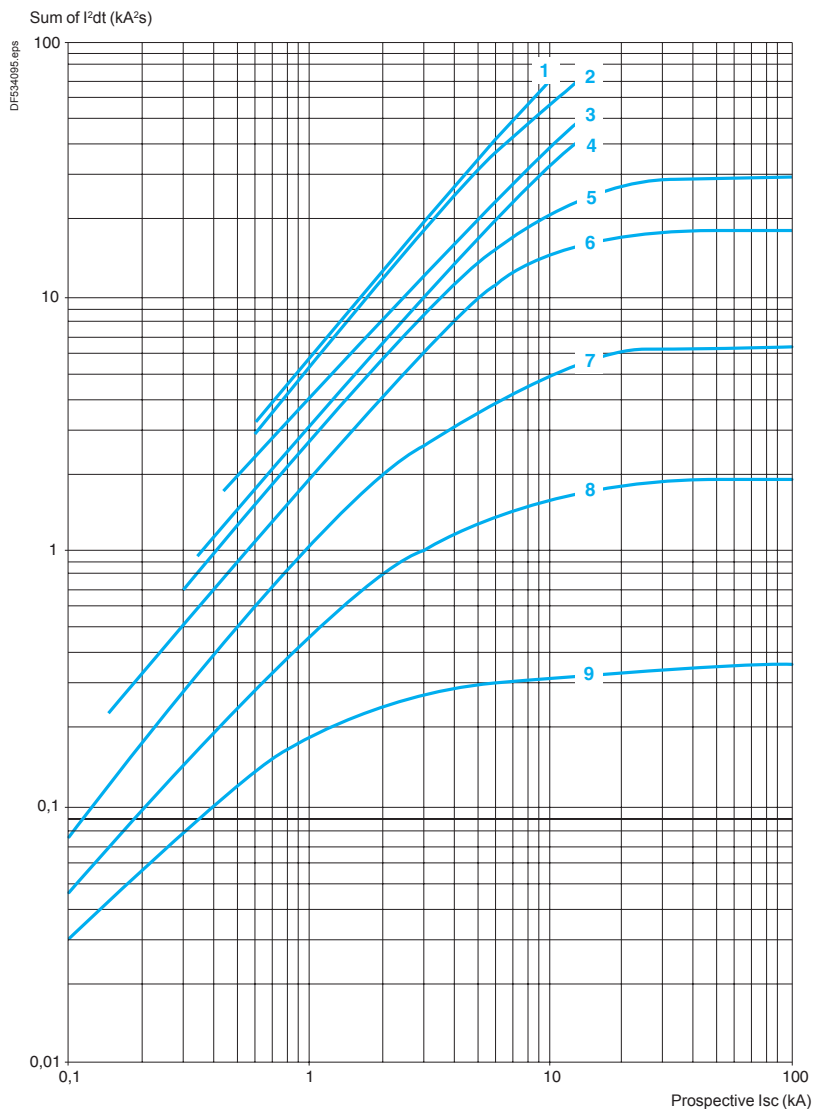


- 1 Maximum peak current
- 2 32 A
- 3 25 A
- 4 18 A
- 5 14 A
- 6 10 A
- 7 6.3 A
- 8 4 A
- 9 2.5 A
- 10 1.6 A
- 11 Limit of rated ultimate breaking capacity on short-circuit of GV2 LE (14, 18, 23 and 25 A ratings).

Thermal limit on short-circuit for GV2 LE only

Thermal limit in kA²s in the magnetic operating zone

Sum of I²dt = f (prospective I_{sc}) at 1.05 U_e = 435 V

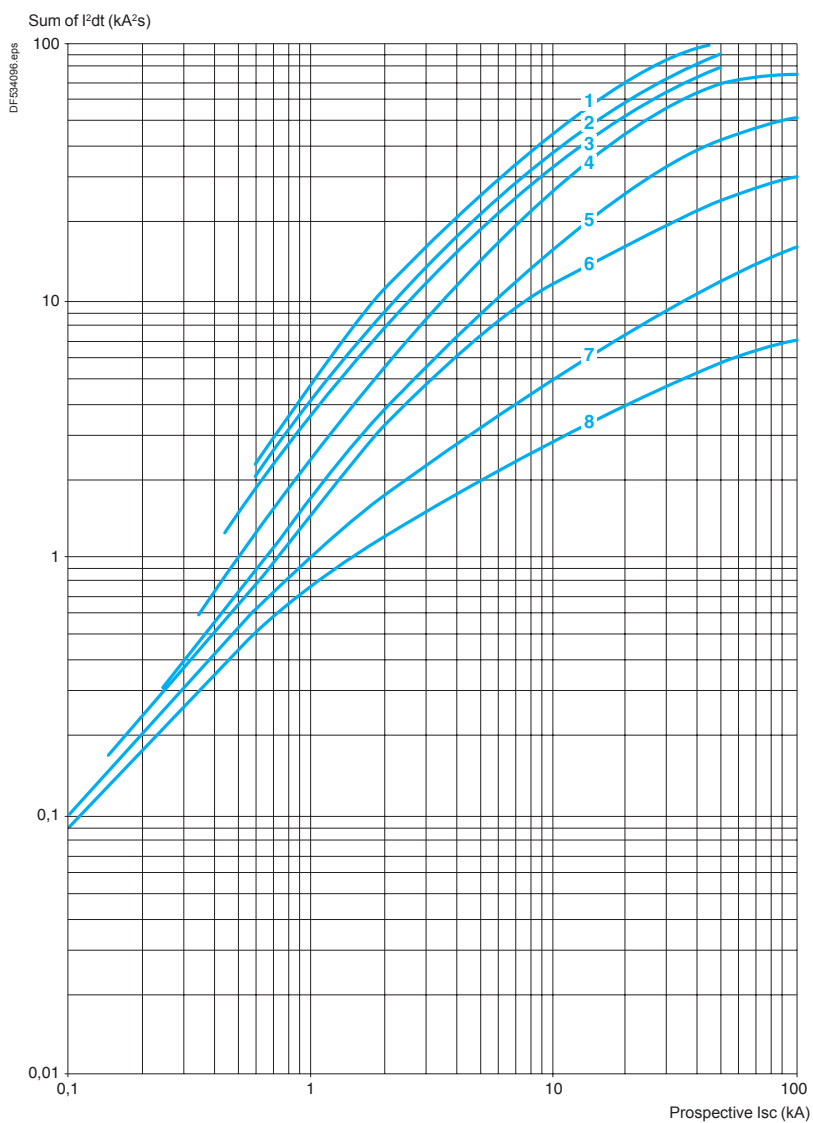


- 1 32 A
- 2 25 A
- 3 18 A
- 4 14 A
- 5 10 A
- 6 6.3 A
- 7 4 A
- 8 2.5 A
- 9 1.6 A

Thermal limit on short-circuit for GV2 L only

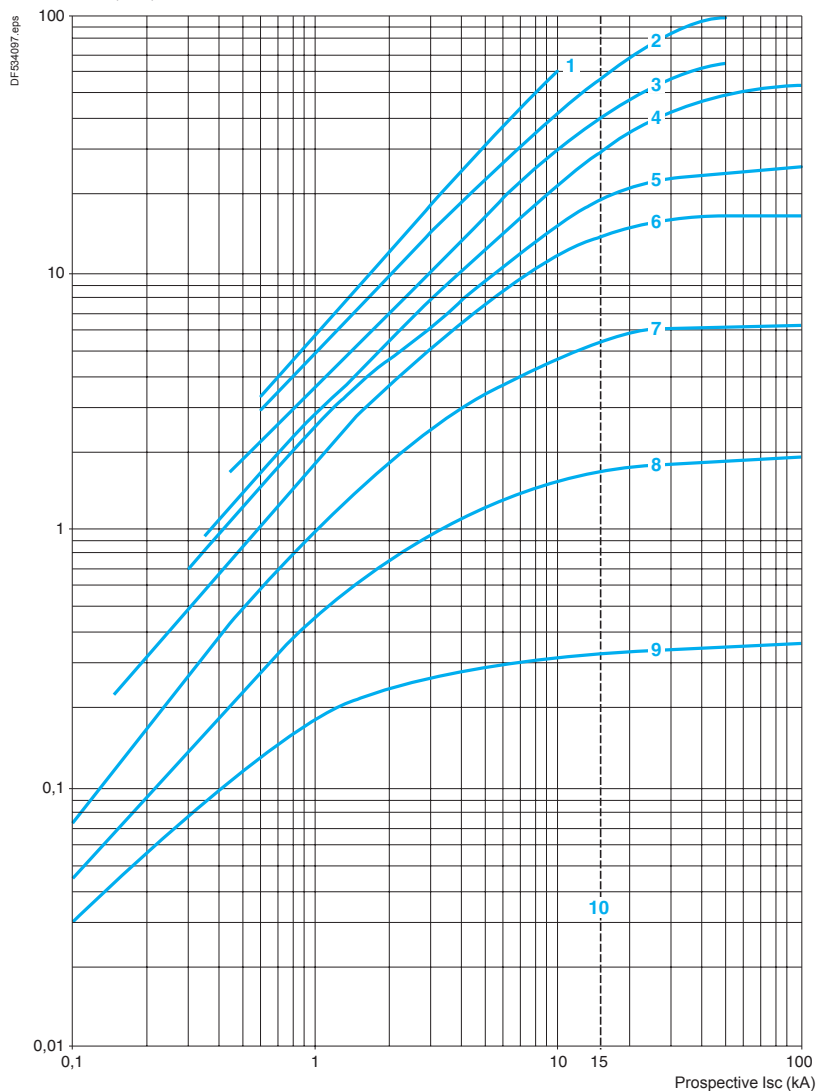
Thermal limit in kA²s in the magnetic operating zone

Sum of I²dt = f (prospective I_{sc}) at 1.05 U_e = 435 V



- 1 25 A and 32 A
- 2 18 A
- 3 14 A
- 4 10 A
- 5 6.3 A
- 6 4 A
- 7 2.5 A
- 8 1.6 A

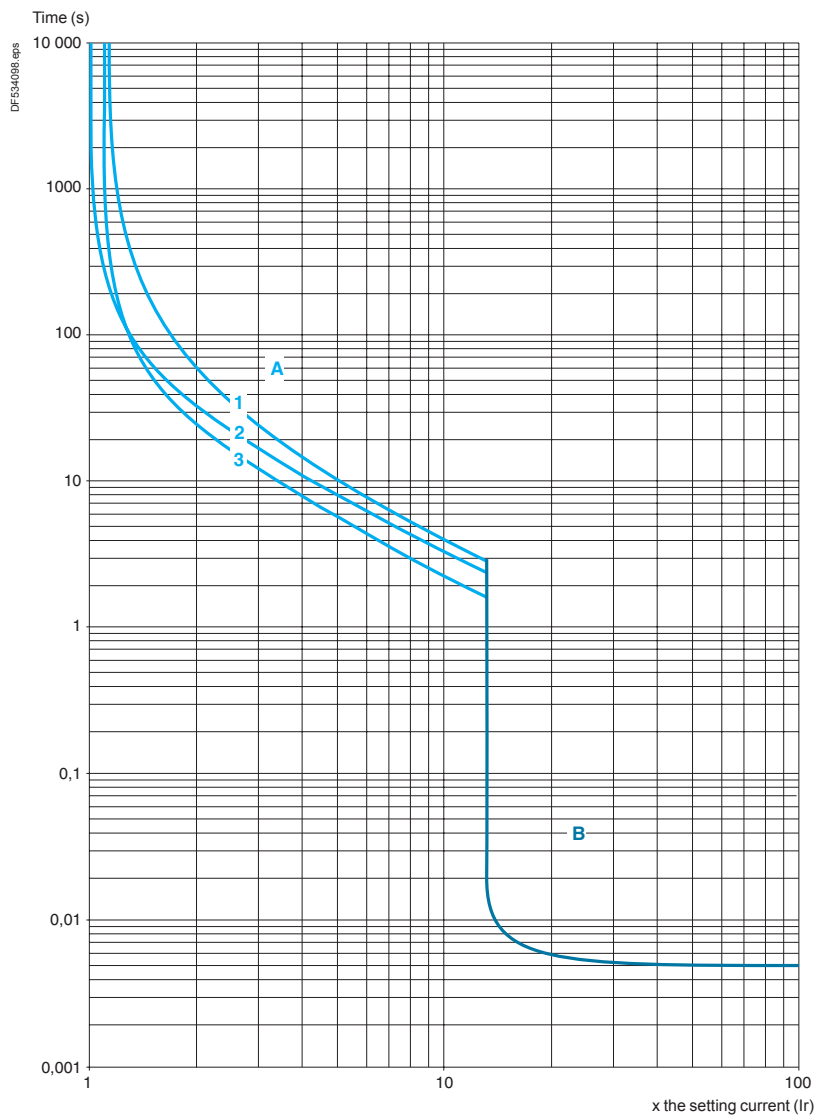
Thermal limit on short-circuit for GV2 L and GV2 LE + thermal overload relay LRD or LR2 K

Thermal limit in kA^2s in the magnetic operating zoneSum of $I^2dt = f(\text{prospective } I_{sc})$ at $1.05 U_e = 435 \text{ V}$ Sum of I^2dt (kA^2s)

- 1 32 A (GV2 LE32)
- 2 25 A and 32 A (GV2 L32)
- 3 18 A
- 4 14 A
- 5 10 A
- 6 6.3 A
- 7 4 A
- 8 2.5 A
- 9 1.6 A
- 10 Limit of rated ultimate breaking capacity on short-circuit of GV2 LE (14, 18, 23 and 25 A ratings).

Tripping curves for GV3 L combined with thermal overload relay LRD 33

Average operating time at 20 °C without prior current flow



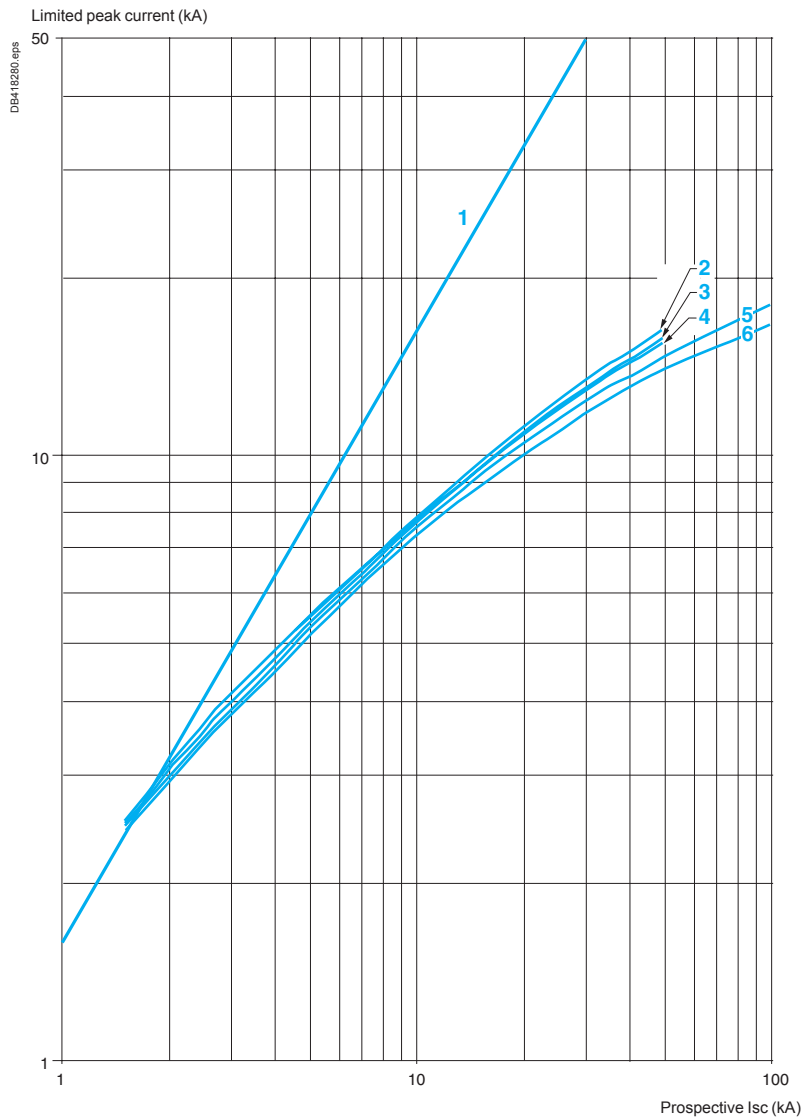
- 1 3 poles from cold state
- 2 2 poles from cold state
- 3 3 poles from hot state

- A Thermal overload relay protection zone
- B GV3 L protection zone

Current limitation on short-circuit for GV3 L (3-phase 400/415 V)

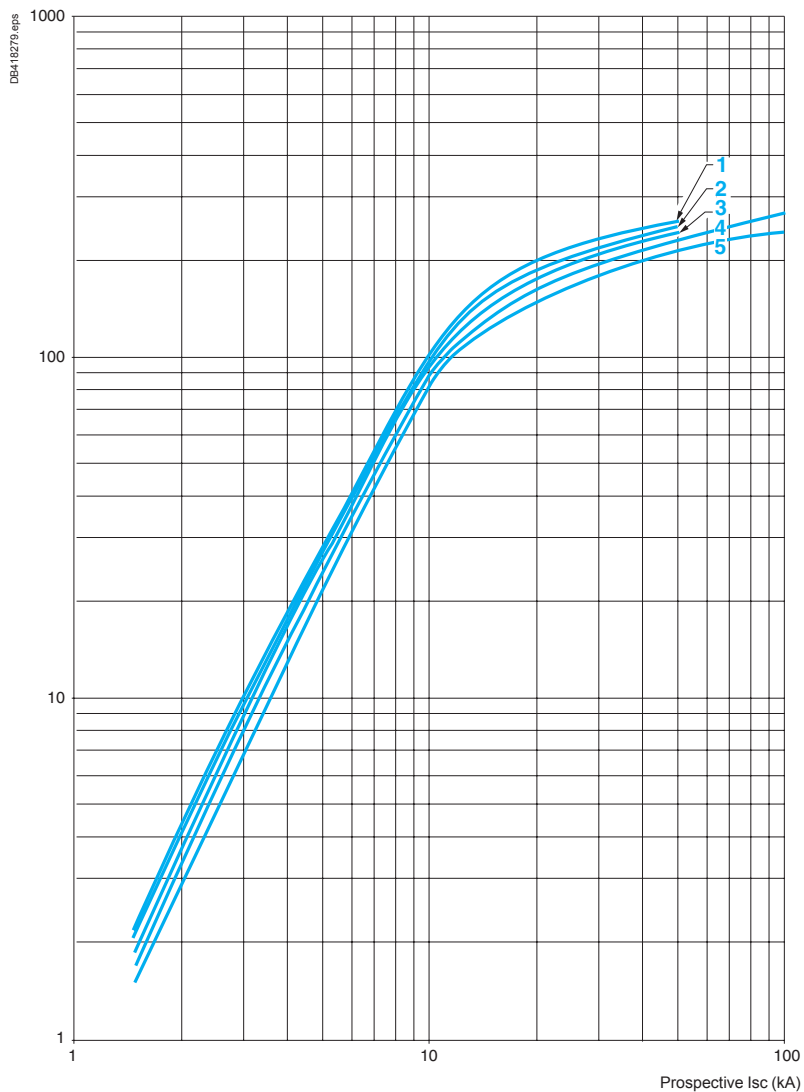
Dynamic stress

$I_{\text{peak}} = f(\text{prospective } I_{\text{sc}}) \text{ at } 1.05 U_e = 435 \text{ V}$



- 1 Maximum peak current
- 2 GV3 L65
- 3 GV3 L50
- 4 GV3 L40
- 5 GV3 L32
- 6 GV3 L25

Thermal limit on short-circuit for GV3 L

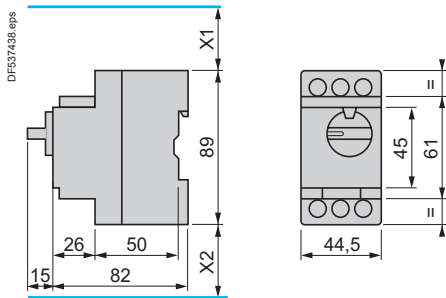
Thermal limit in A²sSum of I²dt = f (prospective I_{sc}) at 1.05 U_e = 435 VSum of I²dt (A²s)

- 1 GV3 L65
- 2 GV3 L50
- 3 GV3 L40
- 4 GV3 L32
- 5 GV3 L25

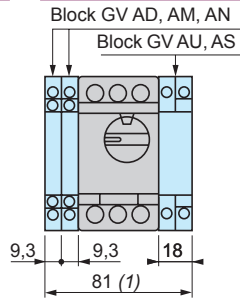
TeSys GV

GV2 L

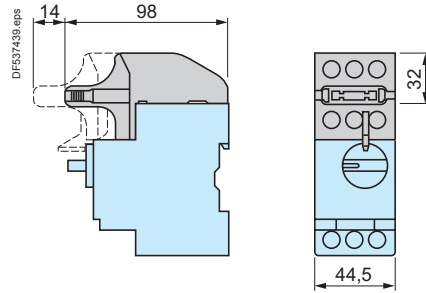
Dimensions



GV AD, AM, AN, AU, AS



GV2 AK00



X1 Electrical clearance = 40 mm for $U_e \leq 415$ V, or 80 mm for $U_e = 440$ V, or 120 mm for $U_e = 500$ and 690 V.
X2 = 40 mm.

(1) Maximum.

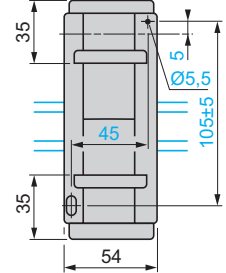
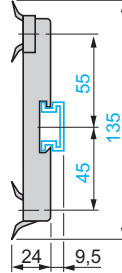
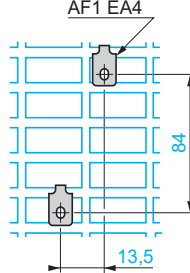
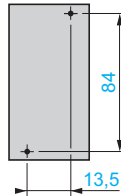
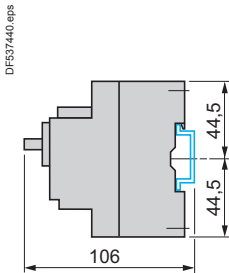
Mounting

On rail AM1 DE200, AM1 ED200 (35 x 15)

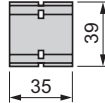
Panel mounted

On pre-slotted mounting plate AM1 PA

Adapter plate GK2 AF01

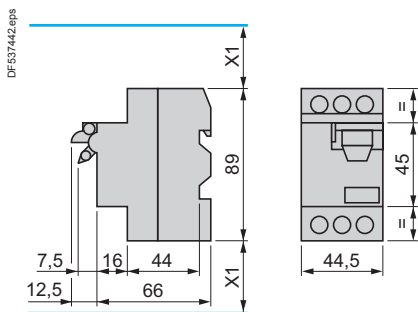


7.5 mm height compensation plate GV1 F03

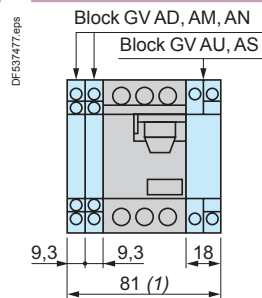


GV2 LE

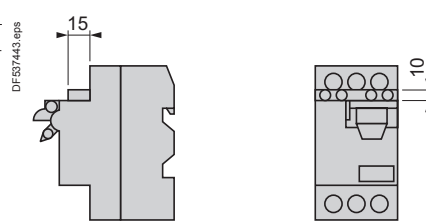
Dimensions



GV AD, AM, AN, AU, AS



GV AE



X1 Electrical clearance = 40 mm for $U_e \leq 690$ V.

(1) Maximum.

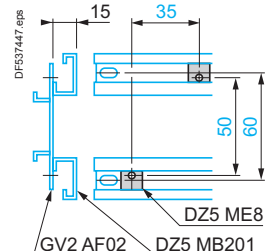
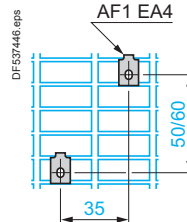
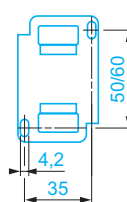
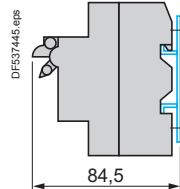
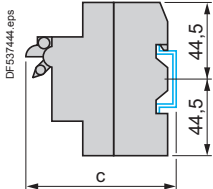
Mounting

On 35 mm rail

On panel with adapter plate GV2 AF02

On pre-slotted plate AM1 PA

On rails DZ5 MB201

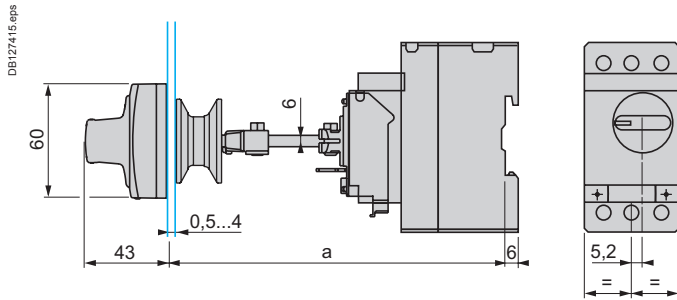


c = 80 on AM1 DP200 (35 x 7.5) and 88 on AM1 DE200, ED200 (35 x 15)

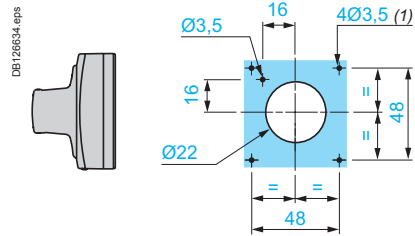
TeSys GV

Mounting

Mounting of external operator GV2 APN01, GV2 APN02 or GV2 APN04 for motor circuit breakers GV2 L

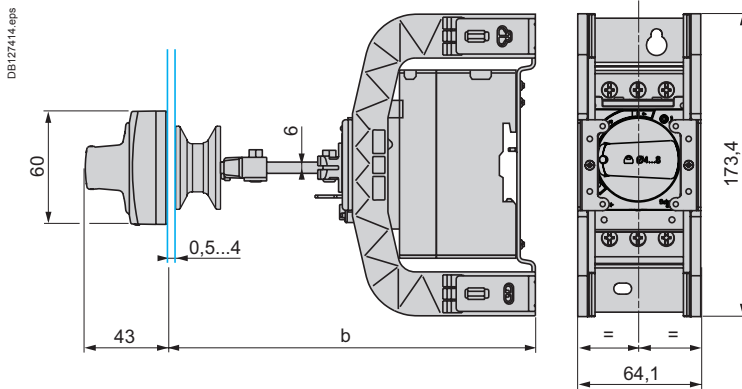


Door cut-out

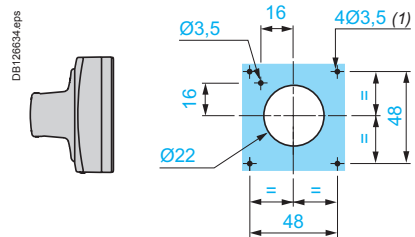


(1) For IP65 only.

Mounting of external operator GV2 APH02 for motor circuit breakers GV2 L



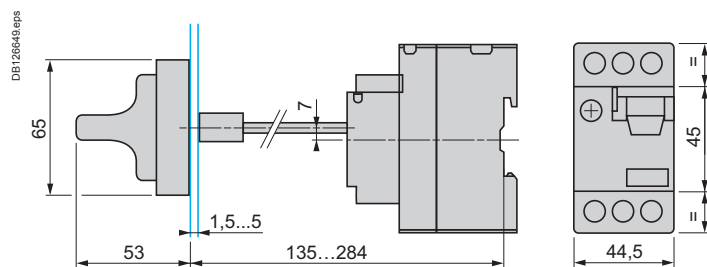
Door cut-out



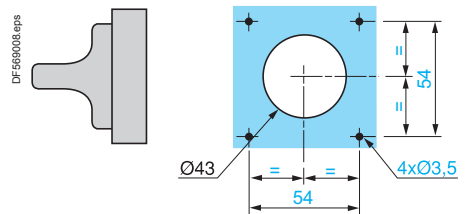
(1) For IP65 only.

	a		b	
	Mini	Maxi	Mini	Maxi
GV2 APN●●	140	250		
GV2 APN●● + GV APH02			151	250
GV2 APN●● + GV APK11	250	434	-	-
GV2 APN●● + GV APH02 + GV APK11	-	-	250	445

Mounting of external operator GV2 AP03 for GV2 LE

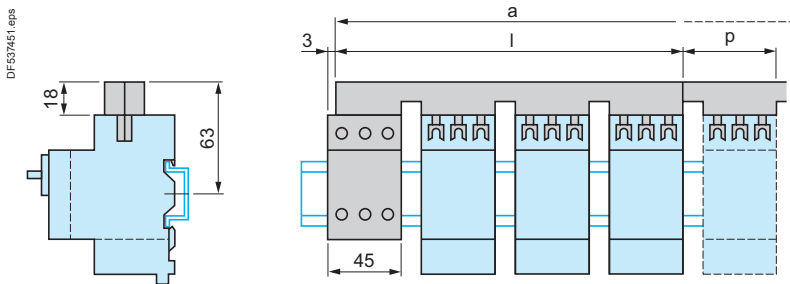


Door cut-out



GV2 L and GV2 LE

Sets of busbars GV2 G445, GV2 G454, GV2 G472, with terminal block GV2 G05

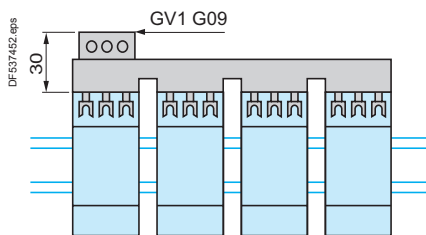


	l	p
GV2 G445 (4 x 45 mm)	179	45
GV2 G454 (4 x 54 mm)	206	54
GV2 G472 (4 x 72 mm)	260	72

	a			
Number of tap-offs	5	6	7	8
GV2 G445	224	269	314	359
GV2 G454	260	314	368	422
GV2 G472	332	404	476	548

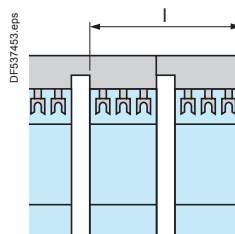
Sets of busbars for GV2 L and GV2 LE

Sets of busbars GV2 G●●● with term. block GV1 G09

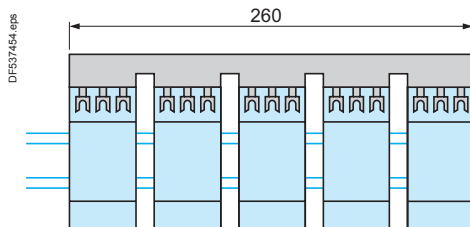


	l
GV2 G245 (2 x 45 mm)	89
GV2 G254 (2 x 54 mm)	98
GV2 G272 (2 x 72 mm)	116

Sets of busbars GV2 G245, GV2 G254, GV2 GR272

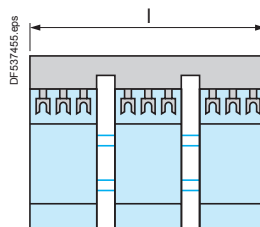


Set of busbars GV2 G554



	l
GV2 G345 (3 x 45 mm)	134
GV2 G354 (3 x 54 mm)	152

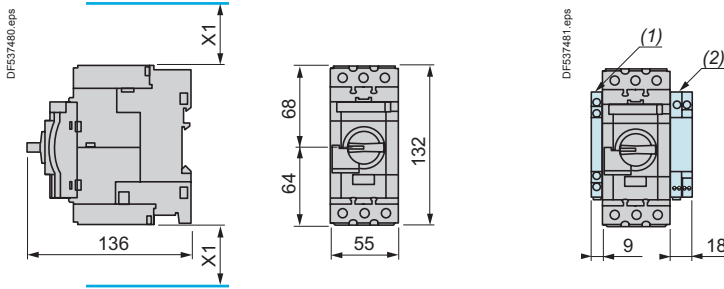
Sets of busbars GV2 G345 and GV2 G354



TeSys GV

GV3 L

Dimensions



X1 = Electrical clearance (ISC max)
40 mm for $U_e \leq 500$ V, 50 mm for $U_e \leq 690$ V

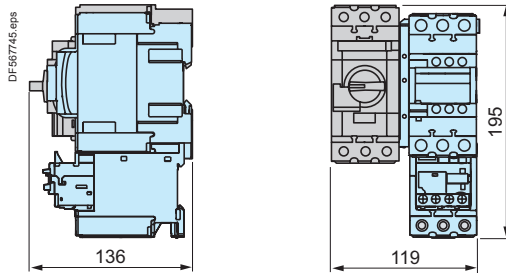
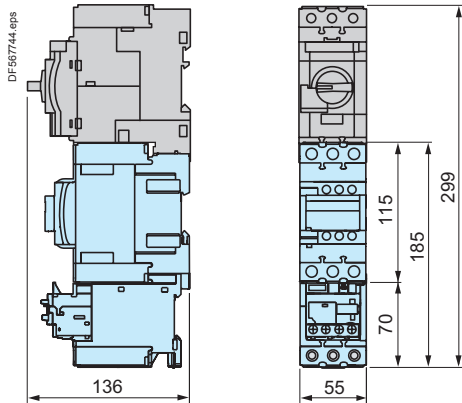
(1) Blocks GV AN●●, GV AD●● and GV AM11.
(2) Blocks GV3 AU●● and GV3 AS●●.

Note: Leave a space of 9 mm between 2 circuit breakers: either an empty space or side-mounting add-on contact blocks.
Side by side mounting is possible up to 40 °C.

Mounting

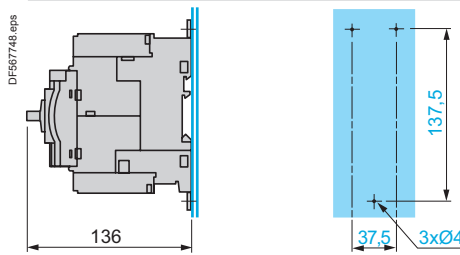
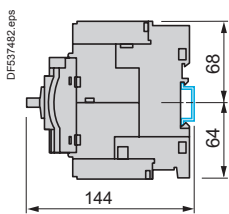
Mounting with Tesys contactor LC1 D40A...D65A and relay LR3 D313...365

Side by side mounting with Tesys contactor LC1 D40A...D65A (S-shape busbar system GV3 S)



Mounting on rail AM1 DE200 or AM1 ED201

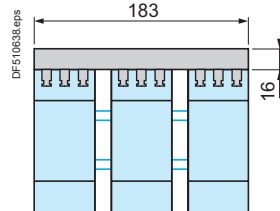
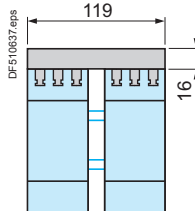
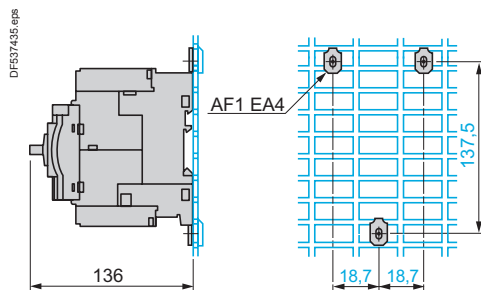
Panel mounting, using M4 screws



Mounting on pre-slotted plate AM1 PA

Set of busbars GV3 G264

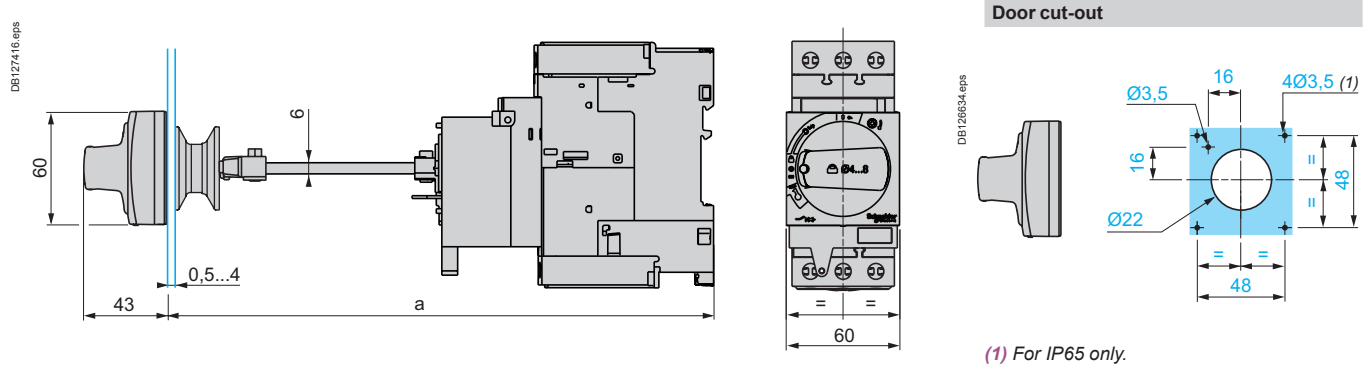
Set of busbars GV3 G364



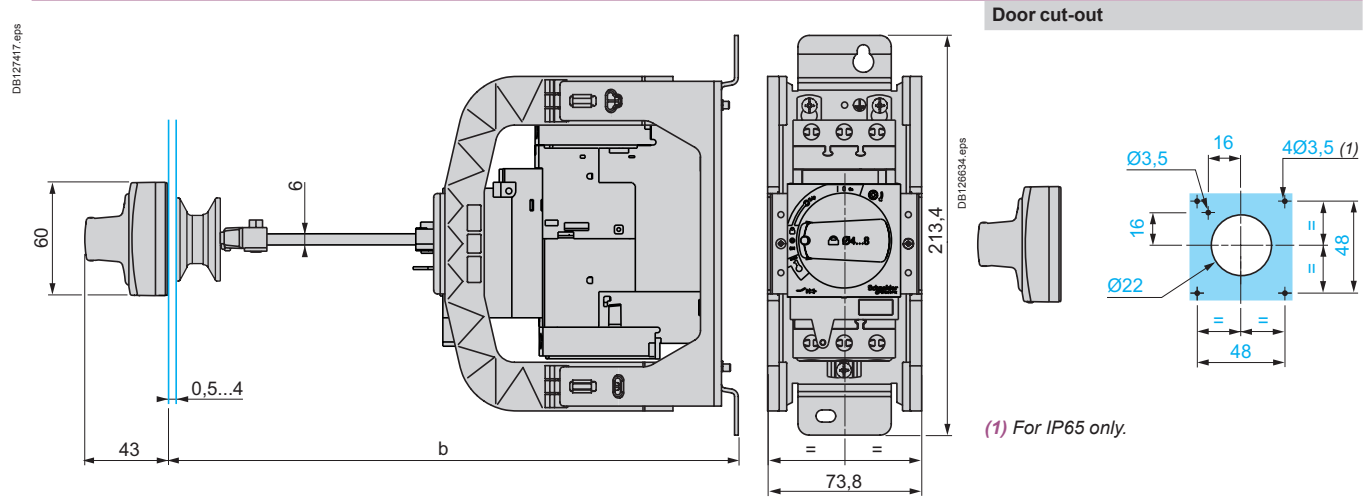
TeSys GV

Mounting

Mounting of external operator GV3 APN01, GV3 APN02 or GV3 APN04 for motor circuit breakers GV3 L



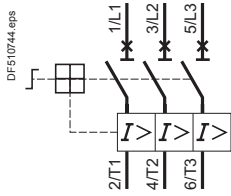
Mounting of external operator GV APH03 for motor circuit breakers GV3 L



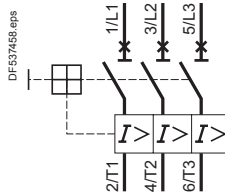
	a		b	
	Mini	Maxi	Mini	Maxi
GV3 APN●●	189	300	-	-
GV3 APN●● + GV APK12	300	481	-	-
GV3 APN●● + GV APH03	-	-	200	300
GV3 APN●● + GV APH03 + GV APK12	-	-	300	492

Magnetic motor circuit breakers

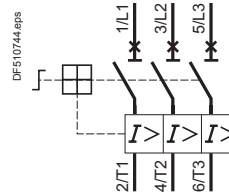
GV2 L●●



GV2 LE●●



GV3 L●●

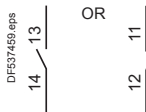


Accessories

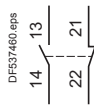
Front mounting add-on contact blocks

Instantaneous auxiliary contacts

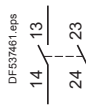
GV AE1



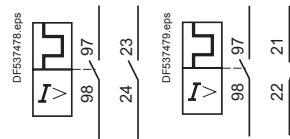
GV AE11



GV AE20



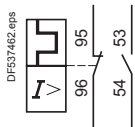
GV AED101 and GV AED011



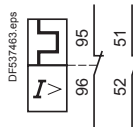
Side mounting add-on contact blocks

Instantaneous auxiliary contacts and fault signalling contacts

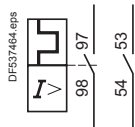
GV AD0110



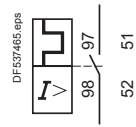
GV AD0101



GV AD1010

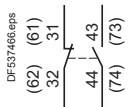


GV AD1001

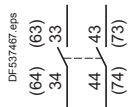


Instantaneous auxiliary contacts

GV AN11

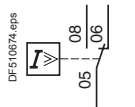


GV AN20



Short-circuit signalling contacts

GV AM11

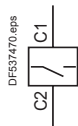


Voltage trips

GV AU●●●

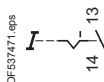


GV AS●●●

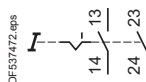


Start-Stop signalling contact blocks

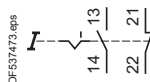
GK2 AX10



GK2 AX20

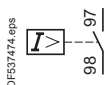


GK2 AX50

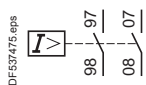


Fault signalling contact blocks

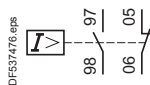
GK2 AX12



GK2 AX22



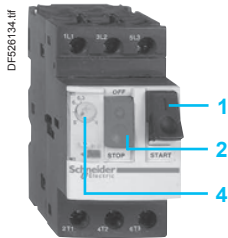
GK2 AX52



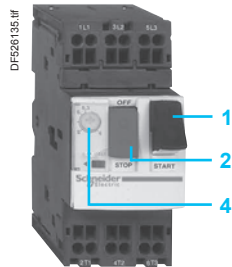
TeSys protection components

Thermal-magnetic motor circuit breakers GV2, GV3 and GV7

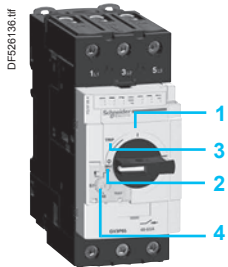
TeSys GV



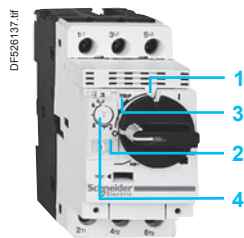
GV2 ME
with screw clamp
terminals



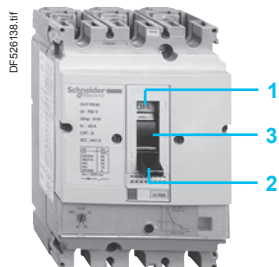
GV2 ME
with spring terminals
connections



GV3 P



GV2 P



GV7 R

Presentation

GV2 ME, GV2 P, GV3 ME, GV3 P and GV7 R motor circuit breakers are 3-pole thermal-magnetic circuit breakers **specifically designed for the control and protection of motors**, conforming to standards IEC 60947-2 and IEC 60947-4-1.

Connection

GV2

GV2 ME and GV2 P circuit breakers are designed for connection by screw clamp terminals.

Circuit breaker GV2 ME can be supplied with lugs or spring terminal connections. Spring terminal connections ensure secure, permanent and durable clamping that is resistant to harsh environments, vibration and impact and are even more effective when conductors without cable ends are used. Each connection can take two independent conductors.

GV3

GV3 circuit breakers feature connection by BTR screws (hexagon socket head), tightened using a n° 4 Allen key.

This type of connection uses the **EverLink®** system with creep compensation ⁽¹⁾ (Schneider Electric patent).

This technique makes it possible to achieve accurate and durable tightening torque, in order to avoid cable creep.

GV3 circuit breakers are also available with connection by lugs. This type of connection meets the requirements of certain Asian markets and is suitable for applications subject to strong vibration, such as railway transport.

GV7

GV7 circuit breakers: with connection by screw clamp terminals (for bars and lugs) and by clip-on connectors.

Operation

Control is manual and local when the motor circuit breaker is used on its own. Control is automatic and remote when it is associated with a contactor.

GV2 ME and GV3 ME80

Pushbutton control.

Energisation is controlled manually by operating the Start button "I" **1**.

De-energisation is controlled manually by operating the Stop button "O" **2**, or automatically by the thermal-magnetic protection elements or by a voltage trip attachment.

GV2 P, GV3 P and GV7 R

- Control by rotary knob: for GV2 P and GV3 P
- Control by rocker lever: for GV7 R.

Energisation is controlled manually by moving the knob or rocker lever to position "I" **1**. De-energisation is controlled manually by moving the knob or rocker lever to position "O" **2**.

De-energisation due to a fault automatically places the knob or rocker lever in the "Trip" position **3**.

Re-energisation is possible only after having returned the knob or rocker lever to position "O".

⁽¹⁾ Creep: normal crushing phenomenon of copper conductors, that is accentuated over time.

TeSys protection components

Thermal-magnetic motor circuit breakers GV2, GV3 and GV7

Presentation

Protection of motors and personnel

Motor protection is provided by the thermal-magnetic protection elements incorporated in the motor circuit breaker.

The **magnetic** elements (short-circuit protection) have a non-adjustable tripping threshold, which is equal to 13 times the maximum setting current of the thermal trips.

The **thermal** elements (overload protection) include automatic compensation for ambient temperature variations.

The rated operational current of the motor is displayed by means of a graduated knob **4**. Personnel protection is also provided. All live parts are protected against direct finger contact from the front panel.

The addition of an undervoltage trip allows the circuit breaker to be de-energised in the event of an undervoltage condition. The user is therefore protected against sudden starting of the machine when normal voltage is restored, since the Start button "I" has to be pressed to restart the motor.

With the addition of a shunt trip, de-energisation of the unit can be remotely controlled.

The operators on both open-mounted and enclosed motor circuit breakers can be locked in the Stop position "O" by up to 4 padlocks.

Because they are suitable for isolation, these circuit breakers, in the open position, provide an adequate isolation distance and indicate the actual position of the moving contacts by the position of the operators.

Special features

These motor circuit breakers are easily installed in any configuration thanks to their universal fixing arrangement: screw fixing or clip-on mounting on symmetrical, asymmetrical or combination rails.

Environment

Circuit breaker type			GV2 ME	GV2 P	GV3 P	GV3 ME80	GV7 R
Conforming to standards			IEC 60947-1, 60947-2, 60947-4-1, EN 60204, UL 508, CSA C 22.2 n° 14-05, NF C 63-650, 63-120, 79-130, VDE 0113, 0660		IEC/EN 60947-1, 60947-2, 60947-4-1, UL 508 type E, CSA C 22.2 n° 14-05 type E	IEC/EN, NF EN, BS EN, DINEN 60947-2, 60947-4-1	IEC 60947-1, 60947-2, 60947-4-1, EN 60947-1, 60947-2, EN 60947-4-1, NF C 63-650, NF C 63-120, 79-130, VDE 0113, 0660
Product certifications			UL, CSA, CCC, CEBC, GOST, TSE, BV, GL, LROS, DNV, PTB, EZU, SETI, RINA, ATEX	UL ⁽¹⁾ , CSA, PTB, EZU, GOST, TSE, DNV, LROS, GL, BV, RINA, CCC, ATEX	UL, CSA, CCC (pending), GOST, ATEX, GL, BV, LROS (DNV, RINA pending)	UL, CSA, LROS	UL, DNV, CCC
Protective treatment			"TH"		"TH"	"TC"	"TC"
Degree of protection (front face)	Conforming to IEC 60529	Open mounted	Against direct finger contact: IP20		Against direct finger contact: IP20	Against direct finger contact: IP20	IP405 with terminal shrouds
		In enclosure	GV2 M●01: IP41 GV2 M●02: IP55	–	GV3 PC01 and GV3 PC02: IP55	GV3 CE01: IP55	–
Shock resistance	Conforming to IEC 60068-2-27	30 gn -11 ms			On: 15 gn -11 ms Off: 30 gn -11 ms	22 gn - 20 ms	15 gn -11 ms
Vibration resistance	Conforming to IEC 60068-2-6	5 gn (5...150 Hz)			4 gn (5...300 Hz)	2.5 gn (0...25 Hz)	2.5 gn (25 Hz)
Ambient air temperature	Storage	°C	-40...+80	-40...+80	-40...+80	-40...+80	-55...+95
	Operation	Open mounted	°C	-20...+60	-20...+60	-20...+60 ⁽²⁾	-20...+60
In enclosure		°C	-20...+40	-20...+40	-20...+40	-20...+40	–
Temperature compensation	Open mounted	°C	-20...+60	-20...+60	-20...+60	-20...+60	-25...+55 ⁽³⁾
	In enclosure	°C	-20...+40	-20...+40	-20...+40	-20...+40	–
Flame resistance	Conforming to IEC 60695-2-1	°C	960		960	960	960
Maximum operating altitude		m	2000		3000	3000	2000
Suitable for isolation	Conforming to IEC 60947-1 § 7-1-6		Yes		Yes	–	Yes
Resistance to mechanical impact		J	0.5	0.5	10	0.5	0.5
			IK04		IK09 (in enclosure)	–	–
Sensitivity to phase failure			Yes, conforming to IEC 60947-4-1 § 7-2-1-5-2				

Technical characteristics

Circuit breaker type		GV2 ME	GV2 P	GV2 RT	GV3 P	GV3 ME80	GV7 R●20... R●100	GV7 R●150	GV7 R●220	
Utilisation category	Conforming to IEC 60947-2	A			A	A	A			
	Conforming to IEC 60947-4-1	AC-3			AC-3	AC-3	AC-3			
Rated operational voltage (Ue)	Conforming to IEC 60947-2	V	690			690	690	690		
Rated insulation voltage (Ui)	Conforming to IEC 60947-2	V	690			690	690	750		
Rated voltage	Conforming to CSA C22-2 n° 14, UL 508	V	600			600	600 (B600)	600		
Rated operational frequency	Conforming to IEC 60947-4-1 UL, CSA	Hz	50/60			50/60	50/60	50/60		
Rated impulse withstand voltage (U imp)	Conforming to IEC 60947-2	kV	6			6	6	8		
Total power dissipated per pole		W	2.5			8	8	5	8.7	14.5
Mechanical durability (C.O.: Close, Open)		C.O.	100 000			50 000	30 000	50 000	40 000	20 000
Electrical durability for AC-3 duty	440 V In/2	C.O.	100 000			–	30 000	50 000	40 000	20 000
	440 V In	C.O.	–			50 000	–	30 000	20 000	10 000
Duty class (maximum operating rate)		C.O./h	25			25	25	25		
Maximum conventional rated thermal current (Ith)	Conforming to IEC 60947-4-1	A	0.16... 32	0.16... 32	0.40... 23	13... 65	80	12... 100	150	220
Rated duty	Conforming to IEC 60947-4-1		Continuous duty							

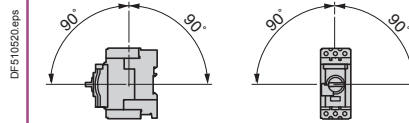
(1) UL 508 type E for **GV2 P●H7**.

(2) Leave a space of 9 mm between 2 circuit breakers: either an empty space, or side mounting add-on contact blocks. Side by side mounting is possible up to 40 °C.

(3) For operation up to 70 °C, please consult your Regional Sales Office.

Mounting characteristics

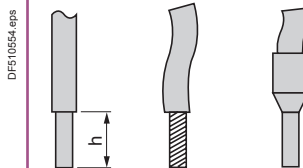
Operating position
Without derating, in relation to normal vertical mounting plane ⁽¹⁾



Connection characteristics

Connection to screw clamp terminals or spring terminals

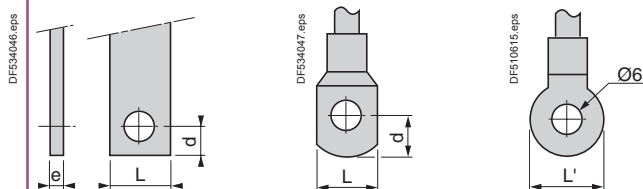
Bare cables



Circuit breaker type			GV2 ME		GV2 P		GV3 P		GV3 ME80	
Connection to screw clamp terminals ⁽²⁾ (Max. number of conductors x c.s.a.)		mm ²	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Solid cable	Solid cable	mm ²	2 x 1	2 x 6	2 x 1	2 x 6	2 x 1	1 x 25 and 1 x 35	1 x 2.5	1 x 35
	Flexible cable without cable end	mm ²	2 x 1.5	2 x 6	2 x 1.5	2 x 6	2 x 1	1 x 25 and 1 x 35	1 x 2.5	2 x 16
	Flexible cable with cable end	mm ²	2 x 1	2 x 4	2 x 1	2 x 4	2 x 1	1 x 25 and 1 x 35	1 x 2.5	2 x 16
Tightening torque		N.m	1.7	1.7	1.7	1.7	5	5: 25 mm ² 8: 35 mm ²	5	5
Connection to spring terminals Number of conductors x c.s.a.	Solid cable	mm ²	2 x 1 ⁽³⁾	2 x 6	-	-	-	-	-	-
	Flexible cable without cable end	mm ²	2 x 1.5 ⁽³⁾	2 x 4	-	-	-	-	-	-

Connection by bars or lugs

Bars or lugs



Circuit breaker type			GV2 ME●●6	GV3 P●●6	GV7 R●20...R●100	GV7 R●150	GV7 R●220
Pitch	Without spreaders	mm	13.5	17.5	35	35	35
	With spreaders	mm	-	-	45	45	45
Bars or cables with lugs	e	mm	≤ 6	≤ 6	≤ 6	≤ 6	≤ 6
	L	mm	≤ 9.5	≤ 13.5	≤ 25	≤ 25	≤ 25
	L'	mm	≤ 9.5	≤ 16.5	-	-	-
	d	mm	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10
Screws			M4	M6	M6	M8	M8
	Tightening torque	N.m	1.7	6	10	15	15
Bare cables (copper or aluminium) with connectors	Height (h)	mm	-	-	20	20	20
	C.s.a.	mm ²	-	-	1.5...95	1.5...95	1.5...185
	Tightening torque	N.m	-	-	15	15	15

- (1) When mounting on a vertical rail, fit a stop to prevent any slippage.
- (2) For motor circuit breakers GV3 P: BTR hexagon socket head screws, EverLink® system. Require use of an insulated Allen key, in compliance with local electrical wiring regulations.
- (3) For cross-sections 1 to 1.5 mm², the use of an LA9 D99 cable end reducer is recommended.

TeSys protection components

Thermal-magnetic motor

circuit breakers GV2 ME and GV2 P

TeSys GV

Breaking capacity of GV2 ME and GV2 P

Circuit breaker type		GV2 ME										GV2 P									
		01 to 06	07	08	10	14	16	20	21 & 22	23 & 25	32	01 to 06	07	08	10	14	16	20	21 & 22	32	
Rating	A	0.1 to 1.6	2.5	4	6.3	10	14	18	23 & 25	32	0.1 to 1.6	2.5	4	6.3	10	14	18	23 & 25	32		
Breaking capacity conforming to IEC 60947-2	230/240 V	Icu	kA	*	*	*	*	*	*	*	50	50	*	*	*	*	*	*	*	*	
		Ics % ⁽¹⁾		*	*	*	*	*	*	*	100	100	*	*	*	*	*	*	*	*	
400/415 V	Icu	kA	*	*	*	*	*	15	15	15	10	*	*	*	*	*	*	50	50	50	
	Ics % ⁽¹⁾		*	*	*	*	*	50	50	40	50	*	*	*	*	*	*	50	50	50	
440 V	Icu	kA	*	*	*	50	15	8	8	6	6	*	*	*	*	*	50	20	20	20	
	Ics % ⁽¹⁾		*	*	*	100	100	50	50	50	50	*	*	*	*	*	75	75	75	75	
500 V	Icu	kA	*	*	*	50	10	6	6	4	4	*	*	*	*	50	42	10	10	10	
	Ics % ⁽¹⁾		*	*	*	100	100	75	75	75	75	*	*	*	*	100	75	75	75	75	
690 V	Icu	kA	*	3	3	3	3	3	3	3	3	*	8	8	6	6	4	4	4	4	
	Ics % ⁽¹⁾		*	75	75	75	75	75	75	75	75	*	100	100	100	100	100	100	100	100	
Associated fuses (if required) if I _{sc} > breaking capacity I _{cu} conforming to IEC 60947-2	230/240 V	aM	A	*	*	*	*	*	*	*	80	80	*	*	*	*	*	*	*	*	
		gG	A	*	*	*	*	*	*	*	100	100	*	*	*	*	*	*	*	*	
400/415 V	aM	A	*	*	*	*	*	63	63	80	80	*	*	*	*	*	*	100	100	100	
	gG	A	*	*	*	*	*	80	80	100	100	*	*	*	*	*	*	125	125	125	
440 V	aM	A	*	*	*	50	50	50	50	63	63	*	*	*	*	*	50	63	80	80	
	gG	A	*	*	*	63	63	63	63	80	80	*	*	*	*	*	63	80	100	100	
500 V	aM	A	*	*	*	50	50	50	50	50	50	*	*	*	*	50	50	50	50	50	
	gG	A	*	*	*	63	63	63	63	63	63	*	*	*	*	63	63	63	63	63	
690 V	aM	A	*	16	25	32	32	40	40	40	40	*	20	25	40	40	50	50	50	50	
	gG	A	*	20	32	40	40	50	50	50	50	*	25	32	50	50	63	63	63	63	

* > 100 kA.
 (1) As % of I_{cu}.

Breaking capacity of GV2 ME and GV2 P (used in association with current limiter GV1 L3)

Circuit breaker type			GV2 ME										
			A	01 to 06	07	08	10	14	16	20	21	22	32
Rating			A	0.1 to 1.6	2.5	4	6.3	10	14	18	23	25	32
Breaking capacity conforming to IEC 60947-2	230/240 V	Icu	kA	*	*	*	*	*	*	*	*	*	*
		Ics % ⁽¹⁾		*	*	*	*	*	*	*	*	*	*
	400/415 V	Icu	kA	*	*	*	*	*	100	100	100	100	100
		Ics % ⁽¹⁾		*	*	*	*	*	50	50	40	40	40
	440 V	Icu	kA	*	*	*	*	*	50	20	20	20	20
		Ics % ⁽¹⁾		*	*	*	*	*	75	75	75	75	75
	500 V	Icu	kA	*	*	*	*	50	42	10	10	10	10
		Ics % ⁽¹⁾		*	*	*	*	100	100	75	75	75	75
Circuit breaker type			GV2 P										
			A	01 to 06	07	08	10	14	16	20	21	22	32
Rating			A	0.1 to 1.6	2.5	4	6.3	10	14	18	23	25	32
Breaking capacity conforming to IEC 60947-2	230/240 V	Icu	kA	*	*	*	*	*	*	*	*	*	*
		Ics % ⁽¹⁾		*	*	*	*	*	*	*	*	*	*
	400/415 V	Icu	kA	*	*	*	*	*	*	*	*	*	*
		Ics % ⁽¹⁾		*	*	*	*	*	*	*	*	*	*
	440 V	Icu	kA	*	*	*	*	*	100	100	100	100	100
		Ics % ⁽¹⁾		*	*	*	*	*	50	50	50	50	50
	500 V	Icu	kA	*	*	*	*	100	100	100	100	100	100
		Ics % ⁽¹⁾		*	*	*	*	50	50	50	50	50	50
	690 V ⁽³⁾	Icu = Ics	kA	*	50	50	50	50	50	50	50	50	50
Circuit breaker type			GV2 ME										
			A	01 to 06	07	08	10	14	16	20	21	22	32
Rating			A	0.1 to 1.6	2.5	4	6.3	10	14	18	23	25	32
Cable protection against thermal stress in the event of short-circuit (PVC insulated copper cables)	Minimum c.s.a. protected at 40 °C at Isc max.	1 mm ²		●	●	●	≤ 10 kA	≤ 6 kA ⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾
		1.5 mm ²		●	●	●	≤ 20 kA	≤ 10 kA ⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾
		2.5 mm ²		●	●	●	●	●	●	●	●	●	⁽²⁾
		4...6 mm ²		●	●	●	●	●	●	●	●	●	●

* > 100 kA.
 ● Cable c.s.a. protected.
 (1) As % of Icu.
 (2) Cable c.s.a. not protected.
 (3) With limiter LA9 LB920.

Breaking capacity of GV3 P and GV3 ME80

Motor circuit breaker type			GV3 P	GV3 P						GV3 ME80		
				13	18	25	32	40	50		65	
Rating		A	13	18	25	32	40	50	65	80		
Breaking capacity conforming to IEC 60947-2	230/240 V	Icu	kA	100	100	100	100	100	100	100	100	
		Ics % ⁽¹⁾		100	100	100	100	100	100	100	100	
	400/415 V	Icu	kA	100	100	100	100	50	50	50	15	
		Ics % ⁽¹⁾		100	100	100	100	100	100	100	50	
	440 V	Icu	kA	50	50	50	50	50	50	50	10	
		Ics % ⁽¹⁾		100	100	100	100	100	100	100	60	
	500 V	Icu	kA	12	12	12	12	12	12	12	4	
		Ics % ⁽¹⁾		50	50	50	50	50	50	50	100	
	690 V	Icu	kA	6	6	6	6	6	6	6	2	
		Ics % ⁽¹⁾		50	50	50	50	50	50	50	100	
	Associated fuses, if required if Isc > breaking capacity Icu	230/240 V	aM	A	*	*	*	*	*	*	*	*
			gG	A	*	*	*	*	*	*	*	*
415 V		aM	A	*	*	*	*	125	125	125	315	
		gG	A	*	*	*	*	160	160	160	400	
440 V		aM	A	63	80	125	125	125	125	125	315	
		gG	A	80	100	160	160	160	160	160	400	
500 V		aM	A	63	63	63	63	80	80	80	200	
		gG	A	80	80	80	80	100	100	100	250	
690 V		aM	A	50	50	50	50	63	63	63	200	
		gG	A	63	63	63	63	80	80	80	250	

* Fuse not required: breaking capacity Icn > Isc.

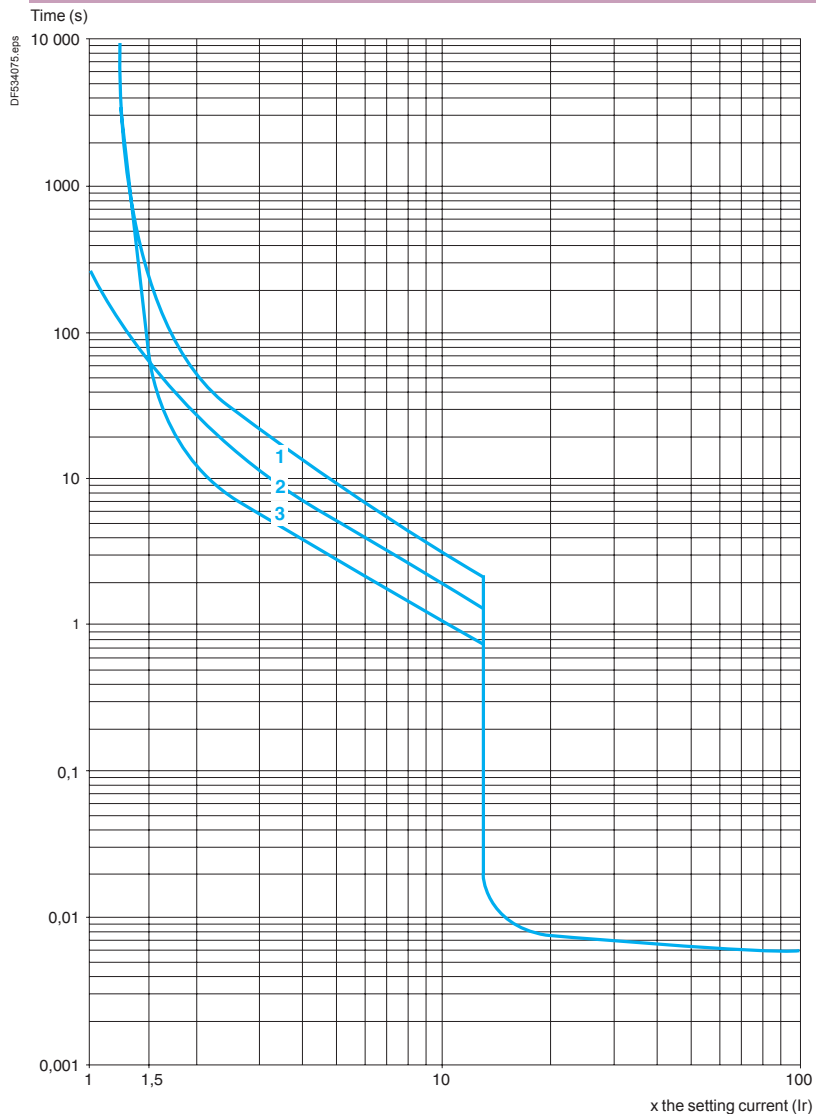
(1) As % of Icu.

Breaking capacity of GV7 R										
Circuit breaker type			A	GV7						
				RE20...RE100	RS20...RS100	RE150	RS150	RE220	RS220	
Rating				12...20 to 60...100		90...150	90...150	132...220	132...220	
Breaking capacity conforming to IEC 60947-2	230/240 V	Icu	kA	85	100	85	100	85	100	
		Ics % ⁽¹⁾		100	100	100	100	100	100	
	400/415 V	Icu	kA	36	70	35	70	35	70	
		Ics % ⁽¹⁾		100	100	100	100	100	100	
	440 V	Icu	kA	36	65	35	65	35	65	
		Ics % ⁽¹⁾		100	100	100	100	100	100	
	500 V	Icu	kA	18	50	30	50	30	50	
		Ics % ⁽¹⁾		100	100	100	100	100	100	
	690 V	Icu	kA	8	10	8	10	8	10	
		Ics % ⁽¹⁾		100	100	100	100	100	100	
	Cable protection against thermal stress in the event of short-circuit (PVC insulated copper cables)	Minimum c.s.a. protected at 40 °C at Isc max.	4 mm ²		≤ 6 kA	≤ 6 kA	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾
			6 mm ²		●	≤ 25 kA	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾
10...50 mm ²				●	●	●	●	●	●	

(1) As % of Icu.
 ● Cable c.s.a. protected.
 (2) Cable c.s.a. not protected.

Thermal-magnetic tripping curves for GV2 ME and GV2 P

Average operating times at 20 °C related to multiples of the setting current



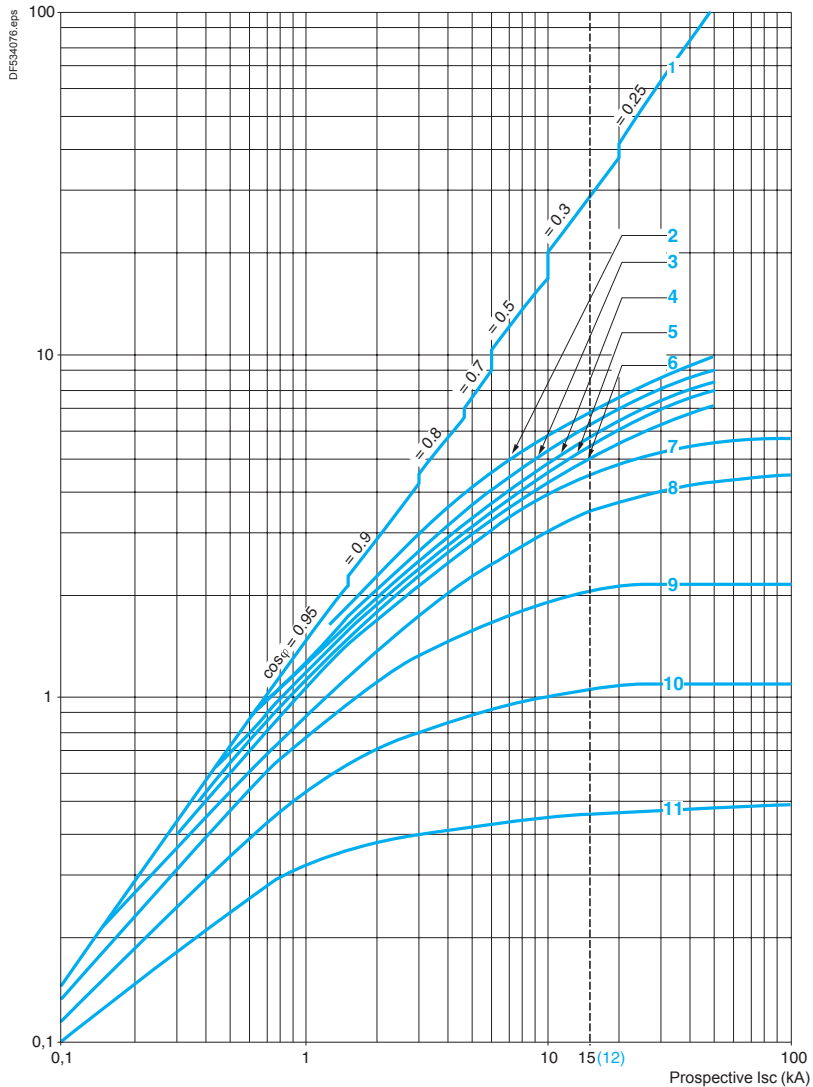
- 1 3 poles from cold state
- 2 2 poles from cold state
- 3 3 poles from hot state

Current limitation on short-circuit for GV2 ME and GV2 P (3-phase 400/415 V)

Dynamic stress

$I_{peak} = f(\text{prospective } I_{sc}) \text{ at } 1.05 U_e = 435 \text{ V}$

Limited peak current (kA)



1 Maximum peak current

2 24 -32 A

3 20 -25 A

4 17 -23 A

5 13 -18 A

6 9 -14 A

7 6 -10 A

8 4 -6.3 A

9 2.5 -4 A

10 1.6 -2.5 A

11 1 -1.6 A

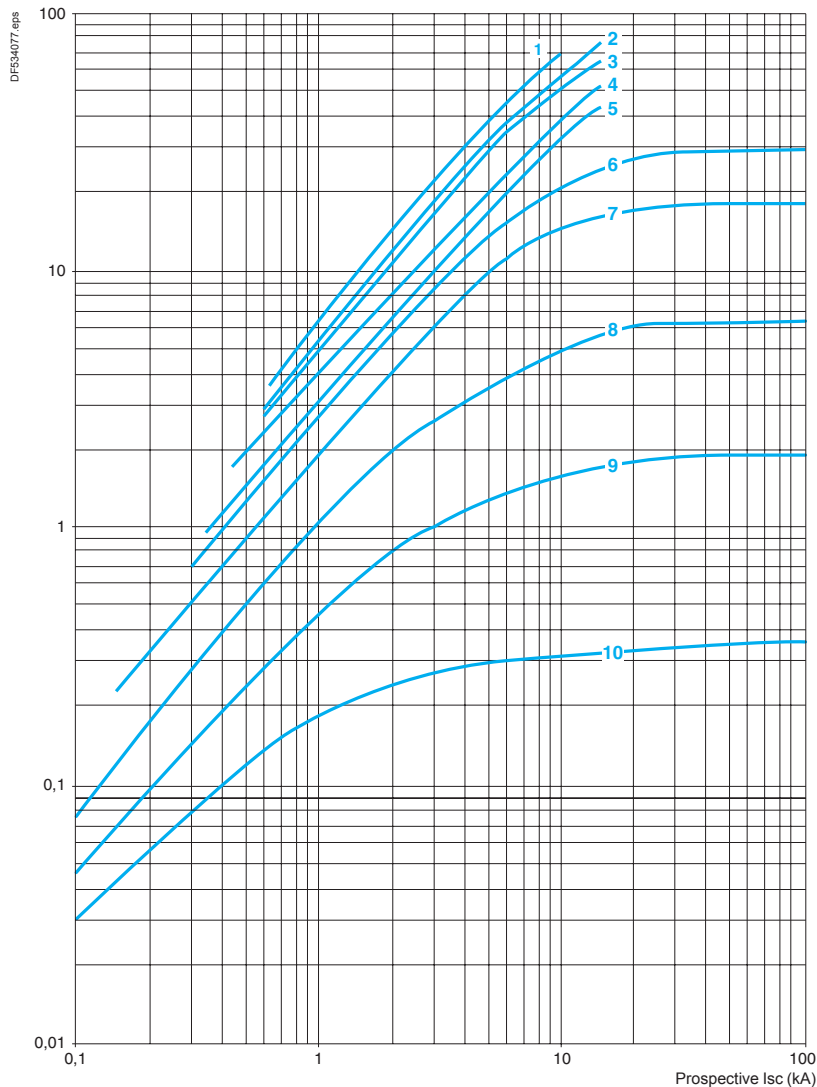
12 Limit of rated ultimate breaking capacity on short-circuit of GV2 ME (14, 18, 23 and 25 A ratings)

Thermal limit on short-circuit for GV2 ME

Thermal limit in kA²s in the magnetic operating zone

Sum of I²dt = f (prospective I_{sc}) at 1.05 U_e = 435 V

Sum of I²dt (kA²s)

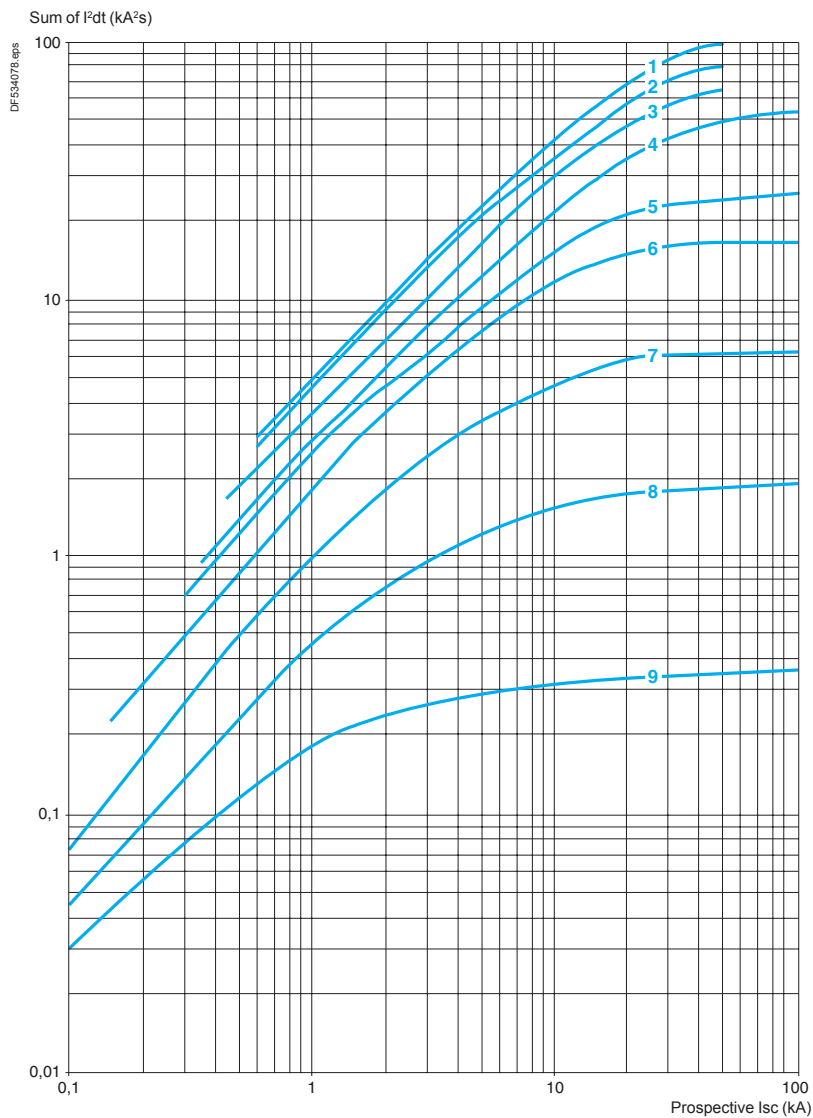


- 1 24 -32 A
- 2 20 -25 A
- 3 17 -23 A
- 4 13 -18 A
- 5 9 -14 A
- 6 6 -10 A
- 7 4 -6.3 A
- 8 2.5 -4 A
- 9 1.6 -2.5 A
- 10 1 -1.6 A

Thermal limit on short-circuit for GV2 P

Thermal limit in kA²s in the magnetic operating zone

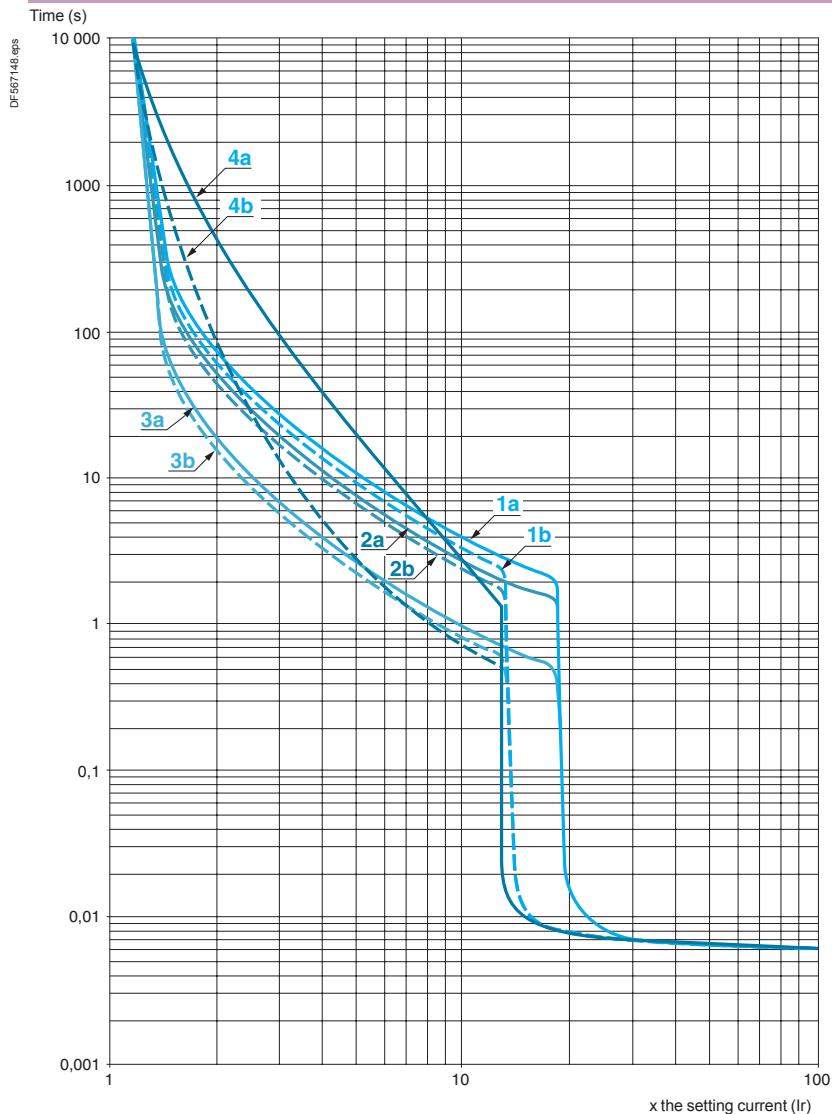
Sum of I²dt = f (prospective I_{sc}) at 1.05 U_e = 435 V



- 1 24 -32 A
- 1 20 -25 A
- 2 17 -23 A
- 3 13 -18 A
- 4 9 -14 A
- 5 6 -10 A
- 6 4 -6.3 A
- 7 2.5 -4 A
- 8 1.6 -2.5 A
- 9 1 -1.6 A

Thermal-magnetic tripping curves

Average operating times at 20 °C related to multiples of the setting current



- 1a 3 poles from cold state (Ir mini.) : GV3 P
- 1b 3 poles from cold state (Ir maxi.) : GV3 P
- 2a 2 poles from cold state (Ir mini.) : GV3 ME80
- 2b 2 poles from cold state (Ir maxi.) : GV3 ME80
- 3a 3 poles from hot state (Ir mini.) : GV3 P
- 3b 3 poles from hot state (Ir maxi.) : GV3 P
- 4a 3 poles from hot state (Ir mini.) : GV3 ME80
- 4b 3 poles from hot state (Ir maxi.) : GV3 ME80

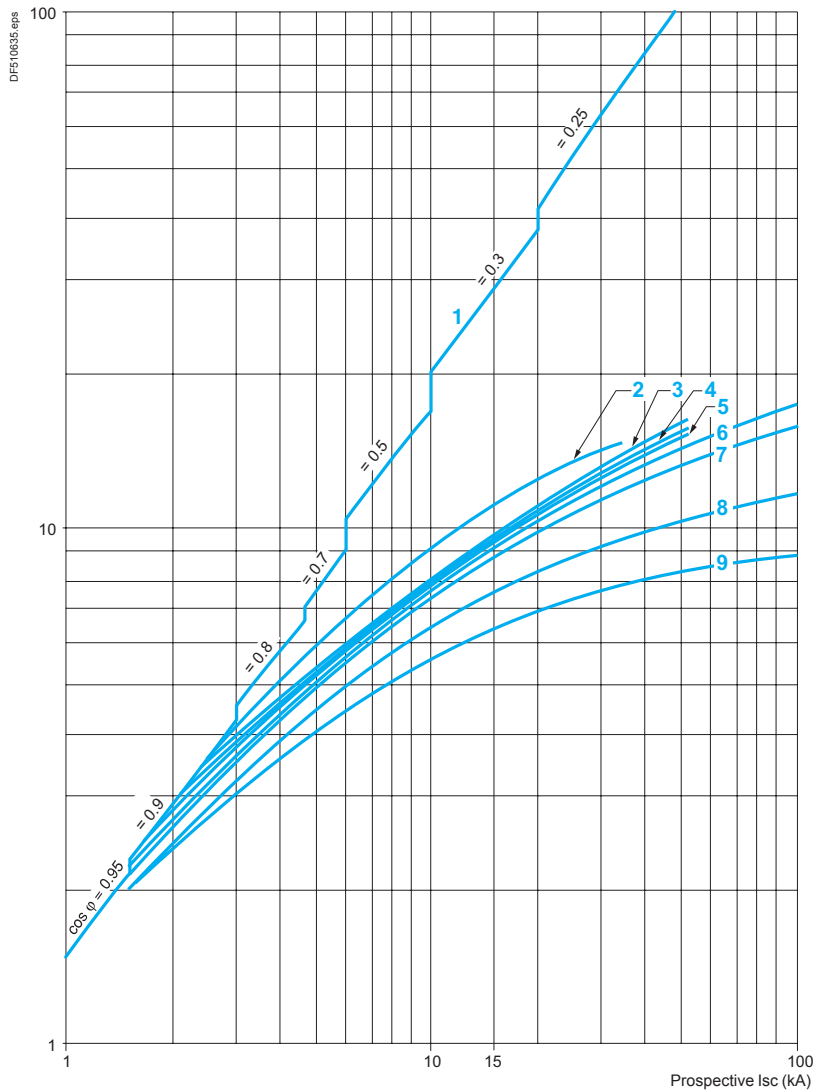
TeSys GV

Current limitation on short-circuit (3-phase 400/415 V)

Dynamic stress

$I_{peak} = f(\text{prospective } I_{sc}) \text{ at } 1.05 U_e = 435 \text{ V}$

Limited peak current (kA)



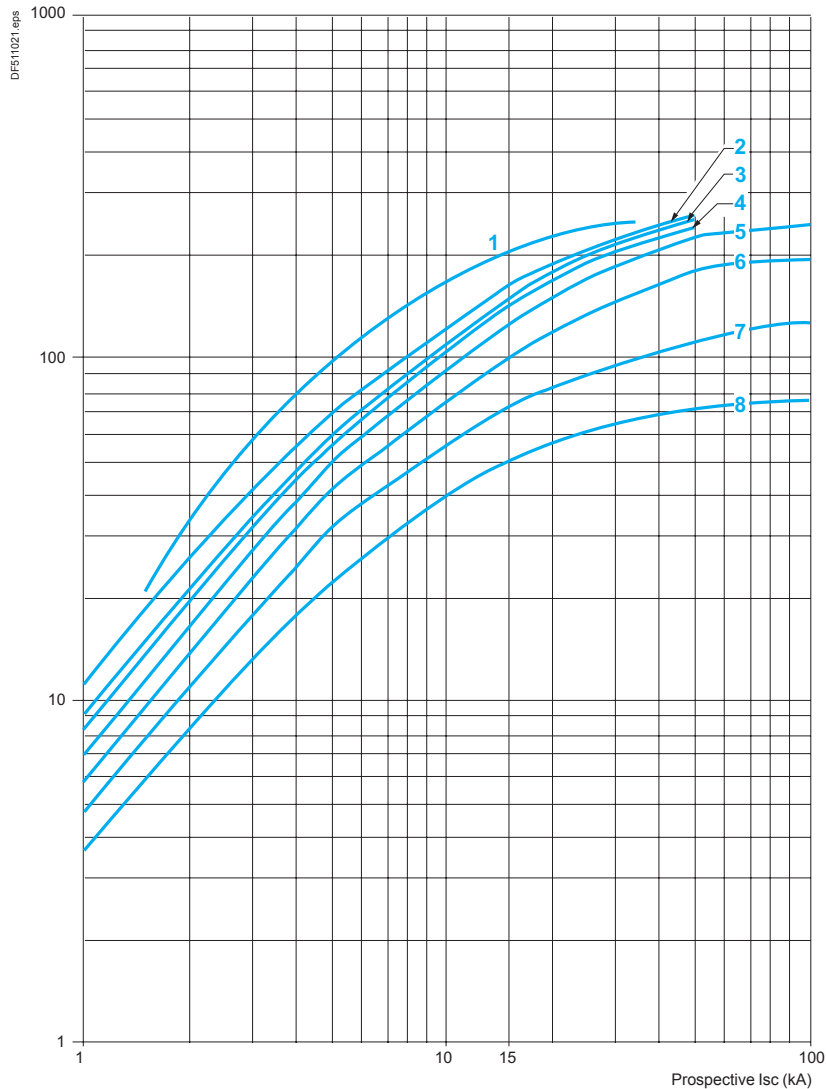
- 1 Maximum peak current
- 2 56 -80 A
- 3 48 -65 A
- 4 37 -50 A
- 5 30 -40 A
- 6 23 -32 A
- 7 17 -25 A
- 8 12 -18 A
- 9 -13 A

Maximum thermal limit on short-circuit

Thermal limit in kA^2s in the magnetic operating zone

Sum of $I^2dt = f(\text{prospective } I_{sc})$ at $1.05 U_e = 435 \text{ V}$

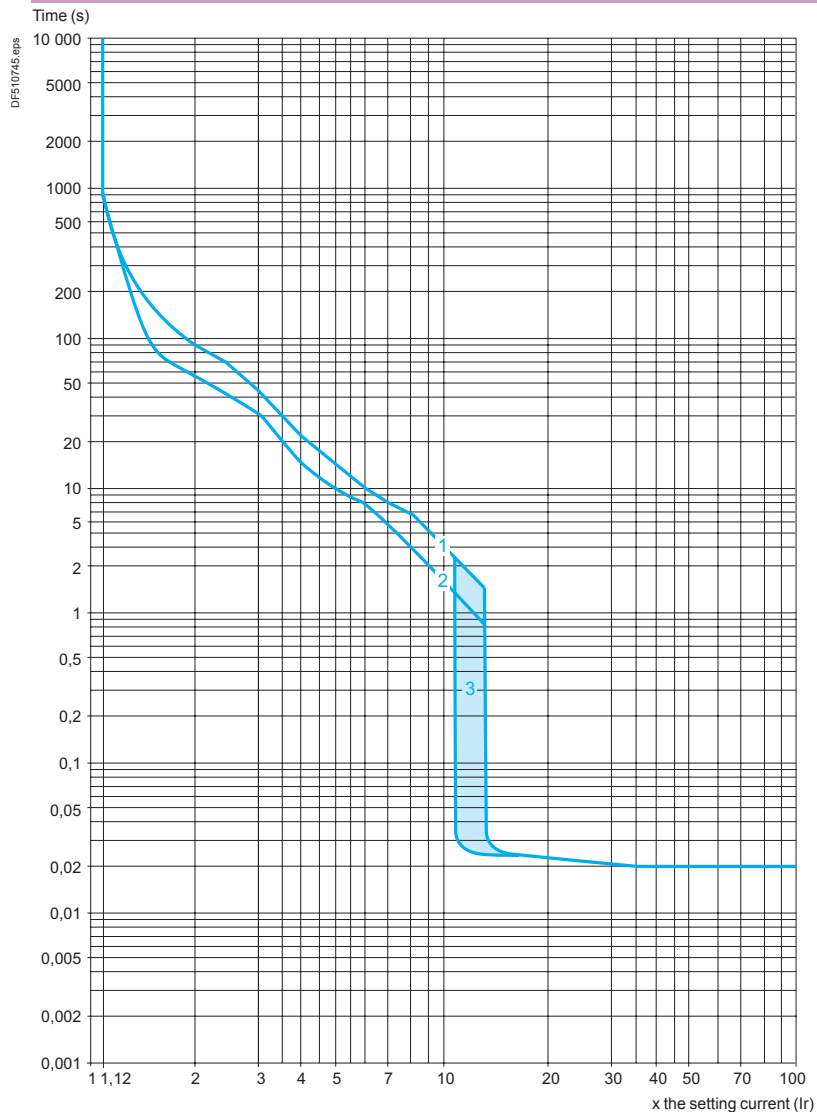
Sum of I^2dt (kA^2s)



- 1 56-80 A (GV3 ME80)
- 2 48-65 A (GV3 P65)
- 3 37-50 A (GV3 P50)
- 4 30-40 A (GV3 P40)
- 5 23-32 A (GV3 P32)
- 6 17-25 A (GV3 P25)
- 7 12-18 A (GV3 P18)
- 8 9-13 A (GV3 P13)

Thermal-magnetic tripping curves for GV7 R

Average operating times at 20 °C related to multiples of the setting current



- 1 Cold state curve
- 2 Cold state curve
- 3 12...14 Ir
In the event of total phase failure, tripping occurs after 4 s ± 20 %

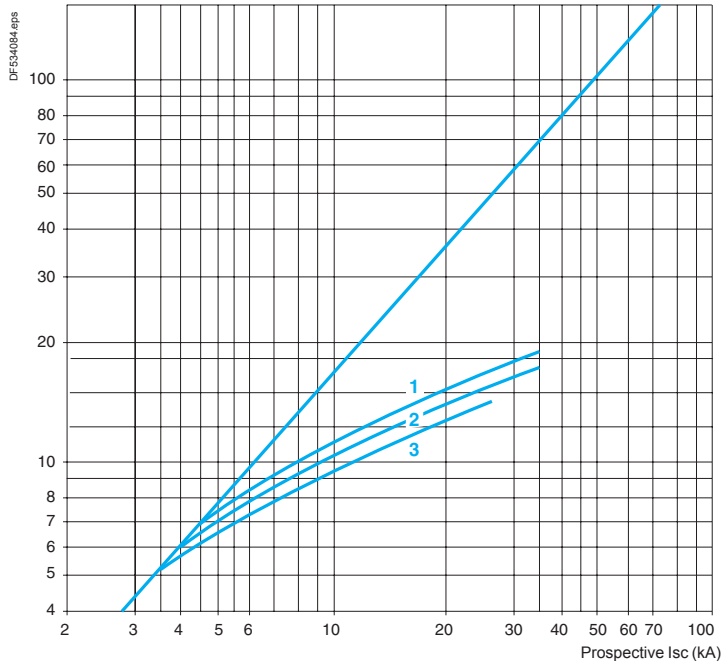
Current limitation on short-circuit (3-phase 400/415 V)

Dynamic stress

$I_{peak} = f(\text{prospective } I_{sc})$

For GV7 RE only

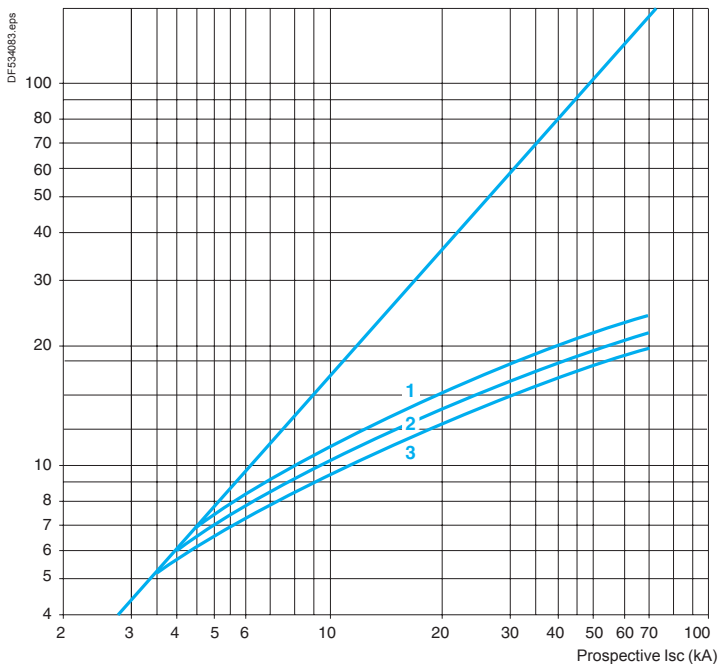
Limited peak current (kA)



- 1 GV7 RE220
- 2 GV7 RE150
- 3 GV7 RE100

For GV7 RS only

Limited peak current (kA)



- 1 GV7 RS220
- 2 GV7 RS150
- 3 GV7 RS100

TeSys GV

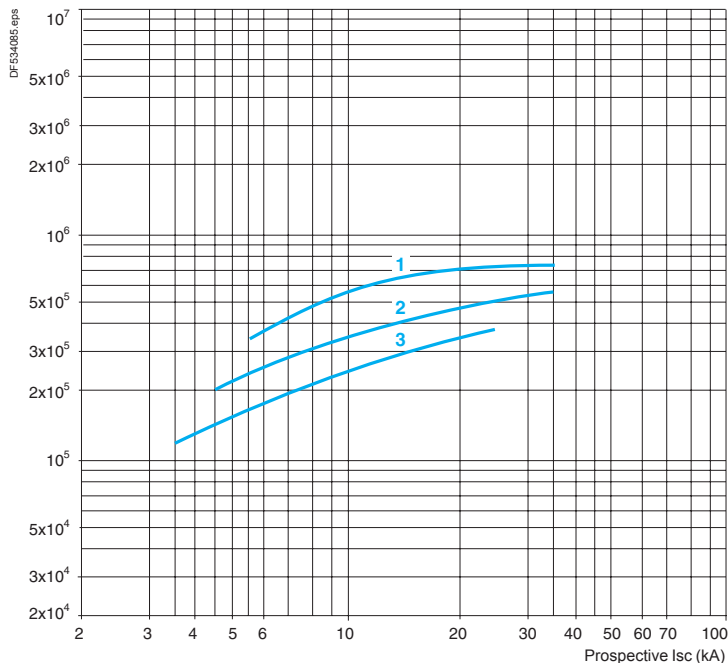
Thermal limit (3-phase 400/415 V)

Thermal limit

Sum of $I^2dt = f$ (prospective I_{sc})

For GV7 RE only

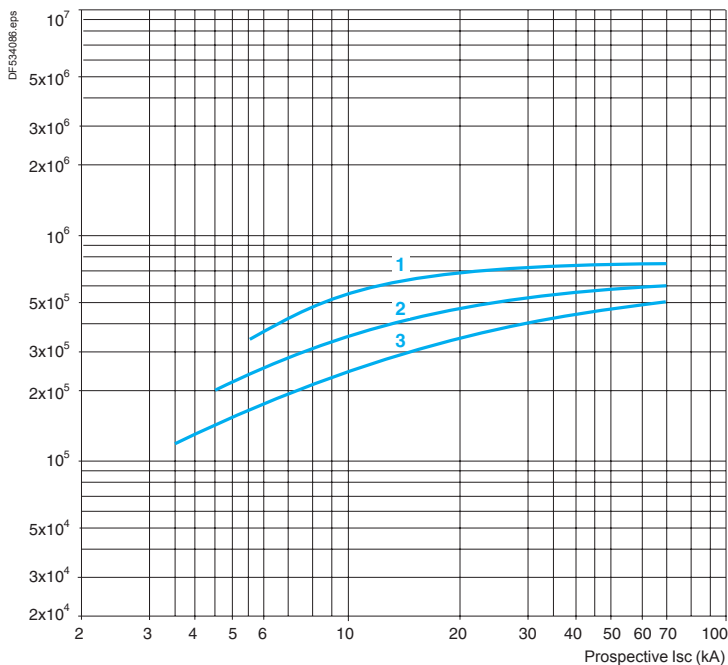
Sum of I^2dt (A²s)



- 1 GV7 RE220
- 2 GV7 RE150
- 3 GV7 RE100

For GV7 RS only

Sum of I^2dt (A²s)



- 1 GV7 RS220
- 2 GV7 RS150
- 3 GV7 RS100

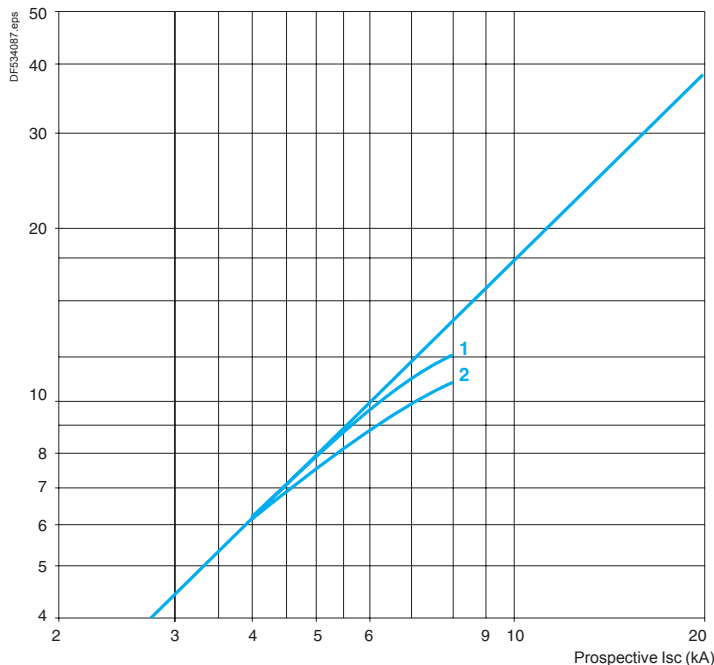
Current limitation on short-circuit (3-phase 690 V)

Dynamic stress

$I_{peak} = f(\text{prospective } I_{sc})$

For GV7 RE only

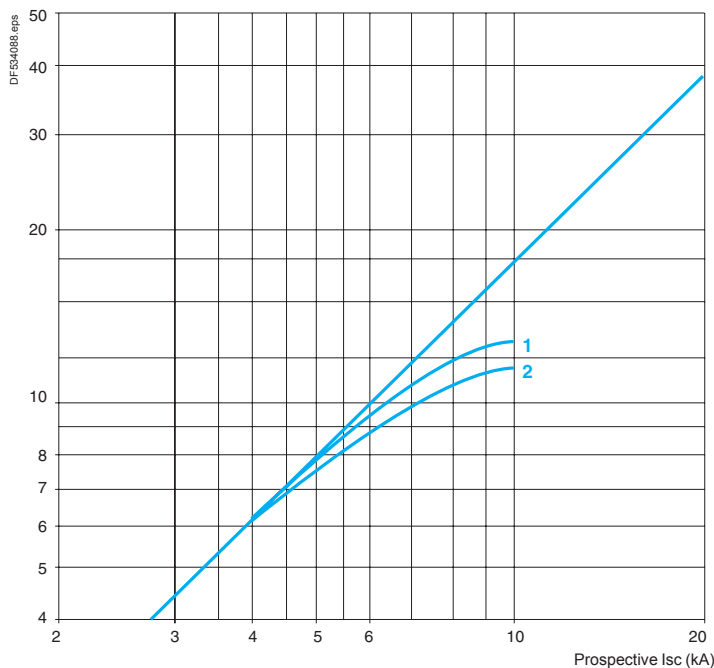
Limited peak current (kA)



- 1 GV7 RE220
- 2 GV7 RE150 and GV7 RE100

For GV7 RS only

Limited peak current (kA)



- 1 GV7 RS220
- 2 GV7 RS150 and GV7 RS100

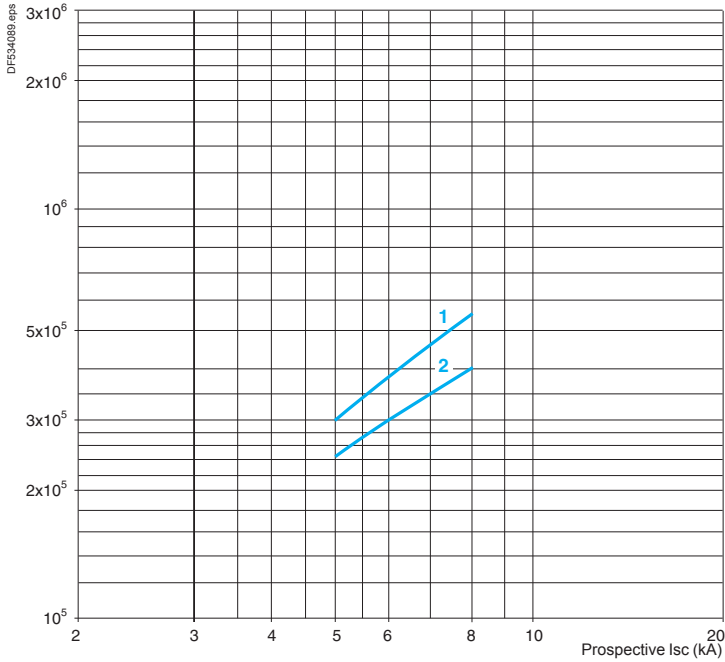
Thermal limit on short-circuit (3-phase 690 V)

Thermal limit

Sum of $I^2dt = f$ (prospective I_{sc})

For GV7 RE only

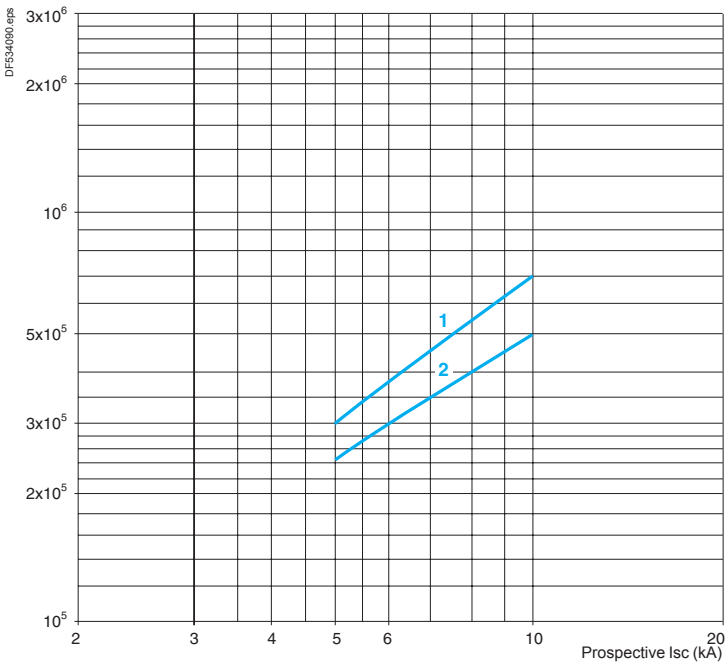
Sum of I^2dt (A²s)



- 1 GV7 RE220
- 2 GV7 RE150 and GV7 RE100

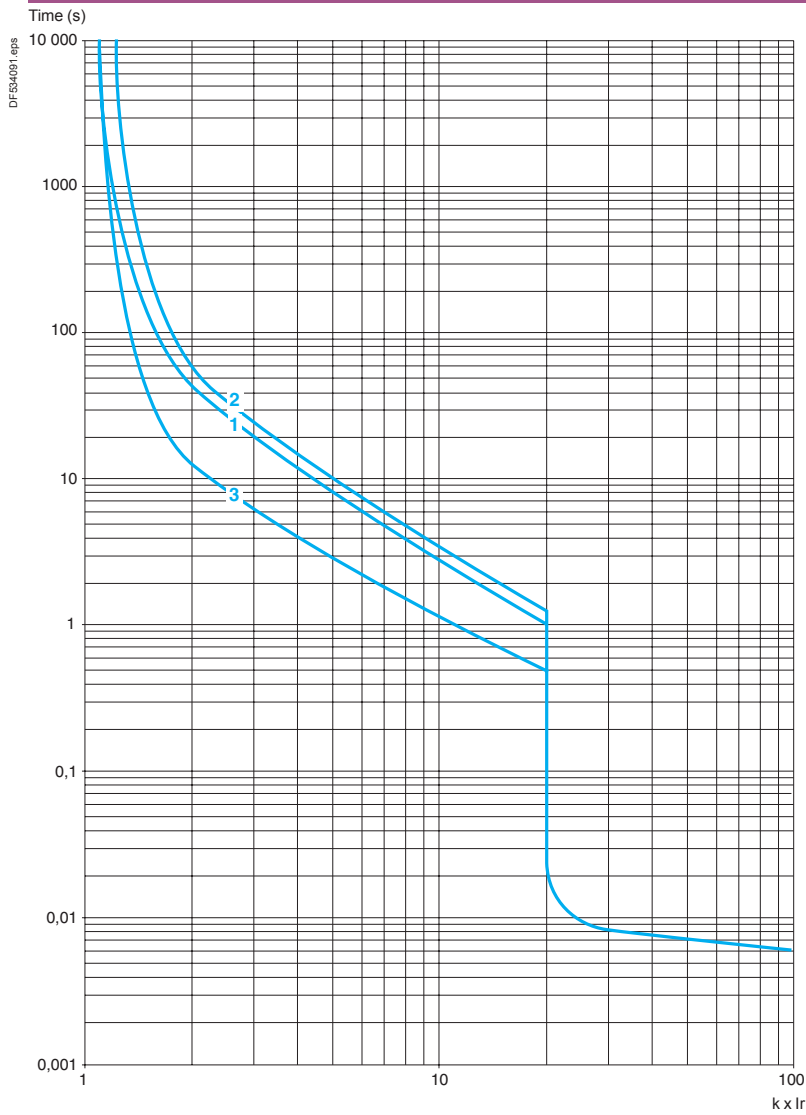
For GV7 RS only

Sum of I^2dt (A²s)



- 1 GV7 RS220
- 2 GV7 RS150 and GV7 RS100

Thermal-magnetic tripping curves for GV2 RT



- 1 3 poles from cold state
- 2 2 poles from cold state
- 3 3 poles from hot state

TeSys protection components

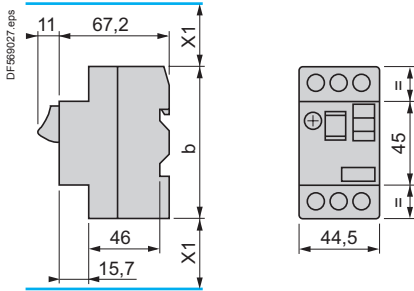
Thermal-magnetic motor circuit breakers

GV2 ME and GV2 P

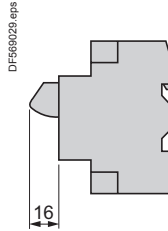
TeSys GV

Dimensions

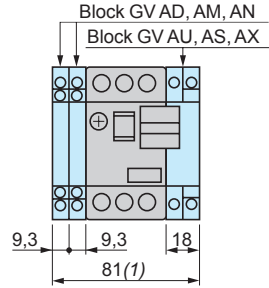
GV2 ME



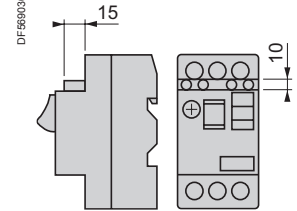
GV AX



GV AD, AM, AN, AU, AS, AX



GV AE

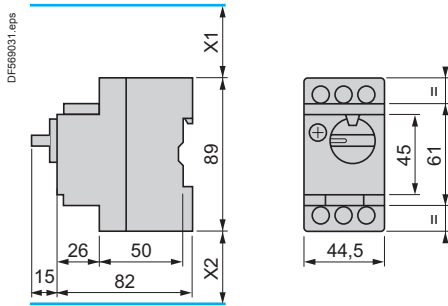


	b
GV2 ME●●	89
GV2 ME●●3	101

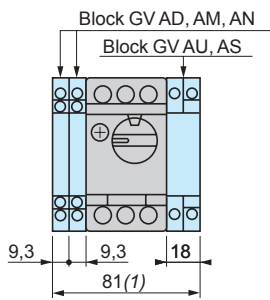
(1) Maximum.

X1 Electrical clearance = 40 mm for $U_e \leq 690$ V

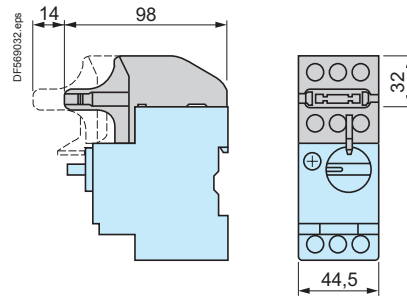
GV2 P



GV AD, AM, AN, AU, AS



GV2 AK00

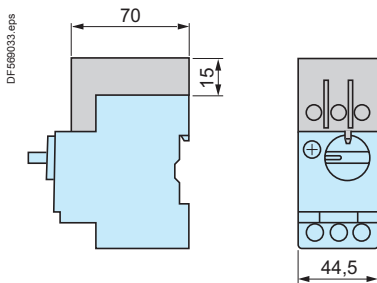


(1) Maximum.

X1 Electrical clearance = 40 mm for $U_e \leq 415$ V, or 80 mm for $U_e = 440$ V, or 120 mm for $U_e = 500$ and 690 V

X2 = 40 mm

GV2 GH7




TeSys protection components

Thermal-magnetic motor circuit breakers GV2 ME and GV2 P

TeSys GV

Mounting

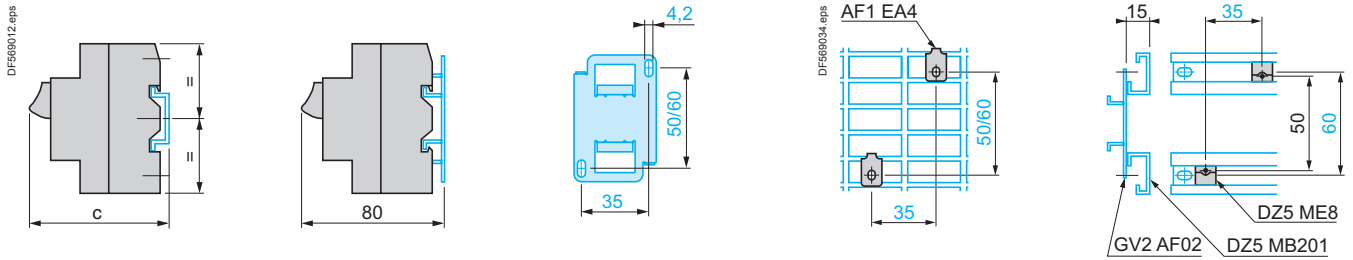
GV2 ME

On 35 mm  rail

On panel with adapter plate GV2 AF02

On pre-slotted plate
AM1 PA

On rails DZ5 MB201



$c = 78.5$ on AM1 DP200 (35 x 7.5)
 $c = 86$ on AM1 DE200, ED200 (35 x 15)

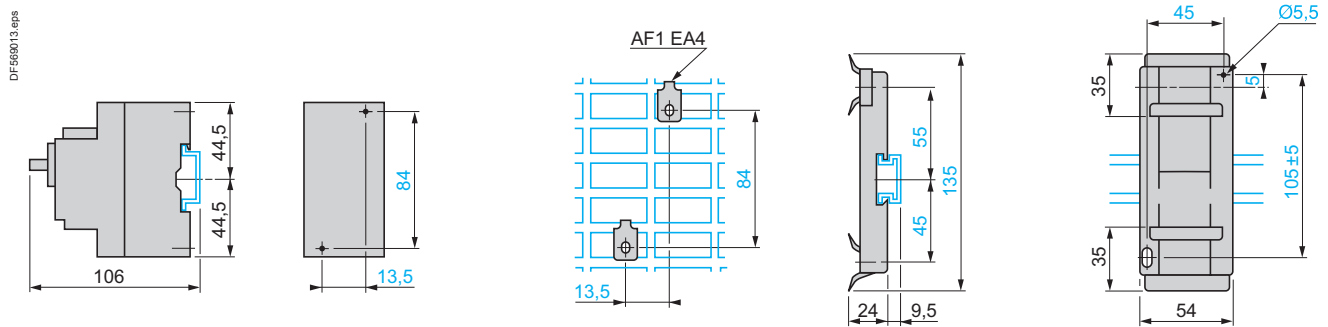
GV2 P

On rail AM1 DE200, ED200
(35 x 15)

Panel mounted

On pre-slotted plate
AM1 PA

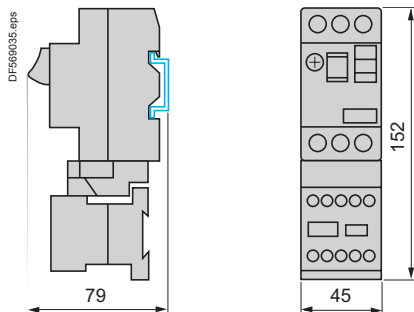
Adapter plate GK2 AF01



Dimensions

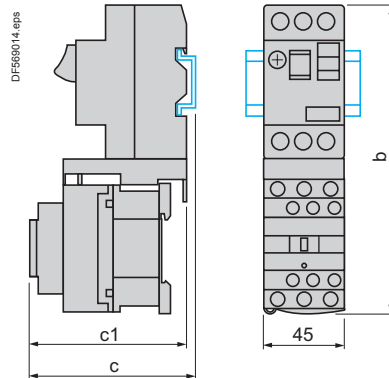
GV2 AF01

Combination GV2 ME + TeSys k contactor

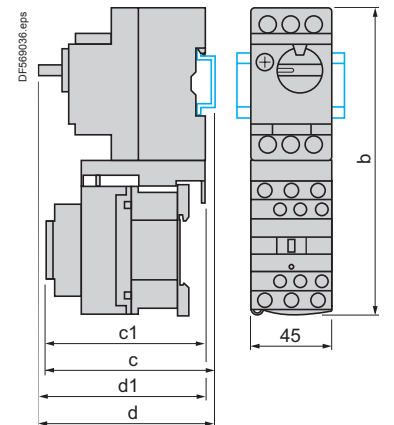


GV2 AF3

Combination GV2 ME + TeSys d contactor



Combination GV2 P + TeSys d contactor



GV2 ME +	LC1 D09 ...D18	LC1 D25 and D32
b	176.4	186.8
c1	94.1	100.4
c	99.6	105.9

GV2 P +	LC1 D09 ...D18	LC1 D25 and D32
b	176.4	186.8
c1	100.1	106.4
c	105.6	111.9
d1	95	95
d	100.5	100.5

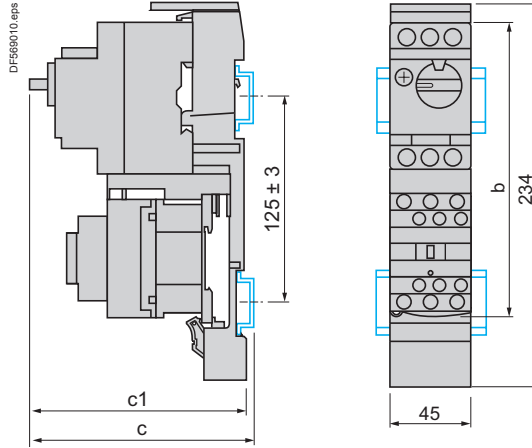
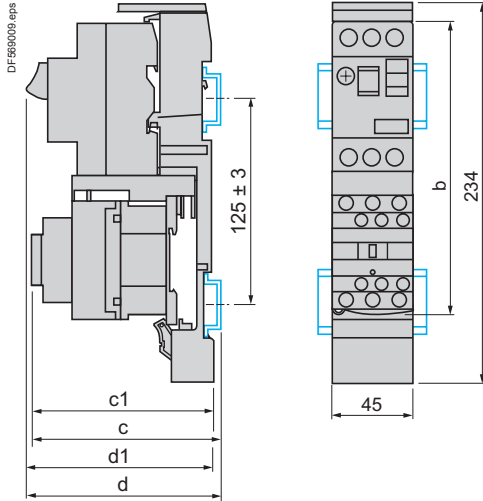
TeSys GV

Dimensions

GV2 AF4 + LAD 311

Combination GV2 ME + TeSys d contactor

Combination GV2 P + TeSys d contactor

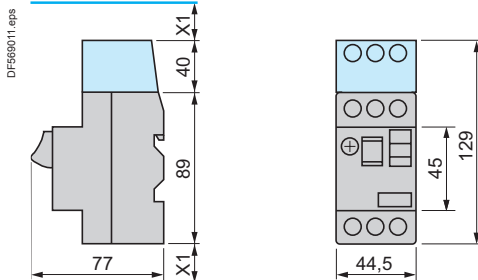


GV2 ME +	LC1 D09...D18	LC1 D25 and D32
b	176.4	186.8
c1	103.1	136.4
c	135.6	141.9
d1	107	107
d	112.5	112.5

GV2 P +	LC1 D09...D18	LC1 D25 and D32
b	176.4	186.8
c1	136.5	142.4
c	141.6	147.9

GV2 ME + GV1 L3 (current limiter)

7.5 mm height compensation plate GV1 F03



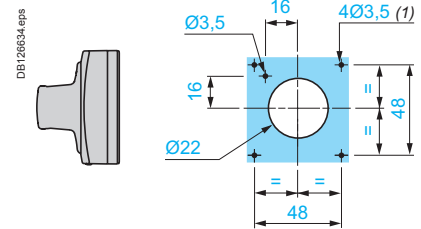
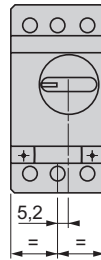
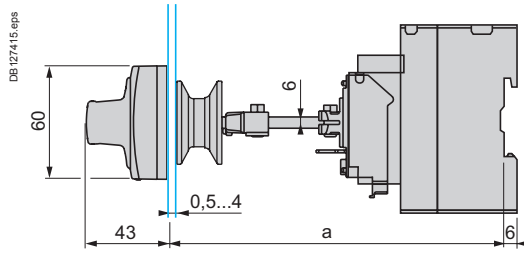
$X1 = 10 \text{ mm}$ for $U_e = 230 \text{ V}$
or 30 mm for $230 \text{ V} < U_e \leq 690 \text{ V}$

TeSys GV

Mounting

Mounting of external operator GV2 APN01, GV2 APN02 or GV2 APN04 for motor circuit breakers GV2 P

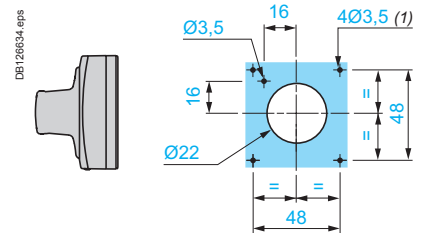
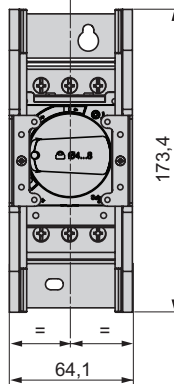
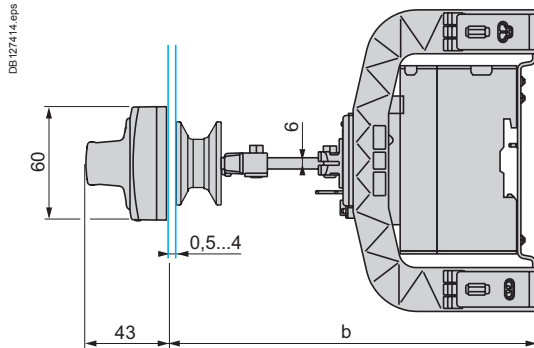
Door cut-out



(1) For IP65 only.

Mounting of external operator GV APH02 for motor circuit breakers GV2 P

Door cut-out



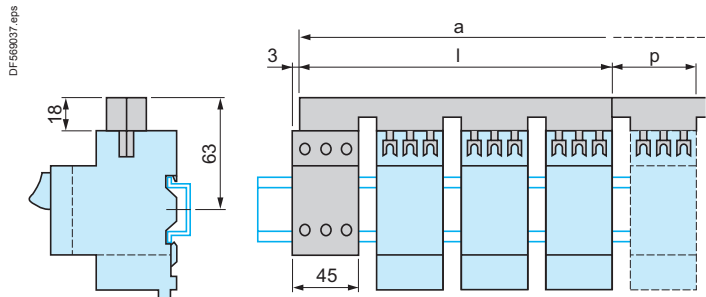
(1) For IP65 only.

	a		b	
	Mini	Maxi	Mini	Maxi
GV2 APN●●	140	250		
GV2 APN●● + GV APH02			151	250
GV2 APN●● + GV APK11	250	434	-	-
GV2 APN●● + GV APH02 + GV APK11	-	-	250	445

TeSys GV

GV2 ME, GV2 P

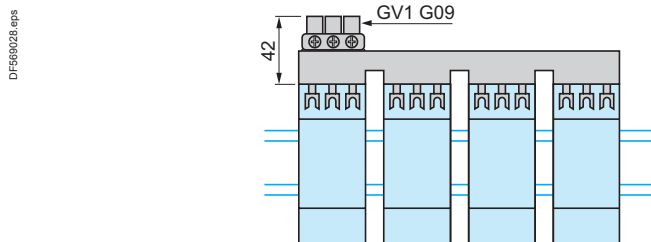
Sets of busbars GV2 G445, GV2 G454, GV2 G472, with terminal block GV2 G05



	l	p
GV2 G445 (4 x 45 mm)	179	45
GV2 G454 (4 x 54 mm)	206	54
GV2 G472 (4 x 72 mm)	260	72

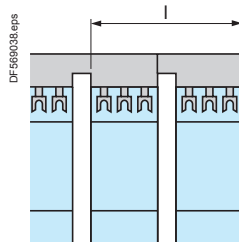
Number of tap-offs	a			
	5	6	7	8
GV2 G445	224	269	314	359
GV2 G454	260	314	368	422
GV2 G472	332	404	476	548

Sets of busbars GV2 G●●● with terminal block GV1 G09

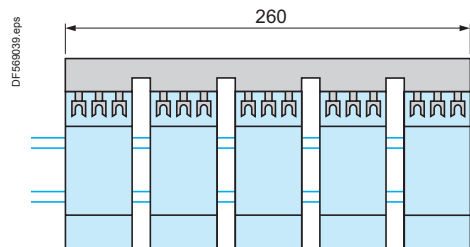


	l
GV2 G245 (2 x 45 mm)	89
GV2 G254 (2 x 54 mm)	98
GV2 G272 (2 x 72 mm)	116

Sets of busbars GV2 G245, GV2 G254, GV2 G272

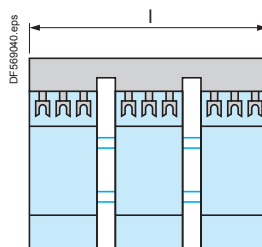


Sets of busbars GV2 G554



	l
GV2 G345 (3 x 45 mm)	134
GV2 G354 (3 x 54 mm)	152

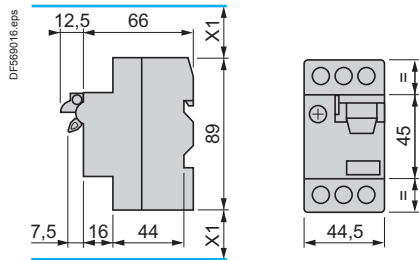
Sets of busbars GV2 G345 and GV2 G354



TeSys GV

GV2 RT

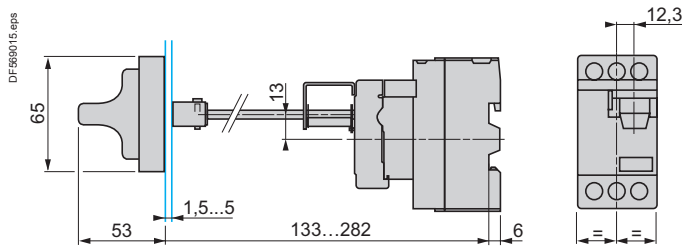
Dimensions



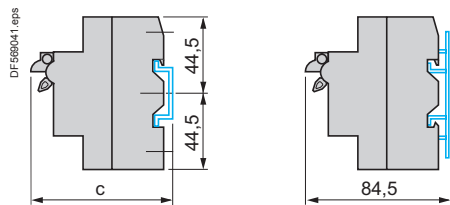
X1: Electrical clearance = 40 mm for $U_e < 690$ V

Mounting

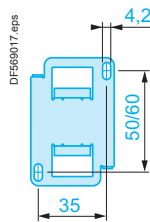
Mounting of external operator GV2 AP03



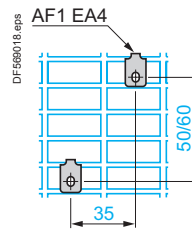
On 35 mm rail



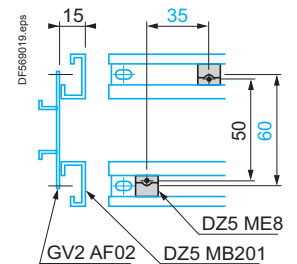
On panel with adapter plate GV2 AF02



On pre-slotted plate AM1 PA



On rails DZ5 MB

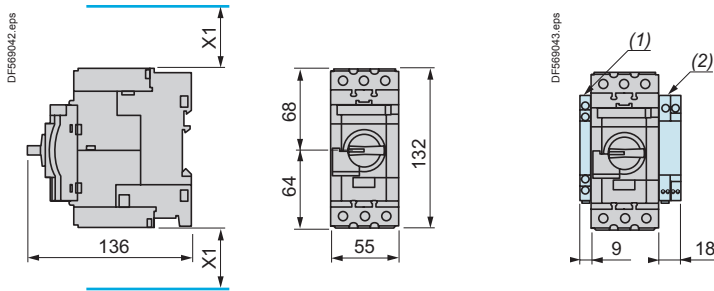


c = 80 on AM1 DP200 (35 x 7.5)
c = 88 on AM1 DE200, ED200 (35 x 15)

TeSys GV

GV3 P

Dimensions



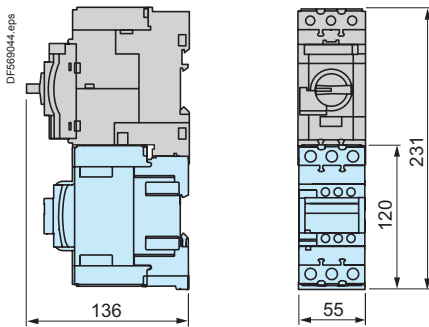
X1 = Electrical clearance (ISC max)
40 mm for $U_e \leq 500$ V, 50 mm for $U_e \leq 690$ V

(1) Blocks GV AN●●, GV AD●● and GV AM11.
(2) Blocks GV3 AU●● and GV3 AS●●.

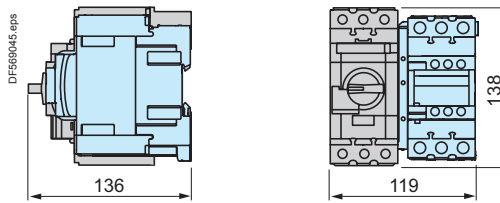
Note: Leave a gap of 9 mm between 2 circuit breakers: either an empty space or side-mounting add-on contact blocks.
Horizontal mounting is possible up to 40 °C.

Mounting

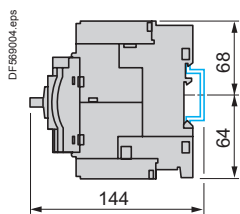
Mounting with TeSys contactor LC1 D40A...D65A



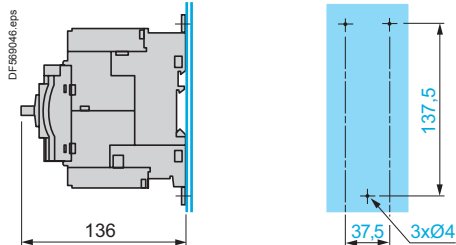
Side by side mounting with TeSys contactor LC1 D40A...D65A (S-shape busbar system GV3 S)



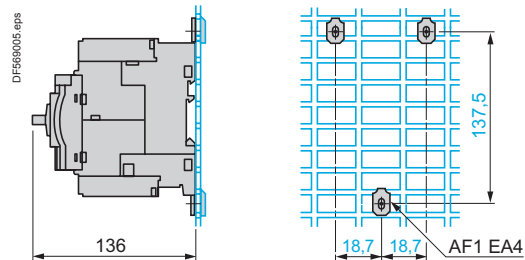
Mounting on rail AM1 DE200 or AM1 ED201



Panel mounting, using M4 screws



Mounting on pre-slotted plate AM1 PA

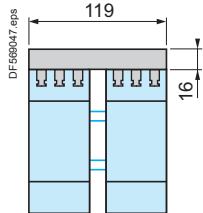


TeSys GV

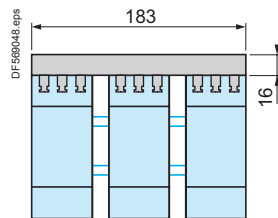
GV3 P

Busbar systems

Set of busbars GV3 G264



Set of busbars GV3 G364

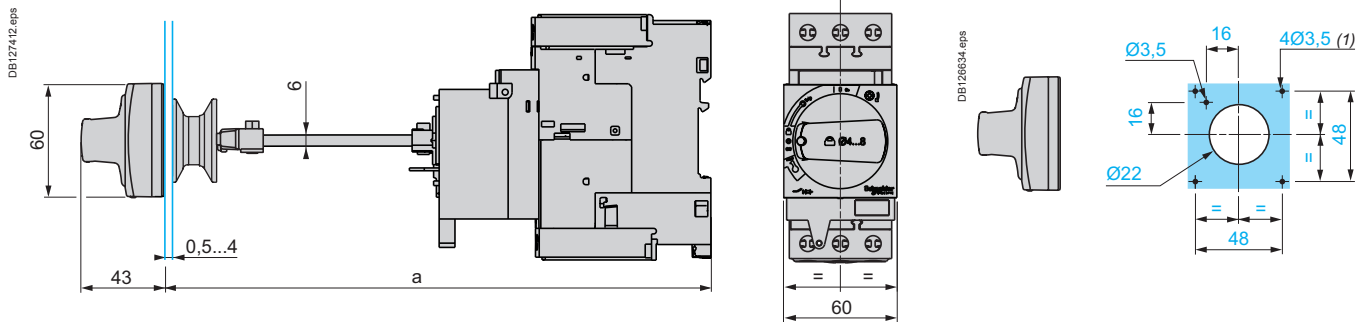


Note: Leave a space of 9 mm between 2 circuit breakers: either an empty space or side-mounting add-on contact blocks. Horizontal mounting is possible up to 40 °C.

Mounting

Mounting of external operator GV3 APN01, GV3 APN02 or GV3 APN04 for motor circuit breakers GV3 P

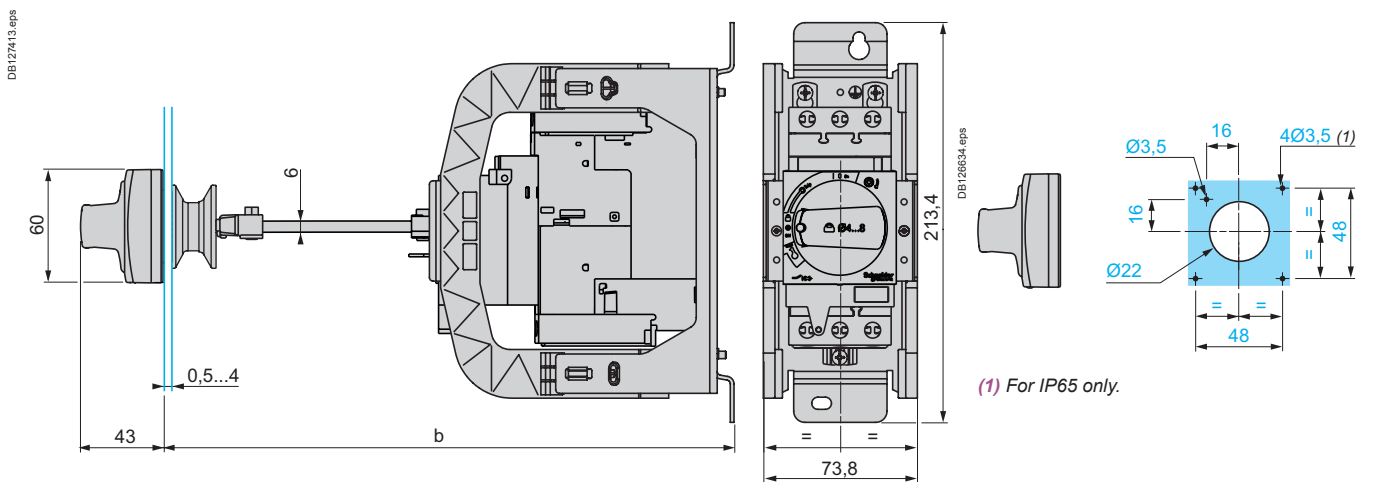
Door cut-out



(1) For IP65 only.

Mounting of external operator GV APH03 for motor circuit breakers GV3 P

Door cut-out

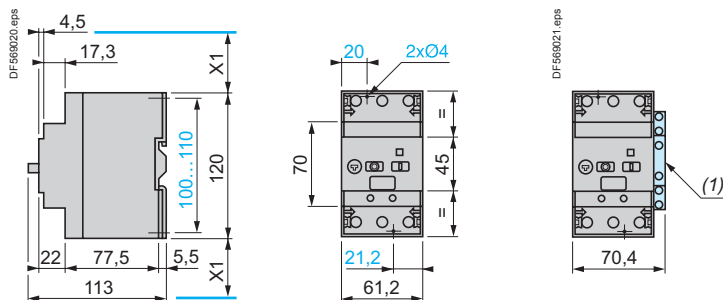


(1) For IP65 only.

	a		b	
	Mini	Maxi	Mini	Maxi
GV3 APN●●	189	300	-	-
GV3 APN●● + GV APK12	300	481		
GV3 APN●● + GV APH03	-	-	200	300
GV3 APN●● + GV APH03 + GV APK12	-	-	300	492

GV3 ME80

Dimensions



X1 = Electrical clearance (ISC max)
40 mm for $U_e \leq 500$ V, 50 mm for $U_e \leq 690$ V

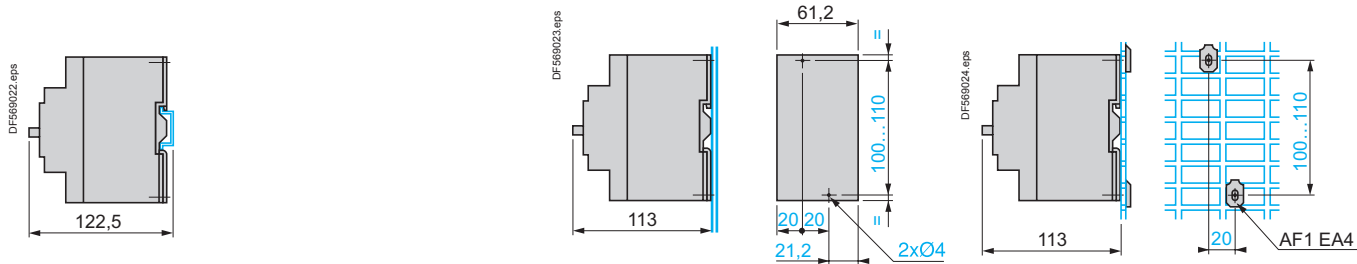
(1) Blocks GV3 A01...A07.

Mounting

Mounting on rail AM1 DE200 or AM1 ED201

Panel mounting, using M4 screws

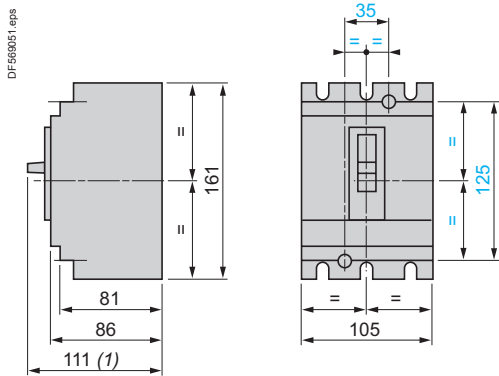
Mounting on pre-slotted plate AM1 PA



TeSys GV

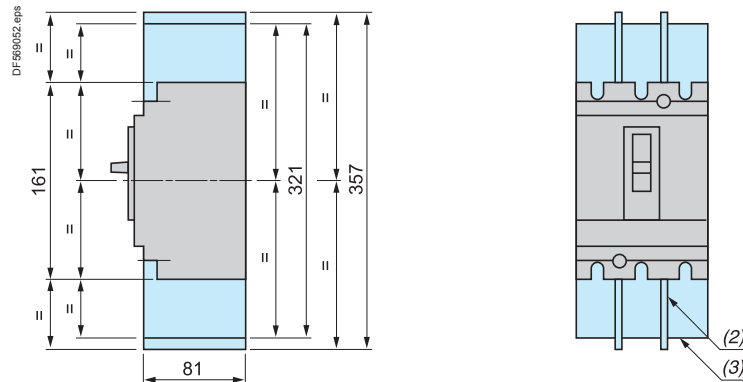
GV7 R

Dimensions



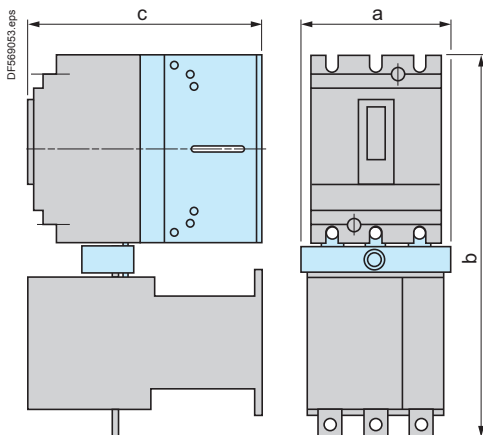
(1) 126 for GV7 R●220.

Motor circuit breakers with terminal shields or phase barriers GV7 R + GV7 AC01 or AC04



(2) Phase barriers: **GV7 AC04**.
(3) Terminal shields: **GV7 AC01**.

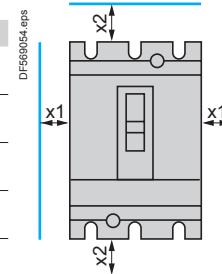
Combination of GV7 R and TeSys contactor LC1 F with kit GV7 AC0●



	a	b	c
GV7 R + LC1 F115 or F150 + GV7 AC06	119	334	181
GV7 R + LC1 F185 + GV7 AC06	119	338	188
GV7 R + LC1 F225 + GV7 AC07	131	358	188
GV7 R + LC1 F265 + GV7 AC07	131	364	215

Minimum distance between 2 circuit breakers mounted side by side = 0

Minimum electrical clearance



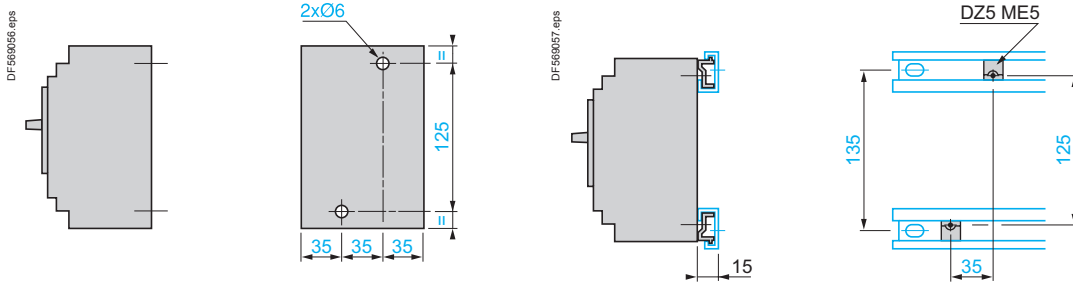
	x1	x2
Painted or insulated metal plate, insulation or insulated bar	0	30
Bare metal plate	U ≤ 440 V	5
	440 V < U < 600 V	10
	U ≥ 600 V	20

TeSys GV

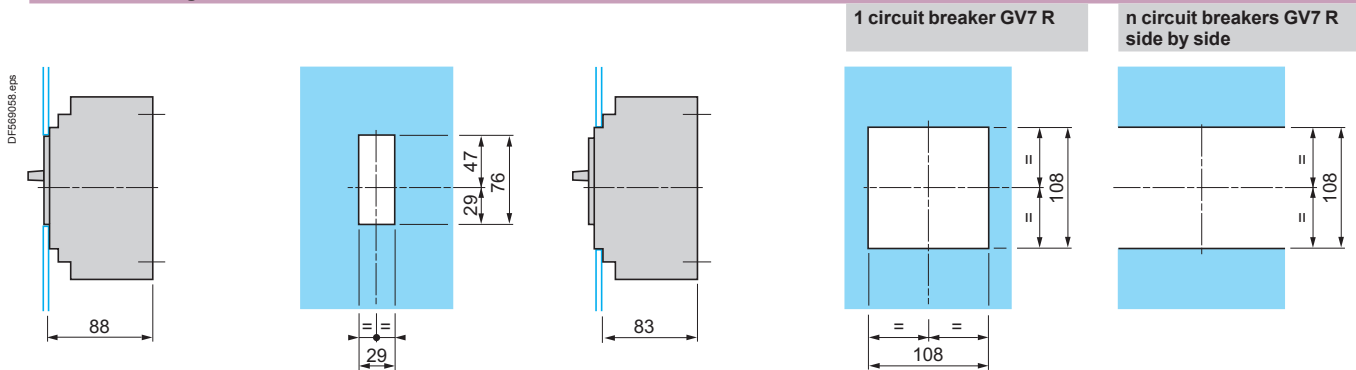
GV7 R

Panel mounting

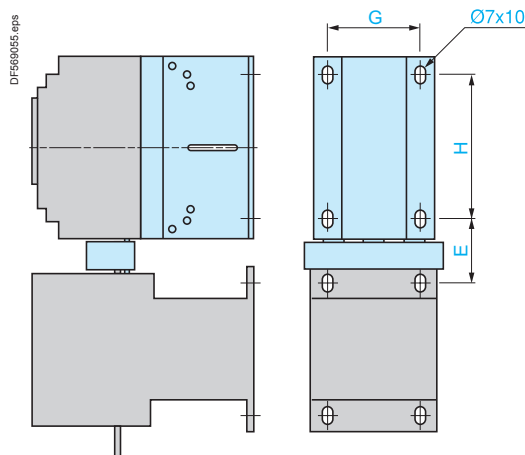
Mounting on 2 mounting rails DZ5 MB201



Flush-mounting



Combination of GV7 R and TeSys contactor LC1 F with kit GV7 AC0

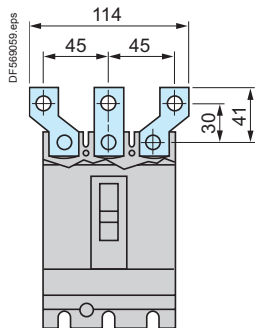


	E	G	H
GV7 R + LC1 F115 + GV7 AC06	44	85	120
GV7 R + LC1 F150 + GV7 AC06	46	85	120
GV7 R + LC1 F185 + GV7 AC06	48	85	120
GV7 R + LC1 F225 + GV7 AC07	57	85	120
GV7 R + LC1 F265 + GV7 AC07	60	85	120

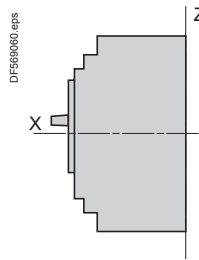
TeSys GV

GV7 R

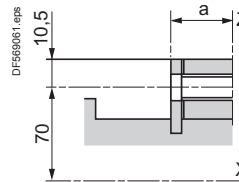
Spreaders GV7 AC03



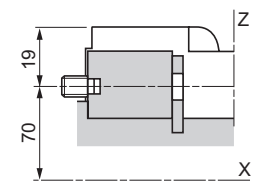
Connection



Smooth terminals



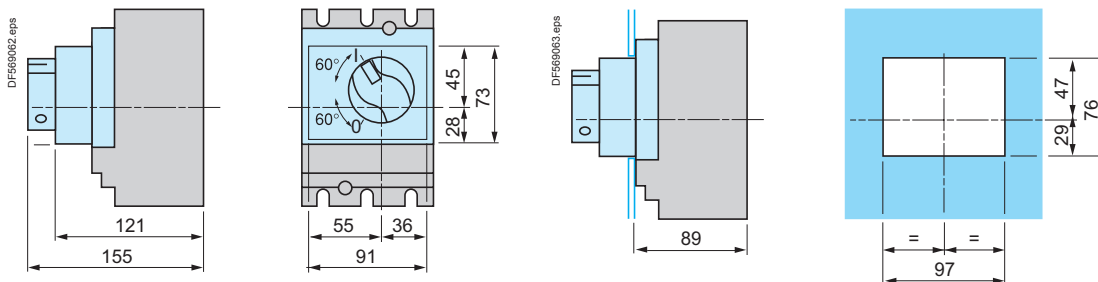
Connectors



	a
GV7 R \bullet 40...R \bullet 150	19.5
GV7 R \bullet 220	21.5

Direct rotary handle GV7 AP03, GV7 AP04

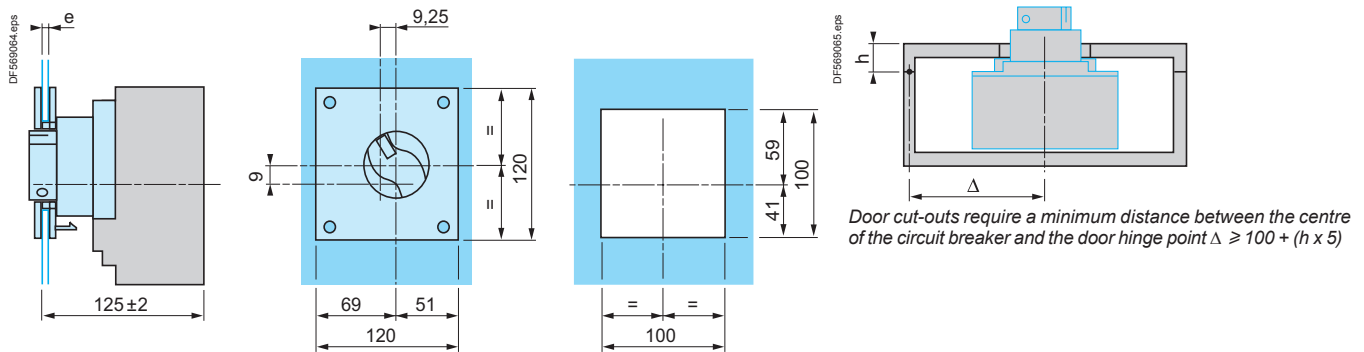
Flush-mounting



Direct rotary handle GV7 AP03 or GV7 AP04 with conversion accessory GV7 AP05

Front face cut-out

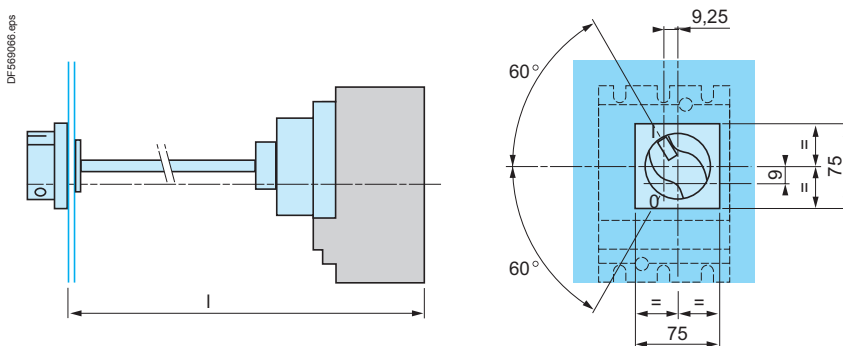
Enclosure viewed from top



Door cut-outs require a minimum distance between the centre of the circuit breaker and the door hinge point $\Delta \geq 100 + (h \times 5)$

e = 1 to 3 max

Extended rotary handle GV7 AP01, GV7 AP02



l: 185 min, 600 max

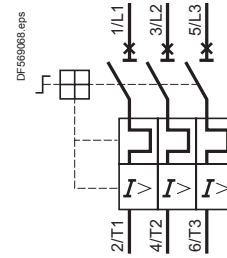
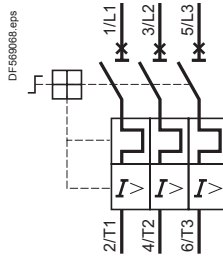
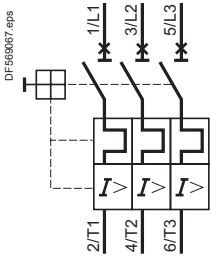
The shaft of the extended rotary handle GV7 AP01 or GV7 AP02 must be cut to length: l – 126 mm.

Schemes

GV2 ME●● and GV2 RT

GV2 P●●

GV3 P●●



Front mounting add-on contact blocks
Instantaneous auxiliary contacts

GV AE1

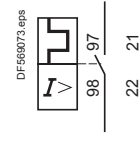
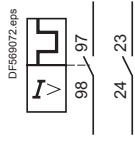
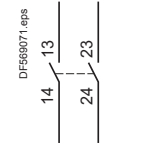
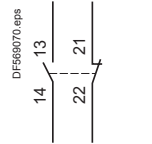
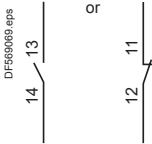
GV AE11

GV AE20

Front mounting add-on contact blocks
Instantaneous auxiliary contacts and fault signalling contacts

GV AED101

GV AED011



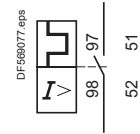
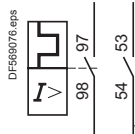
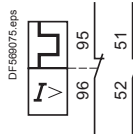
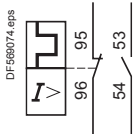
Side mounting add-on contact blocks
Instantaneous auxiliary contacts and fault signalling contacts

GV AD0110

GV AD0101

GV AD1010

GV AD1001



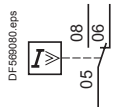
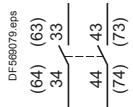
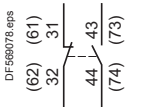
Instantaneous auxiliary contacts

GV AN11

GV AN20

Short-circuit signalling contacts

GV AM11



Voltage trips

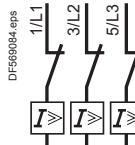
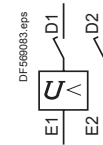
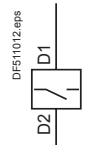
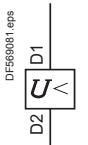
GV AU●●●

GV AS●●●

GV AX●●●

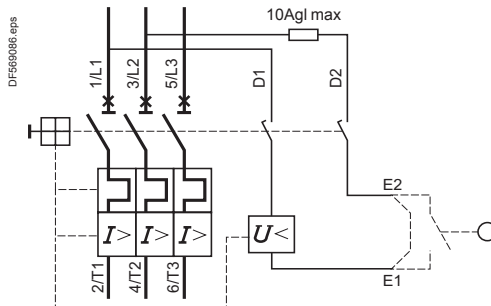
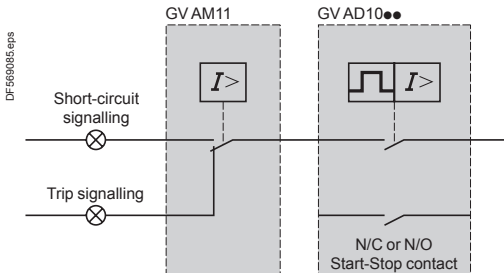
Current limiter

GV1 L3



Use of fault signalling contact and short-circuit signalling contact

Connection of undervoltage trip for dangerous machines (conforming to INRS) on GV2 ME only

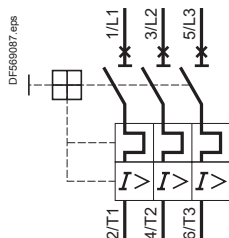


TeSys GV

Schemes

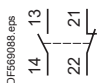
Motor circuit breakers

GV3 ME80

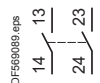


Auxiliary contact block modules

GV3 A01



GV3 A02



GV3 A03



GV3 A05



GV3 A06

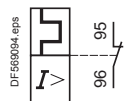


GV3 A07

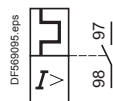


Fault signalling contacts

GV3 A08



GV3 A09



Voltage trips

GV3 B

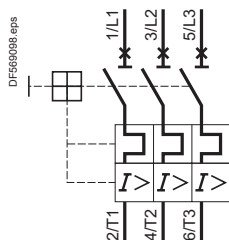


GV3 D



Motor circuit breakers

GV7 R



Add-on auxiliary contacts according to their location ⁽¹⁾

GV7 AE11, GV7 AB11

Location 1 C/O contact



Location 2 Trip indication



Location 3 Electrical fault indication



Location 4 C/O contact

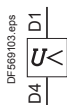


A self-adhesive label, supplied with the contact, can be affixed to the front face of the circuit-breaker to allow personalised marking according to the function of the contact or contacts.

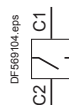
⁽¹⁾ See pages B6/91 and B6/17.

Electric trips

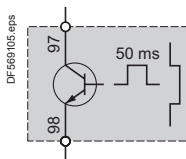
GV7 AU...•••



GV7 AS...•••

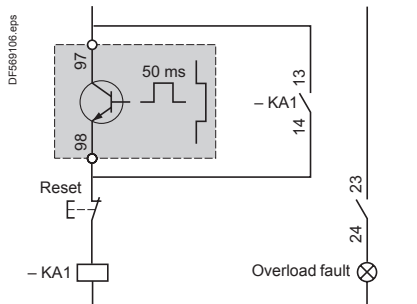


GV7 AD111, AD112

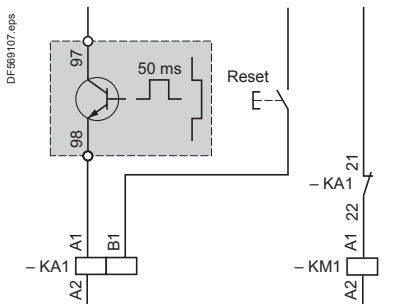


Recommended application schemes GV7 AD111, AD112

Fault indication



Contactor opening on overload



Associated components
KA1: CA2 KN or CAD N

Associated components
KA1: CAD + LAD 6K10 or RHK
KM1: LC1 D or LC1 F

Protection components

Thermal-magnetic circuit breakers

TeSys GB2 for the protection of industrial equipment control circuits

Presentation

GB2 thermal-magnetic circuit breakers protect and isolate the control circuits of industrial equipment with contactor coils, transformers....

They protect and isolate single-phase auxiliary circuits such as solenoid valves, electro-brakes, battery chargers, supplied from the control circuit voltage.

GB2 CB, GB2 CD, GB2 DB

12 ratings are available, from 0.5 to 20 A, in single-pole (GB2 CB), single-pole + neutral (GB2 CD) and 2-pole (GB2 DB) versions.

They have a magnetic tripping threshold set at between 12 and 16 In to withstand the current peaks generated by many industrial components.

GB2 CS

2 ratings are available, 0.5 and 1 A, in single-pole version.

The magnetic tripping threshold is set between 5 and 7 In.

Functions, installation

Clip-on fixing onto all types of 35 mm \perp rails, on \perp rails and on Telequick mounting plates.

Upstream and downstream marking by means of AB1 clip-in markers.

Clear indication of "I" and "O" positions on the operator.

Tamper-proof device which requires no special maintenance (fixed magnetic and thermal tripping thresholds).

Selection for the protection of circuits supplied by transformers

Single-phase transformers.

Magnetising peak: 20 In.

Operation of magnetic trips: 13 In.

Power VA	Primary ⁽¹⁾		Secondary			
	220/240 V	380/415 V	24 V	48 V	110 V	220 V
40	GB2 DB05	GB2 DB05	GB2 CD07	GB2 CD06	GB2 CD05	GB2 CD05
63	GB2 DB05	GB2 DB05	GB2 CD08	GB2 CD07	GB2 CD06	GB2 CD05
100	GB2 DB06	GB2 DB05	GB2 CD10	GB2 CD07	GB2 CD06	GB2 CD05
160	GB2 DB07	GB2 DB06	GB2 CD14	GB2 CD09	GB2 CD07	GB2 CD06
250	GB2 DB07	GB2 DB06	GB2 CD16	GB2 CD12	GB2 CD08	GB2 CD07
400	GB2 DB08	GB2 DB07	GB2 CD22	GB2 CD14	GB2 CD09	GB2 CD07
630	GB2 DB10	GB2 DB08	–	GB2 CD21	GB2 CD12	GB2 CD08
1000	GB2 DB14	GB2 DB09	–	–	GB2 CD16	GB2 CD10
1600	GB2 DB20	GB2 DB14	–	–	–	GB2 CD14
2000	GB2 DB21	GB2 DB14	–	–	GB2 CD22	GB2 CD16
2500	GB2 DB22	GB2 DB20	–	–	–	GB2 CD20
3000	GB2 DB22	GB2 DB20	–	–	–	GB2 CD21
4000	–	GB2 DB21	–	–	–	GB2 CD22
5000	–	GB2 DB22	–	–	–	–

⁽¹⁾ If the breaking capacity of the **GB2** is insufficient, use a **GV2 RT** with 2 poles connected in series, see page B6/8.

Environment		GB2 CB	GB2 CD	GB2 DB	GB2 CS
Circuit breaker type		GB2 CB	GB2 CD	GB2 DB	GB2 CS
Conforming to standards		IEC 60947-1, 947-2, EN 60947-1, 60947-2			
Product certifications		CSA, NEMKO, UL	NEMKO, UL	-	-
Protective treatment		"TC"			
Degree of protection	Conforming to IEC 60529	IP 20			
Shock resistance	Conforming to IEC 60068-2-27	22 gn for 20 ms			
Vibration resistance	Conforming to IEC 60068-2-6	5 gn (5...110 Hz)			
Ambient air temperature around the device	Storage	°C -40...+80			
	Operation	°C -20...+60			
Flame resistance	Conforming to IEC 60695-2-1	°C 960			
Maximum operating altitude		m 3000			
Operating position	In relation to normal vertical mounting plane				
Cabling	Solid cable	mm ²	Minimum c.s.a. 1 x 0.75	Maximum c.s.a. 1 x 6 or 2 x 4	
	Flexible cable with cable end	mm ²	1 x 0.75	1 x 4 or 2 x 2.5	
Tightening torque		N.m	1.2		

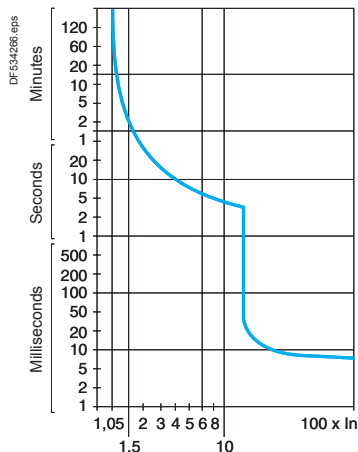
Technical characteristics											
Utilisation category	Conforming to IEC 60947-2	A		A		A		A		A	
Rated operational voltage (U _e)	Conforming to IEC 60947-2	V 250 ⁽¹⁾		250		415		250 ⁽¹⁾			
	Conforming to CSA C22-2 Nr 14 and UL 1077	V 277		-		277		-			
Rated operational frequency	Conforming to IEC 60947-2	Hz 50/60		50/60		50/60		50/60		50/60	
Rated impulse withstand voltage (U _{imp})	Conforming to IEC 60947-2	kV 4		4		4		4		4	
Total power dissipated per pole		W 2		2		2		1.9		1.9	
Mechanical and electrical durability	C.O.: Closing - Opening	C.O.		8000		8000		8000		8000	
		°C		-20	-10	0	+10	+20	+30	+40	+50
Operational current correction coefficient (a or ---)	According to the permissible ambient temperature Correction coefficient	1.2		1.15		1.1		1.05		1	
		0.95		0.90		0.85		0.80			
Tripping threshold	Of the magnetic trips	12...16 In		12...16 In		12...16 In		5...7 In			

(1) U_e = 415 V when a GB2 circuit breaker is fitted on every live conductor.

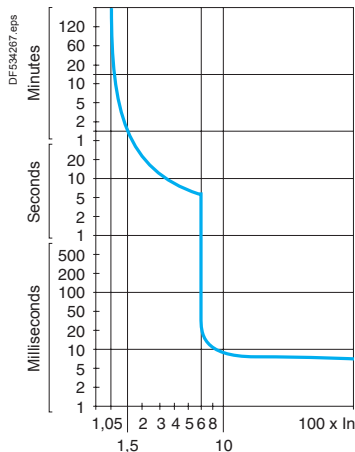
Tripping curves

Average operating time at 20 °C without prior current flow (cold state)

GB2 CB, GB2 CD, GB2 DB



GB2 CS



Protection components

Thermal-magnetic circuit breakers

TeSys GB2 for the protection of industrial equipment control circuits

TeSys GB

Circuit breaker type				GB2											
				CB05	CB06	CB07	CB08	CB09	CB10	CB12	CB14	CB16	CB20	CB21	CB22
Rating			A	0.5	1	2	3	4	5	6	8	10	12	16	20
Breaking capacity conforming to IEC 60947-2 ~ 50/60 Hz	110 V	l _{cu}	kA	50	50	15	10	6	3	3	3	2	2	2	2
		l _{cs} % ⁽¹⁾		100	50	50	50	50	75	75	75	75	75	75	75
	230/240 V	l _{cu}	kA	50	50	15	3	3	2	1.5	1.5	1.5	1.5	1.5	1.5
		l _{cs} % ⁽¹⁾		25	25	25	50	50	75	75	75	75	75	75	75
Associated fuses, if required if l _{sc} > breaking capacity l _{cu} conforming to IEC 60947-2	110 V	aM	A	*	*	20	25	25	40	40	50	50	63	63	63
		gG	A	*	*	25	32	32	50	50	63	63	80	80	80
	230/240 V	aM	A	*	*	16	20	20	32	32	40	40	50	50	50
		gG	A	*	*	25	32	32	40	40	50	50	63	63	63

Circuit breaker type				GB2											
				CD05	CD06	CD07	CD08	CD09	CD10	CD12	CD14	CD16	CD20	CD21	CD22
Rating			A	0.5	1	2	3	4	5	6	8	10	12	16	20
Breaking capacity conforming to IEC 60947-2 ~ 50/60 Hz	110 V	l _{cu}	kA	50	50	15	10	6	3	3	3	2	2	2	2
		l _{cs} % ⁽¹⁾		100	50	50	50	50	75	75	75	75	75	75	75
	230/240 V	l _{cu}	kA	50	50	15	3	3	2	1.5	1.5	1.5	1.5	1.5	1.5
		l _{cs} % ⁽¹⁾		25	25	25	50	50	75	75	75	75	75	75	75
Associated fuses, if required if l _{sc} > breaking capacity l _{cu} conforming to IEC 60947-2	110 V	aM	A	*	*	20	25	25	40	40	50	50	63	63	63
		gG	A	*	*	25	32	32	50	50	63	63	80	80	80
	230/240 V	aM	A	*	*	16	20	20	32	32	40	40	50	50	50
		gG	A	*	*	25	32	32	40	40	50	50	63	63	63

Circuit breaker type				GB2											
				DB05	DB06	DB07	DB08	DB09	DB10	DB12	DB14	DB16	DB20	DB21	DB22
Rating			A	0.5	1	2	3	4	5	6	8	10	12	16	20
Breaking capacity conforming to IEC 60947-2 ~ 50/60 Hz	110 V	l _{cu}	kA	50	50	15	10	6	3	3	3	2	2	2	2
		l _{cs} % ⁽¹⁾		100	50	50	50	50	75	75	75	75	75	75	75
	230/240 V	l _{cu}	kA	50	50	15	3	3	2	1.5	1.5	1.5	1.5	1.5	1.5
		l _{cs} % ⁽¹⁾		25	25	25	50	50	75	75	75	75	75	75	75
Associated fuses, if required if l _{sc} > breaking capacity l _{cu} conforming to IEC 60947-2	110 V	aM	A	*	*	20	25	25	40	40	50	50	63	63	63
		gG	A	*	*	25	32	32	50	50	63	63	80	80	80
	230/240 V	aM	A	*	*	16	20	20	32	32	40	40	50	50	50
		gG	A	*	*	25	32	32	40	40	50	50	63	63	63
400/415 V	aM	A	*	*	16	20	20	32	32	40	40	50	50	50	
	gG	A	*	*	25	32	32	40	40	50	50	63	63	63	

(1) As % of l_{cu}.
 * Fuse not required. Breaking capacity l_{cu} > l_{sc}.

Protection components

Thermal-magnetic circuit breakers

TeSys GB2 for the protection of industrial equipment control circuits

TeSys GB

Circuit breaker type			GB2												
			●●05	●●06	●●07	●●08	●●09	●●10	●●12	●●14	●●16	●●20	●●21	●●22	
Breaking capacity (I _{cu}) conforming to IEC 60947-2 ---	24 V	kA	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
	48 V	kA	1	1	1	1	1	1	1	1	1	1	1	1	
Operational current conforming to IEC 60947-5-1 ---	DC-12	24 V	A	0.5	1	2	3	4	5	6	8	10	12	16	20
		48 V	A	0.5	1	2	3	4	5	6	8	10	12	16	20
	DC-13	24 V	A	0.5	1	2	3	4	5	6	8	10	12	16	20
		48 V	A	0.5	1	2	3	4	5	6	8	10	12	16	20

Circuit breaker type			GB2							
			CS05	CS06						
Rating		A	0.5	1						
Breaking capacity conforming to IEC 60947-2 ~ 50/60 Hz	110 V	I _{cu}	kA	50						
		I _{cs} % ⁽¹⁾		100						
	230/240 V	I _{cu}	kA	50						
		I _{cs} % ⁽¹⁾		25						
Breaking capacity (I _{cu}) conforming to IEC 60947-2 ---	24 V	kA	1.5	1.5						
		kA	1	1						
Operational current conforming to IEC 60947-5-1 ---	DC-12	24 V	A	0.5						
		48 V	A	0.5						
	DC-13	24 V	A	0.5						
		48 V	A	0.5						
Maximum permissible line length for star-delta starting (length of cable containing 2 or more conductors)	With contactors LC●D09...D18	Operational voltage	V	48	110	230	48	110	230	
		C.s.a.	0.60 mm ²	m	⁽³⁾	31	365	6	85	230
			0.75 mm ²	m	⁽³⁾	39	460	8	110	290
			1 mm ²	m	⁽³⁾	52	610	10	145	380
			1.5 mm ²	m	⁽³⁾	78	910	15	220	570
			2.5 mm ²	m	⁽³⁾	130	1520	26	360	950
	4 mm ²	m	⁽³⁾	200	2400	41	580	1500		
	With contactors LC●D25...D32	Operational voltage	V	48	110	230	48	110	230	
		C.s.a.	0.60 mm ²	m	⁽³⁾	⁽³⁾	230	⁽³⁾	56	230
			0.75 mm ²	m	⁽³⁾	⁽³⁾	290	⁽³⁾	70	290
			1 mm ²	m	⁽³⁾	⁽³⁾	390	⁽³⁾	95	380
			1.5 mm ²	m	⁽³⁾	⁽³⁾	580	⁽³⁾	140	570
			2.5 mm ²	m	⁽³⁾	⁽³⁾	970	⁽³⁾	230	950
	4 mm ²	m	⁽³⁾	⁽³⁾	1500	⁽³⁾	375	1500		
	With contactors LC●D40...D80	Operational voltage	V	48	110	230	48	110	230	
		C.s.a.	0.60 mm ²	m	⁽³⁾	⁽³⁾	46	⁽³⁾	13	100
			0.75 mm ²	m	⁽³⁾	⁽³⁾	60	⁽³⁾	17	130
			1 mm ²	m	⁽³⁾	⁽³⁾	80	⁽³⁾	22	170
			1.5 mm ²	m	⁽³⁾	⁽³⁾	120	⁽³⁾	34	250
			2.5 mm ²	m	⁽³⁾	⁽³⁾	190	⁽³⁾	56	420
	4 mm ²	m	⁽³⁾	⁽³⁾	310	⁽³⁾	90	680		

(1) As % of I_{cu}.
 (2) One GB2 CS circuit breaker on each live conductor.
 (3) Use relays.

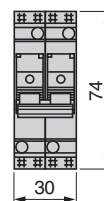
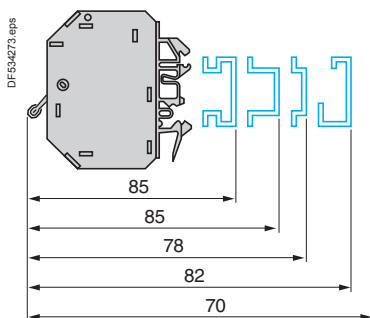
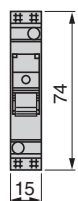
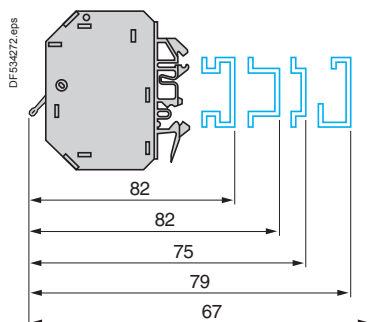
Protection components

Thermal-magnetic circuit breakers TeSys GB2 for the protection of industrial equipment control circuits

Dimensions

GB2 CB●●, GB2 CD●●, GB2 CS●●

GB2 DB●●



Marking: up to twelve AB1 R clip-in markers.

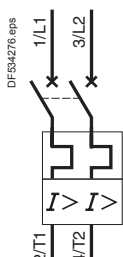
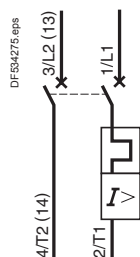
Schemes

GB2 CB●●

GB2 CD●●

GB2 DB●●

GB2 CS●●



TeSys protection components

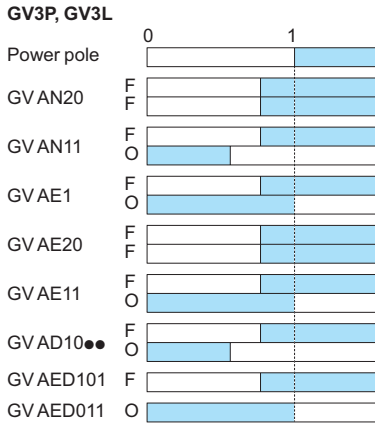
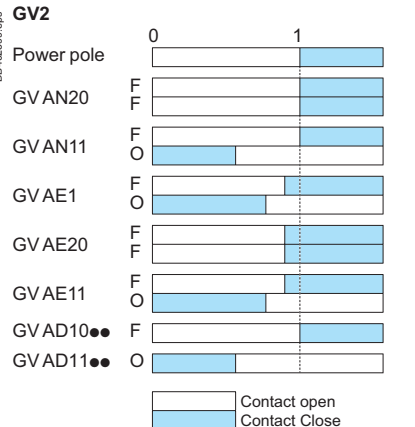
Thermal-magnetic motor circuit breakers GV2, GV3 P and GV3 L

Auxiliary contacts

TeSys GV

Type of contacts			Instantaneous auxiliary GV AN, GV AD								Fault signalling GV AD, GV AM11 ⁽¹⁾				Instantaneous auxiliary GV AE			
Rated insulation voltage (Ui) (associated insulation coordination)	Conforming to IEC 60947-1	V	690								690				250 (690 in relation to main circuit)			
	Conforming to CSA C22-2 n° 14 and UL 508	V	600								300				300			
Conventional thermal current (Ith)	Conforming to IEC 60947-5-1	A	6								2.5				2.5			
	Conforming to CSA C22-2 n° 14 and UL 508	A	5								1				1			
Mechanical durability (C.O.: Close - Open)		C.O.	100 000								1000				100 000			
Operational power and current conforming to IEC 60947-5-1. a.c. operation			AC-15/100 000 C.O.								AC-14/1000 C.O.				AC-15/100 000 C.O.			
	Rated operational voltage (Ue)	V	48	110	230	380	440	500	690	24	48	110	230	24	48	110	230	
	Operational power, normal conditions	VA	300	500	720	850	650	500	400	36	48	72	72	48	60	120	120	
	Occasional breaking and making capacities, abnormal conditions	kVA	3	7	13	15	13	12	9	0.22	0.3	0.45	0.45	0.48	0.6	1.27	2.4	
	Rated operational current (Ie)	A	6	4.5	3.3	2.2	1.5	1	0.6	1.5	1	0.5	0.3	2	1.25	1	0.5	
Operational power and current conforming to IEC 60947-5-1. d.c. operation			DC-13/100 000 C.O.								DC-13/1000 C.O.				DC-13/100 000 C.O.			
	Rated operational voltage (Ue)	V	24	48	60	110	240	–	–	24	48	60	–	24	48	60	–	
	Operational power, normal conditions	W	140	240	180	140	120	–	–	24	15	9	–	24	15	9	–	
	Occasional breaking and making capacities, abnormal conditions	W	240	360	240	210	180	–	–	100	50	50	–	100	50	50	–	
	Rated operational current (Ie)	A	6	5	3	1.3	0.5	–	–	1	0.3	0.15	–	1	0.3	0.15	–	
Low power switching reliability of contact			GV AE: Number of failures for "n" million operating cycles (17 V-5 mA): = 10 ⁻⁶															
Minimum operational conditions d.c. operation		V	17															
		mA	5															
Short-circuit protection			By GB2 CB●● circuit breaker (rating according to operational current for Ue ≤ 415 V) or by gG fuse 10 A max												GB2 CB06 or gG fuse 10 A max			
Cabling, screw clamp terminals	Number of conductors		1				2											
	Solid cable	mm ²	1...2.5				1...2.5											
	Flexible cable without cable end	mm ²	0.75...2.5				0.75...2.5											
	Flexible cable with cable end	mm ²	0.75...1.5				0.75...1.5											
	Tightening torque	N.m	1.4 max				1.4 max											
Cabling, spring terminal connections	Flexible cable without cable end		GV AN only															
		mm ²	0.75...2.5				0.75...2.5				0.75...1.5							

Operation of instantaneous auxiliary contacts



Operation of fault signalling contacts

GV AM11
Change of state following tripping on
short-circuit.

GV AD10●● and GV AD01●●
Change of state following tripping on
short-circuit, overload or undervoltage.

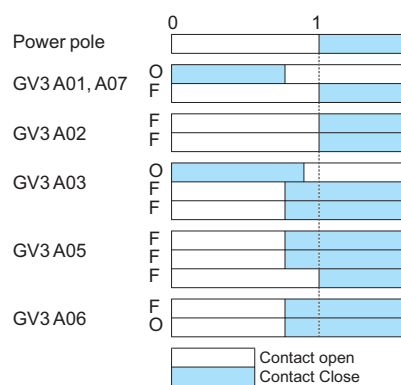
(1) For application example of fault signalling contact and short-circuit signalling contact, see page B6/82.
(2) Add an RC circuit type LA4 D to the load terminals, see page B8/17.

Type of contacts			Instantaneous auxiliary contacts GV3 A01...A07							Fault signalling contacts GV3 A08 and A09							
Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V	690							690							
	Conforming to CSA C22-2 n° 14, UL 508	V	600 (B600)							600 (B600)							
Conventional rated thermal current (Ith)	Conforming to IEC 60947-5-1	A	6							6							
	Conforming to CSA C22-2 n° 14, UL 508	A	5 (B600)							5 (B600)							
Mechanical durability (C.O.: Close - Open)		C.O.	100 000							1000							
Operational power and current conforming to IEC 60947-5-1 a.c. operation	Rated operational voltage (Ue)	V	48	110	220	380	440	500	690	48	110	220	380	440	500	690	
	Operational power		AC-11/100 000 C.O.							AC-11/1000 C.O.							
		VA	350	500	800	850	700	700	400	240	460	800	850	450	450	200	
	Occasional breaking and making capacities	kVA	4	12	20	20	15	15	10	2.4	8	12	15	12	12	8	
	Operational current (Ie)	A	6	4.5	3.5	2.2	1.5	1.5	0.6	5	3.6	3.5	2.2	1	1	0.3	
Operational power and current conforming to IEC 60947-5-1 d.c. operation	Rated operational voltage (Ue)	V	24	48	60	110	220	24	48	60	110	220					
	Operational power		DC-11/100 000 C.O.							DC-11/1000 C.O.							
		W	180	240	180	140	120	120	120	90	70	60					
	Occasional breaking and making capacities	W	240	360	240	210	180	180	180	135	105	90					
	Operational current (Ie)	A	6	5	3	1.3	0.5	5	2.5	1.5	0.7	0.3					
Short-circuit protection			By GB2 CB08 circuit breaker or gG fuse, 6A max														
Connection	Number of conductors		1				2										
	Solid cable	mm²	1...2.5				1...2.5										
	Flexible cable without cable end	mm²	0.75...2.5				0.75...2.5										
	Flexible cable with cable end	mm²	0.75...2.5				0.75...1.5										

Contact operation GV3

GV3 A08 and A09 change state following tripping on short-circuit or overload

DE402400.eps



Auxiliary contact characteristics

Type of contacts			GV7 AE11							GV7 AB11							
Rated insulation voltage(Ui) (associated insulation coordination)	Conforming to IEC 60947-1	V	690							690							
Conventional thermal current (Ith)	Conforming to IEC 60947-5-1	A	6							6							
Mechanical durability (C.O.: Close - Open)		C.O.	50 000							50 000							
Operational current conforming to IEC 60947-5-1 a.c. operation			AC-12 or AC-15. 50 000 C.O.							AC-12 or AC-15. 50 000 C.O.							
	Rated operational voltage (Ue)	V	24	48	110	230/240	380/415	440	690	24	48	110	230/240	380/415	440	690	
	Rated operational current (Ie)	AC-12	A	6	6	6	6	6	6	6	5	5	5	5	5	5	
		AC-15	A	6	6	5	4	3	3	0.1	5	5	4	3	2.5	2.5	0.1
Operational current conforming to IEC 60947-5-1 d.c. operation			DC-12 or DC-14. 50 000 C.O.							DC-12 or DC-14. 50 000 C.O.							
	Rated operational voltage (Ue)	V	24	48	110	250											
	Rated operational current (Ie)	DC-12	A	2.5	2.5	0.8	0.3	2	2	0.5	-						
		DC-14	A	1	0.2	0.5	0.03	0.5	0.1	0.25	-						
Minimum operational conditions d.c. operation		V	17							12							
		mA	5							5							
Short-circuit protection			By GB2 CB●● circuit breaker (rating according to operational current for Ue ≤ 415 V) or gG fuse, 10 A max.														
Cabling	Solid cable	mm²	1 x 1.5 conductor							1 x 1.5 conductor							
	Flexible cable without cable end	mm²	1 x 1.5 conductor							1 x 1.5 conductor							
	Flexible cable with cable end	mm²	1 x 1.5 conductor							1 x 1.5 conductor							

Characteristics of Start-Stop and fault signalling contacts

Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V	500					
Rated operational voltage (Ue)	Conforming to IEC 60947-1	V	500					
Conventional thermal current (Ith)	Conforming to IEC 60947-5-1	A	6					
Operational power and current conforming to IEC 60947-5-1 a.c. operation (C.O.: Close - Open)			AC-15. 20 000 C.O.					
	Rated operational voltage (Ue)	V	48	110/127	220/240	380/415	440	500
	Operational power	VA	360	500	800	850	700	700
	Occasional breaking and making capacities	VA	4000	12 000	20 000	20 000	15 000	15 000
	Rated operational current (Ie)	A	6	4.5	3.5	2.2	1.5	1.5
Operational power and current conforming to IEC 60947-5-1 d.c. operation (C.O.: Close - Open)			DC-13. 1000 C.O.					
	Rated operational voltage (Ue)	V	24	48	60	110	220	
	Operational power	W	180	240	180	140	120	
	Occasional breaking and making capacities	W	240	280	240	210	180	
	Rated operational current (Ie)	A	6	5	3	1.3	0.5	
Short-circuit protection	Conforming to IEC 60947-5-1		By GB2 CB08 circuit breaker or gG fuse, 6 A max					
Cabling	Solid cable	mm²	1 x 1...4 conductor					
	Flexible cable without cable end	mm²	1 x 2.5 conductor					
	Flexible cable with cable end	mm²	1 x 1...2.5 conductor or 2 x 1...2.5 conductors					
Tightening torque		N.m	0.8					

Characteristics of electric trips

Circuit breaker type			GV2 ME, GV2 P GV3 P, GV3 L		GV2 ME only	GV3 ME80		GV7 R		
Type of trip			GV AU	GV AS	GV AX ⁽¹⁾	GV3 B	GV3 D	GV7 AU	GV7 AS	
Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V	690	690	500	690	690	690	690	
	Conforming to CSA C22-2 n° 14, UL 508	V	600	600	–	600 (B600)	600 (B600)	600	600	
Operational voltage	Conforming to IEC 60947-1	V	0.85... 1.1 Un	0.7... 1.1 Un	0.85... 1.1 Un	0.8...1.1 Un		0.85... 1.1 Un	0.7... 1.1 Un	
Drop-out voltage		V	0.7... 0.35 Un	0.75... 0.2 Un	0.7... 0.35 Un	0.7...0.35 Un		0.35... 0.7 Ue	0.2... 0.75 Ue	
Inrush consumption	~	VA	12	14	12	12		< 10		
Sealed consumption	~	VA	3.5	5	3.5	7		< 5		
Operating time	Conforming to IEC 60947-1		From the moment the voltage reaches its operational value until opening of the circuit-breaker.							
		ms	10...15				10	15	< 50	
On-load factor			100 %			100 %		100 %		
Cabling	Number of conductors		2 or 4			1 or 2		1		
	Solid cable	mm²	1...2.5			1...2.5		1.5		
	Flexible cable without cable end	mm²	0.75...2.5			0.75...2.5		1.5		
	Flexible cable with cable end	mm²	0.75...1.5			0.75...2.5		1		
Tightening torque		N.m	1.4 max			1.2		1.2		
Mechanical durability (C.O.: Close - Open)		C.O.	30 000 (GV2 ME and GV2 P) 10 000 (GV3 P and GV3 L)			50 % of the mechanical durability of the circuit-breaker				

⁽¹⁾ Wiring scheme of undervoltage trip for dangerous machines (conforming to INRS) on GV2 ME only, see page B6/82.

TeSys protection components

Thermal-magnetic and magnetic motor circuit breakers GV2 and GV3

Accessories

TeSys GV

Characteristics of 3-pole busbars GV2 G●●● and GV3 G●64

			GV2 G●●●	GV3 G●64
Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V	690	690
Conventional thermal current (Ith)	Conforming to IEC 60439-1	A	63	115
Permissible peak current (I peak)		kA	11	20
Permissible thermal limit (I²t)		kA²s	104	300
Degree of protection	Conforming to IEC 60529		IP 20	IP 20
Terminal block			Yes	–

Characteristics of terminal blocks GV2 G05 and GV1 G09 (for GV2 ME and GV2 P)

Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V	690
Conventional thermal current (Ith)	Conforming to IEC 60439-1	A	63
Degree of protection	Conforming to IEC 60529		IP 20
Connection	Solid cable	mm²	1 x 1.5 to 25 conductor or 2 x 1.5 to 6 conductors
	Flexible cable without cable end	mm²	1 x 1.5 to 16 conductor or 2 x 2.5 to 4 conductors
	Flexible cable with cable end	mm²	1 x 1.5 to 10 conductor or 2 x 1.5 to 2 conductors
	Flexible or solid cable AWG		1 AWG 4
Tightening torque	Connector	N.m	2.2
	Screw clamp terminals	N.m	1.7

Characteristics of current limiters (GV2 ME and GV2 P)

Type			GV1 L3	LA9 LB920	
Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V	690	690	
Conventional thermal current (Ith)	Conforming to IEC 60947-1	A	63	63	
Rated operational current (Ie)		A	32	32	
Operating threshold	rms current	A	1500 (non adjustable threshold)	1000 (non adjustable threshold)	
Connection			1 conductor	2 conductors	
	Solid cable	mm²	1.5...25	1.5...10	1 conductor: 1.5...25 2 conductors: 1.5...10
	Flexible cable without cable end	mm²	1.5...25	2.5...10	1 conductor: 1.5...25 2 conductors: 1.5...10
	Flexible cable with cable end	mm²	1.5...16	1.5...4	1 conductor: 1.5...16 2 conductors: 1.5...4
Tightening torque		N.m	2.2		

Relays – TeSys SK, K - For control of TeSys K contactor coils and other devices

Type of product

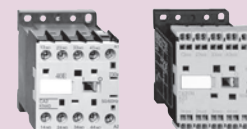
Pages

Mini relay - 2 contacts, simultaneous action
TeSys SK, SKE



B7/2

Relays - 4 contacts, simultaneous action
TeSys K



B7/4

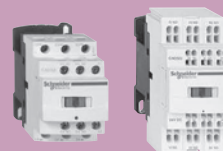
Auxiliary contact blocks, accessories



B7/6

Relays – TeSys D - For control of TeSys D contactor coils and other devices

Relays and auxiliary contact blocks
5 contacts, simultaneous action
TeSys D



B7/8

Accessories



B7/10

Technical Data for Designers

B7/13

Control relays

Mini-control relays

TeSys CA2 SK and CA3 SK

Mini-control relay TeSys CA2 SKE with alternating contacts

TeSys SK

PF526254.1f



CA2 SK20●●

Mini-control relays

- Width of mini-control relays 27 mm.
- Mounting on 35 mm rail.
- Connection by connectors.

Control circuit supply	Auxiliary contacts		Basic reference, to be completed by adding the voltage code ⁽¹⁾
a.c. supply	2	–	CA2SK20●●
	1	1	CA2SK11●●
d.c. supply	2	–	CA3SK20●●
	1	1	CA3SK11●●

PF526255.1f



CA2 SKE20●●

Mini-control relay with alternating contacts

This mini-control relay with alternating contacts (see function diagram page B7/17) makes it possible to automatically split the operating time between 2 circuits of a redundant system.

By regularly energising the “safety circuits”, this device makes it possible to ensure that they are operating correctly.

- Width of mini-control relay 45 mm.
- Fixing by Ø4 screws.
- Connection by connectors.
- Cannot be fitted with front-mounted auxiliary contact block.
- Cannot be fitted with coil suppressor module.

Control circuit supply	Auxiliary contacts		Basic reference, to be completed by adding the voltage code ⁽¹⁾
a.c. supply	2	–	CA2SKE20●●

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Mini-control relays CA2 SK and CA2 SKE

Volts ~ 50/60 Hz	24	48	110	120	220	230	240	380	400
Code	B7	E7	F7	G7	M7	P7	U7	Q7	V7

Mini-control relays CA3 SK

Volts ---	12	24	36	48	72
Code	JD	BD	CD	ED	SD

Control relays

Mini-control relays

TeSys CA2 SK and CA3 SK

Instantaneous auxiliary contacts and coil suppressor modules

TeSys SK

PF526258.fr



LA1 SK11

Instantaneous auxiliary contact blocks

Clip-on front mounting

For use on control relays	Maximum number of blocks per contactor	Composition		Reference
CA2SK20	1			LA1SK20
		–		LA1SK02
				LA1SK11

PF526257.fr



LA4 SK•1•

Suppressor modules

Connection without need for tools by clipping onto right-hand side of contactor

For use on control relays	Type	For voltages	Sold in lots of	Unit reference
CA2SK and CA3SK	Varistor (1)	~ and --- 24 V...48 V	10	LA4SKE1E
		~ and --- 110 V...250 V	10	LA4SKE1U
	Diode (2)	--- 24 V...250 V	10	LA4SKC1U

(1) Protection provided by limiting the transient voltage to 2 U_c max.
Maximum reduction of transient voltage peaks.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

(2) No overvoltage or oscillating frequency.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

Control relays

TeSys K control relays

For a.c. or d.c. control circuit

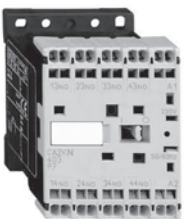
TeSys K

PF526247.tif



CA2 KN40●●

PF526248.tif



CA2 KN403●●

PF526249.tif



CA3 KN407●●

Control relays for a.c. control circuit

- Mounting on 35 mm rail or Ø4 screw fixing.
- Screws in the open "ready-to-tighten" position.

Control circuit Consumption	Auxiliary contacts	Basic reference, to be completed by adding the voltage code ⁽¹⁾

Screw clamp connections

4.5 VA	4	–	CA2KN40●●
	3	1	CA2KN31●●
	2	2	CA2KN22●●

Spring terminal connections

4.5 VA	4	–	CA2KN403●●
	3	1	CA2KN313●●
	2	2	CA2KN223●●

Faston connectors, 1 x 6.35 or 2 x 2.8

4.5 VA	4	–	CA2KN407●●
	3	1	CA2KN317●●
	2	2	CA2KN227●●

Solder pins for printed circuit boards

4.5 VA	4	–	CA2KN405●●
	3	1	CA2KN315●●
	2	2	CA2KN225●●

Control relays for d.c. control circuit

- Mounting on 35 mm rail or Ø4 screw fixing.
- Screws in the open "ready-to-tighten" position.

Control circuit Consumption	Auxiliary contacts	Basic reference, to be completed by adding the voltage code ⁽¹⁾

Screw clamp connections

3 W	4	–	CA3KN40●●
	3	1	CA3KN31●●
	2	2	CA3KN22●●

Spring terminal connections

3 W	4	–	CA3KN403●●
	3	1	CA3KN313●●
	2	2	CA3KN223●●

Faston connectors, 1 x 6.35 or 2 x 2.8

3 W	4	–	CA3KN407●●
	3	1	CA3KN317●●
	2	2	CA3KN227●●

Solder pins for printed circuit boards

3 W	4	–	CA3KN405●●
	3	1	CA3KN315●●
	2	2	CA3KN225●●

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Control relays CA2 K (0.8...1.15 Uc) (0.85...1.1 Uc)

Volts ~	12	20	24 ⁽²⁾	36	42	48	110	115	127	220/	230	230/	380/	400	400/	440	500	660/
50/60 Hz										230		240	400		415			690

Code J7 Z7 B7 C7 D7 E7 F7 FE7 FC7 M7 P7 U7 Q7 V7 N7 R7 S7 Y7

Up to and including 240 V, coil with integral suppression device available: add 2 to the code required. Example: **J72**

Control relays CA3 K (0.8...1.15 Uc)

Volts ---	12	20	24 ⁽²⁾	36	48	60	72	100	110	125	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add 3 to the code required. Example: **JD3**.

⁽²⁾ When connecting an electronic sensor or timer in series with the coil of the control relay, select a 20 V coil (~ code Z7, --- code ZD) so as to compensate for the incurred voltage drop.

Control relays

TeSys K control relays

For d.c. control circuit

TeSys K

PF526250.tif



CA4 KN40●●●

Low consumption control relays (d.c. control circuit)

- Mounting on 35 mm \bar{U} rail or $\varnothing 4$ screw fixing.
- Screws in the open "ready-to-tighten" position.

Control circuit Consumption	Auxiliary contacts	Basic reference, to be completed by adding the voltage code ⁽¹⁾
Screw clamp connections		
1.8 W	4 —	CA4KN40●●
	3 1	CA4KN31●●
	2 2	CA4KN22●●
Spring terminal connections		
1.8 W	4 —	CA4KN403●●
	3 1	CA4KN313●●
	2 2	CA4KN223●●
Faston connectors, 1 x 6.35 or 2 x 2.8		
1.8 W	4 —	CA4KN407●●
	3 1	CA4KN317●●
	2 2	CA4KN227●●
Solder pins for printed circuit boards		
1.8 W	4 —	CA4KN405●●
	3 1	CA4KN315●●
	2 2	CA4KN225●●

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Control relays CA4 K (Wide range coil: 0.7...1.3 Uc)

Volts \bar{U}	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

Control relays

TeSys K control relays

Instantaneous and time delay auxiliary contact blocks

TeSys K



LA1 KN20



LA1 K...

Instantaneous auxiliary contact blocks

Clip-on front mounting, 1 per control relay

Connection	Composition	Reference
Screw clamp terminals		LA1KN20
		LA1KN02
		LA1KN11
		LA1KN40 ⁽¹⁾
		LA1KN31 ⁽¹⁾
		LA1KN22 ⁽¹⁾
		LA1KN13 ⁽¹⁾
		LA1KN04 ⁽¹⁾
Spring terminals		LA1KN203
		LA1KN023
		LA1KN113
		LA1KN403 ⁽¹⁾
		LA1KN313 ⁽¹⁾
		LA1KN223 ⁽¹⁾
		LA1KN133 ⁽¹⁾
		LA1KN043 ⁽¹⁾
Faston connectors 1 x 6.35 or 2 x 2.8		LA1KN207
		LA1KN027
		LA1KN117
		LA1KN407 ⁽¹⁾
		LA1KN317 ⁽¹⁾
		LA1KN227 ⁽¹⁾
		LA1KN137 ⁽¹⁾
		LA1KN047 ⁽¹⁾

Electronic time delay contact blocks

- Relay output with common point changeover contact, \sim or \equiv 240 V, 2 A maximum
- Control voltage 0.85...1.1 Uc
- Maximum switching capacity 250 VA or 150 W
- Operating temperature -10...+60 °C
- Reset time: 1.5 s during the time delay period 0.5 s after the time delay period



LA2 KT2

Clip-on front mounting, 1 per control relay

Voltage	Type	Timing range	Composition	Reference
\sim or \equiv 24...48	On-delay	1...30		LA2KT2E
\sim 110...240	On-delay	1...30		LA2KT2U

Other versions

Electronic timers type RE4.
Please consult your Regional Sales Office.

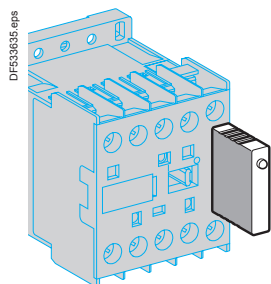
⁽¹⁾ Block of 4 contacts for use on CA2 K and CA3 K.

Control relays

TeSys K control relays

Mounting and marking accessories

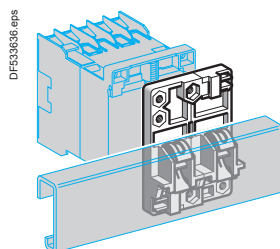
TeSys K



LA4 K●●●

Suppressor modules incorporating LED indicator

Mounting and connection	Type	For voltages	Sold in lots of	Unit reference
Clips onto front of relay with locating device. No tools required.	Varistor ⁽¹⁾	~ and --- 12...24 V	5	LA4KE1B
		~ and --- 32...48 V	5	LA4KE1E
		~ and --- 50...129 V	5	LA4KE1FC
		~ and --- 130...250 V	5	LA4KE1UG
	Diode + Zener diode ⁽²⁾	--- 12...24 V	5	LA4KC1B
		--- 32...48 V	5	LA4KC1E
	RC ⁽³⁾	~ 220...250 V	5	LA4KA1U



LA9 D973

Mounting accessories

Description	Application		Sold in lots of	Unit reference
Mounting plates	On 1 □ rail	Clip-on	1	LA9D973
	On 2 □ rails	110/120 mm fixing centres	10	DX1AP25

Marking accessories

Description	Application		Sold in lots of	Unit reference
Marker holder	Clip-on fixing on front face	–	100	LA9D90
Clip-in markers	4 maximum per relay	Strips of 10 identical numbers 0 to 9	25	AB1R● ⁽⁴⁾
		Strips of 10 identical capital letters A to Z	25	AB1G● ⁽⁴⁾

⁽¹⁾ Protection provided by limiting the transient voltage to 2 Uc max.

Maximum reduction of transient voltage peaks.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

⁽²⁾ No overvoltage or oscillating frequency.

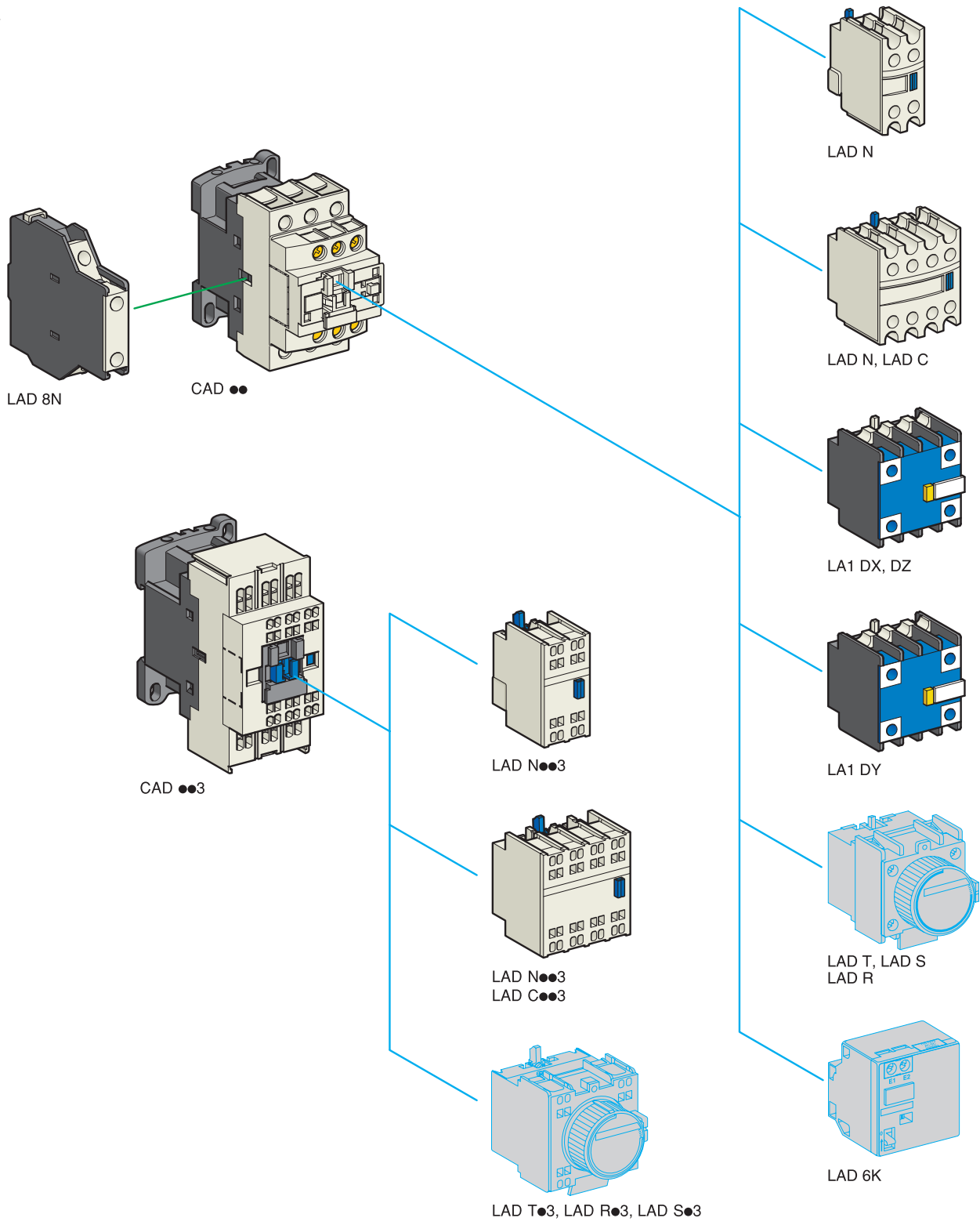
Polarised component.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

⁽³⁾ Protection by limiting the transient voltage to 3 Uc max. and limitation of the oscillating frequency.

Slight increase in drop-out time (1.2 to 2 times the normal time).

⁽⁴⁾ Complete the reference by replacing the dot with the required character.



See page opposite for mounting possibilities according to control relay type and rating

TeSys control relays

TeSys D control relays and add-on blocks

Control circuit: a.c., d.c. or low consumption

TeSys D



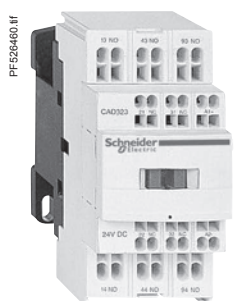
CAD 50●●



CAD 32●●



CAD 503●●



CAD 323●●

Control relays for connection by screw clamp terminals

Type	Number of contacts	Composition	Basic reference, to be completed by adding the control voltage code ⁽¹⁾
Instantaneous	5	5 —	CAD50●● ⁽³⁾
		3 2	CAD32●● ⁽³⁾

Control relays for connection by spring terminals

Instantaneous	5	5 —	CAD503●●
		3 2	CAD323●●

Instantaneous auxiliary contact blocks for connection by screw clamp terminals

For use in normal operating environments

Number of contacts	Maximum number per relay		Composition		Reference
	Clip-on mounting front	side	1	2	
2	1	—	1	1	LADN11
	—	1 on LH side	1	1	LAD8N11 ⁽⁶⁾
	1	—	2	—	LADN20
	—	1 on LH side	2	—	LAD8N20 ⁽⁶⁾
	1	—	—	2	LADN02
	—	1 on LH side	—	2	LAD8N02 ⁽⁶⁾
4 ⁽⁴⁾	1	—	2	2	LADN22 LADN22S ⁽⁷⁾
			1	3	LADN13
			4	—	LADN40
			—	4	LADN04
			3	1	LADN31
			2	2	LADC22

Including 1 N/O and 1 N/C make before break.

With dust and damp protected contacts, for use in particularly harsh industrial environments

Number of contacts	Maximum number per relay	Composition		Reference
		protected ⁽⁵⁾	not protected	
2	1	2 — —	— —	LA1DX20
		— 2 —	— —	LA1DX02
		2 — 2	— —	LA1DY20
4 ⁽⁴⁾	1	2 — —	2 —	LA1DZ40
		2 — —	1 1	LA1DZ31

Instantaneous auxiliary contact blocks for connection by spring terminals

This type of connection is not possible for contact blocks LAD 8 and blocks with dust and damp protected contacts.

For all other instantaneous auxiliary contact blocks, add the digit 3 to the end of the references selected above.

Example: LAD N11 becomes LAD N113.

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office).

a.c. supply

Volts ~	24	42	48	110	115	220	230	240	380	400	415	440
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7

d.c. supply (coils with integral suppression device fitted as standard)

Volts —	12	24	36	48	60	72	110	125	220	250	440
U from 0.7 to 1.25 U _c JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD	

Low consumption (coils with integral suppression device fitted as standard)

Volts —	5	12	20	24	48	110	220	250
Code	AL	JL	ZL	BL	EL	FL	ML	UL

⁽²⁾ LC: low consumption.

⁽³⁾ To order control relays with connection by lugs, add the digit 6 to the end of the selected reference. Example: CAD50●● becomes CAD506●●.

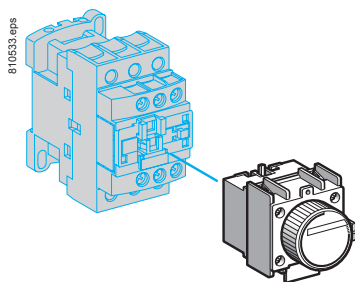
⁽⁴⁾ Blocks with 4 auxiliary contacts cannot be used on low consumption control relays.

⁽⁵⁾ Product fitted with 4 earth screen continuity terminals.

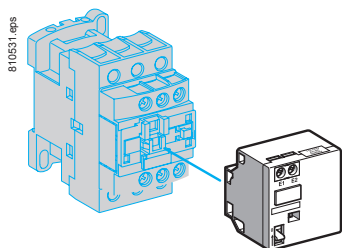
⁽⁶⁾ These contact blocks cannot be used on low consumption control relays.

⁽⁷⁾ With red front face - for safety chain indication.

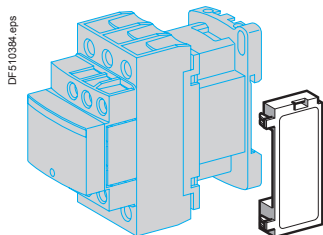
TeSys D



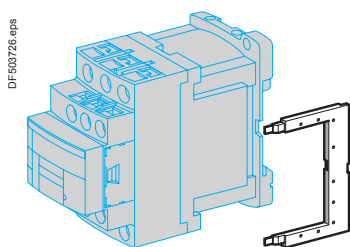
LAD T



LAD 6K10



LAD 4••



LAD 4••

Time delay auxiliary contact blocks for connection by screw clamp terminals ⁽¹⁾

Number and type of contacts	Maximum number per relay Front mounting	Time delay		Reference
		Type	Range	
1 N/C and 1 N/O	1	On-delay	0.1...3 s ⁽²⁾	LADT0
			0.1...30 s	LADT2
			10...180 s	LADT4
		Off-delay	1...30 s ⁽³⁾	LADS2
			0.1...3 s ⁽²⁾	LADR0
			0.1...30 s	LADR2
			10...180 s	LADR4

(Sealing cover: see page B8/21)

Time delay auxiliary contact blocks for connection by spring terminals

Add the digit 3 to the references selected above. Example: LAD T0 becomes LAD T03.

Mechanical latch blocks ⁽⁴⁾

Unlatching control	Maximum number per relay Front mounting	Basic reference to be completed ⁽⁵⁾
Manual or electric 1		LAD6K10•

Suppressor modules

These modules clip onto the top of the control relay and the electrical connection is instantly made. Fitting of an input module is still possible.

RC circuits (Resistor-Capacitor)

- Effective protection for circuits highly sensitive to "high frequency" interference.
- Voltage limited to 3 Uc maximum and oscillating frequency limited to 400 Hz maximum.
- Slight time delay on drop-out (1.2 to 2 times the normal time).

For mounting on	Operational voltage	Reference
CAD ~	~ 24...48 V	LAD4RCE
	~ 110...240 V	LAD4RCU

Varistors (peak limiting)

- Protection provided by limiting the transient voltage value to 2Uc maximum.
- Maximum reduction of transient voltage peaks.
- Slight time delay on drop-out (1.1 to 1.5 times the normal time).

CAD ~	~ 24...48 V	LAD4VE
	~ 50...127 V	LAD4VG
	~ 110...250 V	LAD4VU

Freewheel diode

- No overvoltage or oscillating frequency.
- Increase in drop-out time (6 to 10 times the normal time).
- Polarised component.

CAD ---	--- 24...250 V	LAD4DDL
---------	----------------	---------

Bidirectional peak limiting diode ⁽⁶⁾

- Protection provided by limiting the transient overvoltage value to 2Uc maximum.
- Maximum reduction of transient voltage peaks.

CAD ~	~ 24 V	LAD4TB
	~ 72 V	LAD4TS
CAD ---	--- 24 V	LAD4TBDL
	--- 72 V	LAD4TSDL
	--- 125 V	LAD4TGDL
	--- 250 V	LAD4TUDL
	--- 600 V	LAD4TXDL

⁽¹⁾ These contact blocks cannot be used on low consumption control relays.⁽²⁾ With extended scale from 0.1 to 0.6 s.⁽³⁾ With switching time of 40 ms ±15 ms between opening of the N/C contact and closing of the N/O contact.⁽⁴⁾ Power should not be simultaneously applied or maintained to the mechanical latching block of the CAD N. The duration of the control signal to the mechanical latching block and the CAD N should be ≥ 100 ms.⁽⁵⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

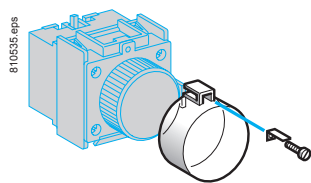
Volts ~ and ---	24	32/36	42/48	60/72	100	110/127	220/240	256/277	380/415
Code	B	C	E	EN	K	F	M	U	Q

⁽⁶⁾ CAD •• --- and low consumption control relays are fitted with a built-in bi-directional peak limiting diode suppressor as standard. On control relays produced after 15th July 2004, this diode is removable. It can therefore be replaced by the user (see references LAD4T••• above). It can also be replaced by a freewheel diode LAD 4DDL. If a d.c. or low consumption control relay is used without suppression, the standard suppressor should be replaced with a blanking plug LAD9DL.

TeSys D

Accessories (to be ordered separately)

Description	For mounting on	Sold in lots of	Unit reference
For marking			
Sheet of 64 blank legends, self-adhesive, 8 x 33 mm	CAD, LAD (4 contacts)	10	LAD21
Sheet of 112 blank legends, self-adhesive, 8 x 12 mm	LAD (2 contacts), LAD T		LAD22
Strips of blank, self-adhesive legends for printing by plotter (4 sets of 5 strips)	All products	35	LAD24
"SIS Label" labelling software for legends LAD 21 and LAD 22, supplied on CD-Rom	Multi-language version: English, French, German, Italian, Spanish	1	XBY2U
Legend holder, snap-in, 8 x 18 mm	LC1 D09...38 LC1DT20...40 LADN (4 contacts) LAD T, LAD R	100	LAD90
For protection			
Sealing cover	LAD T, LAD R	1	LA9D901
Safety cover preventing access to the moving contact carrier	CAD	1	LAD9ET1
Red cover (for safety chain indication)	CAD	1	LAD9ET1S



LA9 D901

Spare parts: coils

Specifications

- Average consumption at 20 °C:
 - inrush ($\cos \varphi = 0.75$) 50/60 Hz: 70 VA at 50 Hz,
 - sealed ($\cos \varphi = 0.3$) 50/60 Hz: 8 VA at 60 Hz,
- Operating range ($\theta < 60$ °C): 0.85 to 1.1 Uc

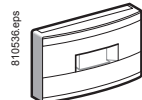
Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference ⁽¹⁾ 50/60 Hz
V	V	H	
12	6.3	0.26	LXD1J7
21 ⁽²⁾	5.6	0.24	LXD1Z7
24	6.19	0.26	LXD1B7
32	12.3	0.48	LXD1C7
36	–	–	LXD1CC7
42	19.15	0.77	LXD1D7
48	25	1	LXD1E7
60	–	–	LXD1EE7
100	–	–	LXD1K7
110	130	5.5	LXD1F7
115	–	–	LXD1FE7
120	159	6.7	LXD1G7
127	192.5	7.5	LXD1FC7
200	–	–	LXD1L7
208	417	16	LXD1LE7
220/230	539	22	LXD1M7 ⁽³⁾
230	595	21	LXD1P7
230/240	645	25	LXD1U7 ⁽⁴⁾
277	781	30	LXD1W7
380/400	1580	60	LXD1Q7
400	1810	64	LXD1V7
415	1938	74	LXD1N7
440	2242	79	LXD1R7
480	2300	85	LXD1T7
500	2499	–	LXD1S7
575	3294	–	LXD1SC7
600	3600	135	LXD1X7
690	5600	190	LXD1Y7

⁽¹⁾ The last 2 digits in the reference represent the voltage code.

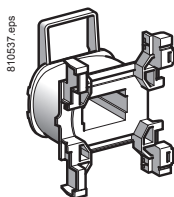
⁽²⁾ Voltage for special coils fitted in control relays with serial timer module with 24 V supply.

⁽³⁾ This coil can be used on 240 V at 60 Hz.

⁽⁴⁾ This coil can be used on 230/240 V at 50 Hz and on 240 V only at 60 Hz.



LAD 9ET1



LXD 1

Technical Data for Designers

Contents

TeSys SK:

- > characteristicsB7/14 and B7/15
- > dimensionsB7/16
- > schemes.....B7/17

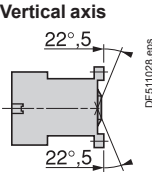
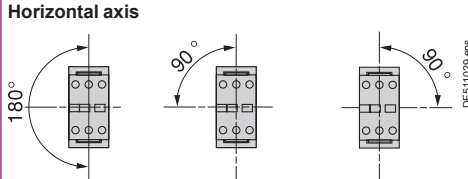
TeSys K:

- > characteristicsB7/18 and B7/19
- > dimensionsB7/20
- > schemes.....B7/21

TeSys D:

- > characteristicsB7/22 to B7/25
- > dimensionsB7/26
- > schemes.....B7/27

TeSys SK

Environment				
Rated insulation voltage (Ui)	Conforming to IEC 60947, VDE 0110 gr C, BS 5424, CSA 22-2 n° 14, UL 508	V	690	
Conforming to standards			IEC 60947, NF C 63-110, VDE 0660, BS 5424	
Product certifications			UL, CSA	
Protective treatment	Conforming to IEC 60068 (DIN 50015)		"TC" (Klimafest, Climateproof)	
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact	
Ambient air temperature around the device	Storage	°C	-50...+70	
	Operation	°C	-20...+50	
Maximum operating altitude	Without derating	m	2000	
Operating position	Without derating	Vertical axis 	Horizontal axis 	
		Without derating	Without derating	
Connection by connectors	Solid cable Flexible cable without cable end Flexible cable with cable end		Min.	Max.
		mm ²	1 x 1.5 or 2 x 1.5	1 x 6 or 2 x 4
		mm ²	1 x 0.5 or 2 x 0.35	1 x 6 or 2 x 2.5
Tightening torque	Pozidriv n° 1 head	N.m	0.8	
Terminal referencing	Conforming to standards EN 50005 and EN 50011		Up to 4 contacts	

Control circuit characteristics				
Control relay		CA2 SK	CA2 SKE	CA3 SK
Rated control circuit voltage (Uc)		V	~ 24...400	~ 12...72
Control voltage limits (≤ 50 °C)	For operation		0.85...1.1 Uc	0.85...1.1 Uc
	For drop-out		≥ 0.20 Uc	≥ 0.10 Uc
Average consumption at 20 °C and at Uc	Inrush		16 VA	23 VA
	Sealed		4.2 VA	4.9 VA
Heat dissipation		W	1.4	1.5
Operating time at 20 °C and at Uc	Between coil energisation and opening of the N/C contacts	ms	8...16	10...18
		ms	7...14	8...12
	Between coil de-energisation and opening of the N/O contacts	ms	6...8	4...6
		ms	8...10	6...8
Maximum operating rate	In operating cycles per hour		1200	1200
Mechanical durability at Uc in millions of operating cycles	50/60 Hz coil		10	–
	Standard ~ coil		–	10

Control relays

Mini-control relays TeSys CA● SK and CA2 SKE

TeSys SK

Auxiliary contact characteristics of mini-control relays and instantaneous contact blocks

Rated operational voltage (Ue)		V	Up to 690
Rated insulation voltage (Ui)	Conforming to IEC 96047, BS 5424, VDE 0110 group C, CSA C 22-2 n° 14	V	690
Conventional rated thermal current (Ith)	For ambient temperature ≤ 55 °C	A	10
Frequency of the operational current		Hz	Up to 400
Short-circuit protection	Conforming to IEC 60947 and VDE 0660, gl fuse	A	10

Operational power of contacts conforming to IEC 60947

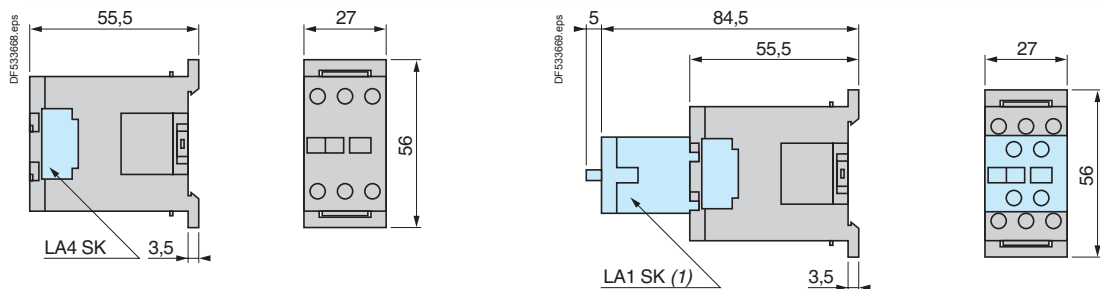
	a.c. supply, category AC-15						d.c. supply, category DC-13						
	V	24	48	110/ 127	220/ 230	380/ 400	440	V	24	48	110	220	440
Electrical durability (valid for up to 3600 operating cycles/hour on an inductive load such as the coil of an electromagnet: making current (cos φ 0.7) = 10 times the power broken (cos φ 0.4).							Electrical durability (valid for up to 1200 operating cycles/hour on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.						
1 million operating cycles	VA	48	96	240	440	800	880	W	120	80	60	52	51
3 million operating cycles	VA	17	34	86	158	288	317	W	55	38	30	28	26
10 million operating cycles	VA	7	14	36	66	120	132	W	15	11	9	8	7
Occasional making capacity	VA	1000	2050	5000	10000	14000	13 000	W	720	600	400	300	230

TeSys SK

Dimensions

Mini-control relays

CA2 SK and CA3 SK



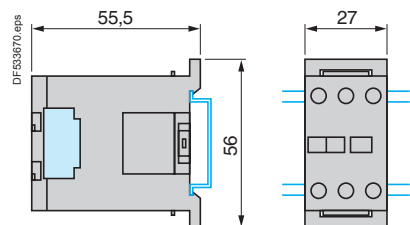
(1) Only on CA2 SK20.

Mounting

Mini-control relays

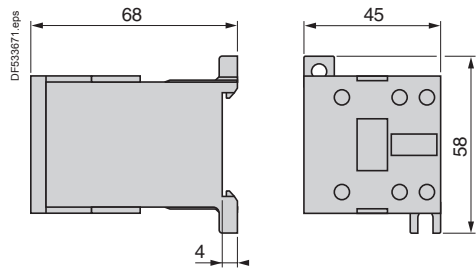
CA2 SK and CA3 SK

On mounting rail AM1 DP200 or AM1 DE200 (└ 35 mm)



Dimensions

CA2 SKE

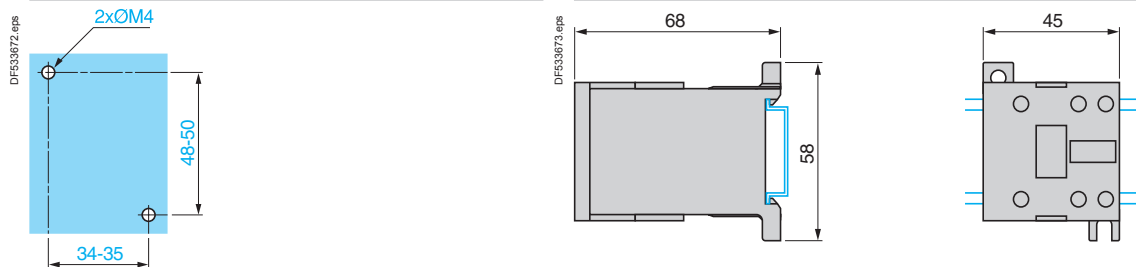


Mounting

CA2 SKE

On panel

On mounting rail AM1 DP200 or AM1 DE200 (└ 35 mm)



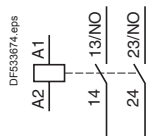
Control relays

Mini-control relays TeSys CA● SK and CA2 SKE

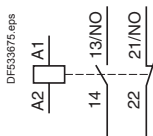
TeSys SK

Schemes

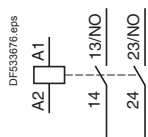
CA2 SK20, CA3 SK20
2 N/O



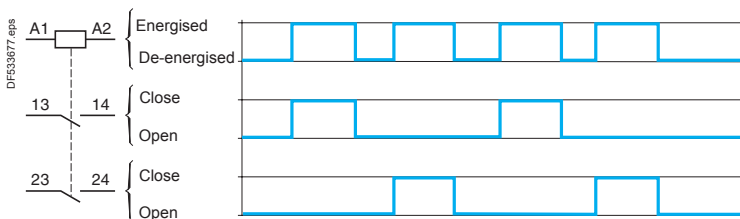
CA2 SK11, CA3 SK11
1 N/O + 1 N/C



CA2 SKE
2 N/O



CA2 SKE
Function diagram

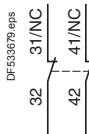


Instantaneous auxiliary contacts

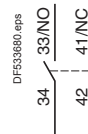
2 N/O
LA1 SK20



2 N/C
LA1 SK02



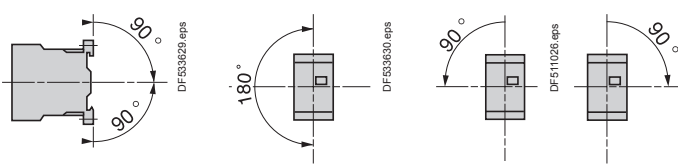
1 N/O + 1 N/C
LA1 SK11



Control relays

TeSys K control relays

TeSys K

Environment				
Conforming to standards			IEC 60947, NF C 63-140, VDE 0660, BS 5424	
Product certifications			UL, CSA	
Operating positions			<p>Vertical axis Horizontal axis</p>  <p>Without derating Without derating Possible positions for CA2 K only, with derating, please consult your Regional Sales Office.</p>	
Connection			Min.	Max.
Screw clamp connections	Solid cable	mm ²	1 x 1.5	2 x 4
	Flexible cable without cable end	mm ²	1 x 0.75	2 x 4
	Flexible cable with cable end	mm ²	1 x 0.34	1 x 1.5 + 1 x 2.5
Spring terminals	Solid cable	mm ²	1 x 0.75	1 x 1.5
	Flexible cable without cable end	mm ²	1 x 0.75	1 x 1.5
Faston connectors	Clip	mm	2 x 2.8 or 1 x 6.35	
Solder pins for printed circuit board	With locating device between power and control circuits		4 mm x 35 microns	
Tightening torque	Phillips head n° 2 and Ø6	N.m	0.8...1.3	
Terminal referencing	Conforming to standards EN 50005 and EN 50011		Up to 8 contacts	
Protective treatment	Conf. to IEC 60068 (DIN 50016)		"TC" (Klimafest, Climateproof)	
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact (devices with screw clamp terminals or pins for printed circuit board)	
Ambient air temperature around the device	Storage	°C	-50...+80	
	Operation	°C	-25...+50	
Maximum operating altitude	Without derating	m	2000	
Vibration resistance 5...300 Hz	Control relay open		2 gn	
	Control relay closed		4 gn	
Flame resistance	Conforming to UL 94		Self-extinguishing material V1	
	Conforming to NF F 16-101 and 16-102		Conforming to requirement 2	
Shock resistance (1/2 sine wave, 11 ms)	Control relay open		10 gn	
	Control relay closed		15 gn	
Safety separation of circuits	Conforming to VDE 0106 and IEC 60536		SELV (Safety Extra Low Voltage), up to 400 V	

Control circuit characteristics					
Control relay type			CA2 K	CA3 K	CA4 K
Rated control circuit voltage (Uc)		V	~ 12...690	~ 12...250	~ 12...120
Control voltage limits (y 50 °C) single voltage coil	For operation		0.8...1.15 Uc	0.8...1.15 Uc	0.7...1.3 Uc
	For drop-out		≤ 0.2 Uc	≤ 0.1 Uc	≤ 0.1 Uc
Mechanical durability at Uc In millions of operating cycles	50/60 Hz coil		10	—	—
	Standard ~ coil		—	20	—
	Wide range, low consumption ~ coil		—	—	30
Maximum operating rate	In operating cycles per hour		10 000	10 000	6000
Average consumption at 20 °C and at Uc	Inrush		30 VA	3 W	1.8 W
	Sealed		4.5 VA	3 W	1.8 W
Heat dissipation		W	1.3	3	1.8
Operating time at 20 °C and at Uc	Between coil energisation and opening of the N/C contacts closing of the N/O contacts	ms	5...15	25...35	25...35
		ms	10...20	30...40	30...40
	Between coil de-energisation and opening of the N/O contacts closing of the N/C contacts	ms	10...20	10	10...20
		ms	15...25	15	15...25
Maximum immunity to microbreaks		ms	2	2	2

TeSys K

Contact characteristics of control relays and instantaneous contact blocks

Number of auxiliary contacts	On CA● K		4
	On LA1 K		2 or 4 for CA2 K and CA3 K , 2 for CA4 K
Rated operational voltage (Ue)	Up to	V	690
Rated insulation voltage (Ui)	Conforming to BS 5424	V	690
	Conforming to IEC 60947	V	690
	Conforming to VDE 0110 group C	V	750
	Conforming to CSA C 22-2 n° 14	V	600
Conventional thermal current (Ith)	For ambient temperature ≤ 50 °C	A	10
Frequency of the operational current		Hz	Up to 400
Minimum switching capacity	U min (DIN 19 240)	V	17
	I min	mA	5
Short-circuit protection	Conforming to IEC 60947 and VDE 0660, gG fuse	A	10
Rated making capacity	Conforming to IEC 60947		
Short-time rating	I rms	A	110
	Permissible for		
	1 s	A	80
	500 ms	A	90
Insulation resistance		MΩ	> 10
Non-overlap distance	CA● K and LA1 K: linked contacts conforming to INRS, BIA and CNA specifications	mm	0.5 (see schemes page B7/21)

Operational power of contacts conforming to IEC 60947

a.c. supply, category AC-15

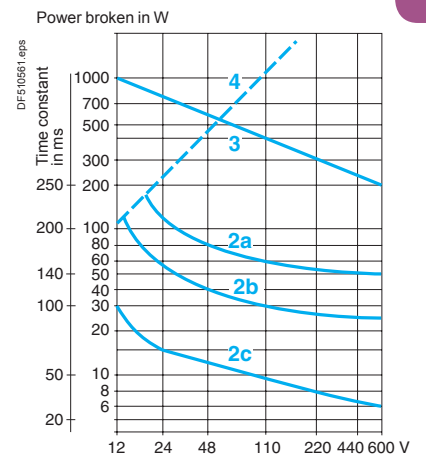
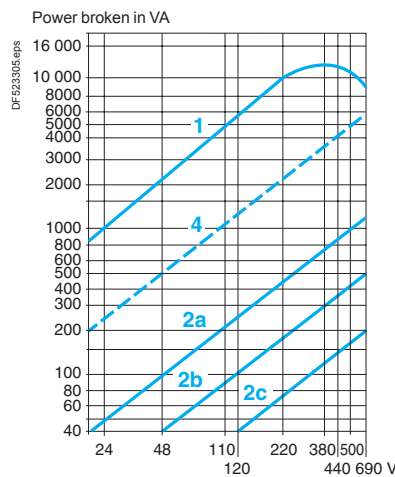
Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \varphi 0.7$) = 10 times the power broken ($\cos \varphi 0.4$)

d.c. supply, category DC-13

Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

	a.c. supply, category AC-15							d.c. supply, category DC-13							
	V	24	48	110/127	220/230	380/400	440/480	600/690	V	24	48	110	220	440	600
1 million operating cycles	VA	48	96	240	440	800	880	1200	W	120	80	60	52	51	50
3 million operating cycles	VA	17	34	86	158	288	317	500	W	55	38	30	28	26	25
10 million operating cycles	VA	7	14	36	66	120	132	200	W	15	11	9	8	7	6
Occasional making capacity	VA	1000	2050	5000	10000	14000	13000	9000	W	720	600	400	300	230	200

- Breaking limit of contacts valid for:
 - maximum of 50 operating cycles at 10 s intervals (power broken = making current x $\cos \varphi 0.7$).
- Electrical durability of contacts for:
 - 1 million operating cycles (**2a**)
 - 3 million operating cycles (**2b**)
 - 10 million operating cycles (**2c**).
- Breaking limit of contacts valid for:
 - maximum of 20 operating cycles at 10 s intervals with current passing for 0.5 s per operating cycle.
- Thermal limit

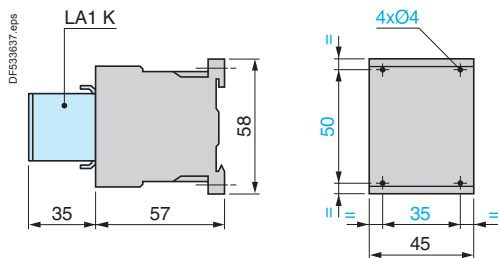


TeSys K

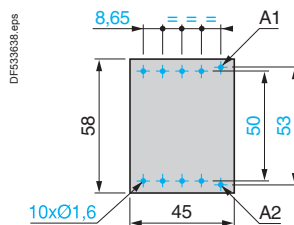
Control relays

CA2 K, CA3 K, CA4 K

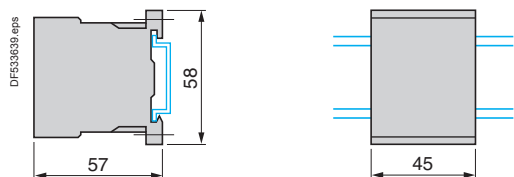
On panel



On printed circuit board

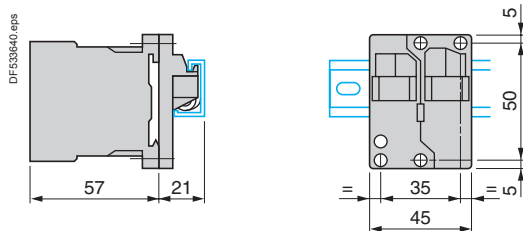


On mounting rail AM1 DP200 or AM1 DE200 (L 35 mm)



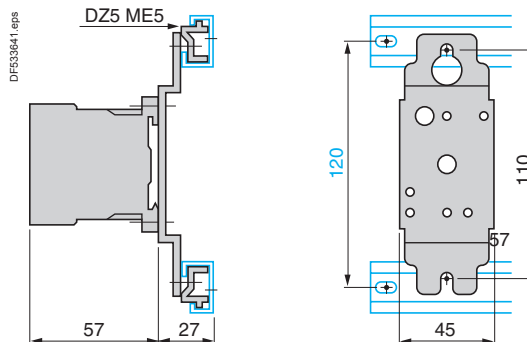
LA9 D973

On asymmetrical rail with clip-on mounting plates



DX1 AP25

On asymmetrical rail with clip-on mounting plates

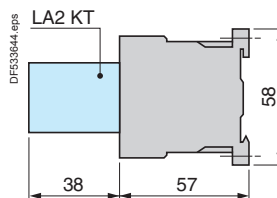


Electronic time delay contact blocks

LA2 KT



On control relay

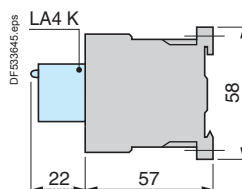


Suppressor modules

LA4 K



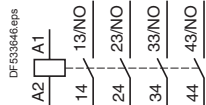
On control relay



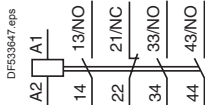
Control relays

CA2 K, CA3 K, CA4 K

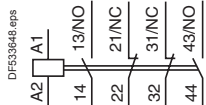
4 N/O



3 N/O + 1 N/C

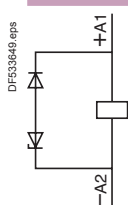


2 N/O + 2 N/C

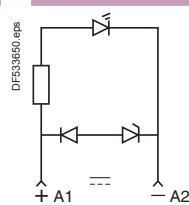


With integral suppression device

CA3 K



CA4 K



Instantaneous auxiliary contact blocks LA1 K

For CA2 K, CA3 K, CA4 K

2 N/O

LA1 KN20,
LA1 KN207



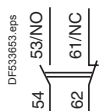
2 N/C

LA1 KN02,
LA1 KN027



1 N/O + 1 N/C

LA1 KN11,
LA1 KN117



For CA2 K, CA3 K

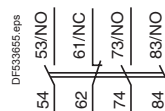
4 N/O

LA1 KN40,
LA1 KN407



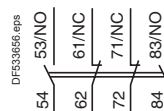
3 N/O + 1 N/C

LA1 KN31,
LA1 KN317



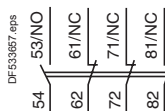
2 N/O + 2 N/C

LA1 KN22,
LA1 KN227



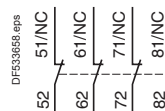
1 N/O + 3 N/C

LA1 KN13, LA1 KN137



4 N/C

LA1 KN04, LA1 KN047

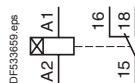


Electronic time delay contact blocks LA2 KT

For CA2 K, CA3 K, CA4 K

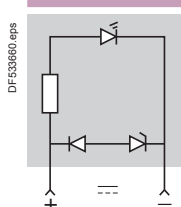
1 C/O

LA2 KT2

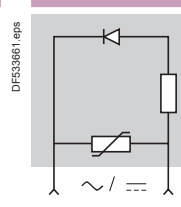


Suppressor modules

LA4 KC



LA4 KE



TeSys D

Environment						
Control relay type			CAD ~	CAD ---	CAD low consumption	
Rated insulation voltage (Ui)	Conforming to IEC 60947-5-1 Overvoltage category III and degree of pollution 3	V	690	690	690	
	Conforming to UL, CSA	V	600	600	600	
Rated impulse withstand voltage (Uimp)	Conforming to IEC 60947	kV	6	6	6	
Separation of electrical circuits	Conforming to IEC 60536 and VDE 0106		Reinforced insulation up to 400 V			
Conforming to standards			IEC 60947-5-1, N-F C 63-140, VDE 0660, BS 4794, EN 60947-5			
Product certifications			UL, CSA			
Protective treatment	Conforming to IEC 60068		"TH"			
Degree of protection	Conforming to VDE 0106		Front face protected against direct finger contact IP 2X		Protection against direct finger contact	
Ambient air temperature around the device	Storage	°C	-60...+80	-60...+80	-60...+80	
	Operation, conforming to IEC 60255 (0.8...1.1 UC)	°C	-5...+60	-5...+60	-5...+60	
	For operation at Uc	°C	-40...+70	-40...+70	-40...+70	
Maximum operating altitude	Without derating	m	3000	3000	3000	
Operating positions	Without derating in the following positions					
Shock resistance ⁽¹⁾ half sine wave for 11ms	Control relay open		10 gn	10 gn	10 gn	
	Control relay closed		15 gn	15 gn	15 gn	
Vibration resistance ⁽¹⁾ 5...300 Hz	Control relay open		2 gn	2 gn	2 gn	
	Control relay closed		4 gn	4 gn	4 gn	
Screw clamp connections	Flexible conductor without cable end	1 conductor	mm²	1...4	1...4	1...4
		2 conductors	mm²	1...4	1...4	1...4
	Flexible conductor with cable end	1 conductor	mm²	1...4	1...4	1...4
		2 conductors	mm²	1...2.5	1...2.5	1...2.5
	Solid conductor without cable end	1 conductor	mm²	1...4	1...4	1...4
		2 conductors	mm²	1...4	1...4	1...4
Tightening torque		N.m	1.7	1.7	1.7	
Spring terminal connections	1 or 2 flexible or rigid conductors without cable end	mm²	1...2.5	1...2.5	1...2.5	

(1) In the least favourable direction, without change of contact state, with coil supplied at Uc.

TeSys D

Control circuit characteristics

Control relay type		CAD ~	CAD ---	CAD low consumption
Rated control circuit voltage (Uc)	V	12...690	12...440	--- 5...72
Control voltage limits	Operation	With coil 50/60 Hz	0.8...1.1 Uc at 50 Hz	–
			0.85...1.1 Uc at 60 Hz	–
		With standard coil, wide range	–	0.7...1.25 Uc
	Drop-out		0.3...0.6 Uc	0.1...0.25 Uc
Average consumption at 20 °C and at Uc	~ 50/60 Hz (at 50 Hz)	VA	Inrush: 70 sealed: 8	–
	With standard coil	W	–	Inrush or sealed: 5.4 Inrush or sealed: 2.4
Operating time (at rated control circuit voltage and at 20 °C)	Between coil energisation and - opening of the N/C contacts - closing of the N/O contacts	ms	4...19	55 ± 15 %
		ms	12...22	63 ± 15 %
	Between coil de-energisation and - opening of the N/O contacts - closing of the N/C contacts	ms	4...12	20 ± 20 %
		ms	6...17	25 ± 20 %
Short supply failure	Maximum duration without affecting hold-in of the device	ms	2	2
Maximum operating rate	In operating cycles per second		3	3
Mechanical durability In millions of operating cycles	With coil 50/60 Hz (at 50 Hz)		30	–
	With standard coil --- wide range		–	30
Time constant L/R		ms	–	28

TeSys D

Characteristics of instantaneous contacts incorporated in the control relay

Number of contacts			5
Rated operational voltage (Ue)	Up to	V	690
Rated insulation voltage (Ui)	Conforming to IEC 60947-5-1	V	690
	Conforming to UL, CSA	V	600
Conventional thermal current (Ith)	For ambient temperature ≤ 60 °C	A	10
Frequency of the operational current		Hz	25...400
Minimum switching capacity	U min	V	17
	I min	mA	5
Short-circuit protection	Conforming to IEC 60947-5-1		gG fuse: 10 A
Rated making capacity	Conforming to IEC 60947-5-1	I rms	~ 140, --- 250
Short-time rating	Permissible for	1 s	A 100
		500 ms	A 120
		100 ms	A 140
Insulation resistance		MΩ	> 10
Non-overlap time	Guaranteed between N/C and N/O contacts	ms	1.5 (on energisation and on de-energisation)
Tightening torque	Philips head n° 2 and Ø6	N.m	1.2
Non-overlap distance			Linked contacts in association with auxiliary contacts LAD N
Mechanically linked contacts	Conforming to IEC 60947-5-1		The 3 N/O contacts and the 2 N/C contacts of CAD N32 are linked mechanically by one mobile contact carrier.

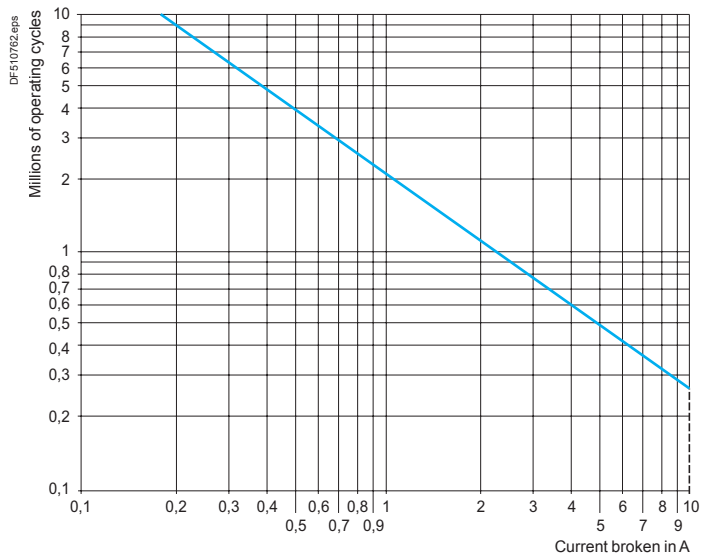
Rated operational power of contacts (conforming to IEC 60947-5-1)

a.c. supply, categories AC-14 and AC-15

Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet:

making current ($\cos \varphi 0.7$) = 10 times the power broken ($\cos \varphi 0.4$).

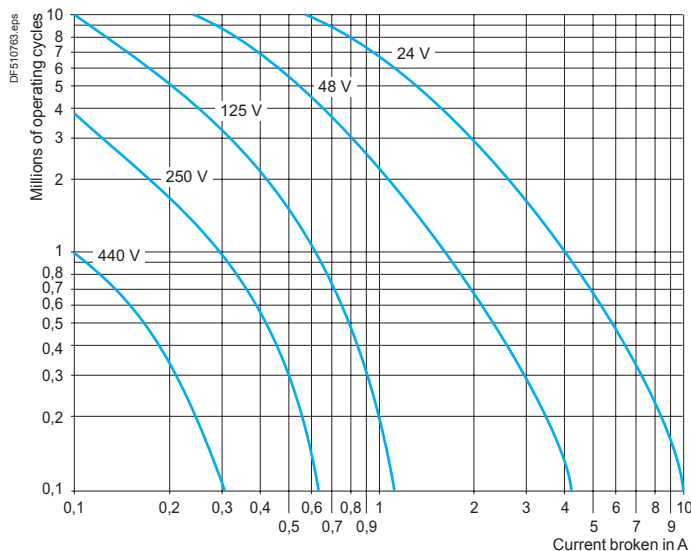
	V	24	48	115	230	400	440	600
1 million operating cycles	VA	60	120	280	560	960	1050	1440
3 million operating cycles	VA	16	32	80	160	280	300	420
10 million operating cycles	VA	4	8	20	40	70	80	100



d.c. supply, category DC-13

Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the power.

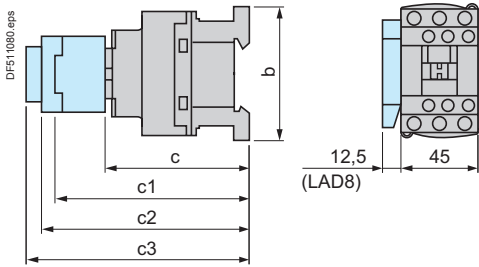
	V	24	48	125	250	440
1 million operating cycles	W	120	90	75	68	61
3 million operating cycles	W	70	50	38	33	28
10 million operating cycles	W	25	18	14	12	10



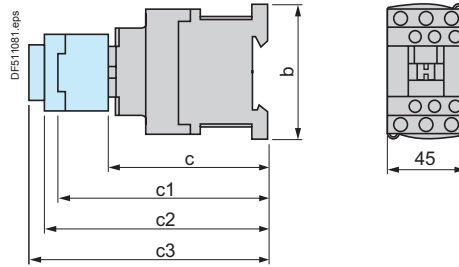
TeSys D

Dimensions

CAD ~



CAD ⋯ or LC (low consumption)



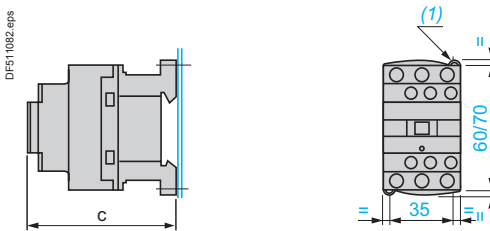
CAD	32	323
b	77	99
c without cover or add-on blocks	84	84
with cover, without add-on blocks	86	86
c1 with LAD N or C (2 or 4 contacts)	117	117
c2 with LAD 6K10	129	129
c3 with LAD T, R, S	137	137
with LAD T, R, S and sealing cover	141	141

CAD	32	323
b	77	99
c without cover or add-on blocks	93	93
with cover, without add-on blocks	95	95
c1 with LAD N or C (2 or 4 contacts)	126	126
c2 with LAD 6K10	138	138
c3 with LAD T, R, S	146	146
with LAD T, R, S and sealing cover	150	150

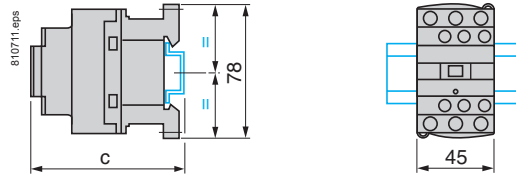
Mounting

CAD

Panel mounted



Mounted on rail AM1 DP200 or DE200



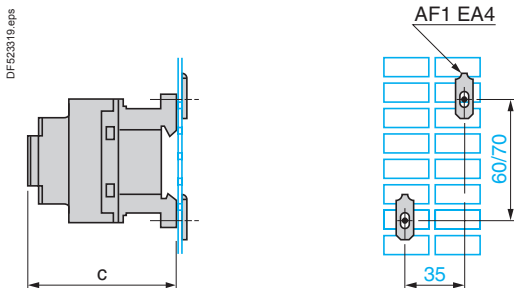
	CAD ~	CAD ⋯ or LC
c with cover	86	95

	CAD ~	CAD ⋯ or LC
c (AM1 DP200) ⁽²⁾	88	97
c (AM1 DP200) ⁽²⁾	96	105

(1) 2 elongated holes 4.5 x 9.

(2) With cover.

Mounted on plate AM1 P



	CAD ~	CAD ⋯ or LC
c with cover	86	95

TeSys D

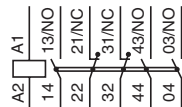
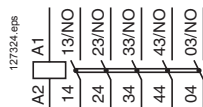
Instantaneous auxiliary contacts

5 N/O

3 N/O + 2 N/C

CAD 50

CAD 32



Instantaneous auxiliary contact blocks

1 N/O + 1 N/C

2 N/O

2 N/C

LAD N11

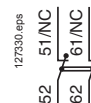
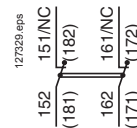
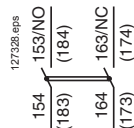
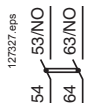
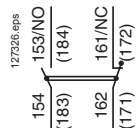
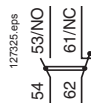
LAD 8N11 ⁽¹⁾

LAD N20

LAD 8N20 ⁽¹⁾

LAD 8N02

LAD N02



⁽¹⁾ The figures in brackets are for the device mounted on the RH side of the control relay.

2 N/O + 2F N/C

1 N/O + 3 N/C

4 N/O

4 N/C

3 N/O + 1 N/C

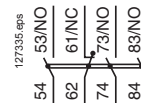
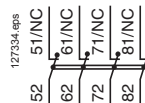
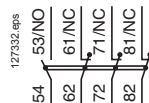
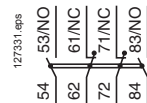
LAD N22

LAD N13

LAD N40

LAD N04

LAD N31



2 N/O + 2 N/C including 1 N/O + 1 N/C make before break

With dust and damp protected contacts
2 N/O protected 2 N/C protected

2 N/O protected ⁽²⁾

2 N/O protected + 2 N/O non protected

2 N/O protected + 1 N/O + 1 N/C non protected

LAD C22

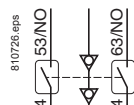
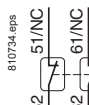
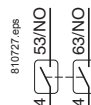
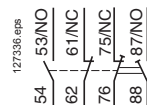
LA1 DX20

LA1 DX02

LA1 DY20

LA1 DZ40

LA1 DZ31



⁽²⁾ Product fitted with 4 earth screen continuity terminals.

Time delay auxiliary contact blocks

On-delay 1 N/O + 1 N/C

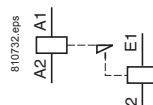
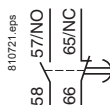
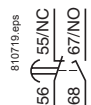
Off-delay 1 N/O + 1 N/C

LAD T

LAD S

LAD R

LAD 6K10



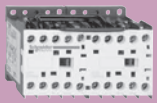


Mechanical latch blocks

Contactors – TeSys D

Contactors with standard coils	From 9 to 150 A		B8/2
Contactors with low consumption coils	From 9 to 65 A		B8/3
Contactors conforming to UL and CSA	From 25 to 160 A		B8/8
Reversing pre-assembled contactors	From 9 to 150 A		B8/9
Contactors for capacitor banks switching	From 12.5 to 60 kVAR		B8/13
Auxiliary contact blocks – accessories – spare coils			B8/14

Mini contactors – TeSys SK, K

Type of product	Range		Pages
Mini contactors TeSys SK	Up to 6 A		B8/29
Mini contactors TeSys K	From 6 to 16 A		B8/31
Reversing pre-assembled mini contactors TeSys K	From 6 to 16 A		B8/35
Auxiliary contact blocks - accessories			B8/41

Contactors for use in modular enclosures / Din rail

Mini contactors TeSys SKGC	Up to 20 A		B8/44
Modular contactors TeSys GC	From 16 to 100 A		B8/46
Dual tariff contactors TeSys GY	16, 25, 40 or 100 A		B8/47
Impulse relay TeSys GF	Up to 16 A		B8/48
Auxiliary contact blocks - accessories TeSys GC, GY			B8/49

TeSys contactors

TeSys D contactors for motor control

up to 75 kW at 400 V, in category AC-3

For connection by screw clamp terminals and lugs

TeSys D



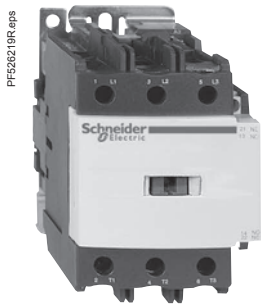
LC1 D09●●



LC1 D25●●



LC1 D65A●●



LC1 D95●●



LC1 D115●●

3-pole contactors

Standard power ratings of 3-phase motors
50-60 Hz in category AC-3
($\theta \leq 60^\circ\text{C}$)

Rated operational current in AC-3 440 V up to

Instantaneous auxiliary contacts

Basic reference, to be completed by adding the control voltage code ⁽²⁾

Weight ⁽³⁾

220 V 380 V 415 V 440 V 500 V 660 V 1000 V
230 V 400 V 690 V



Fixing ⁽¹⁾

kW	kW	kW	kW	kW	kW	kW	A					kg
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Connection by screw clamp terminals

2.2	4	4	4	5.5	5.5	–	9	1	1	LC1D09●●		0.320
3	5.5	5.5	5.5	7.5	7.5	–	12	1	1	LC1D12●●		0.325
4	7.5	9	9	10	10	–	18	1	1	LC1D18●●		0.330
5.5	11	11	11	15	15	–	25	1	1	LC1D25●●		0.370
7.5	15	15	15	18.5	18.5	–	32	1	1	LC1D32●●		0.375
9	18.5	18.5	18.5	18.5	18.5	–	38	1	1	LC1D38●●		0.380

Power connections by EverLink® BTR screw connectors ⁽⁴⁾ and control by screw clamp terminal

11	18.5	22	22	22	30	–	40	1	1	LC1D40A●● ⁽⁵⁾		0.850
15	22	25	30	30	33	–	50	1	1	LC1D50A●● ⁽⁵⁾		0.855
18.5	30	37	37	37	37	–	65	1	1	LC1D65A●● ⁽⁵⁾		0.860

Connection by screw clamp terminals or connectors

22	37	45	45	55	45	45	80	1	1	LC1D80●●		1.590
25	45	45	45	55	45	45	95	1	1	LC1D95●●		1.610
30	55	59	59	75	80	65	115	1	1	LC1D115●●		2.500
40	75	80	80	90	100	75	150	1	1	LC1D150●●		2.500

Connection by lugs or bars

In the references selected above, insert a figure 6 before the voltage code.

Example: LC1 D09●● becomes LC1 D096●●.

Separate components

Auxiliary contact blocks and add-on modules: see pages B8/15 to B8/21.

⁽¹⁾ LC1 D09 to D65A: clip-on mounting on 35 mm rail AM1 DP or screw fixing.

LC1 D80 to D95 ~: clip-on mounting on 35 mm rail AM1 DP or 75 mm rail AM1 DL or screw fixing.

LC1 D80 to D95 ~: clip-on mounting on 75 mm rail AM1 DL or screw fixing.

LC1 D115 and D150: clip-on mounting on 2 x 35 mm rails AM1 DP or screw fixing.

⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D150 (D115 and D150 coils with built-in suppression as standard, by bi-directional peak limiting diode).													
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	S7
LC1 D80...D115													
50 Hz	B5	D5	E5	F5	FE5	M5	P5	U5	Q5	V5	N5	R5	S5
60 Hz	B6	–	E6	F6	–	M6	–	U6	Q6	–	–	R6	–

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC1 D09...D65A (coils with integral suppression device fitted as standard)											
U 0.75...1.25 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
LC1 D80...D95											
U 0.85...1.1 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
U 0.75...1.2 Uc	JW	BW	CW	EW	–	SW	FW	–	MW	–	–
LC1 D115 and D150 (coils with integral suppression device fitted as standard)											
U 0.75...1.2 Uc	–	BD	–	ED	ND	SD	FD	GD	MD	UD	RD

Low consumption

Volts	5	12	20	24	48	110	220	250
LC1 D09...D38 (coils with integral suppression device fitted as standard)								
U 0.8...1.25 Uc	AL	JL	ZL	BL	EL	FL	ML	UL

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

⁽³⁾ The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from LC1 D09 to D38, 0.075 kg from LC1 D40A to D65A and 1 kg for LC1 D80 and D95.

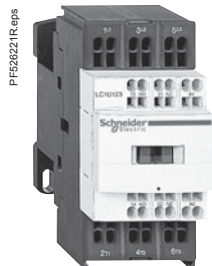
⁽⁴⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page B8/21).

⁽⁵⁾ For low consumption kit LA4 DBL (see page B8/19).

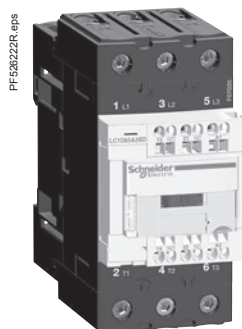
TeSys contactors

TeSys D contactors for motor control
up to 30 kW at 400 V, in category AC-3
For connection by spring terminals

TeSys D



LC1 D123●●



LC1 D65A3●●

3-pole contactors

Standard power ratings of 3-phase motors
50-60 Hz in category AC-3
($\theta \leq 60^\circ\text{C}$)

Rated operational current in AC-3 440 V up to

Instantaneous auxiliary contacts

Basic reference, to be completed by adding the control voltage code ⁽²⁾

220 V	380 V	415 V	440 V	500 V	660 V	1000 V
230 V	400 V			690 V		



Fixing ⁽¹⁾

kW	kW	kW	kW	kW	kW	kW	A
----	----	----	----	----	----	----	---

Power and control connections by spring terminals

2.2	4	4	4	5.5	5.5	9	1	1	LC1D093●●
3	5.5	5.5	5.5	7.5	7.5	12	1	1	LC1D123●●
4	7.5	9	9	10	10	18	1	1	LC1D183●●
5.5	11	11	11	15	15	25	1	1	LC1D253●●
7.5	15	15	15	18.5	18.5	32 ⁽⁴⁾	1	1	LC1D323●●

Power connections by EverLink[®] BTR screw connectors ⁽⁵⁾ and control by spring terminals

11	18.5	22	22	22	30	40	1	1	LC1D40A3●● ⁽⁶⁾
15	22	25	30	30	33	50	1	1	LC1D50A3●● ⁽⁶⁾
18.5	30	37	37	37	37	65	1	1	LC1D65A3●● ⁽⁶⁾

Connection by Faston connectors

These contactors are fitted with Faston connectors: 2 x 6.35 mm on the power poles and 1 x 6.35 mm on the coil and auxiliary terminals.

For contactors LC1 D09 and LC1 D12 only, replace the figure 3 with a 9 in the references selected above. Example: LC1 D093●● becomes LC1 D099●●.

Separate components

Auxiliary contact blocks and add-on modules: see pages B8/15 to B8/21.

(1) LC1 D09 to D32: clip-on mounting on 35 mm rail AM1 DP or screw fixing.

(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440
LC1 D09...D65A												
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC1 D09...D65A (coils with built-in suppression as standard, by bi-directional peak limiting diode)											
U 0.75...1.25 U _c	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD

Low consumption

Volts ---	5	12	20	24	48	110	220	250
LC1 D09...D32 (coils with integral suppression device fitted as standard)								
U 0.8...1.25 U _c	AL	JL	ZL	BL	EL	FL	ML	UL

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

(3) The weights indicated are for contactors with a.c. control circuit.

For d.c. or low consumption control circuit, add 0.160 kg from LC1 D09 to D32 and 0.075 kg from LC1 D40A to D65A.

(4) Must be wired with 2 x 4 mm² cables in parallel on the upstream side. On the downstream side, outgoing terminal block LAD 331 may be used (Quickfit technology, see page B1/18). When wired with a single cable, the product is limited to 25 A (11 kW/400 V motors).

(5) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page B8/21).

(6) For low consumption kit LA4 DBL (see page B8/19).

TeSys contactors

TeSys D, 3-pole contactors

For control in category AC-1, from 25 to 200 A

TeSys D



LC1 D09●●



LC1 D65A●●

3-pole contactors

Non inductive loads maximum current ($\theta \leq 60^\circ\text{C}$) utilisation category AC-1	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the control voltage code ⁽¹⁾	Weight ⁽³⁾
			Fixing ⁽²⁾	

A kg

Connection by screw clamp terminals

25	3	1	1	LC1D09●● or LC1D12●●	0.320 0.325
32	3	1	1	LC1D18●●	0.330
40	3	1	1	LC1D25●●	0.370
50	3	1	1	LC1D32●● or LC1D38●●	0.375 0.380

Connection by EverLink®, BTR screw connectors ⁽⁴⁾

60	3	1	1	LC1D40A●● ⁽⁷⁾	0.850
80	3	1	1	LC1D50A●● ⁽⁷⁾ or LC1D65A●● ⁽⁵⁾⁽⁷⁾	0.855 0.860

Connection by screw clamp terminals or connectors

125	3	1	1	LC1D80●● or LC1D95●● ⁽⁵⁾	1.590 1.610
200	3	1	1	LC1D115●● or LC1D150●● ⁽⁶⁾	2.500 2.500

3-pole contactors for connection by lugs

In the references selected above, insert a figure **6** before the voltage code.

Example: **LC1 D09●●** becomes **LC1 D096●●**.

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D150 (coils D115 and D150 fitted with integral suppression device as standard)													
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	-
LC1 D80...D150													
50 Hz	B5	D5	E5	F5	FE5	M5	P5	U5	Q5	V5	N5	R5	S5
60 Hz	B6	-	E6	F6	-	M6	-	U6	Q6	-	-	R6	-

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC1 D09...D65A (coils with integral suppression device fitted as standard)											
U 0.7...1.25 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
LC1 or LP1 D80 and D95											
U 0.85...1.1 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
U 0.75...1.2 Uc	JW	BW	CW	EW	-	SW	FW	-	MW	-	-
LC1 D115 and D150 (coils with integral suppression device fitted as standard)											
U 0.75...1.2 Uc	-	BD	-	ED	ND	SD	FD	GD	MD	UD	RD

Low consumption

Volts	5	12	20	24	48	110	220	250
LC1 D09...D38 (coils with integral suppression device fitted as standard)								
U 0.8...1.25 Uc	AL	JL	ZL	BL	EL	FL	ML	UL

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

⁽²⁾ **LC1 D09 to D65A**: clip-on mounting on 35 mm rail **AM1 DP** or screw fixing.

LC1 D80 and D95: clip-on mounting on 35 mm rail **AM1 DP** or 75 mm rail **AM1 DL** or screw fixing.

LC1 or LP1 D80 to D95: clip-on mounting on 75 mm rail **AM1 DL** or screw fixing.

LC1 D115 and D150: clip-on mounting on 2 x 35 mm rails **AM1 DP** or screw fixing.

⁽³⁾ The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from **LC1 D09 to D38**, 0.075 kg from **LC1 D40A to D65A** and 1 kg for **LC1 D80 and D95**.

⁽⁴⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page B8/21).

⁽⁵⁾ Selection according to the number of operating cycles, see AC-1 curve, page A5/28.

⁽⁶⁾ 32 A with 2 x 4 mm² cables connected in parallel.

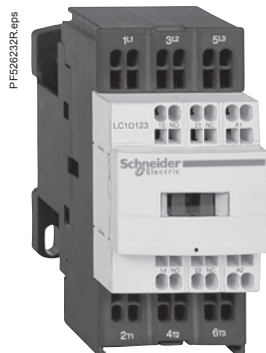
⁽⁷⁾ For low consumption kit **LA4 DBL** (see page B8/19).

TeSys contactors

TeSys D, 3-pole contactors

For control in category AC-1, from 25 to 200 A

TeSys D



LC1 D123●●



LC1 D65A3●●

3-pole contactors for connection by Faston connectors

These contactors are fitted with Faston connectors: 2 x 6.35 mm on the power poles and 1 x 6.35 mm on the coil terminals. For contactors LC1 D09 and LC1 D12 only, in the references selected from the previous page, insert a figure **9** before the voltage code. Example: **LC1 D09●●** becomes **LC1 D099●●**.

3-pole contactors

Non inductive loads maximum current ($\theta \leq 60^\circ\text{C}$) utilisation category AC-1	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the control voltage code ⁽¹⁾	Weight ⁽³⁾
			Fixing ⁽²⁾	
Connection by spring terminals				kg
16	3	1 1	LC1D093●● ⁽⁴⁾ or LC1D123●● ⁽⁴⁾	0.320 0.325
25	3	1 1	LC1D183●● ⁽⁵⁾ or LC1D253●● ⁽⁶⁾ or LC1D323●● ⁽⁶⁾	0.335 0.325 0.325

Power connections by EverLink® BTR screw connectors ⁽⁷⁾ and control by spring terminals

60	3	1 1	LC1D40A3●● ⁽⁹⁾	0.850
80	3	1 1	LC1D50A3●● ^{(8) (9)} or LC1D65A3●● ^{(8) (9)}	0.855 0.860

Separate components

Auxiliary contact blocks and add-on modules: see pages B8/15 to B8/21.

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D65A													
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	S7

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC1 D09...D65A (coils with integral suppression device fitted as standard)											
U 0.75...1.25 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD

Low consumption

Volts	5	12	20	24	48	110	220	250
LC1 D09...D38 (coils with integral suppression device fitted as standard)								
U 0.8...1.25 Uc	AL	JL	ZL	BL	EL	FL	ML	UL

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

⁽²⁾ **LC1 D09** to **D65A**: clip-on mounting on 35 mm rail **AM1 DP** or screw fixing.

⁽³⁾ The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from **LC1 D09** to **D38** and 0.075 kg from **LC1 D40A** to **D65A**.

⁽⁴⁾ 20 A with 2 x 2.5 mm² cables connected in parallel.

⁽⁵⁾ 32 A with 2 x 4 mm² cables connected in parallel.

⁽⁶⁾ 40 A with 2 x 4 mm² cables connected in parallel.

⁽⁷⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page B8/21).

⁽⁸⁾ Selection according to the number of operating cycles, see AC-1 curve, page A5/28.

⁽⁹⁾ For low consumption kit **LA4 DBL** (see page B8/19).

TeSys contactors

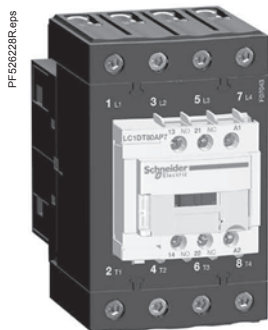
TeSys D, 4-pole contactors

For control in category AC-1, 25 to 200 A

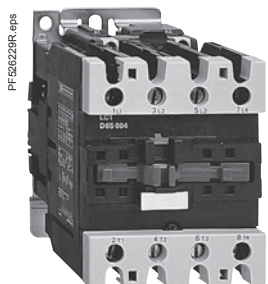
TeSys D



LC1 DT20●●



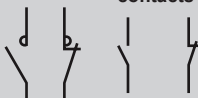
LC1 DT80A●●



LC1 D65008●●

4-pole contactors for connection by screw clamp terminals or connectors

Non inductive loads maximum current ($\theta \leq 60^\circ\text{C}$) utilisation category AC-1	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the control voltage code ⁽¹⁾ Fixing ⁽²⁾	Weight ⁽³⁾
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A kg

Connection by screw clamp terminals

20	4	–	1	1	LC1DT20●●	0.365
	2	2	1	1	LC1D098●●	0.365
25	4	–	1	1	LC1DT25●●	0.365
	2	2	1	1	LC1D128●●	0.365
32	4	–	1	1	LC1DT32●●	0.425
	2	2	1	1	LC1D188●●	0.425
40	4	–	1	1	LC1DT40●●	0.425
	2	2	1	1	LC1D258●●	0.425

Connection by EverLink®, BTR screw connectors

60	4	–	1	1	LC1DT60A●●	1.090
80	4	–	1	1	LC1DT80A●●	1.150

Connection by screw clamp terminals or connectors

60	2	2	–	–	LC1D40008●●	1.440
					or LP1D40008●●	2.210
80	2	2	–	–	LC1D65008●●	1.450
					or LP1D65008●●	2.220
125	4	–	–	–	LC1D80004●●	1.760
					or LP1D80004●●	2.685
					LC1D80008●●	1.840
200	4	–	–	–	or LP1D80008●●	2.910
					LC1D115004●●	2.860

4-pole contactors for connection by lugs or bars

In the references selected above, insert a figure 6 before the voltage code.

Example: LC1 DT20●● becomes LC1 DT206●●.

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D150 and LC1 DT20...DT80A (coils D115 and D150 fitted with integral suppression device as standard)													
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	–
LC1 D80...D115													
50 Hz	B5	D5	E5	F5	FE5	M5	P5	U5	Q5	V5	N5	R5	S5
60 Hz	B6	–	E6	F6	–	M6	–	U6	Q6	–	–	R6	–

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC1 D09...D65A and LC1 DT20...DT80A (coils with integral suppression device fitted as standard)											
U 0.7...1.25 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
LC1 or LP1D40...D80											
U 0.85...1.1 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
U 0.75...1.2 Uc	JW	BW	CW	EW	–	SW	FW	–	MW	–	–
LC1 D115 (coils with integral suppression device fitted as standard)											
U 0.75...1.2 Uc	–	BD	–	ED	ND	SD	FD	GD	MD	UD	RD

Low consumption

Volts	5	12	20	24	48	110	220	250
LC1 D09...D38 and LC1 DT20...DT40 (coils with integral suppression device fitted as standard)								
U 0.8...1.25 Uc	AL	JL	ZL	BL	EL	FL	ML	UL

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

⁽²⁾ LC1 D09 to D38 and LC1 DT20 to DT80A: clip-on mounting on 35 mm rail AM1 DP or screw fixing.

LC1 D80 ~: clip-on mounting on 35 mm rail AM1 DP or 75 mm rail AM1 DL or screw fixing.

LC1 or LP1 D80 ---: clip-on mounting on 75 mm rail AM1 DL or screw fixing.

LC1 D115 and D150: clip-on mounting on 2 x 35 mm rails AM1 DP or screw fixing.

⁽³⁾ The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from LC1 D09 to D38, 0.075 kg from LC1 DT60A and D80A and 1 kg for LC1 D80.


TeSys contactors

TeSys D, 4-pole contactors

For control in category AC-1, 25 to 200 A

TeSys D

4-pole contactors

Non inductive loads maximum (i ≤ 60 °C) utilisation category AC-1	Number of poles	Instantaneous auxiliary contacts		Basic reference, to be completed by adding the voltage code ⁽¹⁾	Weight ⁽³⁾
				Fixing ⁽²⁾	

A **kg**

Connection by spring terminals

20	4	–	1	1	LC1DT203●●	0.380
	2	2	1	1	LC1D0983●●	0.380
25	4	–	1	1	LC1DT253●●	0.380
	2	2	1	1	LC1D1283●●	0.380
32	4	–	1	1	LC1DT323●●	0.425
	2	2	1	1	LC1D1883●●	0.425
40	4	–	1	1	LC1DT403●●	0.425
	2	2	1	1	LC1D2583●●	0.425

Connection by EverLink[®], BTR screw connectors and control circuit by spring terminals

60	4	–	1	1	LC1DT60A3●●	1.090
80	4	–	1	1	LC1DT80A3●●	1.150

Separate components

Auxiliary contact blocks and add-on modules: see pages B8/15 to B8/21.

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
-------	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

LC1 D09...D25 and LC1 DT20...DT80A (coils with integral suppression device fitted as standard)

50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	–
----------	----	----	----	----	-----	----	----	----	----	----	----	----	---

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
-------	----	----	----	----	----	----	-----	-----	-----	-----	-----

LC1 D09...D25 and LC1 DT20...DT80A (coils with integral suppression device fitted as standard)

U 0.7...1.25 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
-----------------	----	----	----	----	----	----	----	----	----	----	----


Low consumption

Volts ---	5	12	20	24	48	110	220	250
-----------	---	----	----	----	----	-----	-----	-----

LC1 D09...D25 and LC1 DT20...DT40 (coils with integral suppression device fitted as standard)

U 0.8...1.25 Uc	AL	JL	ZL	BL	EL	FL	ML	UL
-----------------	----	----	----	----	----	----	----	----

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

⁽²⁾ **LC1 D09** to **D38** and **LC1 DT20** to **DT80A**: clip-on mounting on 35 mm  rail **AM1DP** or screw fixing.

⁽³⁾ The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from **LC1 D09** to **D38**, 0.075 kg for **LC1 DT60A** and **DT80A**.

TeSys contactors

For the North American market,
Conforming to UL and CSA standards
25 to 160 A

TeSys D



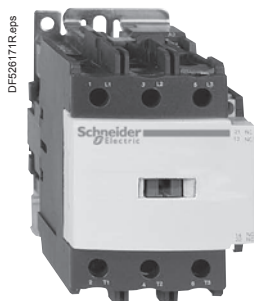
LC1 D09●●



LC1 D25●●



LC1 D65A●●



LC1 D95●●

Contactors

Standard power ratings of motors 50/60 Hz						Associated cable type 75 °C-Cu	Continuous current	Type of contactor required Basic reference, to be completed ⁽¹⁾ Fixing, connection ⁽²⁾
Single-phase 1 Ø		3-phase 3 Ø						
115 V	230 V	200 V	230 V	460 V	575 V			
	240 V	208 V	240 V	480 V	600 V			
HP	HP	HP	HP	HP	HP		A	

Connection by screw clamp terminals

1/3	1	2	2	5	7.5	AWG 18 - 10	25	LC1D09●●
0.5	2	3	3	7.5	10	AWG 18 - 10	25	LC1D12●●
1	3	5	5	10	15	AWG 18 - 8	32	LC1D18●●
2	3	7.5	7.5	15	20	AWG 14 - 6	40	LC1D25●●
2	5	10	10	20	25	AWG 14 - 6	50	LC1D32●●

Power connections by EverLink® BTR screw connectors (4) and control by spring terminals

3	5	10	10	30	30	AWG 16 - 2	60	LC1D40A●●
3	7.5	15	15	40	40	AWG 16 - 2	70	LC1D50A●●
5	10	20	20	40	50	AWG 16 - 2	80	LC1D65A●●

Connection by screw clamp terminals or connectors

7.5	15	25	30	60	60	AWG 10 - 2	110	LC1D80●●
7.5	15	25	30	60	60	AWG 10 - 2	110	LC1D95●●
-	-	30	40	75	100	AWG 2/0	160	LC1D115●●
-	-	40	50	100	125	AWG 3/0	160	LC1D150●●

Applications with High-Fault Short-Circuit ratings

For contactors LC1 D40A to LC1 D65A, the High-Fault Short-Circuit ratings are 50 kA at 480 V and 25 kA at 600 V.

Application example

For a 15 HP-230 V motor

Select a contactor type **LC1 D50A**.

Information: the contactor rating selected corresponds to "size 2", the associated cable is type AWG3 75 °C-Cu.

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	120	208	220	230	240	380	400	415	440	480	500
LC1 D09...D150 (D115 and D150 coils with integral suppression device fitted as standard)																
50/60 Hz	B7	D7	E7	F7	FE7	G7	LE7	M7	P7	U7	Q7	V7	N7	R7	T7	S7
LC1 D80...D115																
50 Hz	B5	D5	E5	F5	FE5	G5	-	M5	P5	U5	Q5	V5	N5	R5	-	S5
60 Hz	B6	-	E6	F6	-	G6	L6	M6	-	U6	Q6	-	-	R6	T6	-

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC1 D09...D65A (coils with integral suppression device fitted as standard)											
U 0.7...1.25 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
LC1 D80 and D95											
U 0.85...1.1 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
U 0.75...1.2 Uc	JW	BW	CW	EW	-	SW	FW	-	MW	-	-
LC1 D115 and D150 (coils with integral suppression device fitted as standard)											
U 0.75...1.2 Uc	-	BD	-	ED	ND	SD	FD	GD	MD	UD	RD

Low consumption

Volts	5	12	20	24	48	72	110	220	250
LC1 D09...D38 (coils with integral suppression device fitted as standard)									
U 0.7...1.25 Uc	AL	JL	ZL	BL	EL	SL	FL	ML	UL

⁽²⁾ **LC1 D09 to D65A**: clip-on mounting on 35 mm L rail **AM1 DP** or screw fixing.

LC1 D80 and LC1 D95: clip-on mounting on 35 mm L rail **AM1 DP** or 75 mm L rail **AM1 DL** or screw fixing.

LC1 D115 and D150: clip-on mounting on 2 x 35 mm L rails **AM1 DP** or screw fixing.

TeSys contactors

TeSys D, 3-pole reversing contactors for motor control up to 75 kW at 400 V, in category AC-3
Horizontally mounted, pre-assembled

TeSys D



LC2 D12●●



LC2 D65A●●



LC2 D115●●

3-pole reversing contactors for connection by screw clamp terminals

Pre-wired power connections.

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3 ($\theta \leq 60^\circ\text{C}$)							Rated operational current in AC-3 440 V up to	Instantaneous auxiliary contacts per contactor	Contactors supplied with coil Basic reference, to be completed by adding the control voltage code ⁽²⁾	Weight ⁽³⁾
220 V 230 V	380 V 400 V	415 V	440 V	500 V	660 V 690 V	1000 V				
kW	kW	kW	kW	kW	kW	kW	A		Fixing ⁽¹⁾	kg

With mechanical interlock, without electrical interlocking, for connection by screw clamp terminals or connectors

2.2	4	4	4	5.5	5.5	–	9	1	1	LC2D09●● ⁽⁴⁾	0.687
3	5.5	5.5	5.5	7.5	7.5	–	12	1	1	LC2D12●● ⁽⁴⁾	0.697
4	7.5	9	9	10	10	–	18	1	1	LC2D18●● ⁽⁴⁾	0.707
5.5	11	11	11	15	15	–	25	1	1	LC2D25●● ⁽⁴⁾	0.787
7.5	15	15	15	18.5	18.5	–	32	1	1	LC2D32●● ⁽⁴⁾	0.797
9	18.5	18.5	18.5	18.5	18.5	–	38	1	1	LC2D38●● ⁽⁴⁾	0.807
11	18.5	22	22	22	30	–	40	1	1	LC2D40A●● ⁽⁵⁾	1.870
15	22	25	30	30	33	–	50	1	1	LC2D50A●● ⁽⁵⁾	1.880
18.5	30	37	37	37	37	–	65	1	1	LC2D65A●● ⁽⁵⁾	1.890
22	37	45	45	55	45	–	80	1	1	LC2D80●●	3.200
25	45	45	45	55	45	–	95	1	1	LC2D95●●	3.200

With mechanical interlock and electrical interlocking, for connection by screw clamp terminals or connectors

30	55	59	59	75	80	65	115	1	1	LC2D115●●	6.350
40	75	80	80	90	100	75	150	1	1	LC2D150●●	6.400

Connection by lugs or bars

For reversing contactors LC2 D09 to LC2 D38, LC2 D115 and LC2 D150, in the references selected above, insert a figure **6** before the voltage code. Example: **LC2 D09●●** becomes **LC2 D096●●**.

To build a 40 to 65 A reversing contactor, for connection by lugs, order 2 contactors **LC1 D●●A6** and mechanical interlock **LAD 4CM** (see page B8/23).

Component parts

Auxiliary contact blocks and add-on modules: see pages B8/15 to B8/21.

⁽¹⁾ LC2 D09 to D65A: clip-on mounting on 35 mm rail **AM1 DP** or screw fixing.

LC2 D80 and D95: clip-on mounting on 35 mm rail **AM1 DP** or 75 mm rail **AM1 DL** or screw fixing.

LC2 D115 and D150: clip-on mounting on 35 mm rail **AM1 DP** or screw fixing.

⁽²⁾ Standard control circuit voltages (for other voltages between 16 and 690 V, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
-------	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

LC2 D09...D150 (D115 and D150 coils with integral suppression device fitted as standard))

50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	S7
----------	----	----	----	----	-----	----	----	----	----	----	----	----	----

LC2 D80...D115

50 Hz	B5	D5	E5	F5	FE5	M5	P5	U5	Q5	V5	N5	R5	S5
-------	----	----	----	----	-----	----	----	----	----	----	----	----	----

60 Hz	B6	–	E6	F6	–	M6	–	U6	Q6	–	–	R6	–
-------	----	---	----	----	---	----	---	----	----	---	---	----	---

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
-------	----	----	----	----	----	----	-----	-----	-----	-----	-----

LC2 D09...D65A (coils with integral suppression device fitted as standard)

U 0.75...1.25 U _c	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
------------------------------	----	----	----	----	----	----	----	----	----	----	----

Low consumption

Volts ---	5	12	20	24	48	110	220	250
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LC2 D09...D38 (coils with integral suppression device fitted as standard)

U 0.8...1.25 U _c	AL	JL	ZL	BL	EL	FL	ML	UL
-----------------------------	----	----	----	----	----	----	----	----

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

⁽³⁾ The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.330 kg for **LC2 D09** to **D38**, 0.150 kg for **LC1 D40A** to **D65A**.

⁽⁴⁾ For reversing contactors with electrical interlocking pre-wired at the factory, add suffix **V** to the references selected above. Example: **LC2 D09P7** becomes **LC2 D09P7V**.

⁽⁵⁾ For low consumption kit **LA4 DBL** (see page B8/19).

Note: when assembling a reversing contactor, it is good practice to incorporate a 50 ms time delay.

TeSys contactors

TeSys D, 3-pole reversing contactors for motor control up to 15 kW at 400 V, in category AC-3
Horizontally mounted, pre-assembled

TeSys D



LC2D123●●

3-pole reversing contactors, for connection by spring terminals

Pre-wired power connections.

Mechanical interlock without electrical interlocking.

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3 ($\theta \leq 60^\circ\text{C}$)						Rated operational current in AC-3 440 V up to	Instantaneous auxiliary contacts per contactor	Contactors supplied with coil Basic reference, to be completed by adding the voltage code ⁽²⁾	Weight ⁽³⁾
220 V	380 V	415 V	440 V	500 V	660 V				
230 V	400 V			690 V			Fixing ⁽¹⁾		
kW	kW	kW	kW	kW	kW	A		kg	

For connection by spring terminals

2.2	4	4	4	5.5	5.5	9	1	1	LC2D093●●	0.687
3	5.5	5.5	5.5	7.5	7.5	12	1	1	LC2D123●●	0.697
4	7.5	9	9	10	10	18	1	1	LC2D183●●	0.707
5.5	11	11	11	15	15	25	1	1	LC2D253●●	0.787
7.5	15	15	15	18.5	18.5	32 ⁽⁴⁾	1	1	LC2D323●●	0.797

Power connection by EverLink[®], BTR screw connectors ⁽⁵⁾ and control by spring terminals

11	18.5	22	22	22	30	40	1	1	LC2D40A3●● ⁽⁶⁾	1.870
15	22	25	30	30	33	50	1	1	LC2D50A3●● ⁽⁶⁾	1.880
18.5	30	37	37	37	37	65	1	1	LC2D65A3●● ⁽⁶⁾	1.890

For connection by Faston connectors

All power connections are to be made by the customer.

These contactors are fitted with Faston connectors: 2 x 6.35 mm on the power poles and 1 x 6.35 mm on the coil terminals.

For reversing contactors LC2 D09 and LC2 D12 only, in the references selected above, replace the figure 3 before the voltage code with a figure 9.

Example: LC2 D093●● becomes LC2 D099●●.

Component parts

Auxiliary contact blocks and add-on modules: see pages B8/15 to B8/21.

⁽¹⁾ LC2 D09 to D32: clip-on mounting on 35 mm rail AM1 DP or screw fixing.

⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC2 D09...D65A													
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	S7

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC2 D09...D65A (coils with integral suppression device fitted as standard)											
U 0.75...1.25 U _c	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD

Low consumption

Volts ---	5	12	20	24	48	110	220	250
LC2 D09...D38 (coils with integral suppression device fitted as standard)								
U 0.8...1.25 U _c	AL	JL	ZL	BL	EL	FL	ML	UL

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

⁽³⁾ The weights indicated are for reversing contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.330 kg for LC2 D09 to D38, 0.150 kg for LC1 D40A to D65A.

⁽⁴⁾ Must be wired with 2 x 4 mm² cables in parallel on the upstream side. On the downstream side, outgoing terminal block LAD 331 may be used (Quickfit technology, see page B1/18). When wired with a single cable, the product is limited to 25 A (11 kW/400 V motors).

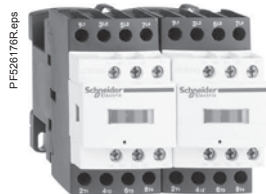
⁽⁵⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page B8/21).

⁽⁶⁾ For low consumption kit LA4 DBL (see page B8/19).

TeSys contactors

TeSys D, 4-pole changeover contactor pairs for control in category AC-1, 20 to 200 A

TeSys D



LC2 DT20●●

Pre-assembled. Pre-wired power connections

For connection by screw clamp terminals or connectors

LC2 DT20 to LC2 DT40: mechanical interlock without electrical interlocking.

LC2 D80004: order separately 2 auxiliary contact blocks LAD N●1 to obtain electrical interlocking between the 2 contactors (see page B8/15).

For electrical interlocking incorporated in the mechanical interlock, please consult your Regional Sales Office.

LC2 D115004: mechanical interlock with integral, pre-wired electrical interlocking.

Utilisation category AC-1 Non-inductive loads Maximum rated operational current ($\theta \leq 60^\circ\text{C}$)	Instantaneous auxiliary contacts per contactor		Contactors supplied with coil	Weight kg
			Basic reference, to be completed by adding the voltage code ⁽¹⁾ Fixing ⁽²⁾	
20	1	1	LC2DT20●●	0.730
25	1	1	LC2DT25●●	0.730
32	1	1	LC2DT32●●	0.850
40	1	1	LC2DT40●●	0.850
125	–	–	LC2D80004●●	3.200
200	–	–	LC2D115004●●	7.400

For connection by lugs or bars

20	1	1	LC2DT206●●	0.730
25	1	1	LC2DT256●●	0.730
32	1	1	LC2DT326●●	0.850
40	1	1	LC2DT406●●	0.850

For customer assembly

For connection by screw clamp terminals or connectors

60	1	1	LC1DT60A●● ⁽³⁾	–
80	1	1	LC1DT80A●● ⁽³⁾	–

For connection by lugs or bars

60	1	1	LC1DT60A6●● ⁽³⁾	–
80	1	1	LC1DT80A6●● ⁽³⁾	–

Auxiliary contact blocks and add-on modules: see pages B8/15 to B8/21.

Note: when assembling changeover contactor pairs, it is good practice to incorporate a 50 ms time delay.

⁽¹⁾ See note ⁽¹⁾ on next page.

⁽²⁾ **LC2 DT20 to LC2 DT80:** clip-on mounting on 35 mm rail **AM1 DP** or screw fixing.

LC2 D80: clip-on mounting on 35 mm rail **AM1 DP** or 75 mm rail **AM1 DL** or screw fixing.

LC2 D115: clip-on mounting on 2 x 35 mm rails **AM1 DP** or screw fixing.

⁽³⁾ For these operational currents, order 2 identical contactors and a mechanical interlock **LAD 4CM** (see page B8/23).

TeSys contactors

TeSys D, 4-pole changeover contactor pairs for control in category AC-1, 20 A

TeSys D

Pre-assembled. Pre-wired power connections

For connection by spring terminals.

Utilisation category AC-1 Non-inductive loads Maximum rated operational current ($\theta \leq 60^\circ\text{C}$)	Instantaneous auxiliary contacts per contactor	Contactors supplied with coil Basic reference, to be completed by adding the control voltage code ⁽¹⁾ Fixing ⁽²⁾

A			
20	1	1	LC2DT203●●

For customer assembly

Power connection by EverLink[®], BTR screw connectors ⁽³⁾ and control by spring terminals

60	1	1	LC1DT60A3●● ⁽⁴⁾
80	1	1	LC1DT80A3●● ⁽⁴⁾

Separate components

Auxiliary contact blocks and add-on modules: see pages B8/15 to B8/21.

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC2 DT20...DT40, LC1 DT60...DT80													
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	-
LC2 D80004...D115004													
50 Hz	B5	D5	E5	F5	FE5	M5	P5	U5	Q5	V5	N5	R5	S5
60 Hz	B6	-	E6	F6	-	M6	-	U6	Q6	-	-	R6	-

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC2 DT20...DT40, LC1 DT60...DT80 (coils with integral suppression device fitted as standard)											
U 0.7...1.25 U _c	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD

Low consumption

Volts ---	5	12	20	24	48	110	220	250
LC2 DT20...DT40 (coils with integral suppression device fitted as standard)								
U 0.8...1.25 U _c	AL	JL	ZL	BL	EL	FL	ML	UL

For other voltages between 5 and 690 V, see pages B8/25 to B8/28.

⁽²⁾ Clip-on mounting on 35 mm rail AM1 DP or screw fixing.

⁽³⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page B8/21).

⁽⁴⁾ For these operational currents, order 2 identical contactors and a mechanical interlock LAD 4CM (see page B8/23).

TeSys contactors

For switching 3-phase capacitor banks,
used for power factor correction

Direct connection without choke inductors

Special contactors

Special contactors **LC1 D●K** are designed for switching 3-phase, single or multiple-step capacitor banks (up to 6 steps). Over 6 steps, it is recommended to use chokes in order to limit the inrush current and thus improve the lifetime of the installation. The contactors conform to standards IEC 60070 and 60831, UL and CSA.

Contactors applications

Specification

Contactors fitted with a block of early make poles and damping resistors, limiting the value of the current on closing to 60 In max.

This current limitation increases the life of all the components of the installation, in particular that of the fuses and capacitors.

The patented design of the add-on block (n° 90 119-20) ensures safety and long life of the installation.

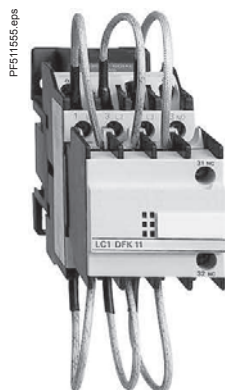
Operating conditions

There is no need to use choke inductors for either single or multiple-step capacitor banks. Short-circuit protection must be provided by gI type fuses rated at 1.7...2 In.

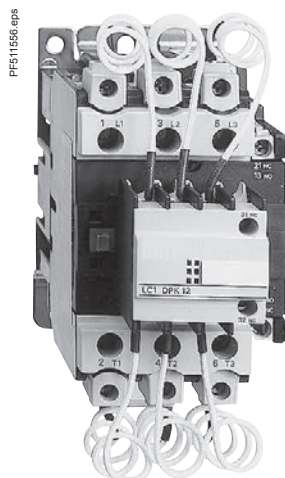
Maximum operational power

The power values given in the selection table below are for the following operating conditions:

Prospective peak current at switch-on	LC1 D●K	200 In
Maximum operating rate	LC1 DFK, DGK, DLK, DMK, DPK	240 operating cycles/hour
	LC1 DTK, DWK	100 operating cycles/hour
Electrical durability at nominal load	All contactor ratings	400 V 300 000 operating cycles
		690 V 200 000 operating cycles



LC1 DFK11●●



LC1 DPK12●●

Operational power at 50/60 Hz ⁽¹⁾ θ ≤ 55 °C ⁽²⁾			Instantaneous auxiliary contacts		Tightening torque on cable end	Basic reference, to be completed by adding the voltage code ⁽³⁾	Weight
220 V	400 V	660 V	N/O	N/C	N.m		kg
kVAR	kVAR	kVAR					
240 V	440 V	690 V					
6.7	12.5	18	1	2	1.7	LC1DFK●●	0.430
8.5	16.7	24	1	2	1.7	LC1DGK●●	0.450
10	20	30	1	2	2.5	LC1DLK●●	0.600
15	25	36	1	2	2.5	LC1DMK●●	0.630
20	33.3	48	1	2	5	LC1DPK●●	1.300
25	40	58	1	2	5	LC1DTK●●	1.300
40	60	92	1	2	9	LC1DWK12●●	1.650

Switching of multiple-step capacitor banks (with equal or different power ratings)

The correct contactor for each step is selected from the above table, according to the power rating of the step to be switched.

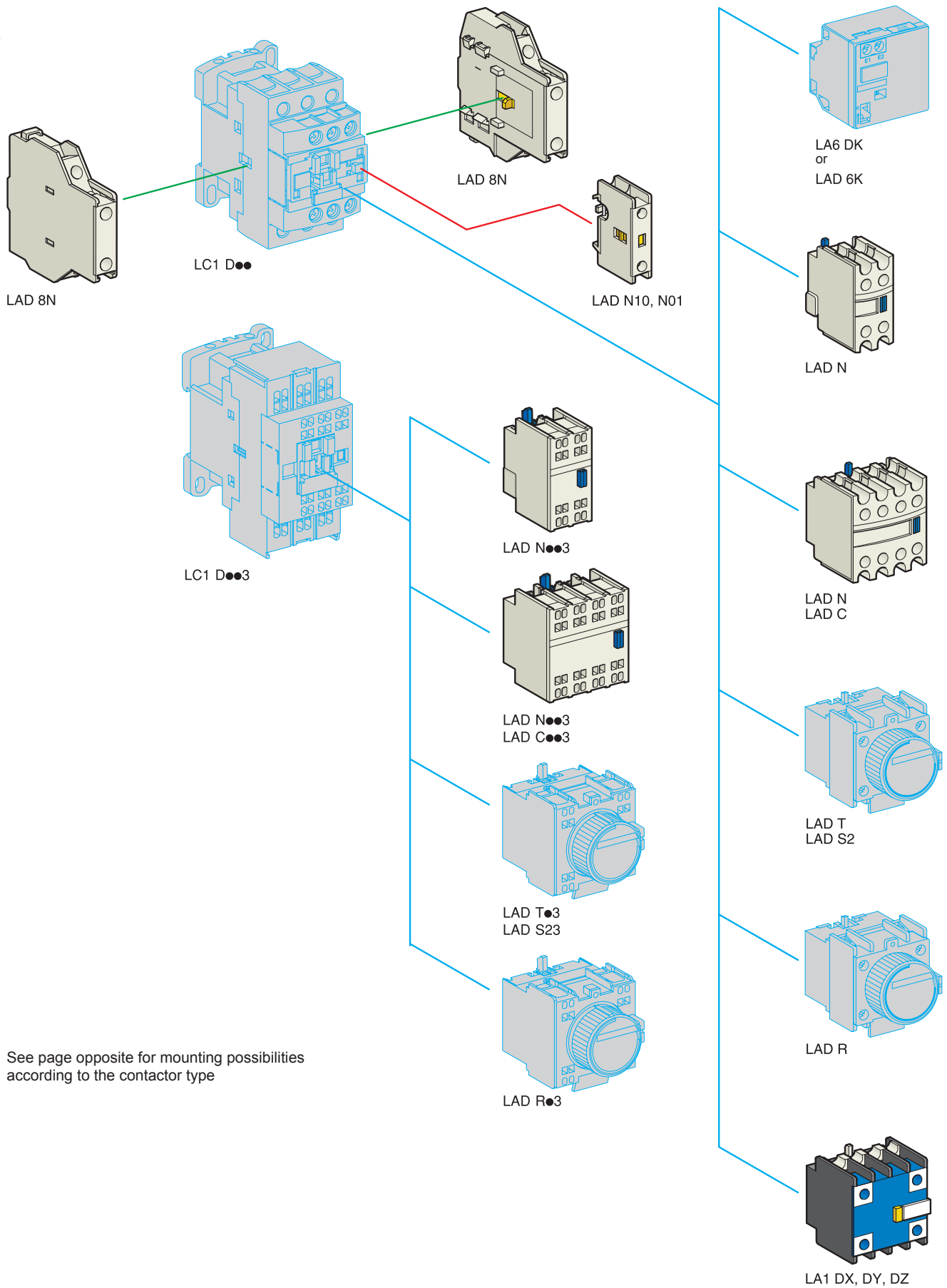
Example: 50 kVAR 3-step capacitor bank. Temperature: 50 °C and U = 400 V or 440 V. One 25 kVAR step: contactor LC1 DMK, one 15 kVAR step: contactor LC1 DGK, and one 10 kVAR step: contactor LC1 DFK.

⁽¹⁾ Operational power of the contactor according to the scheme on the page opposite.

⁽²⁾ The average temperature over a 24-hour period, in accordance with standards IEC 60070 and 60831 is 45 °C.

⁽³⁾ Standard control circuit voltages (the delivery time is variable, please consult your Regional Sales Office):

Volts	24	48	120	220	230	240	380	400	415	440
50/60 Hz	B7	E7	G7	M7	P7	U7	Q7	V7	N7	R7



See page opposite for mounting possibilities according to the contactor type

TeSys contactors






TeSys D contactors and reversing contactors

Instantaneous auxiliary contact blocks

Instantaneous auxiliary contact blocks for connection by screw clamp terminals

For use in normal operating environments

In order to mount an LAD 8N on an LC1 D80 to D95, a set of shims must be ordered separately, see page B8/21.

Clip-on mounting (1)	Number of contacts per block	Composition					Reference	
								
Front	1	-	-	-	1	-	LADN10	
		-	-	-	-	1	LADN01	
	2	-	-	-	1	1	LADN11	
		-	-	-	2	-	LADN20	
	4	-	-	-	-	2	LADN02	
		-	-	-	2	2	LADN22 LADN22S (4)	
		-	-	-	1	3	LADN13	
		-	-	-	4	-	LADN40	
		-	-	-	-	4	LADN04	
		-	-	-	3	1	LADN31	
4 incl. 1 N/O & 1 N/C make before break	-	-	-	2	2	LADC22		
	Side (contact blocks compatible with AC coil contactors only)	2	-	-	-	1	1	LAD8N11
		-	-	-	2	-	LAD8N20	
		-	-	-	-	2	LAD8N02	

For terminal referencing conforming to EN 50012

Front on 3P contactors and 4P contactors 20 to 80 A	2	-	-	-	1	1	LADN11G
	4	-	-	-	2	2	LADN22G
Front on 4P contactors 125 to 200 A	2	-	-	-	1	1	LADN11P
	4	-	-	-	2	2	LADN22P

With dust and damp protected contacts, for use in particularly harsh industrial environments

Front	2	-	2	-	-	-	LA1DX20
		1	1	-	-	-	LA1DX11
		2	-	-	-	-	LA1DX02
	4	-	2	2	-	-	LA1DY20 (2)
		-	2	-	2	-	LA1DZ40
		-	2	-	1	1	LA1DZ31

Instantaneous auxiliary contact blocks for connection by lugs

This type of connection is not possible for blocks with 1 contact or blocks with dust and damp protected contacts. For all other instantaneous auxiliary contact blocks, add the figure 6 to the end of the references selected above. Example: LAD N11 becomes LAD N116.

Instantaneous auxiliary contact blocks for connection by spring terminals

This type of connection is not possible for LAD 8, LAD N with 1 contact or blocks with dust and damp protected contacts. For all other contact blocks, add the figure 3 to the end of the references selected above. Example: LAD N11 becomes LAD N113.

Instantaneous auxiliary contact blocks for connection by Faston connectors

This type of connection is not possible for LAD 8, LAD N with 1 contact or blocks with dust and damp protected contacts. For all other contact blocks, add the figure 9 to the end of the references selected above. Example: LAD N11 becomes LAD N119.

(1) Maximum number of auxiliary contacts that can be fitted:

Contactors	Type	Number of poles and size	Instantaneous auxiliary contacts				Time delay Front mounted	
			Side mounted	Front mounted				
				1 contact	2 contacts	4 contacts		
~	3P	LC1 D09...D38	1 on LH side	and	-	1	or 1	or 1
		LC1 D40A...D65A	1 on LH or 1 on RH side	and	-	1	or 1	or 1
		LC1 D80 and D95 (50/60 Hz)	1 on each side	or	2	and 1	or 1	or 1
		LC1 D80 and D95 (50 or 60 Hz)	1 on each side	and	2	and 1	or 1	or 1
		LC1 D115 and D150	1 on LH side	and	-	1	or 1	or 1
	4P	LC1 DT20...DT40	1 on LH side	and	-	1	or 1	or 1
		LC1 DT60A and DT80A	1 on LH or 1 on RH side	and	-	1	or 1	or 1
		LC1 D40008, D65008 and D80	1 on each side	or	1	or 1	or 1	or 1
		LC1 D115	1 on each side	and	1	or 1	or 1	or 1
		LC1 D115	1 on each side	and	1	or 1	or 1	or 1
---	3P	LC1 D09...D38	-	-	-	1	or 1	or 1
		LC1 D40A...D65A	-	-	-	1	or 1	or 1
		LC1 D80 and D95	-	-	-	1	or 1	or 1
		LC1 D115 and D150	1 on LH side	and	-	1	or 1	or 1
		LC1 D115	1 on LH side	and	-	1	or 1	or 1
	4P	LC1 DT20...DT40	-	-	-	1	or 1	or 1
		LC1 DT60A and DT80A	-	-	-	1	or 1	or 1
		LC1 D40008, D65008 and D80	-	-	-	2	and 1	or 1
		LC1 D115	1 on each side	-	-	and 1	or 1	or 1
		LC1 D115	1 on each side	-	-	and 1	or 1	or 1
BC (3)	3P	LC1 D09...D38	-	-	-	1	-	-
	4P	LC1 DT20...DT40	-	-	-	1	-	-

(2) Device fitted with 4 earth screen continuity terminals.

(3) LC: low consumption.

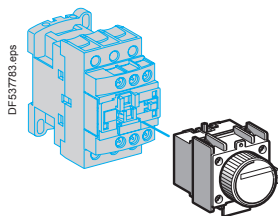
(4) With red front face - for safety chain indication.

TeSys contactors

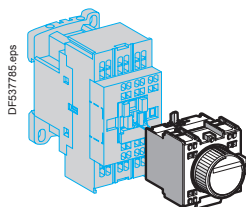
TeSys D contactors and reversing contactors

Time delay auxiliary contact blocks Mechanical latch blocks

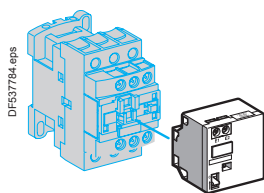
TeSys D



LAD T●



LAD T●3



LAD 6K10●

Time delay auxiliary contact blocks for connection by screw clamp terminals

Maximum number of auxiliary contact blocks that can be fitted per contactor, see page B8/15.

Sealing cover to be ordered separately, see page B8/21.

LAD T0 and LAD R0: with extended scale from 0.1 to 0.6 s.

LAD S2: with switching time of 40 ms ± 15 ms between opening of the N/C contact and closing of the N/O contact.

Clip-on mounting	Number of contacts	Time delay		Reference
		Type	Setting range	
Front	1 N/O + 1 N/C	On-delay	0.1...3 s	LADT0
			0.1...30 s	LADT2
			10...180 s	LADT4
		Off-delay	1...30 s	LADS2
			0.1...3 s	LADR0
			0.1...30 s	LADR2
		10...180 s	LADR4	

Time delay auxiliary contact blocks for connection by lugs

Add the figure 6 to the end of the references selected above. Example: LAD T0 becomes LAD T06.

Time delay auxiliary contact blocks for connection by spring terminals

Add the figure 3 to the end of the references selected above. Example: LAD T0 becomes LAD T03.

Time delay auxiliary contact blocks for connection by Faston connectors

Add the figure 9 to the end of the references selected above. Example: LAD T0 becomes LAD T09.

Mechanical latch blocks ⁽¹⁾

Clip-on mounting	Unlatching control	For use on contactor	Basic reference, to be completed by adding the control voltage code ⁽²⁾
Front	Manual or electric	LC1 D09...D38 (∩ or ∩∩) ⁽³⁾	LAD6K10●
		LC1 DT20...DT40 (∩ or ∩∩)	
		LC1 D40A...D65A (3 P ∩ or ∩∩)	LAD6K10●
		LC1 DT60A and DT80A (4 P ∩ or ∩∩)	
		LC1 D80...D150 (3 P ∩)	LA6DK20●
		LC1 D80 and D115 (3 P ∩∩)	
		LC1 D80 (4 P ∩)	
		LC1 D80 and D115 (4 P ∩)	
		LP1 D80 and LC1 D115 (4 P ∩∩)	

⁽¹⁾ The mechanical latch block must not be powered up at the same time as the contactor. The duration of the control signal for the mechanical latch block and the contactor should be: ≥ 100 ms for a contactor operating on an a.c. supply, ≥ 250 ms for a contactor operating on a d.c. supply. Maximum impulse duration for the LAD 6K10● mechanical latch block: 10 seconds.

⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	50/60 Hz, 24	32/36	42/48	60/72	100	110/127	220/240	256/277	380/415
∩∩									
Code	B	C	E	EN	K	F	M	U	Q

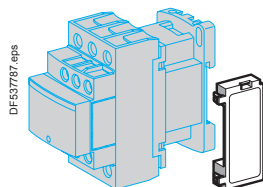
⁽³⁾ The DC, low consumption contactors (coil code ●L) are not compatible with the mechanical latch blocks LAD6K10●.

TeSys contactors

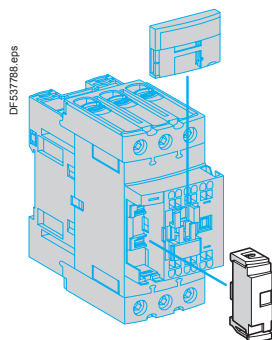
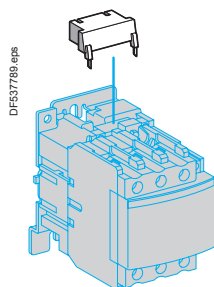
TeSys D contactors and reversing contactors

Suppressor modules

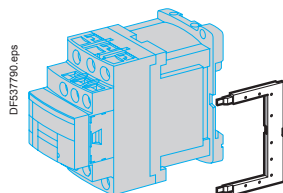
TeSys D



LAD 4●●

LAD 4RC3●, LAD 4V3●,
LAD 4D3U, LAD 4T3●

LA4 D●●



LAD 4DDL or LAD 4DL●

RC circuits (Resistor-Capacitor)

Effective protection for circuits highly sensitive to "high frequency" interference. For use only in cases where the voltage is virtually sinusoidal, i.e. less than 5 % total harmonic distortion. Voltage limited to 3 U_c max. and oscillating frequency limited to 400 Hz max. Slight increase in drop-out time (1.2 to 2 times the normal time).

Mounting	For use with contactor ⁽¹⁾ Rating	Type		Reference
		V ~	V ---	
Clip-on side mounting ⁽³⁾	D09...D38 (3P) DT20...DT40	24...48	–	LAD4RCE
		50...127	–	LAD4RCG
		110...250	–	LAD4RCU
Clip-on front mounting ⁽³⁾	D40A...D65A (3P) DT60A...DT80A (4P)	24...48	–	LAD4RC3E
		50...127	–	LAD4RC3G
		110...240	–	LAD4RC3U
		380...415	–	LAD4RC3N
		24...48	–	LA4DA2E
Screw fixing ⁽⁴⁾	D80...D150 (3P) D40...D115 (4P)	50...127	–	LA4DA2G
		110...240	–	LA4DA2U
		380...415	–	LA4DA2N

Varistors (peak limiting)

Protection provided by limiting the transient voltage to 2 U_c max. Maximum reduction of transient voltage peaks. Slight increase in drop-out time (1.1 to 1.5 times the normal time).

Clip-on side mounting ⁽³⁾	D09...D38 (3P) DT20...DT40	24...48	–	LAD4VE
		50...127	–	LAD4VG
		110...250	–	LAD4VU
Clip-on front mounting ⁽³⁾	D40A...D65A (3P) DT60A...DT80A (4P)	24...48	24...48	LAD4V3E
		50...127	50...127	LAD4V3G
		110...250	110...250	LAD4V3U
		24...48	–	LA4DE2E
		50...127	–	LA4DE2G
Screw fixing ⁽⁴⁾	D80...D115 (3P) D80...D115 (4P)	110...250	–	LA4DE2U
		–	24...48	LA4DE3E
		–	50...127	LA4DE3G
		–	110...250	LA4DE3U
		–	–	–

Flywheel diodes

No overvoltage or oscillating frequency. Increase in drop-out time (6 to 10 times the normal time). Polarised component.

Clip-on side mounting ⁽⁵⁾	D09...D38 (3P), DT20...DT40	–	24...250	LAD4DDL
Clip-on front mounting ⁽⁵⁾	D40A...D65A (3P), DT60A...DT80A (4P)	–	24...250	LAD4D3U
Screw fixing ⁽⁴⁾	D80 and D95 (3P), D40...D80 (4P)	–	24...250	LA4DC3U

Bidirectional peak limiting diodes

Protection provided by limiting the transient voltage to 2 U_c max. Maximum reduction of transient voltage peaks.

Clip-on side mounting ^{(3) (5)}	D09...D38 (3P) DT20...DT40 (4P) ⁽²⁾	24	–	LAD4TB
		–	24	LAD4TBDL
		72	–	LAD4TS
		–	72	LAD4TSDL
		–	125	LAD4TGDL
Clip-on front mounting ⁽³⁾	D40A...D65A (3P) DT60A...DT80A (4P) ⁽²⁾	–	250	LAD4TUDL
		–	600	LAD4TXDL
		12...24	12...24	LAD4T3B
		25...72	25...72	LAD4T3S
		73...125	73...125	LAD4T3G
		126...250	126...250	LAD4T3U
		251...440	251...440	LAD4T3R
Screw fixing ⁽⁴⁾	D80...D95 (3P) D40...D80 (4P)	12...24	12...24	LA4DB2B
		25...72	25...72	LA4DB2S
		–	24	LA4DB3B
		–	72	LA4DB3S
		–	–	–

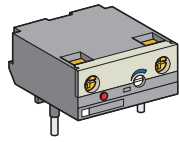
⁽¹⁾ For satisfactory protection, a suppressor module must be fitted across the coil of each contactor.

⁽²⁾ From D09 to D65A and from LC1 DT20 to DT80A, d.c. and low consumption 3-pole contactors are fitted with a built-in bidirectional peak limiting diode suppressor as standard. This bidirectional peak limiting diode is removable and can therefore be replaced by the user. (See reference above). If a d.c. or low consumption contactor is used without suppression, the standard suppressor should be replaced with a blanking plug (reference LAD 9DL for LC1 D09 to D38 and LC1 DT20 to DT40; reference LAD 9DL3 for LC1 D40A to D65A and LC1 DT60A to DT80A).

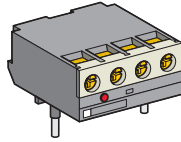
⁽³⁾ Clipping-on makes the electrical connection. The overall size of the contactor remains unchanged.

⁽⁴⁾ Mounting at the top of the contactor on coil terminals A1 and A2.

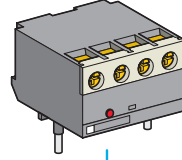
⁽⁵⁾ In order to install these accessories, the existing suppression device must first be removed.



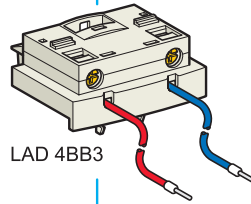
LA4 DT



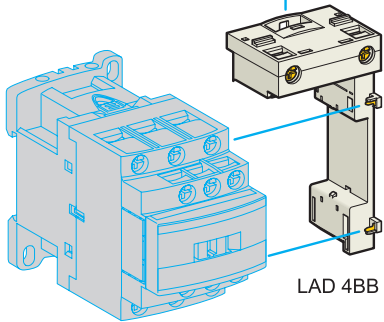
LA4 DFB



LA4 DWB

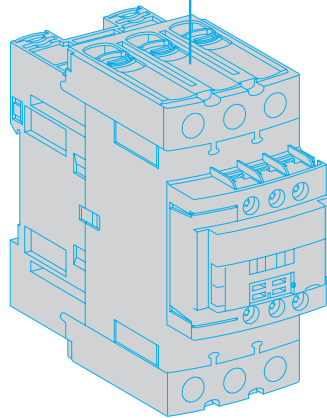


LAD 4BB3

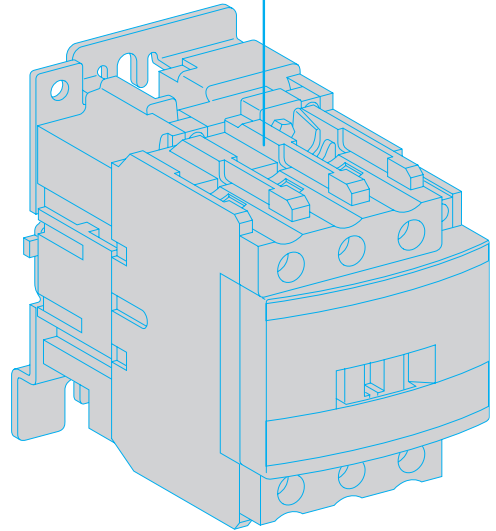


LAD 4BB

LC1 D09...D38



LC1 D40A...D65A



LC1 D80...D95

See page opposite for mounting possibilities according to the contactor type.

TeSys contactors

TeSys D contactors and reversing contactors

Accessories

TeSys D

Electronic serial timer modules ⁽¹⁾

- 3-pole contactors LC1 D09 to D38: mounted using adapter LAD 4BB, to be ordered separately, see below.
- 3-pole contactors LC1 D40A to D65A: mounted using adapter LAD 4BB3, to be ordered separately, see below.
- 3-pole contactors LC1 D80 to D150 and 4-pole contactors LC1 D40 to D115: mounted directly across terminals A1 and A2 of the contactor.

On-delay type

Operational voltage \sim		Time delay	Reference
24...250 V	100...250 V		
LC1 D09...D65A (3P)	LC1 D80...D150 (3P)	0.1...2 s	LA4DT0U
		1.5...30 s	LA4DT2U
		25...500 s	LA4DT4U

Interface modules

- 3-pole contactors LC1 D09 to D38: mounted using adapter LAD 4BB, to be ordered separately, see below.
- 3-pole contactors LC1 D40A to D65A: mounted using adapter LAD4 BB3, to be ordered separately, see below.

Relay interface

Operational voltage \sim		Supply voltage E1-E2 (---)	Reference
24...250 V			
LC1 D09...D150 (3P)		24 V	LA4DFB

Relay interface with "AUTO-I" manual override switch (output forced "ON"), solid state type

Operational voltage \sim		Supply voltage E1-E2 (---)	Reference
24...250 V	100...250 V		
LC1 D09...D65A (3P)	LC1 D80...D115 (3P)	24 V	LA4DWB

Low consumption kit

For use on contactors	Composition	Reference
LC1 D40A...D65A (3P) ⁽²⁾	Kit comprising: <ul style="list-style-type: none"> ■ a retrofit coil LAD 4BB3 ■ a relay interface module LA4 DFB. 	LA4DBL

Retrofit: coil for 3-pole contactor

For adapting existing wiring to a new product

For use on contactors		Reference	
LC1 D09...D38	Without coil suppression	LAD4BB	
	With coil suppression	\sim 24...48 V	LAD4BBVE
		\sim 50...127 V	LAD4BBVG
LC1 D40A...65A	Without coil suppression	\sim 110...250 V	LAD4BBVU
			LAD4BB3

(1) For 24 V operation, the contactor must be fitted with a 21 V coil (code Z).
See pages B8/25 to B8/28.

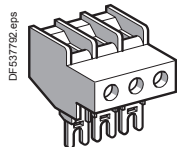
(2) The kit is compatible with a coil voltage of \sim 24 V to \sim 250 V (B7 to U7) and --- 24 V to --- 250 V (BD to UD).

TeSys contactors

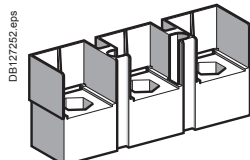
TeSys D contactors and reversing contactors

Accessories

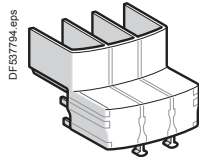
TeSys D



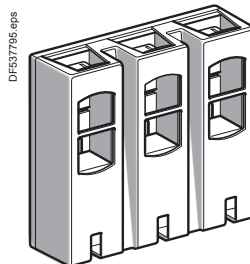
LA9 D3260



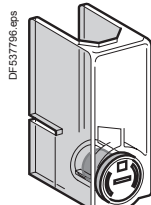
LA9 D11550



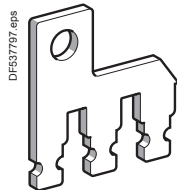
LAD 96570



LA9 D11560



LA9 D11570



LA9 D80962



LA9 D11567

Accessories for main pole and control connections

Description	For use with contactors LC1		Sold in lots of	Unit reference
	~	---		
Connectors for cable, size (1 connector)	4-pole 10 mm ²	DT20, DT25	DT20, DT25	1 LAD92560
	3-pole 25 mm ²	D09...D38	D09...D38	1 LA9D3260
EverLink [®] terminal block	3-pole	D40A...D65A	D40A...D65A	1 LAD96560
Connectors for cables (2 connectors)	3-pole 120 mm ²	D115, D150	D115, D150	1 LA9D115603
	4-pole 120 mm ²	D115	D115	1 LA9D115604
Connectors for lug type terminals (2 connectors)	3-pole	D1156, D1506	D1156, D1506	1 LA9D115503
	4-pole	D1156	D1156	1 LA9D115504
Protective covers for connectors for lug type terminals	3-pole	D40A6...D65A6	D40A6...D65A6	1 LAD96570
	4-pole	D1156, D1506	D1156, D1506	1 LA9D115703 ⁽¹⁾
IP 20 covers for lug type terminals (for mounting with circuit breakers GV3 P●●6 and GV3 L●●6)	3 poles	D60A6...D80A6	D60A6...D80A6	1 LAD96580
		D1156, D1506	D1156, D1506	1 LA9D115704
Links for parallel connection of	2 poles	D40A6...D65A6	D40A6...D65A6	1 LAD96575
		D09...D38	D09...D38	10 LA9D2561
		DT20, DT25 (4P)	DT20, DT25 (4P)	10 LA9D1261
		DT32, DT40 (4P)	DT32, DT40 (4P)	10 LAD96061
		D40A...D65A	D40A...D65A	1 LAD9P32
		D80, D95	D80	2 LA9D80961
	3 poles	D09...D38	D09...D38	10 LAD9P3 ⁽²⁾
		D40A...D65A	D40A...D65A	1 LAD9P33
		D80, D95	D80, D95	1 LA9D80962
	4 poles	DT20, DT25	DT20, DT25	2 LA9D1263
	D80, D95	D80	2 LA9D80963	
Staggered coil connection	–	D80	10 LA9D09966	
Control circuit take-off from main pole	D80, D95	D80, D95	10 LA9D8067	
	D115, D150	D115, D150	10 LA9D11567	
Spreaders for increasing the pole pitch to 45 mm	D115, D150	D115, D150	3 GV7AC03	

⁽¹⁾ For 3-pole contactors: 1 set of 6 covers, for 4-pole contactors: 1 set of 8 covers.

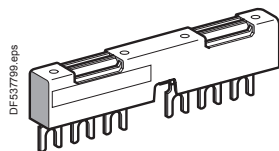
⁽²⁾ Separate connecting bar for connecting 2 poles in parallel.

TeSys contactors

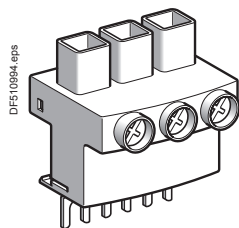
TeSys D contactors and reversing contactors

Accessories

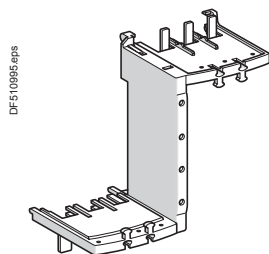
TeSys D



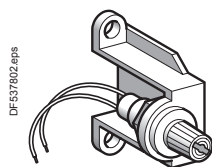
GV2 G245



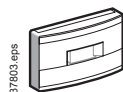
GV1 G09



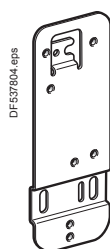
GV3 S



LA9 D941



LAD 9ET●



LAD 7X3

Sets of contacts and arc chambers

Description	For contactor	Reference
Sets of contacts	3-pole	LC1 D115 LA5D1158031
		LC1 D150 LA5D150803
Arc chambers	4-pole	LC1 D115004 LA5D115804
	3-pole	LC1 D115 LA5D11550
	4-pole	LC1 D150 LA5D15050
		LC1 D115004 LA5D115450

Power connection accessories

Terminal block	For supply to one or more GV2 G busbar sets	GV1G09
Set of 63 A busbars for parallelling of contactors	2 contactors LC1 D09...D18 or D25...D38	GV2G245
	4 contactors LC1 D09...D18 or D25...D38	GV2G445
Set of 115 A busbars for parallelling of contactors	2 contactors LC1 D40A...D65A	GV3G264
	3 contactors LC1 D40A...D65A	GV3G364 (1)
Set of S-shape busbars	For circuit breakers GV3 P●● and GV3 L●● and contactors LC1 D40A...D65A	GV3S

Protection accessories

Description	Use	Sold in lots of	Reference
Miniature control circuit fuse holder	5 x 20 with 4 A-250 V fuse	1	LA9D941
Sealing cover	For LAD T, LAD R	1	LA9D901
Safety cover preventing access to the moving contact carrier	LC1 D09...D65A and DT20...DT80A	1	LAD9ET1
	Red cover (for safety chain indication)	1	LAD9ET1S
	LC1 D80 and D95	1	LAD9ET3
	Red cover (for safety chain indication)	1	LAD9ET3S
	LC1 D115 and D150	1	LAD9ET4
	Red cover (for safety chain indication)	1	LAD9ET4S

Marking accessories

Description	Use	Sold in lots of	Unit reference
Sheet of 64 blank legends, self-adhesive, 8 x 33 mm (2)	Contactors (except 4P) LC1 D80...D115, LAD N (4 contacts), LA6 DK	10	LAD21
Sheet of 112 blank legends, self-adhesive, 8 x 12 mm (2)	LAD N (2 contacts), LAD T, LAD R, LRD	10	LAD22
Sheet of 64 blank legends for marking using plotter or 8 x 33 mm engraver	Contactors (except 4P) LC1 D80...D115, LAD (4 contacts), LA6 DK	10	LAD23
Sheet of 440 blank legends for marking using plotter or 8 x 12 mm engraver	All products	35	LAD24
Marker holder snap-in, 8 x 22 mm	4-pole contactors, LC1 D80...D115, LA6 DK	100	LA9D92
Marker holder snap-in, 8 x 18 mm	LC1 D09...D65A, LC1 DT20...DT80A, LAD N (4 contacts), LAD T, LAD R	100	LAD90
Bag of 300 blank legends self-adhesive, 7 x 21 mm	On holder LA9 D92	1	LA9D93
"SIS Label" labelling software supplied on CD-Rom	Multi-language version: English, French, German, Italian, Spanish	1	XBY2U

Mounting accessories

Retrofit plate for screw fixing	For replacement of LC1 D40 to D65 with LC1 D40A to D65A	1	LAD7X3
Mounting plate	For replacement of LC1 F115 or F150 with LC1 D115 or D150	1	LA9D730
Set of shims	For fitting side mounting blocks LAD 8N on LC1 D80 and D95	1	LA9D511
Size 4 Allen key, insulated, 1000 V	For use on contactors LC1 D40A to LC1 D150	5	LADALLEN4

(1) With this set of busbars, any one contactor can be supplied directly by its EverLink® double cage power terminal block. The other two contactors are supplied by the busbar set. The 115 A limitation is therefore applied to these two contactors. Example: 1 LC1 D65A supplied directly + 1 contactor LC1 D65A and 1 contactor LC1 D50 A supplied via the busbar set = 115 A. This combination is compatible with busbar set GV3 G364.

(2) These legends are for sticking onto the safety cover of the contactors or add-on block, if fitted.

References

These devices prevent inadvertent opening of a contactor in the event of a brief volt drop or momentary supply failure.

Control circuit: d.c. supply

For use with contactor	Corresponding delayed opening device			
Type ⁽¹⁾	Contact reference to be completed ⁽²⁾	Supply voltage 50/60 Hz	Non-adjustable delay time (Tr)	Reference
		V	s	
LC1 D09, LC1 D12, LC1 D18, LC1 D25, LC1 D32 or LC1 D38	LC1 D●●PD	110...115	1.5...5	LAZR90F
	LC1 D●●QD	120...127	2.5...5	LAZR90F
	LC1 D●●TD	220	4...8	LAZR90M
	LC1 D●●VD	240	5...10	LAZR90M
	LC1 D●●WD	380	4...8	LAZR90Q
	LC1 D●●XD	415...440	5.5...13	LAZR90Q
LC1 D40, LC1 D50 or LC1 D65	LC1 D●●PD	110...115	0.5...1	LAZR90F
	LC1 D●●QD	120...127	0.5...1.5	LAZR90F
	LC1 D●●TD	220...240	1...2.5	LAZR90M
	LC1 D●●WD	380	1...2.5	LAZR90Q
	LC1 D●●XD	415...440	1...3	LAZR90Q
LC1 D80	LC1 D●●PD	110...120	0.4...1	LAZR90F
	LC1 D●●QD	120...127	0.5...1	LAZR90F
	LC1 D●●TD	220	0.5...2	LAZR90M
	LC1 D●●VD	240	1...2.5	LAZR90M
	LC1 D●●WD	380	1...2	LAZR90Q
	LC1 D●●XD	415...440	1...2.5	LAZR90Q

Add-on blocks for delayed opening devices

Application	For use with delayed opening device	Operational voltage	Non-adjustable delay time	Reference
		V	s	
To double the delay time	LAZR90F	110...127	Tr x 2	LAZR91F
	LAZR90M	220...240	Tr x 2	LAZR91M
	LAZR90Q	380...440	Tr x 2	LAZR91Q

(1) These contactors can be supplied as standard for this application or can be adapted by replacing the coil (except for contactors LC1 D09●●●● to LC1 D38●●●● on which the coil is not replaceable).

(2) Reference to be completed: see page B8/2.



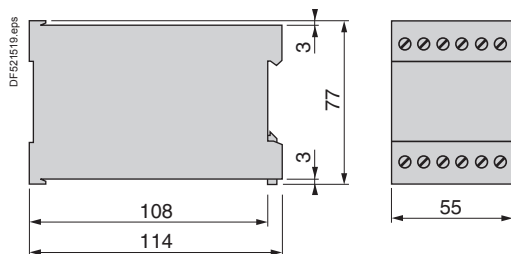
LAZR90F



LAZR91F

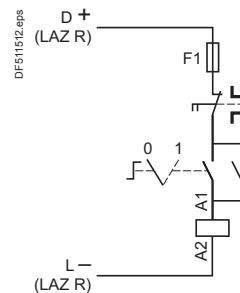
Dimensions

LAZR9●●



Schemes

LAZR9●● + LC1 D



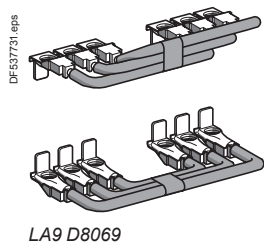
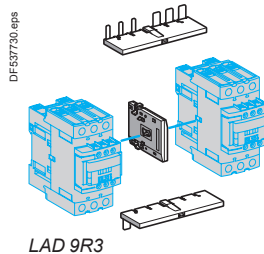
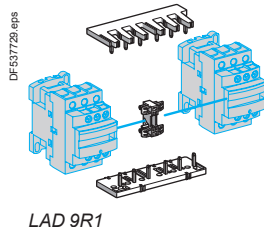
Other versions

Delayed opening devices for use with other types of contactor. Please consult your Regional Sales Office.

TeSys contactors

Component parts for assembling reversing contactors for motor control, low-speed/high-speed starters and star-delta starters

TeSys D



For 3-pole reversing contactors for motor control

Contactors with screw clamp terminals or connectors. Horizontally mounted, assembled by customer.

Description	For contactors ⁽¹⁾ (2 identical contactors)	Reference
Kits for assembly of reversing contactors		
Kit comprising: ■ a mechanical interlock LAD 9V2 with electrical interlocking LAD 9V1 ■ a set of power connections LAD 9V5 (parallel) and LAD 9V6 (reversing).	LC1 D09 to D38	LAD9R1V
Kit comprising: ■ a mechanical interlock LAD 9V2 without electrical interlocking ■ a set of power connections LAD 9V5 (parallel) and LAD 9V6 (reversing).	LC1 D09 to D38	LAD9R1
Kit comprising: ■ a mechanical interlock LAD 4CM ■ a set of power connections LA9 D65A69 .	LC1 D40A to D65A	LAD9R3
Mechanical interlocks		
Mechanical interlock with integral electrical interlocking	LC1 D80 and D95 (~)	LA9D4002
	LC1 D80 and D95 (---)	LA9D8002
	LC1 D115 and D150	LA9D11502
Mechanical interlock without integral electrical interlocking	LC1 D09 to D38	LAD9V2
	LC1 D40A to D65A	LAD4CM
	LC1 D80 and D95 (~)	LA9D50978
	LC1 D80 and D95 (---)	LA9D80978
Sets of power connections		
Comprising: ■ a set of parallel bars ■ a set of reverser bars.	LC1 D09 to D38 with screw clamp terminals or connectors	LAD9V5 + LAD9V6
	LC1 D09...D32 with spring terminal connections	LAD9V12 + LAD9V13 ⁽²⁾
	LC1 D40A to D65A	LA9D65A69
	LC1 D80 and D95 (~)	LA9D8069
	LC1 D80 and D95 (---)	LA9D8069
	LC1 D115 and D150	LA9D11569

For low-speed/high-speed starter

Description	For contactors with connection type	Reference
Connection kit enabling reversing of low and high speed directions using a reversing contactor and a 2N/O + 2N/C main pole contactor	Screw clamps or connectors	LAD9PVGV

For star-delta starter

Description	For contactors	Reference
Mounting kit comprising: ■ 1 time delay contact block LAD S2 (LC1 D09...D80) , ■ power circuit connections (LC1 D09...D80), ■ hardware required for fixing the contactors onto the mounting plate (LC1 D80).	LC1 D09 and D12	LAD91217
	LC1 D18 to D32	LAD93217
	LC1 D40A and D50A	LAD9SD3
	LC1 D80	LA9D8017
Equipment mounting plates	LC1 D09, D12 and D18	LA9D12974
	LC1 D32	LA9D32974
	LC1 D40A and D50A	–
	LC1 D80	LA9D80973

(1) To order the 2 contactors: see pages B8/3 and B8/9.

(2) To assemble a reversing contactor with spring terminal connections, the following components must be ordered:

- 1 mechanical interlock **LAD 9V2**,

- 1 upstream power connection kit and 1 downstream power connection kit.

Upstream power connection kit **LAD 9V10**: installed in the Quickfit system with power connection module **LAD 34**.

(If module **LAD 34** is not used, replace **LAD 9V10** with **LAD 9V12**).

Downstream power connection kit **LAD 9V11**: installed in the Quickfit system with outgoing terminal block **LAD 331**.

(If **LAD 331** is not used, replace **LAD 9V11** with **LAD 9V13**).

TeSys contactors

Component parts for assembling changeover contactor pairs

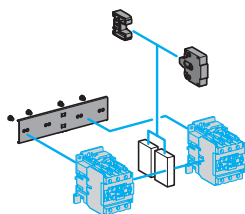
TeSys D

For 4-pole changeover contactor pairs (3-phase distribution + neutral)

Contactors with screw clamp terminals or connectors. Horizontally mounted, assembled by customer.

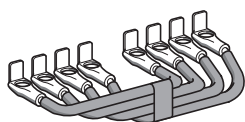
Description	For contactors ⁽¹⁾ (2 identical contactors)	Reference
Kits for assembly of changeover contactor pairs		
Kit comprising: ■ a mechanical interlock LAD 9V2 with electrical interlocking LAD 9V1, ■ a set of power connections (changeover) LAD 9V7.	LC1 DT20 to DT40 with screw clamps or connectors	LADT9R1V
Kit comprising: ■ a mechanical interlock LAD 9V2 without electrical interlocking, ■ a set of power connections (changeover) LAD 9V7.	LC1 DT20 to DT40 with screw clamps or connectors	LADT9R1
Mechanical interlocks		
With integral electrical interlocking	LC1 D80004	LA9D4002
	LP1 D80004	LA9D8002
	LC1 D115004	LA9D11502
Without integral electrical interlocking	LC1 DT20 to DT40 with screw clamps or connectors	LAD9V2 ⁽²⁾
	LC1 DT203 to DT403 with spring terminals	LAD9V2 ⁽²⁾
	LC1 DT60A and DT80A	LAD4CM
	LC1 D80004	LA9D50978
	LP1 D80004	LA9D80978
Sets of power connections		
Comprising a set of parallel bars	LC1 D80004	LA9D8070
	LP1 D80004	LA9D8070
	LC1 D115004	LA9D11570
	LC1 DT203 to DT403 with spring terminals	LAD9V9
	LC1 D80004	LA9D8070 ⁽²⁾
	LP1 D80004	LA9D8070 ⁽²⁾
For 3-pole changeover contactor pairs		
Contactors with screw clamp terminals or connectors. Horizontally mounted, assembled by customer.		
Description	For contactors ⁽¹⁾ (2 identical contactors)	Reference
Mechanical interlocks		
Without integral electrical interlocking	LC1 D40A...D65A	LAD9R3S
With integral electrical interlocking	LC1 D115 and D150	LA9D11502
Sets of power connections		
Comprising a set of parallel bars	LC1 D115 and D150	LA9D11571

DF537733.eps



LA9 D50978

DF537735.eps



LA9 D8070

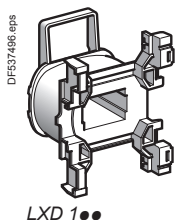
⁽¹⁾ To order the 2 contactors: see pages B8/3 and B8/9.

⁽²⁾ Order 2 contact blocks **LAD N•1** to build the electrical interlock, see page B8/15.

TeSys contactors

a.c. coils for TeSys D, 3 or 4-pole contactors

TeSys D



For ~ contactors LC1 D09...D38 and LC1 DT20...DT40

Specifications

Average consumption at 20 °C:

- inrush ($\cos \varphi = 0.75$) 70 VA,
- sealed ($\cos \varphi = 0.3$) 50 Hz: 7 VA, 60 Hz: 7.5 VA.

Operating range ($\theta \leq 60$ °C): 50 Hz: 0.8...1.1 U_c , 60 Hz: 0.85...1.1 U_c .

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference ⁽¹⁾
V	Ω	H	50/60 Hz
12	1.33	0.05	LXD1J7
21 ⁽²⁾	4.17	0.17	LXD1Z7
24	5.37	0.22	LXD1B7
32	10.1	0.39	LXD1C7
36	12.8	0.49	LXD1CC7
42	17	0.67	LXD1D7
48	21.7	0.87	LXD1E7
60	34.6	1.4	LXD1EE7
100	100.4	3.8	LXD1K7
110	124.1	4.6	LXD1F7
115	129.8	5	LXD1FE7
120	150.6	5.4	LXD1G7
127	158.5	6.1	LXD1FC7
200	410.7	15	LXD1L7
208	430.4	16	LXD1LE7
220	515.4	18	LXD1M7 ⁽³⁾
230	538.6	20	LXD1P7
240	562.3	22	LXD1U7
277	800.7	29	LXD1W7
380	1551	55	LXD1Q7 ⁽⁴⁾
400	1633	60	LXD1V7
415	1694	65	LXD1N7
440	1993	73	LXD1R7
480	2398	87	LXD1T7
500	2499	95	LXD1S7
575	3294	125	LXD1SC7
600	3810	136	LXD1X7
660	4656	165	LXD1YC7
690	5020	180	LXD1Y7

⁽¹⁾ The last 2 digits in the reference represent the voltage code.

⁽²⁾ Voltage for special coils fitted in contactors with serial timer modules, with 24 V supply.

⁽³⁾ Suitable for use on 230 V / 50 Hz. In this case, apply a coefficient of 0.6 to the mechanical durability of the contactor (see page B8/54 and B8/66).

⁽⁴⁾ Suitable for use on 400 V / 50 Hz. In this case, apply a coefficient of 0.6 to the mechanical durability of the contactor (see page B8/54 and B8/66).

TeSys contactors

a.c. coils for TeSys D, 3 or 4-pole contactors

TeSys D

For \sim contactors LC1 D40A...D65A, LC1 DT60A and LC1 DT80A

Specifications

Average consumption at 20 °C:

■ inrush ($\cos \varphi = 0.75$) 160 VA,

■ sealed ($\cos \varphi = 0.3$) 50 Hz: 15 VA, 60 Hz: 15 VA.

Operating range ($\theta \leq 60$ °C): 50 Hz: 0.8...1.1 Uc, 60 Hz: 0.85...1.1 Uc.

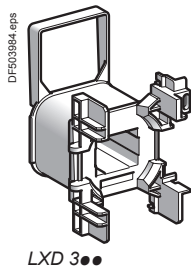
Control circuit voltage Uc	Average resistance at 20 °C $\pm 10\%$	Inductance of closed circuit	Reference ⁽¹⁾
V	Ω	H	
			50/60 Hz
12	0.49	0.03	LXD3J5 ⁽²⁾
24	1.98	0.12	LXD3B7
32	3.76	0.22	LXD3C7
42	6.18	0.37	LXD3D7
48	7.97	0.48	LXD3E7
100	37.63	2.07	LXD3K7
110	42.28	2.50	LXD3F7
115	48.76	2.74	LXD3FE7
120	37.63	2.07	LXD3G7
127	60.29	3.34	LXD3FC7
200	149	8.27	LXD3L7
208	105	6.22	LXD3LE7
220	182	10	LXD3M7 ⁽³⁾
230	192	10.9	LXD3P7
240	202	11.9	LXD3U7
277	193	11	LXD3W7
380	512	29.9	LXD3Q7 ⁽⁴⁾
400	607	33.1	LXD3V7
415	635	35.6	LXD3N7
440	682	40.1	LXD3R7
480	607	33.1	LXD3T7
500	878	51.7	LXD3S7
575	1238	68.4	LXD3SC7
600	1304	74.5	LXD3X7
660	1593	90.1	LXD3YC7
690	1683	98.5	LXD3Y7

⁽¹⁾ The last 2 digits in the reference represent the voltage code.

⁽²⁾ This coil can only be used on 50 Hz.

⁽³⁾ Suitable for use on 230 V / 50 Hz. In this case, apply a coefficient of 0.6 to the mechanical durability of the contactor (see page B8/54 and B8/66).

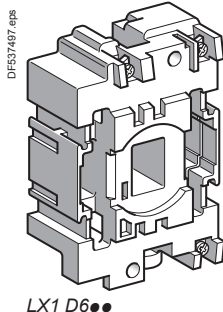
⁽⁴⁾ Suitable for use on 400 V / 50 Hz. In this case, apply a coefficient of 0.6 to the mechanical durability of the contactor (see page B8/54 and B8/66).



TeSys contactors

a.c. coils for TeSys D, 3 or 4-pole contactors

TeSys D



For 3 or 4-pole contactors LC1D40, D50, D65, D80, D95

Specifications

Average consumption at 20 °C:

■ inrush ($\cos \varphi = 0.75$) 50 Hz: 200 VA, 60 Hz: 220 VA

■ sealed ($\cos \varphi = 0.3$) 50 Hz: 20 VA, 60 Hz: 22 VA.

Operating range ($\theta \leq 55$ °C): 0.85...1.1 Uc.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference ⁽¹⁾	Average resistance at 20 °C ± 10 %		Reference ⁽¹⁾
				Ω	H	
			50 Hz		60 Hz	
24	1.4	0.09	LX1D6B5	1.05	0.06	LX1D6B6
32	2.6	0.16	LX1D6C5	–	–	–
42	4.4	0.27	LX1D6D5	–	–	–
48	5.5	0.35	LX1D6E5	4.2	0.23	LX1D6E6
110	31	1.9	LX1D6F5	22	1.2	LX1D6F6
115	31	1.9	LX1D6FE5	–	–	–
120	–	–	–	28	1.5	LX1D6G6
127	41	2.4	LX1D6G5	–	–	–
208	–	–	–	86	4.3	LX1D6L6
220	–	–	–	98	4.8	LX1D6M6
220/230	127	7.5	LX1D6M5	–	–	–
230	133	8.1	LX1D6P5	–	–	–
240	152	8.7	LX1D6U5	120	5.7	LX1D6U6
256	166	10	LX1D6W5	–	–	–
277	–	–	–	157	8	LX1D6W6
380	–	–	–	300	14	LX1D6Q6
380/400	381	22	LX1D6Q5	–	–	–
400	411	25	LX1D6V5	–	–	–
415	463	26	LX1D6N5	–	–	–
440	513	30	LX1D6R5	392	19	LX1D6R6
480	–	–	–	480	23	LX1D6T6
500	668	38	LX1D6S5	–	–	–
575	–	–	–	675	33	LX1D6S6
600	–	–	–	775	36	LX1D6X6
660	1220	67	LX1D6Y5	–	–	–

Specifications

Average consumption at 20 °C:

■ inrush ($\cos \varphi = 0.75$) 50/60 Hz: 245 VA at 50 Hz

■ sealed ($\cos \varphi = 0.3$) 50/60 Hz: 26 VA at 50 Hz.

Operating range ($\theta \leq 55$ °C): 0.85...1.1 Uc.

				50/60 Hz		
24	–	–	–	1.22	0.08	LX1D6B7
42	–	–	–	3.5	0.25	LX1D6D7
48	–	–	–	5	0.32	LX1D6E7
110	–	–	–	26	1.7	LX1D6F7
115	–	–	–	–	–	LX1D6FE7
120	–	–	–	32	2	LX1D6G7
220/230 ⁽²⁾	–	–	–	102	6.7	LX1D6M7
230	–	–	–	115	7.7	LX1D6P7
230/240 ⁽³⁾	–	–	–	131	8.3	LX1D6U7
380/400 ⁽⁴⁾	–	–	–	310	20	LX1D6Q7
400	–	–	–	349	23	LX1D6V7
415	–	–	–	390	24	LX1D6N7
440	–	–	–	410	27	LX1D6R7

⁽¹⁾ The last 2 digits in the reference represent the voltage code.

⁽²⁾ For use on 230 V / 50 Hz, apply a coefficient of 0.6 to the mechanical durability of the contactor, see page B8/54 and B8/66. This coil can be used on 240 V at 60 Hz.

⁽³⁾ This coil can be used on 220/240 V at 50 Hz and on 240 V only at 60 Hz.

⁽⁴⁾ For use on 400 V / 50 Hz, apply a coefficient of 0.6 to the mechanical durability of the contactor, see page B8/54 and B8/66.

For 3 or 4-pole contactors LC1 D115

Specifications

Average consumption at 20 °C:

■ inrush ($\cos \varphi = 0.8$) 50 or 60 Hz: 300 VA■ sealed ($\cos \varphi = 0.3$) 50 or 60 Hz: 22 VA.Operating range ($\theta \leq 55$ °C): 0.85...1.1 Uc.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference ⁽¹⁾	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference ⁽¹⁾
V	Ω	H		Ω	H	
			50 Hz			60 Hz
24	1.24	0.09	LX1D8B5	0.87	0.07	LX1D8B6
32	2.14	0.17	LX1D8C5	–	–	–
42	3.91	0.28	LX1D8D5	–	–	–
48	4.51	0.36	LX1D8E5	3.91	0.28	LX1D8E6
110	26.53	2.00	LX1D8F5	19.97	1.45	LX1D8F6
115	26.53	2.00	LX1D8FE5	–	–	–
120	–	–	–	24.02	1.70	LX1D8G6
127	32.75	2.44	LX1D8FC5	–	–	–
208	–	–	–	67.92	5.06	LX1D8L6
220	104.77	7.65	LX1D8M5	79.61	5.69	LX1D8M6
230	104.77	8.29	LX1D8P5	–	–	–
240	125.25	8.89	LX1D8U5	97.04	6.75	LX1D8U6
277	–	–	–	125.75	8.89	LX1D8W6
380	338.51	22.26	LX1D8Q5	243.07	17.04	LX1D8Q6
400	368.43	25.55	LX1D8V5	–	–	–
415	368.43	27.65	LX1D8N5	–	–	–
440	441.56	30.34	LX1D8R5	338.51	22.26	LX1D8R6
480	–	–	–	368.43	25.55	LX1D8T6
500	566.62	38.12	LX1D8S5	–	–	–

For 3 or 4-pole contactors LC1 D115, LC1 D150

Specifications

Average consumption at 20 °C:

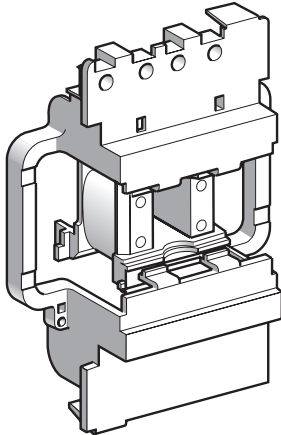
■ inrush: $\cos \varphi = 0.9$ - 280 to 350 VA■ sealed: $\cos \varphi = 0.9$ - 2 to 18 VA.Operating range ($\theta \leq 55$ °C): 0.8...1.15 Uc.

Coils with integral suppression device fitted as standard, class B.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference ⁽¹⁾	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference ⁽¹⁾
V	Ω	H		Ω	H	
			50/60 Hz			
24	–	–	–	147	3.03	LX1D8B7
32	–	–	–	301	8.28	LX1D8C7
42	–	–	–	498	13.32	LX1D8D7
48	–	–	–	1061	24.19	LX1D8E7
110	–	–	–	4377	109.69	LX1D8F7
115	–	–	–	4377	109.69	LX1D8FE7
120	–	–	–	4377	109.69	LX1D8G7
127	–	–	–	6586	152.65	LX1D8FC7
208	–	–	–	10 895	260.15	LX1D8LE7
220	–	–	–	9895	210.72	LX1D8M7
230	–	–	–	9895	210.72	LX1D8P7
240	–	–	–	9895	210.72	LX1D8U7
277	–	–	–	21 988	533.17	LX1D8UE7
380	–	–	–	21 011	482.42	LX1D8Q7
400	–	–	–	21 011	482.42	LX1D8V7
415	–	–	–	21 011	482.42	LX1D8N7
440	–	–	–	21 501	507.47	LX1D8R7
480	–	–	–	32 249	938.41	LX1D8T7
500	–	–	–	32 249	938.41	LX1D8S7

⁽¹⁾ The last 2 digits in the reference represent the voltage code.

DF-537502.eps



LX1 D8●●

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

TeSys SK



LC1 SK06



LA1 SK10

- Width of contactor 27 mm.
- Mounting on 35 mm rail.
- Screw clamp terminals.

Mini-contactors for motor in category AC-3

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3 ⁽¹⁾		Rated operational voltage in AC-3 up to 400 V	Number of poles	Instantaneous auxiliary contacts	Basic reference. Complete with code indicating control circuit voltage ⁽²⁾
220 V	380 V	660 V			LC1SK0600●●
230 V	415 V	690 V			
kW	kW	kW	A		
1.1	2.2	2.2	6	2	- -

Mini-contactors for motor in category AC-1

Non inductive loads maximum current (θ ≤ 55 °C) utilisation category AC-1	Control circuit supply	Number of poles	Instantaneous auxiliary contacts	Basic reference. Complete with code indicating control circuit voltage ⁽²⁾
A	a.c.	2		LC1SK0600●●
	d.c.	2		LP1SK0600●●

Add-on block with 1 power pole (for 3-phase circuits)

For use on contactor	Number of poles	Instantaneous auxiliary contacts	Reference
LC1 SK06 clip-on front mounting	1	1 -	LA1SK10
	1	- 1	LA1SK01

Note: Auxiliary contact blocks and coil suppressor module, see next page.

(1) For use in AC-3 category and 3-phase circuits, an LA1 SK●● auxiliary contact block should be ordered separately for mounting on the contactor.

(2) Standard control circuit voltages (variable delivery times, please consult your Regional Sales Office):

Mini-contactors LC1 SK									
Volts ~ 50/60 Hz	24	48	110	120	220	230	240	380	400
Code	B7	E7	F7	G7	M7	P7	U7	Q7	V7
Mini-contactors LP1 SK									
Volts ⋯	12	24	36	48	72				
Code	JD	BD	CD	ED	SD				

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK Instantaneous auxiliary contacts and coil suppressor modules

TeSys SK



LA1 SK11



LA4 SK1

Instantaneous auxiliary contact blocks

Clip-on front mounting

For use on contactor	Maximum number of blocks per contactor	Composition	Reference
LC1 SK06	1	2 –	LA1SK20
		– 2	LA1SK02
	1 1	LA1SK11	

Coil suppressor modules

Clip-on fixing and electrical connection on right-hand side, without use of tools

For use on contactors	Type	For voltages	Sold in lots of	Unit reference
LC1 SK06 and LP1 SK06	Varistor ⁽¹⁾	~ and ≡ 24 V...48 V	10	LA4SKE1E
		~ and ≡ 110 V...250 V	10	LA4SKE1U
	Diode ⁽²⁾	≡ 24 V...250 V	10	LA4SKC1U

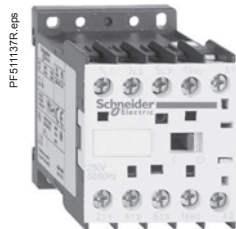
⁽¹⁾ Protection provided by limiting the transient voltage to 2 U_c max. Maximum reduction of transient voltage peaks. Slight increase in drop-out time (1.1 to 1.5 times the normal time).

⁽²⁾ No overvoltage or oscillating frequency.
Slight increase in drop-out time (1.1 to 1.5 times the normal time).

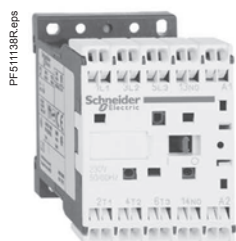
TeSys contactors

Contactors for motor control,
6 to 16 A in category AC-3 and
6 to 12 A in category AC-4
Control circuit: a.c.

TeSys K



LC1 K0910●●



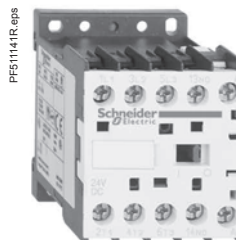
LC1 K09103●●



LC1 K09107●●



LC1 K09105●●



LC7 K0910●●

Contactors selection according to utilisation category, see pages A5/23 to A5/27 and A5/30 to A5/33.
Mounting on 35 mm rail or Ø4 screw fixing.
Screws in the open "ready-to-tighten" position.
Add-on auxiliary contact blocks and accessories, see pages B8/40 to B8/43.

3-pole contactors for standard applications

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3			Rated operational current in category AC-3 440 V up to	Instantaneous auxiliary contacts 	Basic reference, to be completed by adding the voltage code ^{(1) (2)}
220 V 230 V	380 V 415 V	440/500 V 660/690 V			
kW	kW	kW	A		
Screw clamp connections					
1.5	2.2	3	6	1 -	LC1K0610●●
				- 1	LC1K0601●●
2.2	4	4	9	1 -	LC1K0910●●
				- 1	LC1K0901●●
3	5.5	4 (> 440) 5.5 (440)	12	1 -	LC1K1210●●
				- 1	LC1K1201●●
4	7.5	4 (> 440) 5.5 (440)	16	1 -	LC1K1610●●
				- 1	LC1K1601●●

Spring terminal connections

For 6 to 12 A ratings only, in the references selected above, insert a figure 3 before the voltage code.
Example: LC1 K0610●● becomes LC1 K06103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

For 6 to 16 A ratings, in the references selected above, insert a figure 7 before the voltage code.
Example: LC1 K0610●● becomes LC1 K06107●●.

Solder pins for printed circuit boards

For 6 to 16 A ratings, in the references selected above, insert a figure 5 before the voltage code.
Example: LC1 K0610●● becomes LC1 K06105●●.

3-pole silent contactors

Recommended for use in areas sensitive to noise, high interference mains supplies, etc.
Coil with rectifier incorporated, suppressor fitted as standard.

Screw clamp connections

1.5	2.2	3	6	1 -	LC7K0610●●
				- 1	LC7K0601●●
2.2	4	4	9	1 -	LC7K0910●●
				- 1	LC7K0901●●
3	5.5	4 (> 440) 5.5 (440)	12	1 -	LC7K1210●●
				- 1	LC7K1201●●

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LC7 K0610●● becomes LC7 K06107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LC7 K0610●● becomes LC7 K06105●●.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Contactors LC1 K (0.8...1.15 Uc) (0.85...1.1 Uc)

Volts	12	20	24 ⁽²⁾	36	42	48	110	115	120	127	200/208	220/230	230	230/240
50/60 Hz	J7	Z7	B7	C7	D7	E7	F7	FE7	G7	FC7	L7	M7	P7	U7
Volts	256	277	380/400	400	400/415	440	480	500	575	600	660/690			
50/60 Hz	W7	UE7	Q7	-	V7	N7	R7	T7	S7	SC7	X7	Y7	-	-

Up to and including 240 V, coil with integral suppression device available: add 2 to the code required. Example: J72.

Contactors LC7 K (0.85...1.1 Uc)

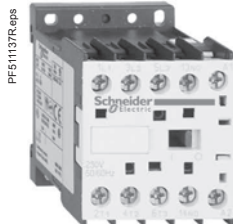
Volts	24	42	48	110	115	220	230/240
50/60 Hz	B7	D7	E7	F7	FE7	M7	U7

(2) For mains supplies with a high level of interference (voltage surge > 800 V), use a suppressor module LA4 KE1FC (50...129 V) or LA4 KE1UG (130...250 V), see page B8/42

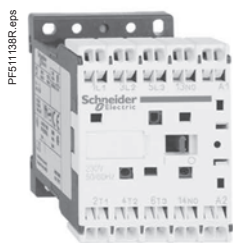
TeSys contactors

Contactors for motor control,
6 to 12 A in categories AC-3 and AC-4
Control circuit: d.c. or low consumption

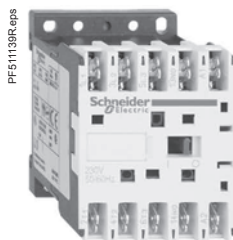
TeSys K



LP1 K0910●●



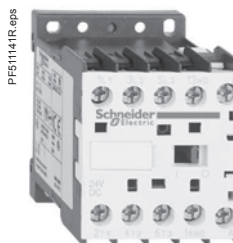
LP1 K09103●●



LP1 K09107●●



LP1 K09105●●



LP4 K0910●●

Contactors selection according to utilisation category, see pages A5/23 to A5/27 and A5/30 to A5/33.
Mounting on 35 mm rail or Ø4 screw fixing.

Screws in the open "ready-to-tighten" position.

Add-on auxiliary contact blocks and accessories, see pages B8/40 to B8/43.

3-pole contactors, d.c. supply

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3			Rated operational current in category AC-3 440 V up to	Instantaneous auxiliary contacts ↓ ↓	Basic reference, to be completed by adding the voltage code (1) (2)
220 V	380 V	440/500 V			
230 V	415 V	660/690 V			
kW	kW	kW	A		

Screw clamp connections

1.5	2.2	3	6	1	–	LP1K0610●●
				–	1	LP1K0601●●
2.2	4	4	9	1	–	LP1K0910●●
				–	1	LP1K0901●●
3	5.5	4 (> 440)	12	1	–	LP1K1210●●
		5.5 (440)		–	1	LP1K1201●●

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.

Example: LP1 K0610●● becomes LP1 K06103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.

Example: LP1 K0610●● becomes LP1 K06107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.

Example: LP1 K0610●● becomes LP1 K06105●●.

3-pole low consumption contactors

Compatible with programmable controller outputs.

Wide range coil (0.7...1.30 Uc), suppressor fitted as standard, consumption 1.8 W.

Screw clamp connections

1.5	2.2	3	6	1	–	LP4K0610●●
				–	1	LP4K0601●●
2.2	4	4	9	1	–	LP4K0910●●
				–	1	LP4K0901●●
3	5.5	4 (> 440)	12	1	–	LP4K1210●●
		5.5 (440)		–	1	LP4K1201●●

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.

Example: LP4 K0610●● becomes LP4 K06103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.

Example: LP4 K0610●● becomes LP4 K06107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.

Example: LP4 K0610●● becomes LP4 K06105●●.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

d.c. supply (contactors LP1 K: 0.8...1.15 Uc)

Volts	12	20	24 (2)	36	48	60	72	100	110	125	155	174	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	PD	QD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add 3 to the code required. Example: JD3

Low consumption (contactors LP4 K: 0.7...1.130 Uc)

Volts	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

(2) For LP1 K only, when connecting an electronic sensor or timer in series with the contactor coil, select a 20 V coil (~ control circuit voltage code Z7, --- control circuit voltage code ZD) so as to compensate for the incurred voltage drop.

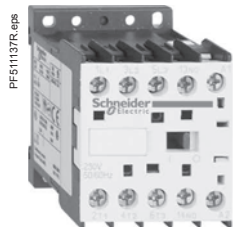
TeSys contactors

Contactors for control in category AC-1, 20 A

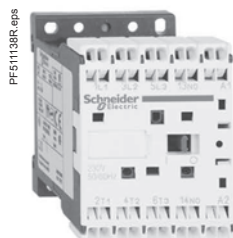
Control circuit: a.c.

TeSys K

Contactor selection according to utilisation category, see pages A5/28 and A5/29.
 Mounting on 35 mm rail or Ø4 screw fixing.
 Screws in the open "ready-to-tighten" position.
 Add-on auxiliary contact blocks and accessories, see pages B8/40 to B8/43.



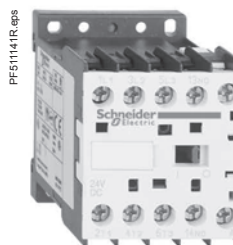
LC1 K09004●●



LC1 K09103●●



LC1 K09107●●



LC1 K09004●●

3 or 4-pole contactors for standard applications ⁽¹⁾

Non-inductive loads Category AC-1 Maximum current at 0 ≤ 50 °C	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the voltage code ⁽²⁾⁽³⁾

A

Screw clamp connections

20	3	-	1	-	LC1K0910●● or LC1K1210●●
	3	-	-	1	LC1K0901●● or LC1K1201●●
	4	-	-	-	LC1K09004●● or LC1K12004●●
	2	2	-	-	LC1K09008●●

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
 Example: LC1 K0910●● becomes LC1 K09103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
 Example: LC1 K0910●● becomes LC1 K09107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
 Example: LC1 K0910●● becomes LC1 K09105●●.

3 or 4-pole silent contactors ⁽¹⁾

Recommended for use in areas sensitive to noise, high interference mains supplies, etc.
 Coil with rectifier incorporated, suppressor fitted as standard.

Screw clamp connections

20	3	-	1	-	LC7K0910●● or LC7K1210●●
	3	-	-	1	LC7K0901●● or LC7K1201●●
	4	-	-	-	LC7K09004●● or LC7K12004●●
	2	2	-	-	LC7K09008●●

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
 Example: LC7 K0910●● becomes LC7 K09107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
 Example: LC7 K0910●● becomes LC7 K09105●●.

⁽¹⁾ Selection between 9 and 12 A ratings according to number of operating cycles, see AC-1 curve on page A5/28.
⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Contactors LC1 K (0.8...1.15 Uc) (0.85...1.1 Uc)

Volts	12	20	24 ⁽³⁾	36	42	48	110	115	120	127	200/208	220/230	230	230/240
50/60 Hz	J7	Z7	B7	C7	D7	E7	F7	FE7	G7	FC7	L7	M7	P7	U7
Volts	256	277	380/400	400	400/415	440	480	500	575	600	660/690			
50/60 Hz	W7	UE7	Q7	V7	N7	R7	T7	S7	SC7	X7	Y7			

Up to and including 240 V, coil with integral suppression device available: add 2 to the code required. Example: J72.

Contactors LC7 K (0.8...1.1 Uc)

Volts	24	42	48	110	115	220	230/240
50/60 Hz	B7	D7	E7	F7	FE7	M7	U7

⁽³⁾ For mains supplies with a high level of interference (voltage surge > 800 V), use a suppressor module LA4 KE1FC (50...129 V) or LA4 KE1UG (130...250 V), see page B8/42.

TeSys contactors

Contactors for control in category AC-1, 20 A

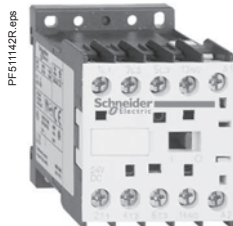
Control circuit: d.c. or low consumption

Contactor selection according to utilisation category, see pages A5/28 and A5/29.

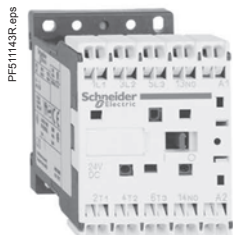
Mounting on 35 mm rail or Ø4 screw fixing.

Screws in the open "ready-to-tighten" position.

Add-on auxiliary contact blocks and accessories, see pages B8/40 to B8/43.



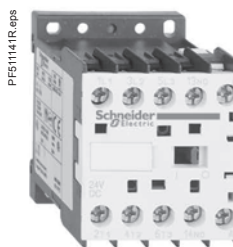
LC1 K09004●●



LC1 K09103●●



LC1 K09105●●



LC1 K09004●●

3 and 4-pole contactors, d.c. supply ⁽¹⁾

Non-inductive loads
Category AC-1
Maximum current at
 $\theta \leq 50^\circ\text{C}$



Instantaneous
auxiliary contacts

Basic reference,
to be completed by adding
the voltage code ⁽²⁾⁽³⁾

A

Screw clamp connections

20	3	–	1	–	LP1K0910●● or LP1K1210●●
	3	–	–	1	LP1K0901●● or LP1K1201●●
	4	–	–	–	LP1K09004●● or LP1K12004●●
	2	2	–	–	LP1K09008●●

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.

Example: LP1 K0910●● becomes LP1 K09103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.

Example: LP1 K0910●● becomes LP1 K09107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.

Example: LP1 K0910●● becomes LP1 K09105●●.

3 or 4-pole low consumption contactors ⁽¹⁾

Compatible with programmable controller outputs.

Wide range coil (0.7...1.30 Uc), suppressor fitted as standard, consumption 1.8 W.

Screw clamp connections

20	3	–	1	–	LP4K0910●●●● or LP4K1210●●●●
	3	–	–	1	LP4K0901●●●● or LP4K1201●●●●
	4	–	–	–	LP4K09004●●●● or LP4K12004●●●●
	2	2	–	–	LP4K09008●●●●

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.

Example: LP4 K0910●● becomes LP4 K09103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.

Example: LP4 K0910●● becomes LP4 K09107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.

Example: LP4 K0910●● becomes LP4 K09105●●.

⁽¹⁾ Selection between 9 and 12 A ratings according to number of operating cycles, see AC-1 curve on page A5/28.

⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

d.c. supply (contactors LP1 K: 0.8...1.15 Uc)

Volts ---	12	20	24 ⁽³⁾	36	48	60	72	100	110	125	155	174	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	PD	QD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add 3 to the code required. Example: JD3.

Low consumption (contactors LP4 K: 0.7...130 Uc)

Volts ---	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

⁽³⁾ For LP1 K only, when connecting an electronic sensor or timer in series with the contactor coil, select a 20 V coil (~ control circuit voltage code Z7, --- control circuit voltage code ZD) so as to compensate for the incurred voltage drop.

TeSys contactors

Reversing contactors for motor control,
6 to 16 A in category AC-3 and
6 to 12 A in category AC-4
Control circuit: a.c.

TeSys K

Reversing contactor selection according to utilisation category, see pages A5/23 to A5/27 and A5/30 to A5/33. Integral mechanical interlock.

It is essential to link the contacts of the electrical interlock.

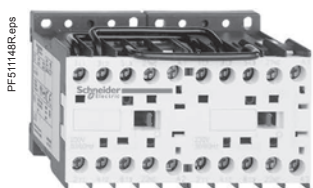
Pre-wired power circuit connections as standard on screw clamp versions.

Mounting on 35 mm rail or Ø4 screw fixing. Screws in the open "ready-to-tighten" position.

Add-on auxiliary contact blocks and accessories, see pages B8/40 to B8/43.



LC2 K0910●●



LC2 K09105●●

3-pole reversing contactors for standard applications

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3			Rated operational current in category AC-3 440 V up to	Instantaneous auxiliary contacts per contactor	Basic reference, to be completed by adding the voltage code ⁽¹⁾⁽²⁾
220 V 230 V	380 V 415 V	440/500 V 660/690 V			
kW	kW	kW	A		
Screw clamp connections					
1.5	2.2	3	6	1 –	LC2K0610●●
				– 1	LC2K0601●●
2.2	4	4	9	1 –	LC2K0910●●
				– 1	LC2K0901●●
3	5.5	4 (> 440) 5.5 (440)	12	1 –	LC2K1210●●
				– 1	LC2K1201●●
4	7.5	4 (> 440) 5.5 (440)	16	1 –	LC2K1610●●
				– 1	LC2K1601●●

Spring terminal connections

For 6 to 12 A ratings only, in the references selected above, insert a figure 3 before the voltage code.

Example: LC2 K0610●● becomes LC2 K06103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

For 6 to 16 A ratings, in the references selected above, insert a figure 7 before the voltage code.

Example: LC2 K0610●● becomes LC2 K06107●●.

Solder pins for printed circuit boards

For 6 to 16 A ratings, in the references selected above, insert a figure 5 before the voltage code.

Example: LC2 K0610●● becomes LC2 K06105●●.

3-pole silent reversing contactors

Recommended for use in areas sensitive to noise, high interference mains supplies, etc.

Coil with rectifier incorporated, suppressor fitted as standard.

Screw clamp connections

1.5	2.2	3	6	1 –	LC8K0610●●
				– 1	LC8K0601●●
2.2	4	4	9	1 –	LC8K0910●●
				– 1	LC8K0901●●
3	5.5	4 (> 440) 5.5 (440)	12	1 –	LC8K1210●●
				– 1	LC8K1201●●

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.

Example: LC8 K0610●● becomes LC8 K06107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.

Example: LC8 K0610●● becomes LC8 K06105●●.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Reversing contactors LC2 K (0.8...1.15 Uc) (0.85...1.1 Uc)

Volts	12	20	24 ⁽²⁾	36	42	48	110	115	120	127	200/208	220/230	230	230/240
50/60 Hz	J7	Z7	B7	C7	D7	E7	F7	FE7	G7	FC7	L7	M7	P7	U7
Volts	256	277	380/400	400	400/415	440	480	500	575	600	660/690			
50/60 Hz	W7	UE7	Q7	V7	N7	R7	T7	S7	SC7	X7	Y7			

Up to and including 240 V, coil with integral suppression device available: add 2 to the code required. Example: J72.

Reversing contactors LC8 K (0.8...1.1 Uc)

Volts	24	42	48	110	115	220	230/240
50/60 Hz	B7	D7	E7	F7	FE7	M7	U7

(2) For mains supplies with a high level of interference (voltage surge > 800 V), use a suppressor module LA4 KE1FC (50...129 V) or LA4 KE1UG (130...250 V), see page B8/42.

TeSys contactors

Reversing contactors for motor control, 6 to 12 A in categories AC-3 and AC-4 Control circuit: d.c. or low consumption

TeSys K

Reversing contactor selection according to utilisation category, see pages A5/23 to A5/27 and A5/30 to A5/33. Integral mechanical interlock.

It is essential to link the contacts of the electrical interlock.

Pre-wired power circuit connections as standard on screw clamp versions.

Mounting on 35 mm rail or Ø4 screw fixing.

Screws in the open "ready-to-tighten" position.

Add-on auxiliary contact blocks and accessories, see pages B8/40 to B8/43.

3-pole reversing contactors, d.c. supply						
Standard power ratings of 3-phase motors 50-60 Hz in category AC-3			Rated operational current in category AC-3 440 V up to	Instantaneous auxiliary contacts per contactor	Basic reference, to be completed by adding the voltage code ⁽¹⁾⁽²⁾	
220 V	380 V	440/500 V				
230 V	415 V	660/690 V				
kW	kW	kW	A			
Screw clamp connections						
1.5	2.2	3	6	1	–	LP2K0610●●
				–	1	LP2K0601●●
2.2	4	4	9	1	–	LP2K0910●●
				–	1	LP2K0901●●
3	5.5	4 (> 440)	12	1	–	LP2K1210●●
		5.5 (440)		–	1	LP2K1201●●

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.

Example: LP2 K0610●● becomes LP2 K06103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.

Example: LC2 K0610●● becomes LC2 K06107●●.

Solder pins for printed circuit boards

For 6 to 16 A ratings, in the references selected above, insert a figure 5 before the voltage code.

Example: LC2 K0610●● becomes LC2 K06105●●.

3-pole low consumption reversing contactors

Compatible with programmable controller outputs.

Wide range coil (0.7...1.30 U_c), suppressor fitted as standard, consumption 1.8 W.

Screw clamp connections

1.5	2.2	3	6	1	–	LP5K0610●●
				–	1	LP5K0601●●
2.2	4	4	9	1	–	LP5K0910●●
				–	1	LP5K0901●●
3	5.5	4 (> 440)	12	1	–	LP5K1210●●
		5.5 (440)		–	1	LP5K1201●●

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.

Example: LP5 K0610●● becomes LP5 K06103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.

Example: LP5 K0610●● becomes LP5 K06107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.

Example: LP5 K0610●● becomes LP5 K06105●●.

⁽¹⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

d.c. supply

Reversing contactors LP2 K (0.8...1.15 U_c)

Volts	12	20	24 ⁽²⁾	36	48	60	72	100	110	125	155	174	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	PD	QD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add 3 to the code required. Example: JD3.

Low consumption

Reversing contactors LP5 K (0.7...1.30 U_c)

Volts	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

⁽²⁾ For LP2 K only, when connecting an electronic sensor or timer in series with the contactor coil, select a 20 V coil (~ control circuit voltage code Z7, --- control circuit voltage code ZD) so as to compensate for the incurred voltage drop.

TeSys contactors

Reversing contactors for control in category AC-1, 20 A Control circuit: a.c.

TeSys K

Warning: reversing contactors LC2 K0910●● and LC2 K0901●● are pre-wired for reverse motor operation as standard.

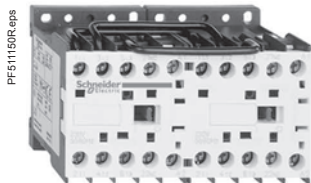
Reversing contactor selection according to utilisation category, see pages A5/28 and A5/29. Integral mechanical interlock.

It is essential to link the contacts of the electrical interlock.

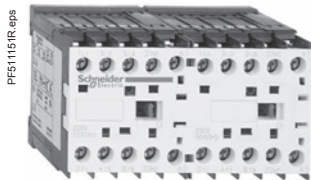
Mounting on 35 mm rail or Ø4 screw fixing.

Screws in the open "ready-to-tighten" position.

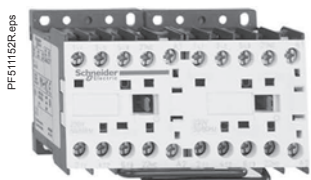
Add-on auxiliary contact blocks and accessories, see pages B8/40 to B8/43.



LC2 K0910●●



LC2 K09105●●



LC2 K09004●●

3 or 4-pole reversing contactors for standard applications ⁽¹⁾

Non-inductive loads Category AC-1 Maximum current at $\theta \leq 50^\circ\text{C}$	Number of poles	Instantaneous auxiliary contacts per contactor	Basic reference, to be completed by adding the voltage code ⁽²⁾⁽³⁾

Screw clamp connections

In the references selected above, insert a figure 3 before the voltage code.
Example: **LC2 K0910●●** becomes **LC2 K09103●●**.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: **LC2 K0910●●** becomes **LC2 K09107●●**.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: **LC2 K0910●●** becomes **LC2 K09105●●**.

3 or 4-pole silent reversing contactors ⁽¹⁾

Recommended for use in areas sensitive to noise, high interference mains supplies, etc.
Coil with rectifier incorporated, suppressor fitted as standard.

Screw clamp connections

20	3	-	1	-	LC8K0910●●
					or LC8K1210●●
	3	-	-	1	LC8K0901●●
					or LC8K1201●●
	4	-	-	-	LC8K09004●●
					or LC8K12004●●

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: **LC8 K0910●●** becomes **LC8 K09107●●**.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: **LC8 K0910●●** becomes **LC8 K09105●●**.

⁽¹⁾ Selection between 9 and 12 A ratings according to number of operating cycles, see AC-1 curve on page A5/28.

⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Reversing contactors LC2 K (0.8...1.15 Uc) (0.85...1.1 Uc)	12	20	24 ⁽³⁾	36	42	48	110	115	120	127	200/208	220/230	230	230/240
50/60 Hz	J7	Z7	B7	C7	D7	E7	F7	FE7	G7	FC7	L7	M7	P7	U7
Volts	256	277	380/400	400	400/415	440	480	500	575	600	660/690			
50/60 Hz	W7	UE7	Q7	V7	N7	R7	T7	S7	SC7	X7	Y7			

Up to and including 240 V, coil with integral suppression device available: add 2 to the code required. Example: **J72**.

Reversing contactors LC8 K (0.8...1.1 Uc)

Volts	24	42	48	110	115	220	230/240
50/60 Hz	B7	D7	E7	F7	FE7	M7	U7

⁽³⁾ For mains supplies with a high level of interference (voltage surge > 800 V), use a suppressor module LA4 KE1FC (50...129 V) or LA4 KE1UG (130...250 V), see page B8/42.

TeSys contactors

Reversing contactors for control

in category AC-1, 20 A

Control circuit: d.c. or low consumption

Warning: reversing contactors LP2 K0910●● and LP2 K0901●● are pre-wired for reverse motor operation as standard.

Reversing contactor selection according to utilisation category, see pages A5/28 and A5/29.

Integral mechanical interlock.





It is essential to link the contacts of the electrical interlock.

Mounting on 35 mm rail or Ø4 screw fixing.

Screws in the open "ready-to-tighten" position.

Add-on auxiliary contact blocks and accessories, see pages B8/40 to B8/43.

3 or 4-pole reversing contactors, d.c. supply ⁽¹⁾

Non-inductive loads Category AC-1 Maximum current at $\theta \leq 50^\circ\text{C}$	Number of poles		Instantaneous auxiliary contacts per contactor		Basic reference, to be completed by adding the voltage code ^{(2) (3)}
					
A					
Screw clamp connections					
20	3	–	1	–	LP2K0910●● or LP2K1210●●
	3	–	–	1	LP2K0901●● or LP2K1201●●
	4	–	–	–	LP2K09004●● or LP2K12004●●

Spring terminal connections

In the references selected above, insert a figure **3** before the voltage code.

Example: LP2 K0910●● becomes LP2 K09103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure **7** before the voltage code.

Example: LP2 K0910●● becomes LP2 K09107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure **5** before the voltage code.

Example: LP2 K0910●● becomes LP2 K09105●●.

3 or 4-pole low consumption reversing contactors ⁽¹⁾

Compatible with programmable controller outputs.

Wide range coil (0.7...1.30 Uc), suppressor fitted as standard, consumption 1.8 W.

Screw clamp connections

20	3	–	1	–	LP5K0910●●● or LP5K1210●●●
	3	–	–	1	LP5K0901●●● or LP5K1201●●●
	4	–	–	–	LP5K09004●●● or LP5K12004●●●

Spring terminal connections

In the references selected above, insert a figure **3** before the voltage code.

Example: LP5 K0910●● becomes LP5 K09103●●.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure **7** before the voltage code.

Example: LP5 K0910●● becomes LP5 K09107●●.

Solder pins for printed circuit boards

In the references selected above, insert a figure **5** before the voltage code.

Example: LP5 K0910●● becomes LP5 K09105●●.

⁽¹⁾ Selection between 9 and 12 A ratings according to number of operating cycles, see AC-1 curve on page A5/28.

⁽²⁾ Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

d.c. supply (reversing contactors LP2 K: 0.8...1.15 Uc)

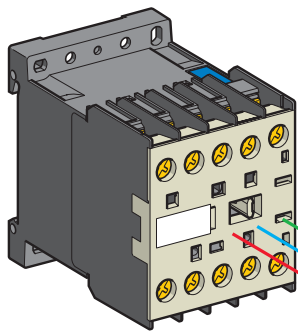
Volts $\overline{\text{---}}$	12	20	24 ⁽³⁾	36	48	60	72	100	110	125	155	174	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	PD	QD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add **3** to the code required. Example: **JD3**.

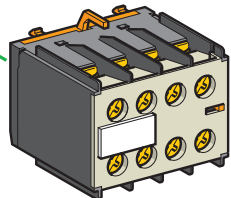
Low consumption (reversing contactors LP5 K: 0.7...130 Uc)

Volts $\overline{\text{---}}$	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

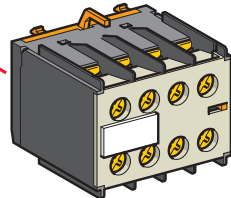
⁽³⁾ For LP2 K only, when connecting an electronic sensor or timer in series with the contactor coil, select a 20 V coil (\sim control circuit voltage code Z7, $\overline{\text{---}}$ control circuit voltage code ZD) so as to compensate for the incurred voltage drop.



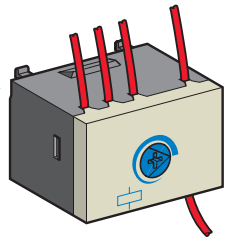
LC1, LC7, LP1 K



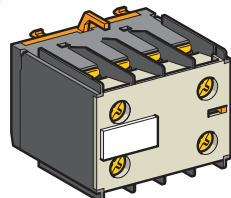
LA1 KN...M



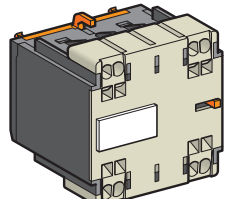
LA1 KN...



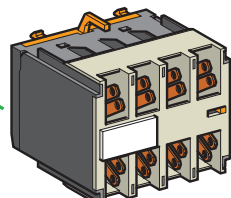
LA2 KT2...



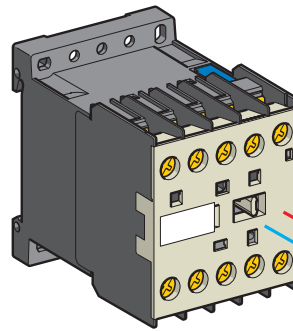
LA1 KN...P



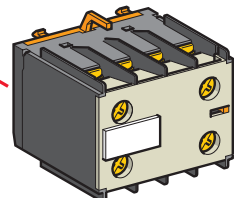
LA1 KN...3



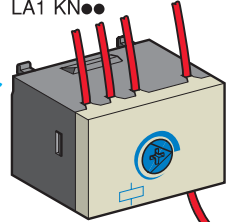
LA1 KN...7



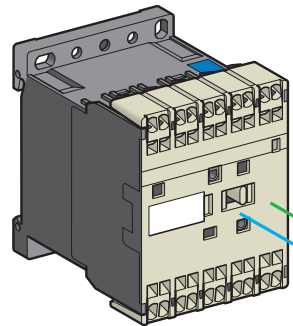
LP4



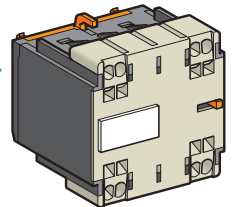
LA1 KN...



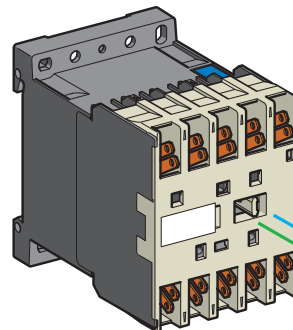
LA2 KT2...



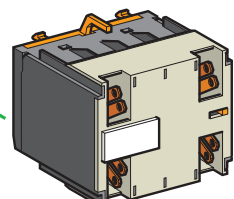
LP4



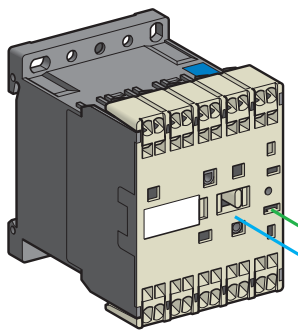
LA1 KN...3



LP4



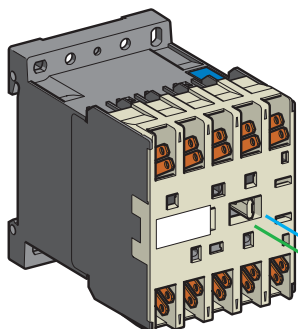
LA1 KN...7



LC1, LC7, LP1 K



LC1, LP1 K



LC1, LC7, LP1 K



TeSys contactors

TeSys K contactors and reversing contactors

Auxiliary contact blocks

TeSys K

Instantaneous auxiliary contact blocks

Recommended for standard applications. Clip-on front mounting, 1 block per contactor

Connection	For use on contactors	Composition		Reference	
Screw clamp terminals	All products with screw clamp terminals	2	–	LA1KN20	
		–	2	LA1KN02	
		1	1	LA1KN11	
	All products with screw clamp terminals except low consumption	4	–	LA1KN40	
		3	1	LA1KN31	
		2	2	LA1KN22	
		1	3	LA1KN13	
		–	4	LA1KN04	
	Spring terminals	All products with spring terminals	2	–	LA1KN203
			–	2	LA1KN023
1			1	LA1KN113	
All products with spring terminals except low consumption		4	–	LA1KN403	
		3	1	LA1KN313	
		2	2	LA1KN223	
		1	3	LA1KN133	
		–	4	LA1KN043	
Faston connectors, 1 x 6.35 or 2 x 2.8		All products with Faston connectors	2	–	LA1KN207
			–	2	LA1KN027
	1		1	LA1KN117	
	All products with Faston connectors except low consumption	4	–	LA1KN407	
		3	1	LA1KN317	
		2	2	LA1KN227	
		1	3	LA1KN137	
		–	4	LA1KN047	

With terminal referencing to standard EN 50012. Clip-on front mounting, 1 block per contactor

Screw clamp terminals with referencing conforming to standard EN 50012	All 3-pole + N/O products with screw clamp terminals except LP4 and LP5 K12	–	2	LA1KN02M
		1	1	LA1KN11M
	All 3-pole + N/O products with screw clamp terminals except LP4 or LP5 K06, K09 and K12	3	1	LA1KN31M
		2	2	LA1KN22M
		1	3	LA1KN13M
All 4-pole products with screw clamp terminals except LP4 or LP5 K12	1	1	LA1KN11P	
	All 4-pole products with screw clamp terminals except LP4 or LP5 K09 and K12	2	2	LA1KN22P

Electronic time delay auxiliary contact blocks

Relay output with common point changeover contact, \sim or $\overline{\sim}$ 240 V, 2 A maximum.


Control voltage 0.85...1.1 Uc.

Maximum switching capacity 250 VA or 150 W.

Operating temperature -10...+60 °C.

Reset time: 1.5 s during the time delay period, 0.5 s after the time delay period.

Clip-on front mounting, 1 block per contactor

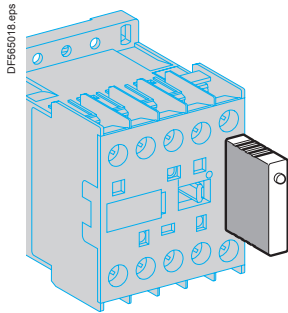
Voltage	Type	Timing range	Composition	Reference
\sim or $\overline{\sim}$ 24...48	On-delay	1...30		LA2KT2E
\sim 110...240	On-delay	1...30		LA2KT2U

TeSys contactors

TeSys K contactors and reversing contactors

Suppressor modules incorporating LED indicator

TeSys K



LA4 K●●●

References

Mounting and connection	Type	For voltages	Sold in lots of	Unit reference
Clip-on fixing on the front of contactors LC1 and LP1, with locating device. No tools required.	Varistor ⁽¹⁾	~ and ≡ 12...24 V	5	LA4KE1B
		~ and ≡ 32...48 V	5	LA4KE1E
		~ and ≡ 50...129 V	5	LA4KE1FC
		~ and ≡ 130...250 V	5	LA4KE1UG
Diode + Zener diode ⁽²⁾		≡ 12...24 V	5	LA4KC1B
		≡ 32...48 V	5	LA4KC1E
RC ⁽³⁾		~ 110...250 V	5	LA4KA1U

(1) Protection provided by limiting the transient voltage to 2 Uc max.

Maximum reduction of transient voltage peaks.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

(2) No overvoltage or oscillating frequency.

Polarised component.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

(3) Protection by limiting the transient voltage to 3 Uc max. and limitation of the oscillating frequency.

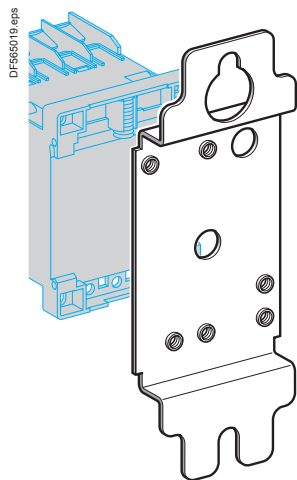
Slight increase in drop-out time (1.2 to 2 times the normal time).

TeSys contactors

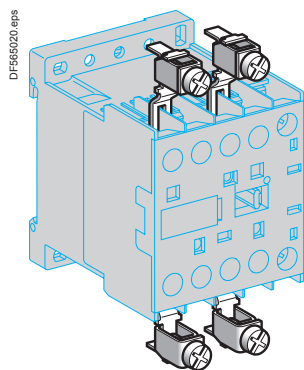
TeSys K contactors and reversing contactors

Accessories

TeSys K



DX1 AP25



LA9 E01

Mounting and marking accessories

Description	Application		Sold in lots of	Unit reference
Mounting plates ⁽¹⁾	For fixing on 1 \perp rail	Clip-on	1	LA9D973
	For fixing on 2 \perp rails	110/120 mm fixing centres	10	DX1AP25
Marker holder	Clip-on	Onto front of contactor	100	LA9D90
Clip-in markers	4 maximum per contactor	Strips of 10 identical numbers 0...9	25	AB1R● ⁽²⁾
		Strips of 10 identical letters A...Z	25	AB1G● ⁽²⁾

Connection accessories

Description	Application		Sold in lots of	Unit preference
Paralleling links	For 2 poles	With screw clamps	4	LA9E01
	For 4 poles	With screw clamps	2	LA9E02
Set of 6 power connections	For 3-pole reversing contactors for motor control	For contactors with screw clamp terminals	100	LA9K0969
Set of 4 power connections	For 4-pole changeover contactor pairs	For contactors with screw clamp terminals	100	LA9K0970

⁽¹⁾ Order 1 mounting plate for fixing a contactor and 2 mounting plates for fixing a reversing contactor.

⁽²⁾ Complete the reference by replacing the dot with the required character.

TeSys contactors

Mini-contactors TeSys LC1 SKGC, for use in modular panels

TeSys SKGC

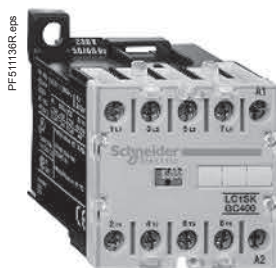
- Mounting on 35 mm rail or fixing by four Ø4 screws, except for LC1 SKGC200.
- Connection by connectors.
- Mini-contactor fitted with transparent, sealable protective cover to prevent front face access.



LC1 SKGC200

Mini-contactors, width 27 mm

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3			Rated operational current in AC-3 up to 400 V	Non inductive loads category AC-1 maximum current $\theta \leq 50^\circ\text{C}$	No. of poles			Basic reference, to be completed by adding the voltage code ⁽¹⁾
220 V	380 V	660 V			2	3	4	
230 V	415 V	690 V						
kW	kW	kW	A	A				
-	-	-	5	20	2	-	-	LC1SKGC200●●



LC1 SKGC400

Mini-contactors, width 45 mm

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3			Rated operational current in AC-3 up to 400 V	Non inductive loads category AC-1 maximum current $\theta \leq 50^\circ\text{C}$	No. of poles			Basic reference, to be completed by adding the voltage code ⁽¹⁾
220 V	380 V	660 V			3	4	5	
230 V	415 V	690 V						
kW	kW	kW	A	A				
1.1	4	4	9	20	3	1	-	LC1SKGC310●●
					3	-	1	LC1SKGC301●●
					4	-	-	LC1SKGC400●●

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts ~ 50/60 Hz	24	48	110	120	220	230	240	380	400
Code	B7	E7	F7	G7	M7	P7	U7	Q7	V7

TeSys contactors

Mini-contactors TeSys LC1 SKGC,
for use in modular panels
Suppressor modules

TeSys SKGC



Suppressor modules

Connection without need for tools by clipping onto right-hand side of contactor

For use on contactors	Type	For voltages	Sold in lots of	Unit reference
LC1SKGC	Varistor ⁽¹⁾	~ and ∩ 24...48 V	10	LA4SKE1E
		~ and ∩ 110...250 V	10	LA4SKE1U
	Diode ⁽²⁾	∩ 24...250 V	10	LA4SKC1U

⁽¹⁾ Protection provided by limiting the transient voltage to 2 U_c max.
Maximum reduction of transient voltage peaks.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

⁽²⁾ No overvoltage or oscillating frequency.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

Modular equipment

Standard contactors TeSys GC

TeSys GC

PB113075_12.eps



GC 2520

PB113073_18.eps



GC 4040

PB113079_24.eps



GC 10020

Standard contactors, TeSys GC

No. of poles	Number of 17.5 mm modules	Commercial reference 50 Hz coil - different voltages					Sold in lots of		
		12 V	24 V	48 V	110 V	220/240 V			
Maximum current rating category AC-7a - 16 A									
1	1	GC1610J5	GC1610B5	GC1610E5	GC1610F5	GC1610M5	★ 12		
1	1	GC1611J5	GC1611B5	–	GC1611F5	GC1611M5	★ 12		
2	1	GC1620J5	GC1620B5	GC1620E5	GC1620F5	GC1620M5	★ 12		
2	2	–	GC1622B5	GC1622E5	GC1622F5	GC1622M5	6		
3	2	–	–	–	–	GC1630B5 GC1630M5	6		
4	2	–	GC1640B5	–	GC1640F5	GC1640M5	★ 6		
Maximum current rating category AC-7a - 25 A									
–	2	1	–	GC2502B5	GC2502E5	★	GC2502M5	★ 12	
–	4	2	–	GC2504B5	GC2504E5	★	GC2504M5	★ 6	
1	1	1	–	GC2510B5	–	–	GC2510M5	★ 12	
1	1	1	–	GC2511B5	–	GC2511F5	GC2511M5	★ 12	
2	1	1	GC2520J5	GC2520B5	GC2520E5	GC2520F5	★	GC2520M5	★ 12
2	2	2	–	GC2522B5	GC2522E5	GC2522F5	GC2522M5	★ 6	
3	2	2	–	GC2530B5	–	GC2530F5	GC2530M5	★ 6	
3	2	1	–	–	–	–	GC2531M5	6	
4	2	2	GC2540J5	GC2540B5	GC2540E5	GC2540F5	★	GC2540M5	★ 6
Maximum current rating category AC-7a - 40 A									
–	2	2	–	GC4002B5	–	–	GC4002M5	★ 6	
–	4	3	–	GC4004B5	–	GC4004F5	★	GC4004M5	4
1	1	2	–	GC4011B5	–	–	GC4011M5	★ 6	
2	2	2	–	GC4020B5	–	GC4020F5	★	GC4020M5	★ 6
2	2	3	–	–	–	–	GC4022M5	4	
3	3	3	–	GC4030B5	–	GC4030F5	GC4030M5	★ 4	
4	3	3	–	GC4040B5	GC4040E5	GC4040F5	★	GC4040M5	★ 4
Maximum current rating category AC-7a - 63 A									
–	2	2	–	–	–	–	GC6302M5	6	
–	4	3	–	GC6304B5	–	–	GC6304M5	4	
1	1	2	–	–	–	–	GC6311M5	6	
2	2	2	–	–	–	–	GC6320M5	6	
2	2	3	–	–	–	GC6322F5	GC6322M5	4	
3	3	3	–	GC6330B5	–	GC6330F5	GC6330M5	★ 4	
4	3	3	–	GC6340B5	GC6340E5	GC6340F5	★	GC6340M5	★ 4
Maximum current rating category AC-7a - 100 A									
2	3	3	–	–	–	–	GC10020M5	4	
4	6	6	–	GC10040B5	–	–	GC10040M5	★ 2	

★ for 60 Hz coil replace last figure 5 by 6.

Modular equipment

TeSys GY "dual tariff" contactors

TeSys GY



GY 2520M5



GY 6340M5

TeSys GY "dual tariff" contactors

No. of poles	Number of 17.5 mm modules	Commercial reference 50 Hz coil - different voltages					Sold in lots of
		12 V	24 V	48 V	110 V	220/240 V	
Maximum current rating category AC-7a - 16 A							
2	–	1	–	GY1620B5	–	–	GY1620M5 12
4	–	2	–	–	–	–	GY1640M5 6
Maximum current rating category AC-7a - 25 A							
2	–	1	–	GY2520B5	–	–	GY2520M5 ★ 12
3	–	2	–	–	–	–	GY2530M5 6
4	–	2	–	GY2540B5	–	–	GY2540M5 6
Maximum current rating category AC-7a - 40 A							
2	–	2	–	–	–	–	GY4020M5 6
3	–	3	–	–	–	–	GY4030M5 4
4	–	3	–	GY4040B5	–	–	GY4040M5 4
Maximum current rating category AC-7a - 63 A							
2	–	2	–	–	–	–	GY6320M5 6
4	–	3	–	GY6340B5	–	–	GY6340M5 4

★ for 60 Hz coil replace last figure 5 by 6.

Modular equipment

TeSys GF impulse relays

TeSys GF



GF 1611M7

TeSys GF impulse relays

Maximum current rating category AC-1	Composition		Coil voltages		Sold in lots of	Unit reference
			~ 50/60 Hz	—		
16	1	—	12	6	12	GF1610J7
			24	12	12	GF1610B7
			48	24	12	GF1610E7
			110	48	12	GF1610F7
			220	—	12	GF1610M7
			230/240	110	12	GF1610U7
			2	—	12	6
	24	12	12		GF1620B7	
	48	24	12		GF1620E7	
	110	48	12		GF1620F7	
	220	—	12		GF1620M7	
	230/240	110	12		GF1620U7	
	1	1	12	6	12	GF1611J7
			24	12	12	GF1611B7
			48	24	12	GF1611E7
			110	48	12	GF1611F7
			220	—	12	GF1611M7
			230/240	110	12	GF1611U7

TeSys GC, GY



GAP 23

Instantaneous auxiliary contact blocks				Reference
Number of contacts	Number of poles			
2				GAC0521
	-	2	-	GAC0531
	-	-	1	GAC0511



GAC 5

Accessories					
Description	For use on contactor	Number of modules	Operational voltage in V	Sold in lots of	Unit reference
Coil suppression blocks comprising 2 RC circuits	-	1	12...48	1	GAP21
			110...240	1	GAP23
Ventilation 1/2 module clips onto rail	-	1/2	-	10	GAC5
Set of screw shields (10 top parts + 10 bottom parts)	40 or 63 A 2 contacts	2	-	1	A9A15922
	40 or 63 A 3 or 4 contacts	3	-	1	A9A15923



A9A15922



A9A15923

Technical Data for Designers

Contents

TeSys D:

- > characteristics B8/53 to B8/64
- > dimensions B8/65 to B8/75

TeSys SK:

- > characteristics B8/76 to B8/79
- > dimensions B8/80

TeSys K:

- > characteristics B8/81 to B8/84
- > dimensions B8/85 to B8/88

TeSys SKGC:

- > characteristics B8/89 to B8/92
- > dimensions B8/93

TeSys GC:

- > characteristics B8/94 to B8/101
- > dimensions B8/102 and B8/103

TeSys GY:

- > characteristics B8/104 to B8/107
- > dimensions B8/108 and B8/109

TeSys GF:

- > characteristics B8/110 to B8/113
- > dimensions B8/114

Standard IEC tests - Contactors
conforming to UL/CSA B8/115

TeSys D

Environment			D09...D18 DT20 and DT25	D25...D38 DT32 and DT40	D40A...D65A DT60A and DT80A	D80...D95	D115 and D150	
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1, overvoltage category III, degree of pollution: 3	V	690			1000		
	Conforming to UL, CSA	V	600					
Rated impulse withstand voltage (Uimp)	Conforming to IEC 60947	kV	6			8		
	Conforming to standards		IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 508, CSA C22.2 n°14.					
Product certifications			UL, CSA ⁽¹⁾ , CCC, GOST GL, DNV, RINA, BV, LROS					
Degree of protection ⁽²⁾ (front face)	Conforming to IEC 60529							
	Power circuit connections		Protection against direct finger contact IP20					
	Coil connection		Protection against direct finger contact IP20					
Protective treatment	Conforming to IEC 60068-2-30		"TH"					
Ambient air temperature around the device	Storage	°C	-60...+80					
	Operation	°C	-5...+60					
	Permissible	°C	-40...+70, for operation at U _c					
Maximum operating altitude	Without derating	m	3000					
Operating positions ⁽³⁾	Without derating in the following positions							
	Positions that are not permissible		For ~ contactors LC1 D09 to LC1 D65A. 					
Flame resistance	Conforming to UL 94		V1					
	Conforming to IEC 60695-2-1	°C	850					
Shock resistance ⁽⁴⁾ 1/2 sine wave = 11 ms	Contactor open		10 gn	8 gn	10 gn	8 gn	6 gn	
	Contactor closed		15 gn	15 gn	15 gn	10 gn	15 gn	
Vibration resistance ⁽⁴⁾ 5...300 Hz	Contactor open		2 gn					
	Contactor closed		4 gn	4 gn	4 gn	3 gn	4 gn	

(1) Contactor LC1 D95 with d.c. coil is not UL/CSA certified.

(2) Protection provided for the cabling c.s.a.'s indicated on the next page and for connection by cable. For lug type: add a protective cover.

(3) When mounting on a vertical rail, use a stop.

(4) Without modifying the contact states, in the most unfavourable direction (coil energised at U_e).

TeSys D

Pole characteristics											
Contactor type	LC1		D09 (3P)	DT20 D098	D12 (3P)	DT25 D128	D18 (3P)	DT32 D188	D25 (3P)	DT40 D258	
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, θ ≤ 60 °C	A	9		12		18		25		
	In AC-1, θ ≤ 60 °C	A	25 ⁽¹⁾	20	25 ⁽¹⁾	25	32 ⁽¹⁾	32	40 ⁽¹⁾	40	
Rated operational voltage (Ue)	Up to	V	690		690		690		690		
Frequency limits	Of the operational current	Hz	25...400		25...400		25...400		25...400		
Conventional thermal current (Ith)	θ ≤ 60 °C	A	25 ⁽¹⁾	20	25 ⁽¹⁾	25	32 ⁽¹⁾	32	40 ⁽¹⁾	40	
Rated making capacity (440 V)	Conforming to IEC 60947	A	250		250		300		450		
Rated breaking capacity (440 V)	Conforming to IEC 60947	A	250		250		300		450		
Permissible short time rating No current flowing for preceding 15 minutes with θ ≤ 40 °C	For 1 s	A	210		210		240		380		
	For 10 s	A	105		105		145		240		
	For 1 min	A	61		61		84		120		
	For 10 min	A	30		30		40		50		
Fuse protection against short-circuits (U ≤ 690 V)	Without thermal overload relay, gG fuse	type 1	A	25		40		50		63	
		type 2	A	20		25		35		40	
	With thermal overload relay	A	See pages B11/4 and B11/5, for aM or gG fuse ratings corresponding to the associated thermal overload relay								
Average impedance per pole	At Ith and 50 Hz	mΩ	2.5		2.5		2.5		2		
Power dissipation per pole for the above operational currents	AC-3	W	0.20		0.36		0.8		1.25		
	AC-1	W	1.56		1.56		2.5		3.2		

Control circuit characteristics, a.c. supply										
Rated control circuit voltage (Uc)	50/60 Hz	V	12...690							
Control voltage limits	50 or 60 Hz coils	Operation	-							
		Drop-out	-							
	50/60 Hz coils	Operation	0.8...1.1 Uc on 50 Hz and 0.85...1.1 Uc on 60 Hz at 60 °C							
		Drop-out	0.3...0.6 Uc at 60 °C							
Average consumption at 20 °C and at Uc	~ 50 Hz	Inrush	50 Hz coil	VA	-					
			Cos φ		0.75					
		Sealed	50/60 Hz coil	VA	70					
			Cos φ		0.3					
		~ 60 Hz	Inrush	60 Hz coil	VA	-				
				Cos φ		0.75				
	Sealed		50/60 Hz coil	VA	70					
			Cos φ		0.3					
	50/60 Hz coil			VA	7.5					
					0.3					
	Heat dissipation	50/60 Hz	W	2...3						
	Operating time ⁽²⁾	Closing "C"		ms	12...22					
Opening "O"			ms	4...19						
Mechanical durability in millions of operating cycles	50 or 60 Hz coil		-							
	50/60 Hz coil on 50 Hz		15							
Maximum operating rate at ambient temperature ≤ 60 °C	In operating cycles per hour		3600							

(1) Versions with spring terminal connections:
 16 A for LC1 D093 and LC1 D123 (20 A possible with 2 x 2.5 mm² in parallel),
 25 A for LC1 D183 to LC1 D323 (32 A possible for LC1 D183 connected with 2 x 4 mm² cables in parallel; 40 A possible for LC1 D253 and LC1 D323 connected with 2 x 4 mm² in parallel).

(2) The closing time "C" is measured from the moment the coil supply is switched on to closure of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

D32	D38	D40A	DT60A	D50A	D65A	DT80A	D80	D95	D115	D150
32	38	40	–	50	65	–	80	95	115	150
50 ⁽¹⁾	50	60	60	80	80	80	125	125	200	200
690	690	690	690	690	690	690	1000	1000	1000	1000
25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400
50	50	60	60	80	80	80	125	125	200	200
550	550	800	800	900	1000	1000	1100	1100	1260	1660
550	550	800	800	900	1000	1000	1100	1100	1100	1400
430	430	720	720	810	900	900	990	1100	1100	1400
260	310	320	320	400	520	520	640	800	950	1200
138	150	165	165	208	260	260	320	400	550	580
60	60	72	72	84	110	110	135	135	250	250
63	63	80	80	100	125	125	200	200	250	315
63	63	80	80	100	125	125	160	160	200	250

See pages B11/4 and B11/5 for aM or gG fuse ratings corresponding to the associated thermal overload relay

2	2	1.5	1.6	1.5	1.5	1.6	0.8	0.8	0.6	0.6
2	3	2.4	–	3.7	6.3	–	5.1	7.2	7.9	13.5
5	5	5.4	5.8	9.6	9.6	10.2	12.5	12.5	24	24

12...690	12...690	24...500	
–	–	0.85...1.1 Uc at 55 °C	
–	–	0.3...0.6 Uc at 55 °C	0.3...0.5 Uc at 55 °C
0.8...1.1 Uc on 50 Hz and 0.85...1.1 Uc on 60 Hz at 60 °C	0.8...1.1 Uc on 50 Hz and 0.85...1.1 Uc on 60 Hz at 60 °C	0.8...1.1 Uc on 50 Hz and 0.85...1.1 Uc on 60 Hz at 55 °C	0.8...1.15 Uc on 50/60 Hz at 55 °C
0.3...0.6 Uc at 60 °C	0.3...0.6 Uc at 60 °C	0.3...0.6 Uc at 55 °C	0.3...0.5 Uc at 55 °C
–	–	200	300
0.75	0.75	0.75	0.8
70	160	245	280...350
–	–	20	22
0.3	0.3	0.3	0.3
7	15	26	2...18
–	–	220	300
0.75	0.75	0.75	0.8
70	140	245	280...350
–	–	22	22
0.3	0.3	0.3	0.3
7.5	13	26	2...18
2...3	4...5	6...10	3...8
12...22	12...26	20...35	20...50
4...19	4...19	6...20	40...75
–	–	10	8
15	6	4	8
3600	3600	3600	2400

TeSys D

Power circuit connections

Screw clamp terminal connections

Contactor type	LC1	D09 and D12 DT20 and DT25	D18 (3P)	D25 (3P)	D32	D38	D18 and D25 (4P) DT32 and DT40	D40A to D65A DT60A and DT80A ⁽¹⁾	D80 and D95	D115 and D150
Tightening		Screw clamp terminals					Connector 2 inputs	Screw clamp terminals	Connector 1 input	Connector 2 inputs
Flexible cable without cable end	1 conductor	mm ²	1...4	1.5...6	2.5...10		2.5...10	1...35	4...50	10...120
	2 conductors	mm ²	1...4	1.5...6	2.5...10		2.5...10	1...25 and 1...35	4...25	10...120 + 10...50
Flexible cable with cable end	1 conductor	mm ²	1...4	1...6	1...10		2.5...10	1...35	4...50	10...120
	2 conductors	mm ²	1...2.5	1...4	1.5...6		2.5...10	1...25 and 1...35	4...16	10...120 + 10...50
Solid cable without cable end	1 conductor	mm ²	1...4	1.5...6	1.5...10		2.5...16	1...35	4...50	10...120
	2 conductors	mm ²	1...4	1.5...6	2.5...10		2.5...16	1...25 and 1...35	6...25	10...120 + 10...50
Screwdriver	Philips		N° 2	N° 2	N° 2		N° 2	–	–	–
	Flat screwdriver Ø		Ø6	Ø6	Ø6		Ø6	–	Ø6...Ø8	–
Hexagonal key			–	–	–		–	4	4	4
Tightening torque		N.m	1.7	1.7	2.5		1.8	5: ≤ 25 mm ² 8: 35 mm ²	9	12

Spring terminal connections ⁽²⁾

Flexible cable without cable end	1 conductor	mm ²	2.5 (4: DT25)	4	4	4	–	10	–	–
	2 conductors	mm ²	2.5 (except DT25)	4	4	4	–	–	–	–

Connection by bars or lugs

Bar c.s.a.			–	–	–	–	–	–	3 x 16	5 x 25
Lug external Ø	mm		8	8	10	10	8	16.5	17	25
Ø of screw	mm		M3.5	M3.5	M4	M4	M3.5	M6	M6	M8
Screwdriver	Philips		N° 2	N° 2	N° 2	N° 2	N° 2	–	–	–
	Flat screwdriver Ø		Ø6	Ø6	Ø6	Ø6	Ø6	–	Ø8	–
Key for hexagonal headed screw			–	–	–	–	–	10	10	13
Tightening torque		N.m	1.7	1.7	2.5	2.5	1.8	6	9	12

Control circuit connections

Connection by cable (tightening via screw clamps)

Flexible cable without cable end	1 conductor	mm ²	1...4	1...4	1...4	1...4	1...4	1...4	1...4	1...2.5
	2 conductors	mm ²	1...4	1...4	1...4	1...4	1...4	1...4	1...4	1...2.5
Flexible cable with cable end	1 conductor	mm ²	1...4	1...4	1...4	1...4	1...4	1...4	1...4	1...2.5
	2 conductors	mm ²	1...2.5	1...2.5	1...2.5	1...2.5	1...2.5	1...2.5	1...2.5	1...2.5
Solid cable without cable end	1 conductor	mm ²	1...4	1...4	1...4	1...4	1...4	1...4	1...4	1...2.5
	2 conductors	mm ²	1...4	1...4	1...4	1...4	1...4	1...4	1...4	1...2.5
Screwdriver	Philips		N° 2	N° 2	N° 2	N° 2	N° 2	N° 2	N° 2	N° 2
	Flat screwdriver Ø		Ø6	Ø6	Ø6	Ø6	Ø6	Ø6	Ø6	Ø6
Tightening torque		N.m	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.2

Spring terminal connections ⁽²⁾

Flexible cable without cable end	1 conductor	mm ²	2.5	2.5	2.5	2.5	–	2.5	0.75...2.5	–
	2 conductors	mm ²	2.5	2.5	2.5	2.5	–	2.5	0.75...2.5	–

Connection by bars or lugs

Lug external Ø	mm		8	8	8	8	8	8	8	8
Ø of screw	mm		M3.5	M3.5	M3.5	M3.5	M3.5	M3.5	M3.5	M3.5
Screwdriver	Philips		N° 2	N° 2	N° 2	N° 2	N° 2	N° 2	N° 2	N° 2
	Flat screwdriver Ø		Ø6	Ø6	Ø6	Ø6	Ø6	Ø6	Ø6	Ø6
Tightening torque		N.m	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.2

⁽¹⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page B8/21).

⁽²⁾ If cable ends are used, choose the next size down (example: for 2.5 mm², use 1.5 mm²) and square crimp the cable ends using a special tool.

TeSys D

d.c. control circuit characteristics

Contactor type			LC1 D09...D38 LC1 DT20...DT40	LC1 D40A...D65A LC1 DT60A and DT80A	LC1 or LP1 D80 LC1 D95	LC1 D115 and LC1 D150	
Rated control circuit voltage (Uc) ---		V	12...440	12...440		24...440	
Rated insulation voltage	Conforming to IEC 60947-1	V	690				
	Conforming to UL, CSA	V	600				
Control voltage limits	Operation	Standard coil	0.7...1.25 Uc at 60 °C	0.75...1.25 Uc at 60 °C	0.85...1.1 Uc at 55 °C	0.75...1.2 Uc at 55 °C	
		Wide range coil	–	–	0.75...1.2 Uc at 55 °C	–	
	Drop-out		0.1...0.25 Uc at 60 °C	0.1...0.3 Uc at 60 °C	0.1...0.3 Uc at 55 °C	0.15...0.4 Uc at 55 °C	
Average consumption at 20 °C and at Uc	---	Inrush	W	5.4	19	22	270...365
		Sealed	W	5.4	7.4	22	2.4...5.1
Operating time ⁽¹⁾ average at Uc	Closing	"C"	ms	63 ±15 %	50 ±15%	95...130	20...35
	Opening	"O"	ms	20 ±20 %	20 ±20%	20...35	40...75
			<i>Note: The arcing time depends on the circuit switched by the poles. For all normal 3-phase applications, the arcing time is less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.</i>				
Time constant (L/R)		ms	28	34	75	25	
Mechanical durability at Uc	In millions of operating cycles		30	10	10	8	
Maximum operating rate at ambient temperature ≤ 60 °C	In operating cycles per hour		3600	3600	3600	1200	

Low consumption control circuit characteristics

Rated insulation voltage	Conforming to IEC 60947-1	V	690	–
	Conforming to UL, CSA	V	600	–
Maximum voltage	Of the control circuit on ---	V	250	–
Average consumption d.c. at 20 °C and at Uc	Wide range coil (0.7...1.25 Uc)	Inrush	W	2.4
		Sealed	W	2.4
Operating time ⁽¹⁾ at Uc and at 20 °C	Closing	"C"	ms	77 ±15 %
	Opening	"O"	ms	25 ±20 %
Voltage limits (θ ≤ 60 °C) of the control circuit	Operation		0.8 to 1.25 Uc	–
	Drop-out		0.1...0.3 Uc	–
Time constant (L/R)		ms	40	–
Mechanical durability	In millions of operating cycles		30	–
Maximum operating rate at ambient temperature ≤ 60 °C	In operating cycles per hour		3600	–

⁽¹⁾ The operating times depend on the type of contactor electromagnet and its control mode.
 The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles.
 The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

TeSys D

Characteristics of auxiliary contacts incorporated in the contactor

Mechanically linked contacts	Conforming to IEC 60947-5-1		Each contactor has 2 N/O and N/C contacts mechanically linked on the same movable contact holder
Mirror contact	Conforming to IEC 60947-4-1		The N/C contact on each contactor represents the state of the power contacts and can be connected to a PREVENTA safety module
Rated operational voltage (Ue)	Up to	V	690
Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V	690
	Conforming to UL, CSA	V	600
Conventional thermal current (Ith)	For ambient temperature ≤ 60 °C	A	10
Frequency of the operational current		Hz	25...400
Minimum switching capacity $\lambda = 10^{-8}$	U min	V	17
	I min	mA	5
Short-circuit protection	Conforming to IEC 60947-5-1		gG fuse: 10 A
Rated making capacity	Conforming to IEC 60947-5-1, I rms	A	~: 140, ---: 250
Short-time rating	Permissible for	1 s	A 100
		500 ms	A 120
		100 ms	A 140
Insulation resistance		MΩ	> 10
Non-overlap time	Guaranteed between N/C and N/O contacts	ms	1.5 (on energisation and on de-energisation)

Operational power of contacts conforming to IEC 60947-5-1

a.c. supply, categories AC-14 and AC-15

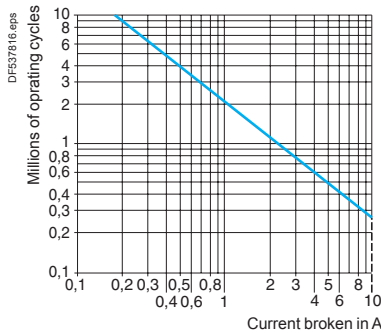
Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \varphi 0.7$) = 10 times the power broken ($\cos \varphi 0.4$).

Operating cycles	V	24	48	115	230	400	440	600
1 million	VA	60	120	280	560	960	1050	1440
3 million	VA	16	32	80	160	280	300	420
10 million	VA	4	8	20	40	70	80	100

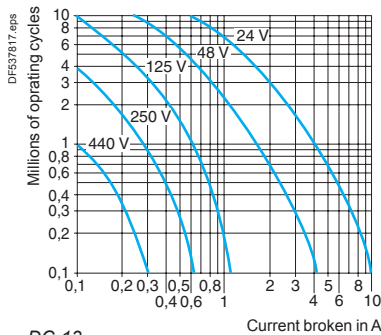
d.c. supply, category DC-13

Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

Operating cycles	V	24	48	125	250	440
1 million	W	96	76	76	76	44
3 million	W	48	38	38	32	–
10 million	W	14	12	12	–	–



AC-15



DC-13

Environment							
Contact block type			LAD N or LAD C	LAD T and LAD S	LAD R	LAD 8	
Conforming to standards			IEC 60947-5-1, NF C 63-140, VDE 0660, BS 4794, EN 60947-5-1				
Product certifications			UL, CSA				
Protective treatment	Conforming to IEC 60068		"TH"				
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 2X				
Ambient air temperature around the device	Storage	°C	-60...+80				
	Operation	°C	-5...+60				
	Permissible for operation at U _c	°C	-40...+70				
Maximum operating altitude	Without derating	m	3000				
Connection by cable	Phillips n° 2 and Ø6 mm Flexible or solid cable with or without cable end	mm ²	Min: 1 x 1; max: 2 x 2.5				
	Spring terminal connections	Flexible or solid cable without cable end	mm ²	Max: 2 x 2.5			
Instantaneous and time delay contact characteristics							
Number of contacts			1, 2 or 4	2	2	2	
Rated operational voltage (U _e)	Up to	V	690				
	Conforming to IEC 60947-5-1	V	690				
Rated insulation voltage (U _i)	Conforming to IEC 60947-5-1	V	690				
	Conforming to UL, CSA	V	600				
Conventional thermal current (I _{th})	For ambient temperature ≤ 60 °C	A	10				
Frequency of the operational current		Hz	25...400				
Minimum switching capacity	U min	V	17				
	I min	mA	5				
Short-circuit protection	Conforming to IEC 60947-5-1 and VDE 0660, gG fuse	A	10				
Rated making capacity	Conforming to IEC 60947-5-1	I rms	~: 140; ---: 250				
Short-time rating	Permissible for	1 s	A	100			
		500 ms	A	120			
		100 ms	A	140			
Insulation resistance		MΩ	> 10				
Non-overlap time	Guaranteed between N/C and N/O contacts	ms	1.5 (on energisation and on de-energisation)				
Overlap time	Guaranteed between N/C and N/O contacts on LAD C22	ms	1.5	–	–	–	
Time delay (LADT, R and S contact blocks) Accuracy only valid for setting range indicated on the front face	Ambient air temperature for operation	°C	–	-40...+70	-40...+70	–	
	Repeat accuracy		–	±2 %	±2 %	–	
	Drift up to 0.5 million operating cycles		–	+15 %	+15 %	–	
	Drift depending on ambient air temperature		–	0.25 % per °C	0.25 % per °C	–	
Mechanical durability	In millions of operating cycles		30	5	5	30	
Operational power of contacts			See page B8/61				

TeSys contactors

Auxiliary contact blocks without dust and damp protected contacts for TeSys D contactors

TeSys D

Environment								
Contact block type			LA1 DX	LA1 DZ		LA1 DY		
				Protected	Non protected			
Conforming to standards			IEC 60947-5-1, VDE 0660					
Product certifications			UL, CSA					
Protective treatment	Conforming to IEC 60068		"TH"					
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 2X					
Ambient air temperature	Storage and operation		°C	-25...+70				
Cabling	Phillips n° 2 and Ø6 mm Flexible or solid conductor with or without cable end		mm²	Min: 1 x 1; max: 2 x 2.5				
Number of contacts			2	2	2	2		
Contact characteristics								
Rated operational voltage (Ue)	Up to		V	50	50	690	24	
Rated insulation voltage (Ui)	Conforming to IEC 60947-5-1		V	250	250	690	250	
	Conforming to UL, CSA		V	-	-	600	-	
Conventional thermal current (Ith)	For ambient temperature ≤ 40 °C		A	-	-	10	-	
Maximum operational current (Ie)			mA	500	500	-	50	
Frequency of the operational current			Hz	-	-	25...400	-	
Minimum switching capacity			U min	V	3	3	17	3
			I min	mA	0.3	0.3	5	0.3
Short-circuit protection	Conforming to IEC 60947-5-1 gG fuse		A	-	-	10	-	
Rated making capacity	Conforming to IEC 60947-5-1		I rms	A	-	~:140; ∴: 250	-	
Short-time rating	Permissible for		1 s	A	-	-	100	-
			500 ms	A	-	-	120	-
			100 ms	A	-	-	140	-
Insulation resistance			MΩ	> 10	> 10	> 10	> 10	
Mechanical durability	In millions of operating cycles			5	5	30	5	
Materials and technology used for dust and damp protected contacts				Silver - Single break	Silver - Single break	-	Gold - Single break with crossed bars	

TeSys contactors

Auxiliary contact blocks with dust and damp protected contacts for TeSys D contactors

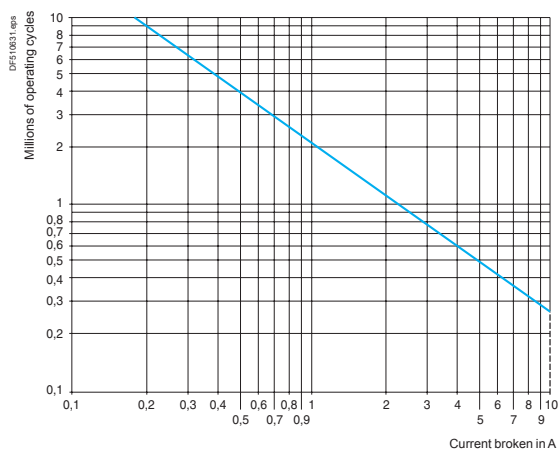
TeSys D

Rated operational power of contacts (conforming to IEC 60947-5-1)

a.c. supply, categories AC-14 and AC-15

Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \varphi 0.7$) = 10 times the power broken ($\cos \varphi 0.4$).

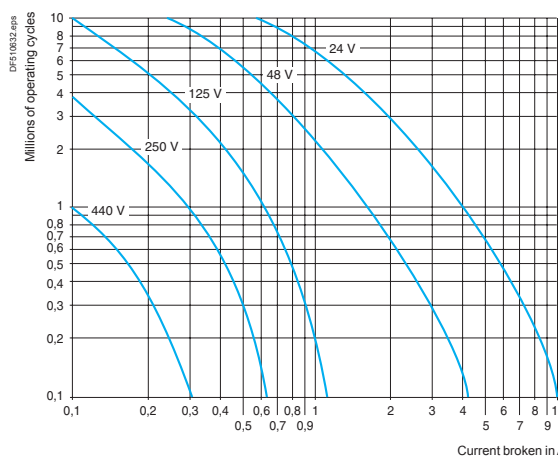
Operating cycles	V	24	48	115	230	400	440	600
1 million	VA	60	120	280	560	960	1050	1440
3 million	VA	16	32	80	160	280	300	420
10 million	VA	4	8	20	40	70	80	100



d.c. supply, category DC-13

Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

Operating cycles	V	24	48	125	250	440
1 million	W	120	90	75	68	61
3 million	W	70	50	38	33	28
10 million	W	25	18	14	12	10



Contactors

TeSys contactors

Control modules, coil suppressor modules and mechanical latch blocks for TeSys D contactors

TeSys D

Environment

Conforming to standards			IEC 60947-5-1
Product certifications			UL, CSA
Protective treatment	Conforming to IEC 60068		"TH"
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 2X
Ambient air temperature around the device	Storage	°C	-40...+80
	Operation	°C	-25...+55
	Permissible for operation at Uc	°C	-25...+70

Suppressor modules

Module type			LA4 DA, LAD 4RC, LAD 4RC3	LA4 DB, LAD 4T, LAD 4T3	LA4 DC, LAD 4D3	LA4 DE, LAD 4V, LAD 4V3
Type of protection			RC circuit	Bidirectional peak limiting diode	Diode	Varistor
Rated control circuit voltage (Uc)		V	~ 24...415	~ or --- 24...440	--- 12...250	~ or --- 24...250
Maximum peak voltage			3 Uc	2 Uc	Uc	2 Uc
Natural RC frequency	24/48 V	Hz	400	—	—	—
	50/127 V	Hz	200	—	—	—
	110/240 V	Hz	100	—	—	—
	380/415 V	Hz	150	—	—	—

Mechanical latch blocks ⁽¹⁾

Mechanical latch block type			LAD 6K10	LA6 DK20
For use on contactor			LC1 D09...D65A DT20...DT80A	LC1 D80...D150 LP1 D80 and LC1 D115
Product certifications			UL, CSA	UL, CSA
Rated insulation voltage	Conforming to IEC 60947-5-1	V	690	690
Rated control circuit voltage	~ 50/60 Hz and ---	V	24...415	24...415
Power required	For unlatching	~	VA 25	25
		---	W 30	30
Maximum operating rate	In operating cycles/hour		1200	1200
On-load factor			10 %	10 %
Mechanical durability at Uc	In millions of operating cycles		0.5	0.5

⁽¹⁾ Unlatching can be manually operated or electrically controlled (pulsed).

The **LA6 DK** or **LAD 6K** latch coil and the **LC1 D** operating coil must not be energised simultaneously.
The duration of the **LA6 DK** or **LAD 6K** and **LC1 D** control signals must be ≥ 100 ms.

TeSys contactors

Electronic serial timer module for TeSys D contactors

TeSys D

Environment

Module type		LA4 DT (On-delay)	
Conforming to standards			IEC 60255-5
Product certifications			UL, CSA
Protective treatment	Conforming to IEC 60068		"TH"
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 2X
Ambient air temperature around the device	Storage	°C	-40...+80
	Operation	°C	-25...+55
	For operation at U _c	°C	-25...+70
Rated insulation voltage (U _i)	Conforming to IEC 60947-1	V	250
Cabling	Phillips n° 2 and Ø6 mm Flexible or solid conductor with or without cable end	mm ²	Min: 1 x 1; max: 2 x 2.5

Control circuit characteristics

Built-in protection	Of the input		By varistor
	Contactors coil suppression		By varistor
Rated control circuit voltage (U _c)		V	~ or ≡; 24...250
Permissible variation			0.8...1.1 U _c
Type of control			By mechanical contact only

Timing characteristics

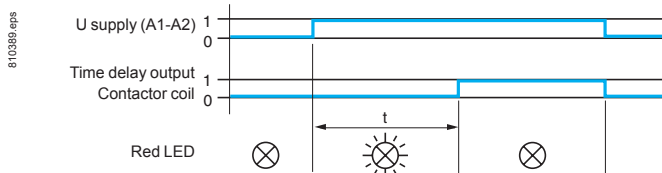
Timing ranges		s	0.1...2; 1.5...30; 25...500
Repeat accuracy	0...40 °C		±3 % (10 ms minimum)
Reset time	During time delay period	ms	150
	After time delay period	ms	50
Immunity to microbreaks	During time delay period	ms	10
	After time delay period	ms	2
Minimum control pulse duration		ms	–
Time delay signalling	By LED		Illuminates during time delay period

Switching characteristics (solid state type)

Maximum power dissipated		W	2
Leakage current		mA	< 5
Residual voltage		V	3.3
Overvoltage protection			3 kV; 0.5 joule
Electrical durability	In millions of operating cycles		30

Function diagram

Electronic on-delay timer LA4 DT



TeSys contactors

Interface modules

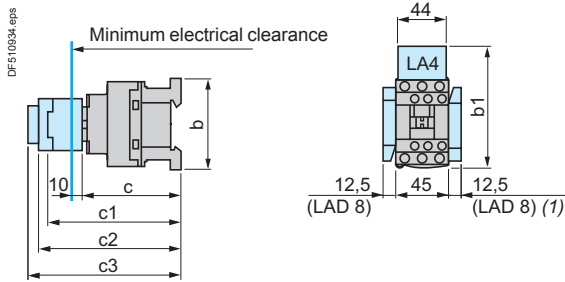
for TeSys D contactors

TeSys D

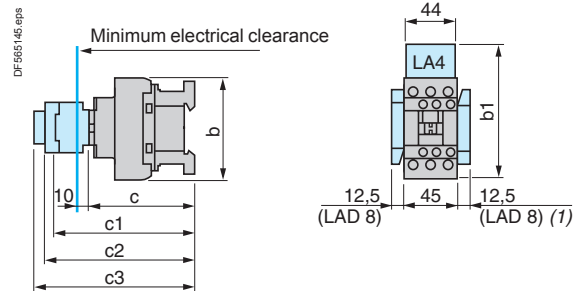
Environment						
Conforming to standards			IEC 60255-5			
Product certifications			UL, CSA			
Protective treatment	Conforming to IEC 60068		"TH"			
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 2X			
Ambient air temperature around the device	Storage	°C	-40...+80			
	Operation	°C	-25...+55			
	Permissible for operation at Uc	°C	-25...+70			
Other characteristics						
Module type			LA4 DFB With relay	LA4 DWB Solid state		
Conventional thermal current (Ith)	For ambient temperature ≤ 50 °C	A	8			
Rated insulation voltage	Conforming to IEC 60947-5-1	V	250			
Rated operational voltage	Conforming to IEC 60947-5-1	V	250			
Indication of input state			By integral LED which illuminates when the contactor coil is energised			
Input signals	Control voltage (E1-E2)	V	~ 24	~ 24		
	Permissible variation	V	17...30	5...30		
	Current consumption at 20 °C	mA	25	8.5 for 5 V 15 for 24 V		
	State "0" guaranteed for U	V	< 2.4	< 2.4		
	I	mA	< 2	< 2		
	State "1" guaranteed for U	V	17	5		
Built-in protection	Against reversed polarity		By diode	By diode		
	Of the input		By diode	By diode		
Electrical durability at 220 A/240 V	In millions of operating cycles		10	20		
Maximum immunity to microbreaks		ms	4	1		
Power dissipated	At 20 °C	W	0.6	0.4		
Direct mounting on contactor	With coil	~ 24...250 V	LC1 D80...D150	–		
		~ 100...250 V	–	LC1 D80...D115		
		~ 380...415 V	–	–		
Mounting with cabling adapter LAD 4BB	With coil	~ 24...250 V	LC1 D09...D38, LC1 DT20...DT40	LC1 D09...D38, LC1 DT20...DT40		
		~ 380...415 V	–	–		
Mounting with cabling adapter LAD 4BB3	With coil	~ 24...250 V	LC1 D40A...D65A	LC1 D40A...D65A		
		~ 380...415 V	LC1 D40A...D65A	LC1 D40A...D65A		
Total operating time at Uc (of the contactor)				The operating times depend on the type of contactor electromagnet and its control mode. The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.		
			LC1 D09...D38, LC1 DT20...DT40	LC1 D40A...D65A	LC1 D80 and D95	
	With LA4 DFB	"C"	ms	20...30	28...34	28...43
		"O"	ms	16...24	20...24	18...32
Cabling	Phillips n° 2 and Ø6 mm Flexible or solid cable with or without cable end	mm²	Min: 1 x 1; max: 2 x 2.5			

TeSys D

LC1 D09...D18 (3-pole)



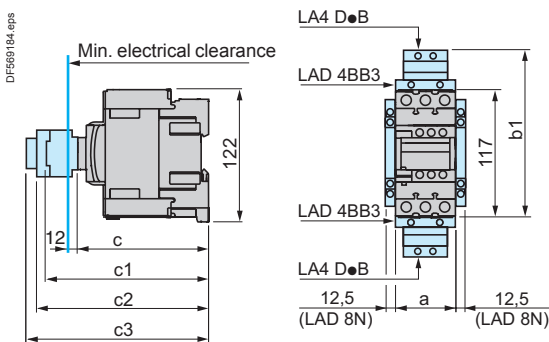
LC1 D25...D38 (3-pole), LC1 DT20...DT40 (4-pole)



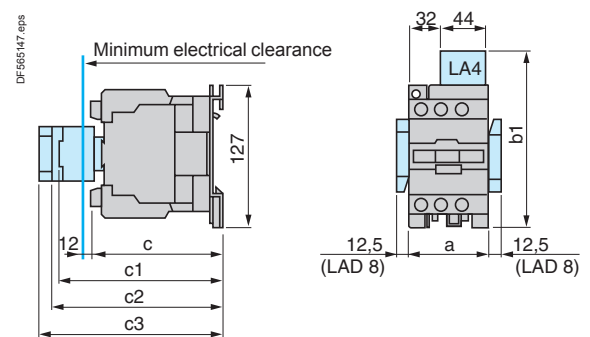
LC1	D09...D18	D093... D123	D099... D129	D25... D38	D183... D323	D098, D128, DT20 and DT25	DT203 and DT253	DT32 and DT40	D188, D258, DT323 and DT403
b without add-on blocks	77	99	80	85	99	85	99	91	105
b1 with LAD 4BB	94	107	95,5	98	107	98	-	-	-
with LA4 D●2	110 ⁽¹⁾	123 ⁽¹⁾	111,5 ⁽¹⁾	114 ⁽¹⁾	123 ⁽¹⁾	114	-	-	-
with LA4 DF, DT	119 ⁽¹⁾	132 ⁽¹⁾	120,5 ⁽¹⁾	123 ⁽¹⁾	132 ⁽¹⁾	129	-	-	-
with LA4 DW, DL	126 ⁽¹⁾	139 ⁽¹⁾	127,5 ⁽¹⁾	130 ⁽¹⁾	139 ⁽¹⁾	190	-	-	-
c without cover or add-on blocks	84	84	84	90	90	90	90	97	97
with cover, without add-on blocks	86	86	86	92	92	92	92	99	99
c1 with LAD N or C (2 or 4 contacts)	117	117	117	123	123	123	123	131	131
c2 with LA6 DK10, LAD 6K10	129	129	129	135	135	135	135	143	143
c3 with LAD T, R, S	137	137	137	143	143	143	143	151	151
with LAD T, R, S and sealing cover	141	141	141	147	147	147	147	155	155

(1) Including LAD 4BB.

LC1 D40A...D65A (3-pole), LC1 DT60A...DT80A (4-pole)



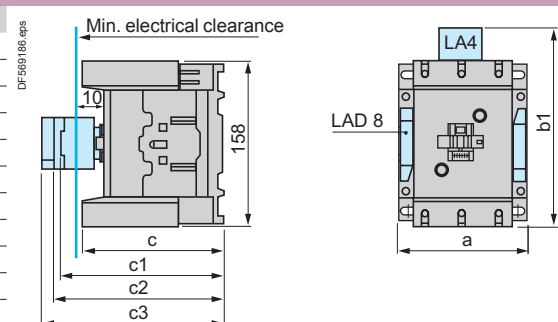
LC1 D80 and D95 (3-pole), LC1 D80004 and D80008 (4-pole), D40008 and D65008 (4-pole)



LC1	D40A...D65A	DT60A...DT80A	D40008	D80	D95, D65008	D80004	D80008
a	55	70	85	85	85	96	96
b1 with LA4 D●2	-	-	135	135	135	135	135
with LA4 DB3 or LAD 4BB3	136	-	-	135	-	-	-
with LA4 DF, DT	157	-	142	142	142	142	142
with LA4 DM, DW, DL	166	-	150	150	150	150	150
c without cover or add-on blocks	118	118	125	125	125	125	140
with cover, without add-on blocks	120	120	-	130	130	-	-
c1 with LAD N (1 contact)	-	-	139	150	150	150	150
with LAD N or C (2 or 4 contacts)	150	150	147	158	158	158	158
c2 with LAD 6K10 or LA6 DK	163	163	159	170	170	170	170
c3 with LAD T, R, S	171	171	167	178	178	178	178
with LAD T, R, S and sealing cover	175	175	171	182	182	182	182

LC1 D115 and D150 (3-pole), LC1 D115004 (4-pole)

LC1	D115, D150	D115004	D1150046
a	120	150	155
b1 with LA4 DA2	174	174	174
with LA4 DF, DT	185	185	185
with LA4 DM, DL	188	188	188
with LA4 DW	188	188	188
c without cover or add-on blocks	132	132	115
with cover, without add-on blocks	136	-	-
c1 with LAD N or C (2 or 4 contacts)	150	150	150
c2 with LA6 DK20	155	155	155
c3 with LAD T, R, S	168	168	168
with LAD T, R, S and sealing cover	172	172	172



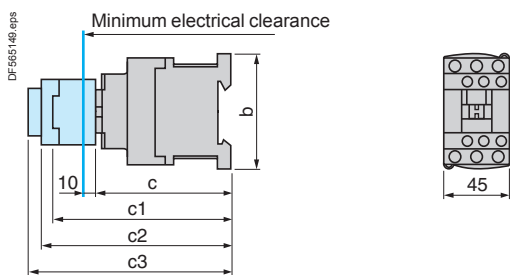
TeSys contactors

TeSys D contactors

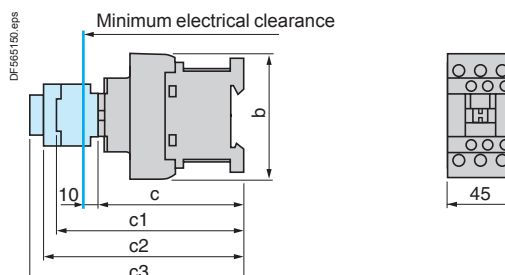
Control circuit: d.c. or low consumption

TeSys D

LC1 D09...D18 (3-pole)

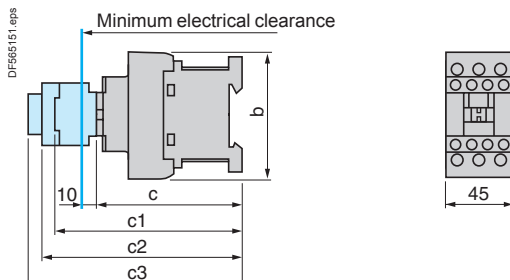


LC1 D25...D38 (3-pole)



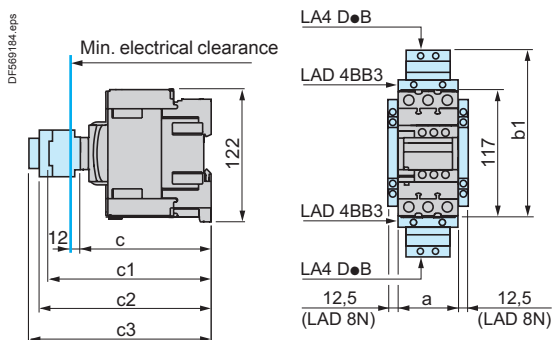
LC1	D09...D18	D093...D123	D099...D129	D25...D38	D183...D323
b	77	99	80	85	99
c without cover or add-on blocks	93	93	93	99	99
with cover, without add-on blocks	95	95	95	101	101
c1 with LAD N or C (2 or 4 contacts)	126	126	126	132	132
c2 with LA6 DK10	138	138	138	144	144
c3 with LAD T, R, S	146	146	146	152	152
with LAD T, R, S and sealing cover	150	150	150	156	156

LC1 DT20...DT40 (4-pole)

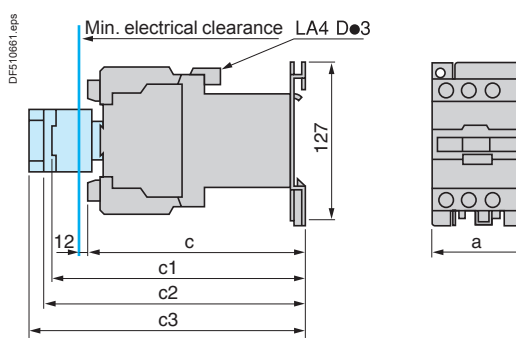


LC1	DT20 and DT25 D098 and D128	DT203 and DT253 D0983 and D1283	DT32 and DT40 D188...D258	DT323 and DT403 D1883 and D2583
b	85	99	91	105
c with cover	99	99	107	107
c1 with LAD N or C (2 or 4 contacts)	123	123	131	131
c2 with LA6 DK10	135	135	143	143
c3 with LAD T, R, S	143	143	151	151
with LAD T, R, S and sealing cover	147	147	155	155

LC1 D40A...D65A (3-pole), LC1 DT60A...DT80A (4-pole)



LC1 D80 and D95 (3-pole), LP1 D80004, LP1 D80008 (4-pole), LP1 D40008 and D65008 (4-pole)



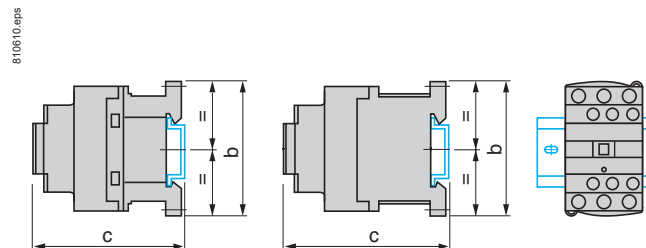
	LC1 D40A ... D65A	LC1 DT60A...DT80A	LP1 D40008 and D65008	LC1 D80 and D95	LP1 D80004	LP1 D80008
a	55	72	85	85	96	96
b1 with LAD 4BB3	136	136	-	-	-	-
with LA4 DF, DT	157	157	-	-	-	-
c without cover or add-on blocks	118	118	182	181	181	196
with cover, without add-on blocks	120	120	-	186	-	-
c1 with LAD N (1 contact)	-	-	196	204	204	204
with LAD N or C (2 or 4 contacts)	150	150	202	210	210	210
c2 with LA6 DK10	163	163	213	221	221	221
c3 with LAD T, R, S	171	171	221	229	229	229
with LAD T, R, S and sealing cover	175	175	225	233	233	233

LC1 D115... and LC1 D150... with coil: see page B8/65.

TeSys D

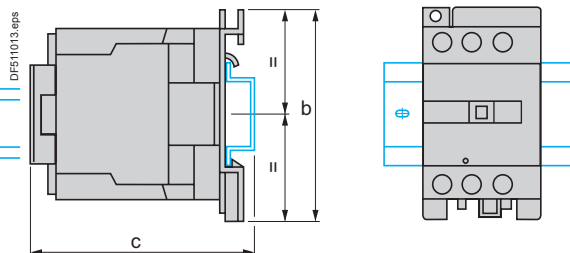
LC1 D09...D38, DT20...DT40

On mounting rail AM1 DP200, DR200 or AM1 DE200 (width 35 mm)



LC1 D40A...D65A, LC1 DT60A and DT80A, LC1 D80 and D95, LC1 D40008 and D65008

On mounting rail AM1 DL200 or DL201 (width 75 mm) ⁽²⁾
On mounting rail AM1 ED●●● or AM1 DE200 (width 35 mm)



Control circuit: a.c.

LC1	D09... D18	D25... D38	DT20 and DT25	DT32 and DT40
b	77	85	85	100
c (AM1 DP200 or DR200) ⁽¹⁾	88	94	94	109
c (AM1 DE200) ⁽¹⁾	96	102	102	117

Control circuit: d.c.

LC1	D09... D18	D25... D38	DT20 and DT25	DT32 and DT40
b	77	85	94	109
c (AM1 DP200 or DR200) ⁽¹⁾	97	103	103	118
c (AM1 DE200) ⁽¹⁾	105	110	111	1236

⁽¹⁾ With safety cover.

Control circuit: a.c.

LC1	D40A...D65A DT60A...DT80A	D80 and D95	D40008 and D65008
b	122	127	127
c (AM1 DL200) ⁽¹⁾	–	147	143
c (AM1 DL201) ⁽¹⁾	–	137	133
c (AM1 ED●●● or DE200) ⁽¹⁾	128	137	133

Control circuit: d.c.

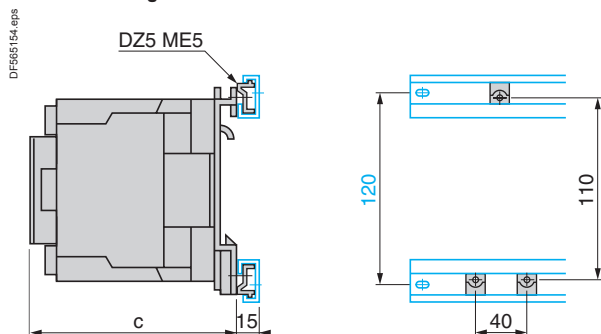
LC1	D40A...D65A DT60A...DT80A	D80 and D95	D40008 and D65008
c (AM1 DL200) ⁽¹⁾	–	205	200
c (AM1 DL201) ⁽¹⁾	–	195	190
c (AM1 ED●●● or DE200) ⁽¹⁾	128	128	190

⁽¹⁾ With safety cover.

⁽²⁾ Except for LC1 D40A...D65A, LC1 DT60A and DT80A.

LC1 D80 and D95, LP1 D80

On 2 mounting rails DZ5 MB on 120 mm centres



Control circuit: a.c.

LC1	D80 and D95
c with cover	130

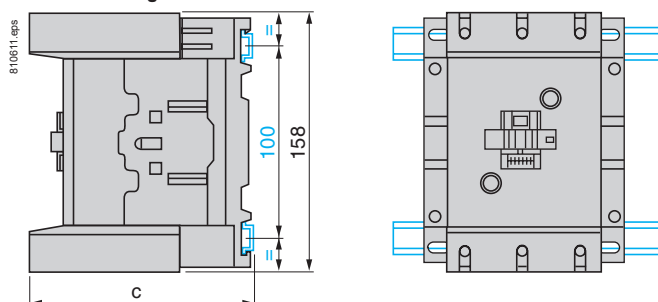
Control circuit: d.c.

LC1	D80 and D95
c with cover	186

LP1	D80
c	181

LC1 D115, D150

On 2 mounting rails DZ5 MB on 120 mm centres



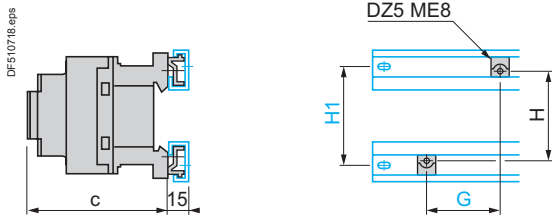
Control circuit: a.c. or d.c.

LC1	D115 and D150	D1156 and D1506
c (AM1 DP200 or DR200)	134.5	117.5
c (AM1 DE200 or ED●●●)	142.5	125.5

TeSys D

LC1 D09...D38 and LC1 DT20...DT40

On 2 mounting rails DZ5 MB



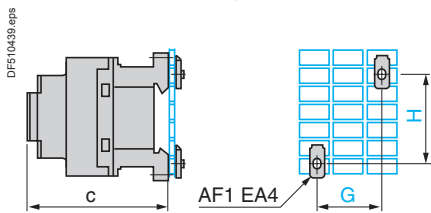
Control circuit:	a.c.		d.c.	
LC1	D09...D18	D25...D38	D09...D18	D25...D38
c with cover	86	92	95	101
G	35	35	35	35
H	60	60	70	70
H1	70	70	70	70

4-pole contactors

LC1	DT20 and DT25	DT32 and DT40	DT20 and DT25	DT32 and DT40
c	92	100	101	109
G	35	35	35	35
H	60	60	70	70
H1	70	70	70	70

LC1 D09...D38 and LC1 DT20...DT40

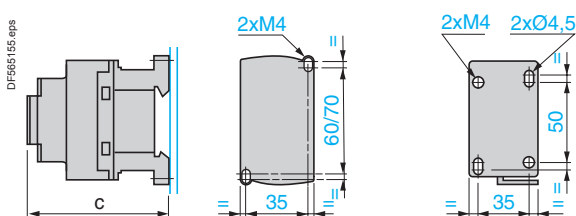
On pre-slotted mounting plate AM1 PA, PB, PC



Control circuit:	a.c.		d.c.	
LC1	D09...D18	D25...D38	D09...D18	D25...D38
c with cover	86	92	95	101
G	35	35	35	35
H	60/70	60/70	70	70
LC1	DT20 and DT25	DT32 and DT40	DT20 and DT25	DT32 and DT40
c with cover	80	93	118	132
G	35	35	35	35
H	60	60	70	70

LC1 D09...D38, LC1 DT20...DT40

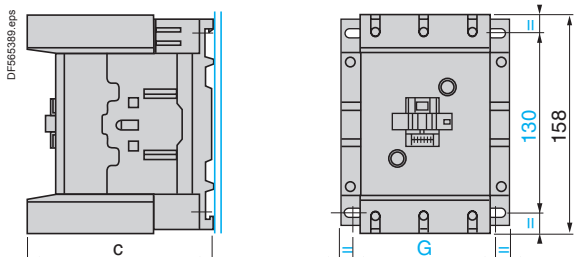
Panel mounted



Control circuit:	a.c.		d.c.	
LC1	D09...D18	D25...D38	D09...D18	D25...D38
c with cover	86	92	95	101
4-pole contactors				
LC1	DT20 and DT25	DT32 and DT40	DT20 and DT25	DT32 and DT40
c with cover	90	98	90	98

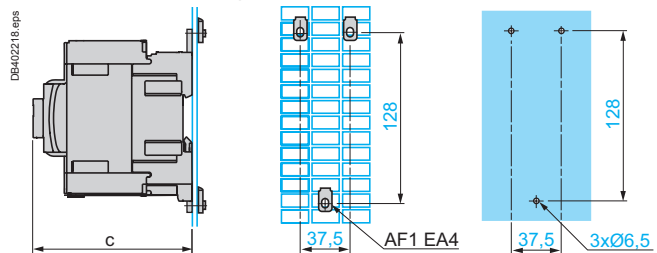
LC1 D115, D150

Panel mounted



LC1 D40A...D65A, LC1 DT60A...DT80A

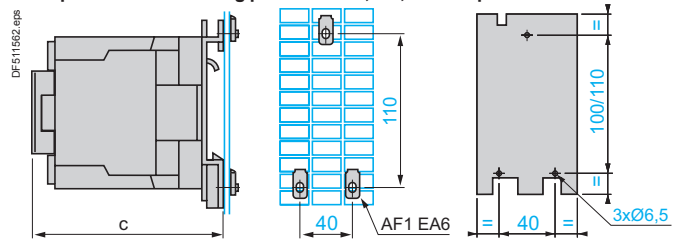
On pre-slotted mounting plate AM1 PA, PB, PC and panel mounted



Control circuit:	a.c.	d.c.
LC1	D40A...65A, DT60A...DT80A	D40A...65A, DT60A...DT80A
c with cover	120	120

LC1 D80 and D95, LC1 D40008 and D65008, LP1 D80

On pre-slotted mounting plate AM1 PA, PB, PC and panel mounted



Control circuit:	a.c.	d.c.
LC1	D80 and D95, D40008 and D65008	D80 and D95, D40008 and D65008
c with cover	130	186
LP1		
	–	D80
c without cover	–	181

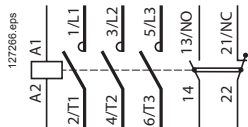
LC1	D115	D1156	D150	D1506
c	132	115	132	115
G (3-pole)	96/110	96/110	96/110	96/110
G (4-pole)	130/144	130/144	–	–

TeSys D

Contactors

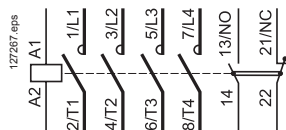
3-pole contactors (References: pages B8/2 to B8/5)

LC1 D09 to D150

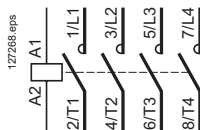


4-pole contactors (References: pages B8/6 and B8/7)

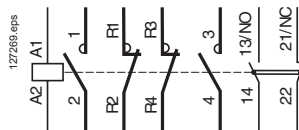
LC1 DT20 to DT80A



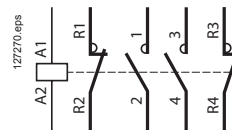
LC1 D115004



LC1 D098 to D258



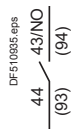
LC1 and LP1 D40008 to D80008



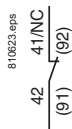
Front mounting add-on contact blocks

Instantaneous auxiliary contacts (References: page B8/41)

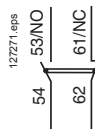
1 N/O LAD N10⁽¹⁾



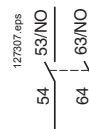
1 N/C LAD N01⁽¹⁾



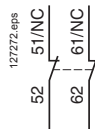
1 N/O + 1 N/C LAD N11



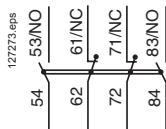
2 N/O LAD N20



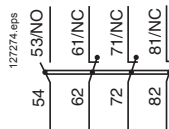
2 N/C LAD N02



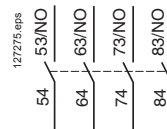
2 N/O + 2 N/C LAD N22



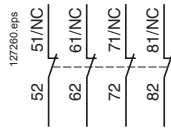
1 N/O + 3 N/C LAD N13



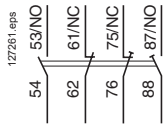
4 N/O LAD N40



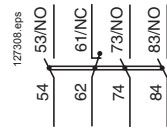
4 N/C LAD N04



2 N/O + 2 N/C including 1 N/O + 1 N/C make before break LAD C22

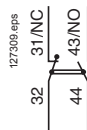


3 N/O + 1 N/C LAD N31

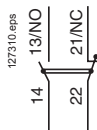


Instantaneous auxiliary contacts conforming to standard EN 50012 (References: page B8/41)

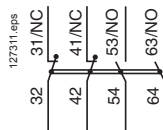
1 N/O + 1 N/C LAD N11G



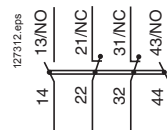
1 N/O + 1 N/C LAD N11P



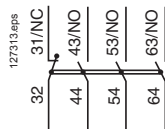
2 N/O + 2 N/C LAD N22G



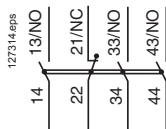
2 N/O + 2 N/C LAD N22P



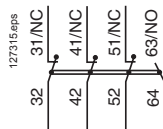
3 N/O + 1 N/C LAD N31G



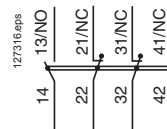
3 N/O + 1 N/C LAD N31P



1 N/O + 3 N/C LAD N13G



1 N/O + 3 N/C LAD N13P



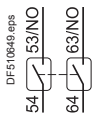
(1) Items in brackets refer to blocks mounted on right-hand side of contactor.

TeSys D

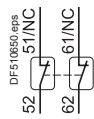
Front mounting add-on contact blocks

Dust and damp protected instantaneous auxiliary contacts (References: page B8/41)

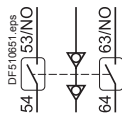
2 N/O (24-50 V)
LA1 DX20



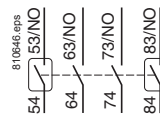
2 N/C (24-50 V)
LA1 DX02



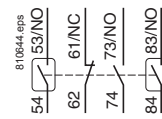
2 N/O (5-24 V)
LA1 DY20



2 N/O protected (24-50 V)
2 N/O standard LA1 DZ40



2 N/O protected (24-50 V)
+ 1 N/O + 1 N/C standard LA1 DZ31

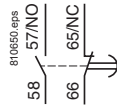


Time delay auxiliary contacts (References: page B8/16)

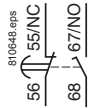
On-delay 1 N/O + 1 N/C
LAD T



Off-delay 1 N/O + 1 N/C
LAD R

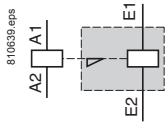


On-delay 1 N/C + 1 N/O break before make LAD S



Mechanical latch blocks (References: page B8/16)

LAD 6K10 and LA6 DK20



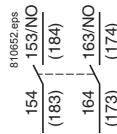
Side mounting add-on contact blocks

Instantaneous auxiliary contacts (References: page B8/41)

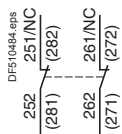
1 N/O + 1 N/C LAD 8N11 ⁽¹⁾



2 N/O LAD 8N20 ⁽¹⁾



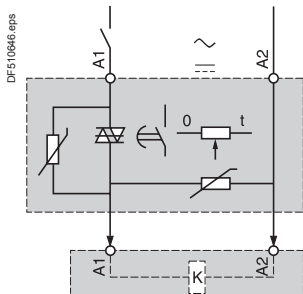
2 N/O LAD 8N02 ⁽¹⁾



⁽¹⁾ Items in brackets refer to blocks mounted on right-hand side of contactor.

Electronic serial timer modules

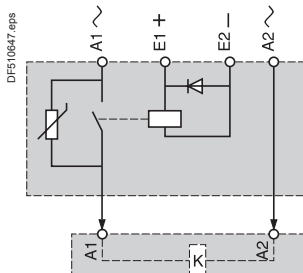
On-delay LA4 DT•U



Interface modules

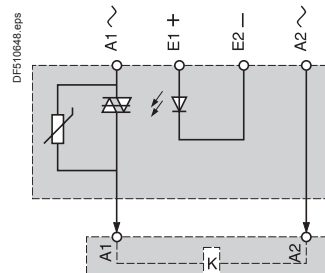
Relay output

LA4 DFB



Solid state

LA4 DWB



References: page B8/85.

Selection:
pages A5/23 to A5/47

Characteristics:
pages B8/53 to B8/58

References:
pages B8/2 to B8/19

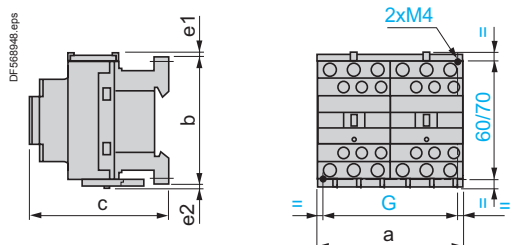
Dimensions:
pages B8/65 and B8/66

TeSys contactors

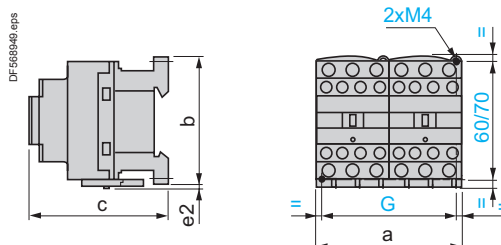
TeSys D reversing contactors

TeSys D

LC2 D09 to D38
2 x LC1 D09 to D38



LC2 DT20 to DT40
2 x LC1 DT20 to DT40



LC2 or 2 x LC1	a	b	c ⁽¹⁾	e1	e2	G
D09 to D18 ~	90	77	86	4	1.5	80
D093 to D123 ~	90	99	86	-	-	80
D09 to D18 -	90	77	95	4	1.5	80
D093 to D123 -	90	99	95	-	-	80
D25 to D38 ~	90	85	92	9	5	80
D183 to D383 ~	90	99	92	-	-	80
D25 to D32 -	90	85	101	9	5	80
D183 to D383 -	90	99	101	-	-	80

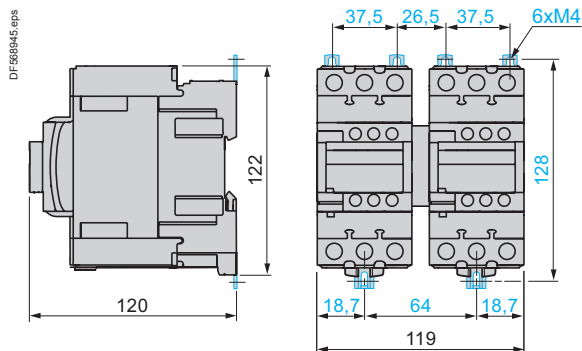
LC2 or 2 x LC1	a	b	c	G
DT20 and DT25 ~	90	85	92	80
DT32 and DT40 ~	90	91	99	80
DT20 and DT25 -	90	85	102	80
DT32 and DT40 -	90	91	109	80

c, e: including cabling.

e1 and e2: including cabling.

(1) With safety cover, without add-on block.

LC2 D40A to D65A
2 x LC1 D40A to D65A

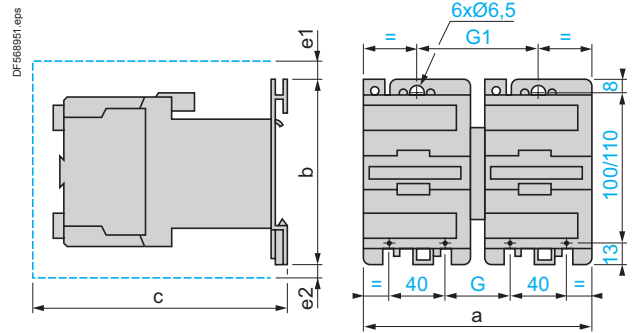
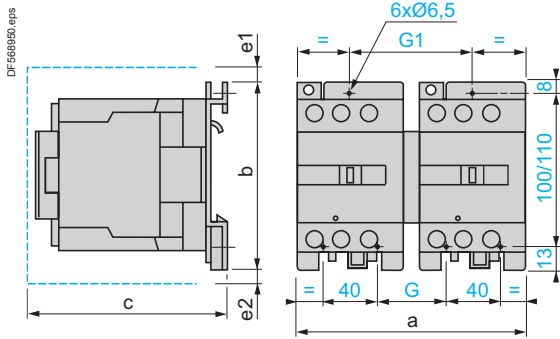


TeSys D

LC2 D80 and D95

2 x LC1 D80 and D95 ~

2 x LC1 D80 and D95 ---



LC2 or 2 x LC1	a	b	c	e1	e2	G	G1
D80 and D95 ~	182	127	158	13	-	57	96
D80004 ~	207	127	158	-	20	71	111

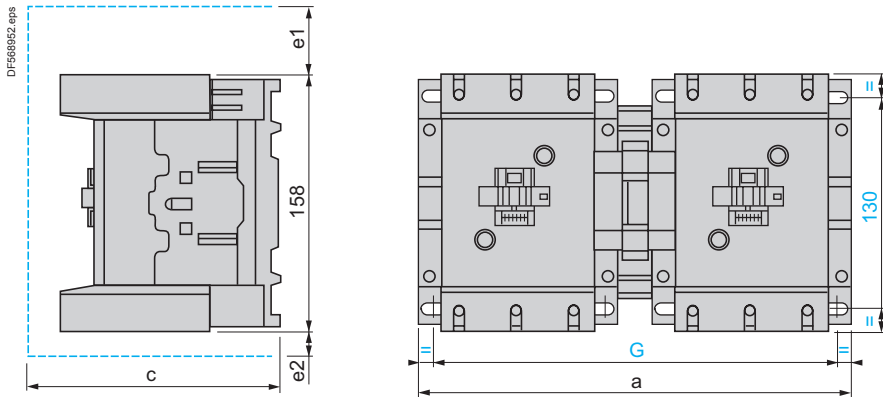
2 x LC1	a	b	c	e1	e2	G	G1
D80 and D95	207	127	215	13	20	96	111

c, e1 and e2: including cabling.

c, e1 and e2: including cabling.

LC2 D115 and D150

2 x LC1 D115 and D150



LC2 or 2 x LC1	a	c	e1	e2	G
D115 and D150	266	148	56	18	242/256
D115004	334	148	-	60	310/324

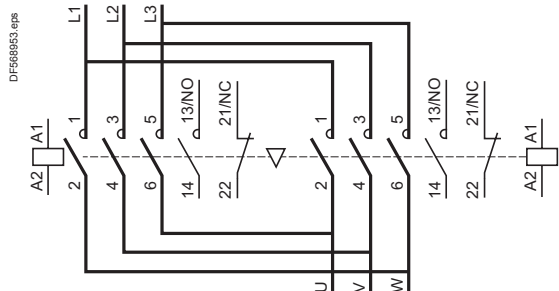
c, e1 and e2: including cabling.

TeSys D

Reversing contactors for motor control

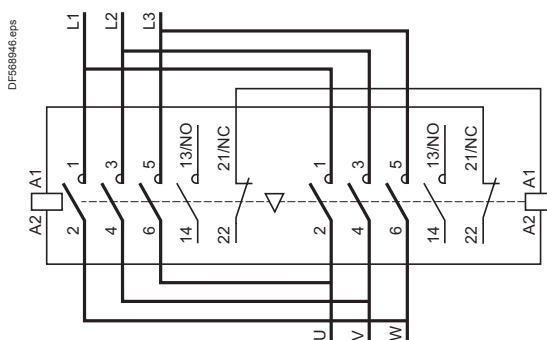
LC2 D09...D150

Horizontally mounted



LAD 9R1V

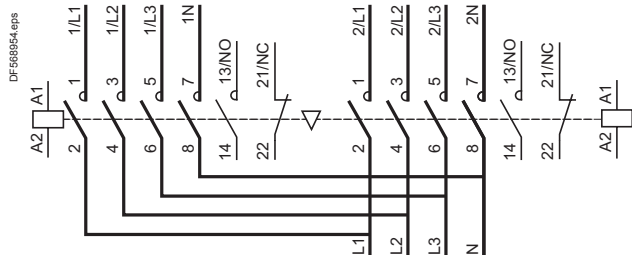
With integral electrical interlocking



Changeover contactor pairs

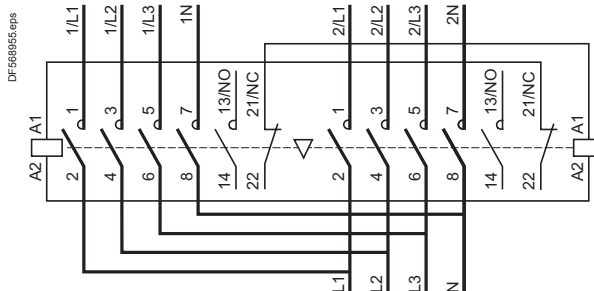
LC2 DT20...DT40

Horizontally mounted



LAD T9R1V

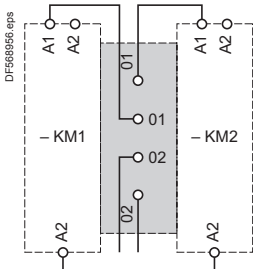
With integral electrical interlocking



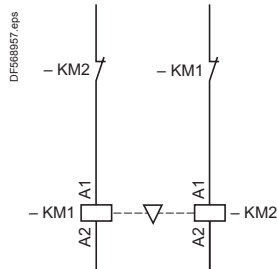
TeSys D

Electrical interlocking of reversing contactors fitted with:

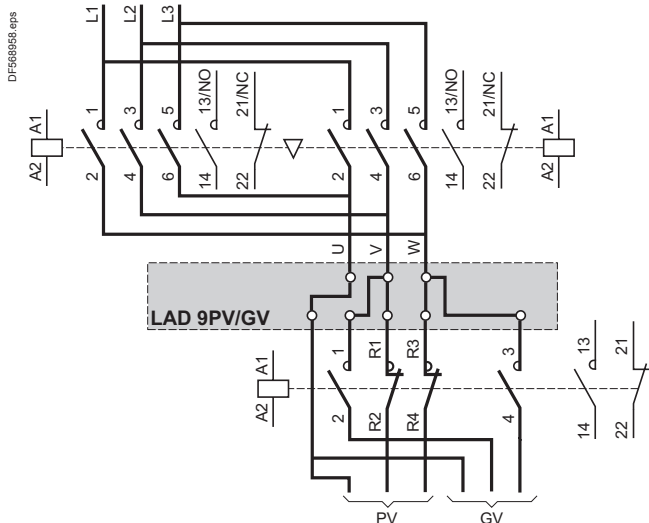
Mechanical interlock with integral electrical contacts
 LA9 D4002, LA9 D8002 and LA9 D11502



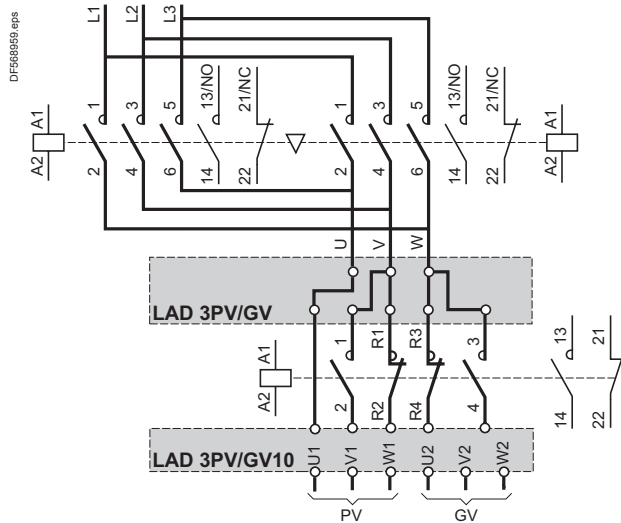
Mechanical interlock without integral electrical contacts
 LAD 9V2, LAD 4CM, LA9 D50978 and LA9 D80978



Low speed - High speed cabling kit, screw clamp terminals



Low speed - High speed cabling kit, spring terminals



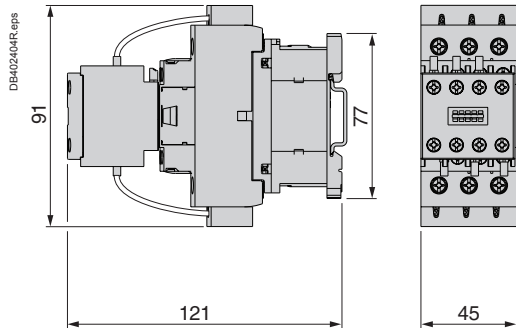
TeSys contactors

For switching 3-phase capacitor banks,
used for power factor correction

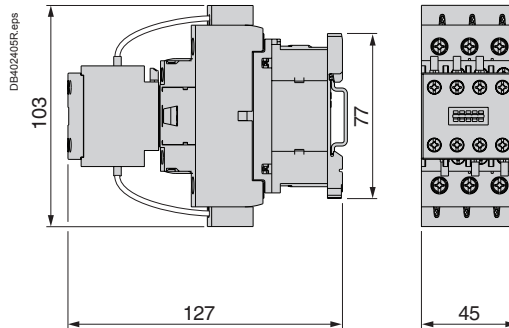
TeSys D

Dimensions

LC1 DFK, DGK



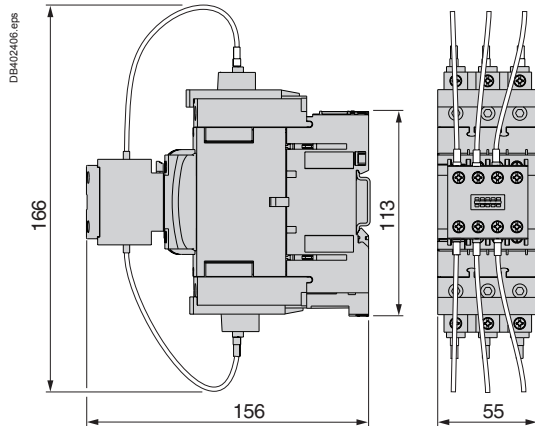
LC1 DLK, DMK



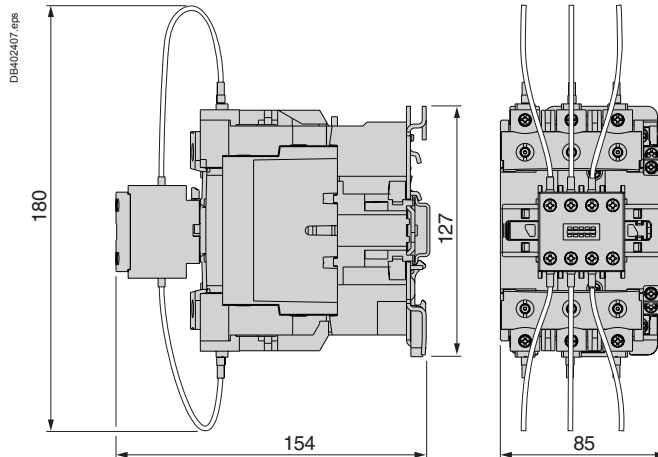
LC1	Type of fixing
DFK	LC1 D18 See pages B8/67 and B8/68
DGK	LC1 D18 See pages B8/67 and B8/68

LC1	Type of fixing
DLK	LC1 D25 See pages B8/67 and B8/68
DMK	LC1 D32 See pages B8/67 and B8/68

LC1 DPK, DTK



LC1 DWK

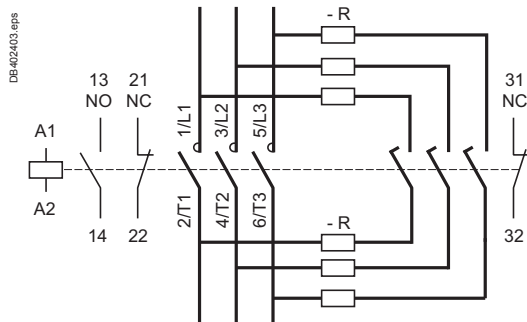


LC1	Type of fixing
DPK	LC1 D40A See pages B8/67 and B8/68
DTK	LC1 D65A See pages B8/67 and B8/68

LC1	Type of fixing
DWK	LC1 D80 See pages B8/67 and B8/68

Schemes

LC1 D•K



R = Pre-wired resistor connections.

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

TeSys SK

Environment			
Rated insulation voltage (Ui)	Conforming to 60947, VDE 0110 gr C, BS 5424, CSA 22-2 n° 14, UL 508	V	690
Conforming to standards			IEC 60947, NF C 63-110, VDE 0660, BS 5424
Approvals			UL, CSA
Protective treatment	Conforming to IEC 60068 (DIN 50015)		"TC" (Klimafest, Climateproof)
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact
Ambient air temperature around the device	Storage	°C	-50...+70
	Operation	°C	-20...+50
Maximum operating altitude	Without derating	m	2000
Operating position			<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Vertical axis</p> <p>Without derating</p> </div> <div style="text-align: center;"> <p>Horizontal axis</p> <p>Without derating</p> </div> </div>
Cabling, screw clamp terminals			Min
	Solid conductor	mm ²	1 x 1.5 or 2 x 1.5
	Flexible cable without cable end	mm ²	1 x 0.5 or 2 x 0.35
	Flexible cable with cable end	mm ²	1 x 0.35 or 2 x 0.35
			Max
			1 x 6 or 2 x 4
			1 x 6 or 2 x 2.5
			1 x 6 or 2 x 1.5
Tightening torque	Pozidriv n° 1 head	N.m	0.8
Terminal referencing			Conforming to standards En 50005

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

TeSys SK

Pole characteristics

Conventional thermal current (I _{th})	For ambient temperature ≤ 55 °C	A	12
Rated operational frequency		Hz	50/60
Frequency limits of the operational current		Hz	Up to 400
Rated operational voltage (U _e)		V	690
Rated making capacity	I rms conforming to NF C 63-110 and IEC 60947	A	66
Rated breaking capacity (for U _e ≤ 400 V)	Conforming to NF C 63-110 and IEC 60947 (I rms)	A	52
Short time rating	In free air for a time "t" from cold state (θ ≤ 55 °C)	A	50
Short-circuit protection	gl fuse U ≤ 440 V	A	16
Average impedance per pole	At I _{th} and 50 Hz	mΩ	4
Maximum rated operational current For a temperature ≤ 55 °C	AC-3 ⁽¹⁾ (U _e ≤ 400 V)	A	6
	AC-1	A	12
Utilisation in category AC-1 resistive circuits, heating, lighting (U _e ≤ 440 V)	Increase in operational current by paralleling of poles	A	20

Auxiliary contact characteristics of add-on blocks

Rated operational voltage (U _e)	Up to	V	690
Rated insulation voltage (U _i)	Conforming to IEC 60947, BS 5424, VDE 0110 group C, CSA C 22-2 n° 14	V	690
Conventional thermal current (I _{th})	For ambient temperature ≤ 55 °C	A	10
Frequency of operational current		Hz	Up to 400
Short-circuit protection	Conforming to IEC 60947 and VDE 0660, gl fuse	A	10

Operational power of contacts conforming to IEC 60947

a.c. supply, category AC-15

Electrical durability (valid up to 3600 operating cycles per hour) on an inductive load such as the coil of an electromagnet: making current (cos φ 0.7) = 10 times the breaking current (cos φ 0.4).

	V	24	48	110/ 127	220/ 230	380/ 400	440
1 million operating cycles	VA	48	96	240	440	800	880
3 million operating cycles	VA	17	34	86	158	288	317
10 million operating cycles	VA	7	14	36	66	120	132
Occasional making capacity	VA	1000	2050	5000	10000	14000	13000

d.c. supply, category DC-13

Electrical durability (valid up to 1200 operating cycles per hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

	V	24	48	110	220	440	440
1 million operating cycles	W	120	80	60	52	51	880
3 million operating cycles	W	55	38	30	28	26	317
10 million operating cycles	W	15	11	9	8	7	132
Occasional making capacity	W	720	600	400	300	230	13000

(1) For LC1 contactors.

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

TeSys SK

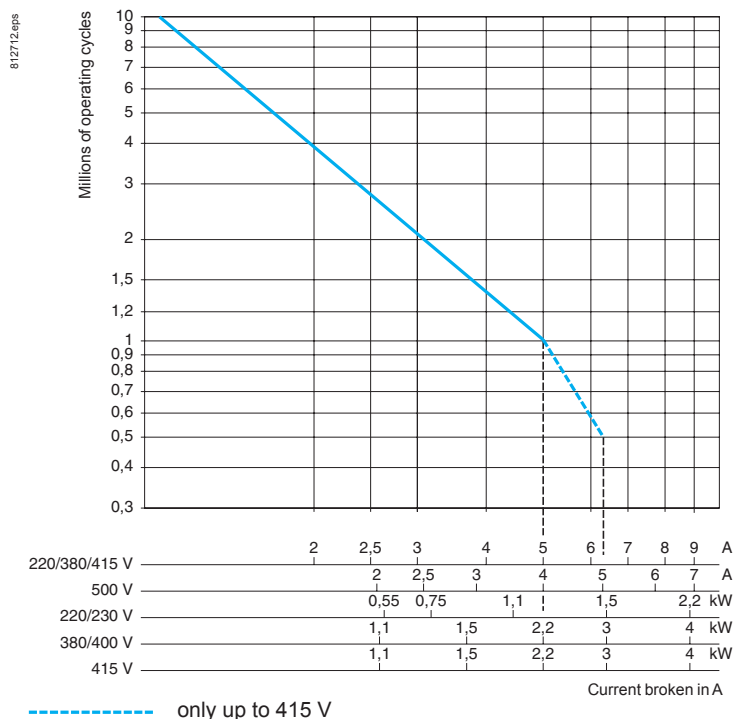
Control circuit characteristics

Type			LC1 SK06	LP1 SK06
Rated control circuit voltage (Uc)		V	~ 24...400	~ 12...72
Control voltage limits ($\theta \leq 50\text{ }^\circ\text{C}$)	For operation		0.85...1.1 Uc	0.85...1.1 Uc
	For drop-out		$\geq 0.20\text{ }U_c$	$\geq 0.10\text{ }U_c$
Average coil consumption at 20 °C and at Uc	Inrush		16 VA	2.2 W
	Sealed		4.2 VA	2.2 W
Heat dissipation		W	1.4	2.2
Operating time at 20 °C and at Uc				
Between coil energisation and	opening of the N/C contacts	ms	8...16	10...18
	closing of the N/O contacts	ms	7...14	8...12
Between coil de-energisation and	opening of the N/O contacts	ms	6...8	4...6
	closing of the N/C contacts	ms	8...10	6...8
Maximum operating rate	In operating cycles per hour		1200	1200
Mechanical durability at Uc In millions of operating cycles	50/60 Hz coil		10	–
	~ coil		–	10

Use in category AC-3 ($U_e \leq 440$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.

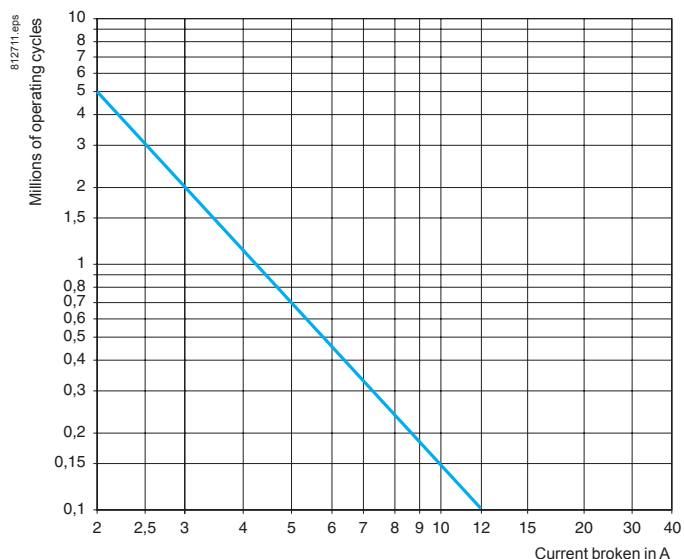
The current broken (I_c) in category AC-3 is equal to the rated operational current (I_e) of the motor.



Use in category AC-1 ($U_e \leq 440$ V)

Control of resistive circuits ($\cos \varphi \geq 0.95$).

The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.



TeSys contactors

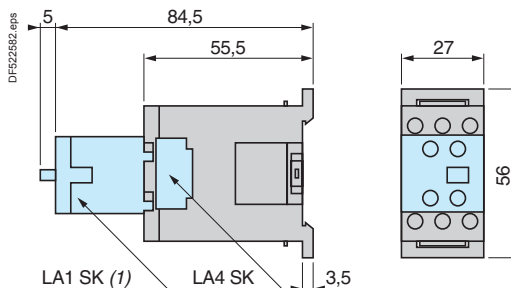
Mini-contactors TeSys LC1 SK and LP1 SK

TeSys SK

Dimensions

Mini-contactors

LC1 and LP1 SK06



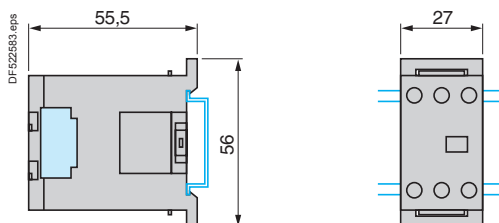
(1) Only on LC1 SK06.

Mounting

Mini-contactors

LC1 and LP1 SK06

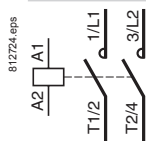
On mounting rail AM1 DP200 or AM1 DE200 (≈ 35 mm)



Schemes

2-pole mini-contactors

LC1 and LP1 SK06



Add-on power pole block

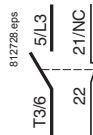
1 pole + 1 "N/O" aux.

LA1 SK10



1 pole + 1 "N/C" aux.

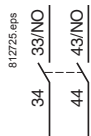
LA1 SK01



Instantaneous auxiliary contacts

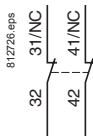
2 "N/O"

LA1 SK20



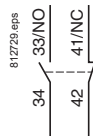
2 "N/C"

LA1 SK02



1 "N/O" + 1 "N/C"

LA1 SK11



TeSys contactors

TeSys K contactors and reversing contactors

TeSys K

Environment characteristics			
Conforming to standards		IEC 60947, NF C 63-110, VDE 0660, BS 5424	
Product certifications		LC● and LP● K06 to K12	
Operating positions			
Connection		mm²	Min. Max. Max. to IEC 60947
Screw clamp terminals	Solid conductor	mm ²	1 x 1.5 2 x 4 1 x 4 + 1 x 2.5
	Flexible conductor without cable end	mm ²	1 x 0.75 2 x 4 2 x 2.5
	Flexible conductor with cable end	mm ²	1 x 0.34 1 x 1.5 + 1 x 2.5 1 x 1.5 + 1 x 2.5
Spring terminals	Solid conductor	mm ²	1 x 0.75 1 x 1.5 2 x 1.5
	Flexible conductor without cable end	mm ²	1 x 0.75 1 x 1.5 2 x 1.5
Faston connectors	Clip	mm	2 x 2.8 or 1 x 6.35
Solder pins for printed circuit board	With locating device between power and control circuits		4 mm x 35 microns
Tightening torque	Philips head n° 2 and Ø6	N.m	0.8
Terminal referencing	Conforming to standards EN 50005 and EN 50012		Up to 5 contacts, depending on model
Rated insulation voltage (Ui)	Conforming to IEC 60947	V	690
	Conforming to VDE 0110 gr C	V	750
	Conforming to BS 5424, NF C 20-040	V	690
	Conforming to CSA 22-2 n° 14, UL 508	V	600
Rated impulse withstand voltage (Uimp)		kV	8
Protective treatment	Conforming to IEC 60068 (DIN 50016)		"TC" (Klimafest, Climateproof)
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact
Ambient air temperature around the device	Storage	°C	-50...+80
	Operation	°C	-25...+50
Maximum operating altitude	Without derating	m	2000
Vibration resistance 5 ... 300 Hz	Contactors open		2 gn
	Contactors closed		4 gn
Flame resistance	Conforming to UL 94		Self-extinguishing materials V1
	Conforming to NF F 16-101 and 16-102		Conforming to requirement 2
Shock resistance (1/2 sine wave, 11 ms)	Contactors open		On X axis: 6 gn On Y and Z axes: 10 gn
	Contactors closed		On X axis: 10 gn On Y and Z axes: 15 gn
Safe separation of circuits	Conforming to VDE 0106 and IEC 60536		SELV (Safety Extra Low Voltage), up to 400 V

Pole characteristics								
Type	LC● or LP●		K06	K09	K12	K16		
Conventional thermal current (Ith)	For ambient temperature ≤ 50 °C	A	20					
Rated operational frequency		Hz	50/60					
Frequency limits of the operational current		Hz	Up to 400					
Rated operational voltage (Ue)		V	690					
Rated making capacity	I rms conforming to NF C 63 110 and IEC 60947	A	110	110	144	160		
Rated breaking capacity	I rms conforming to NF C 63 110 and IEC 60947	A	110	110	–	–		
	220/230 V	A	110	110	–	–		
	380/400 V	A	110	110	–	–		
	415 V	A	110	110	–	–		
	440 V	A	110	110	110	110		
	500 V	A	80	80	80	80		
Permissible short time rating	In free air for a time "t" from cold state (θ ≤ 50 °C)	1 s	A	90	90	115	115	
		5 s	A	85	85	105	105	
		10 s	A	80	80	100	100	
		30 s	A	60	60	75	75	
		1 min	A	45	45	55	55	
		3 min	A	40	40	50	50	
		≥ 15 min	A	20	20	25	25	
Short-circuit protection	gG fuse U ≤ 440 V (aM fuse, see page 22009/2)	A	25					
Average impedance per pole	At Ith and 50 Hz	mΩ	3					
Use in category AC-1 resistive circuits, heating, lighting (Ue ≤ 440 V)	Maximum rated operational current for a temperature ≤ 50 °C	A	20					
	Maximum rated operational current for a temperature ≤ 70 °C	A	16 for Ue only					
	Rated operational current limits in relation to the on-load factor and operating frequency	On-load factor			90 %	60 %	30 %	
		A		300 operating cycles/hour	13	15	18	
		A		120 operating cycles/hour	15	18	19	
		A		30 operating cycles/hour	19	20	20	
	Increase in rated operational current by paralleling of poles			Apply the following coefficients to the above currents; these coefficients take into account an often unbalanced distribution of current between the poles				
			2 poles in parallel: K = 1.60					
			3 poles in parallel: K = 2.25					
			4 poles in parallel: K = 2.80					
Use in category AC-3 squirrel cage motors	Operational power according to the voltage. Voltage 50 or 60 Hz	115 V single-ph.	kW	0.37	0.55	–	–	
		220 V single-ph.	kW	0.75	1.1	–	–	
		220/230 V 3-ph.	kW	1.5	2.2	3	4	
		380/415 V 3-ph.	kW	2.2	4	5.5	7.5	
		440/480 V 3-ph.	kW	3	4	5.5/4 (480)	5.5/4 (480)	
		500/600 V 3-ph.	kW	3	4	4	4	
		660/690 V 3-ph.	kW	3	4	4	4	
		Maximum operating rate (in operating cycles/hour in relation to % of rated power)			Op. cycles/h	600	900	1200
				Power	100 %	75 %	50 %	

TeSys contactors

TeSys K contactors and reversing contactors

TeSys K

Control circuit characteristics

Type		LC1	LC2	LC7	LC8	LP1	LP2	LP4	LP5	
Rated control circuit voltage (Uc)	V	~ 12...690 ⁽¹⁾		~ 24...240 ⁽¹⁾		~ 12...250 ⁽¹⁾		~ 12...120		
Control voltage limits (≤ 50 °C) single voltage coil	Operation	0.8...1.15 Uc ⁽²⁾		0.85...1.1 Uc		0.8...1.15 Uc		0.7...1.30 Uc		
	Drop-out	≥ 0.20 Uc		≥ 0.10 Uc		≥ 0.10 Uc		≥ 0.10 Uc		
Average consumption at 20 °C and at Uc	Inrush	30 VA		3 VA		3 W		1.8 W		
	Sealed	4.5 VA		3 VA		3 W		1.8 W		
Heat dissipation	W	1.3		3		3		1.8		
Operating time at 20 °C and at Uc	Between coil energisation and:	- opening of the N/C contacts	ms 5...15		25...35		25...35		25...35	
		- closing of the N/O contacts	ms 10...20		30...40		30...40		30...40	
	Between coil de-energisation and:	- opening of the N/O contacts	ms 10...20		30		10		10...20	
		- closing of the N/C contacts	ms 15...25		40		15		15...25	
Maximum immunity to microbreaks	ms	2		2		2		2		
Maximum operating rate	In operating cycles per hour	3600		3600		3600		3600		
Mechanical durability at Uc In millions of operating cycles	50/60 Hz coil	10	5	10	5	-	-	-	-	
	--- coil	-	-	-	-	10	5	-	-	
	Wide range coil, Low consumption	-	-	-	-	-	-	30	5	

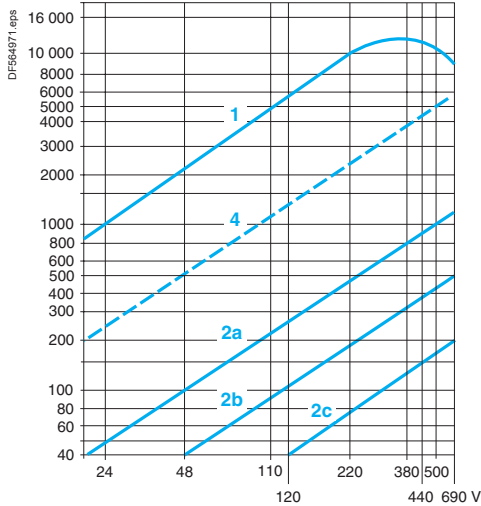
(1) For mains supplies with a high level of interference (voltage surge > 800 V), use a suppressor module LA4 KE1FC (50...129 V) or LA4 KE1UG (130...250 V), see page B8/42.

(2) LC1 K16: 0.85...1.15 Uc.

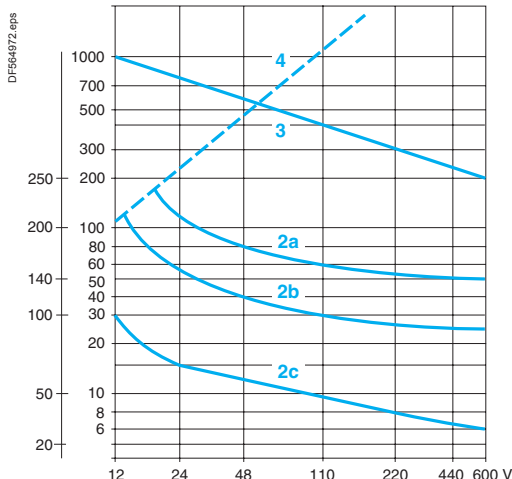
Auxiliary contact characteristics of contactors and instantaneous contact blocks

Number of auxiliary contacts	On LC● K or LP● K 3-pole		1
	On LA1 K		2 or 4
Rated operational voltage (Ue)	Up to	V	690
Rated insulation voltage (Ui)	Conforming to BS 5424	V	690
	Conforming to IEC 60947	V	690
	Conforming to VDE 0110 group C	V	750
	Conforming to CSA C 22-2 n° 14	V	600
Conventional thermal current (Ith)	For ambient temperature ≤ 50 °C	A	10
		Hz	Up to 400
Frequency of the operational current			
Minimum switching capacity	U min (DIN 19 240)	V	17
	I min	mA	5
Short-circuit protection	Conforming to IEC 60947 and VDE 0660, gG fuse	A	10
Rated making capacity	Conforming to IEC 60947	A	110
Short-time rating	Permissible for	1 s	A 80
		500 ms	A 90
		100 ms	A 110
Insulation resistance		MΩ	> 10
Non-overlap distance	LA1 K: linked contacts conforming to INRS, BIA and CNA specifications	mm	0.5 (see schemes pages B8/86 and B8/88)

Power broken in VA



Power broken in W



Operational power of contacts conforming to IEC 60947

a.c. supply, category AC-15

Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \varphi 0.7$) = 10 times the power broken ($\cos \varphi 0.4$).

Operating cycles	V	24	48	110/127	220/230	380/400	440	600/690
1 million operating cycles	VA	48	96	240	440	800	880	1200
3 million operating cycles	VA	17	34	86	158	288	317	500
10 million operating cycles	VA	7	14	36	66	120	132	200
Occasional making capacity	VA	1000	2050	5000	10000	14000	13000	9000

d.c. supply, category DC-13

Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

Operating cycles	V	24	48	110	220	440	600
1 million operating cycles	W	120	80	60	52	51	50
3 million operating cycles	W	55	38	30	28	26	25
10 million operating cycles	W	15	11	9	8	7	6
Occasional making capacity	W	720	600	400	300	230	200

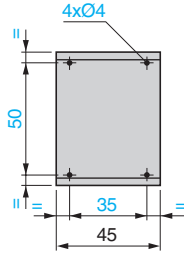
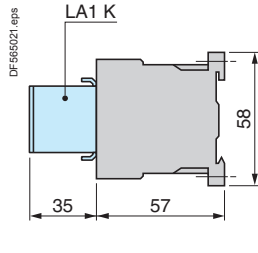
1. Breaking limit of contacts valid for:
 - maximum of 50 operating cycles at 10 s intervals (power broken = making current x $\cos \varphi 0.7$).
2. Electrical durability of contacts for:
 - 1 million operating cycles (2a)
 - 3 million operating cycles (2b)
 - 10 million operating cycles (2c).
3. Breaking limit of contacts valid for:
 - maximum of 20 operating cycles at 10 s intervals with current passing for 0.5 s per operating cycle.
4. Thermal limit.

TeSys K

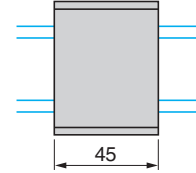
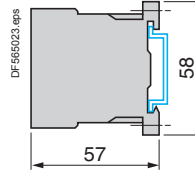
Contactors

LC1 K, LC7 K, LP1 K, LP4 K

On panel

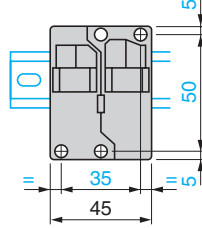
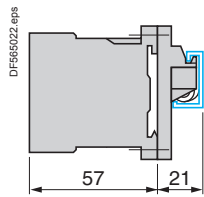


On mounting rail AM1 DP200 or AM1 DE200 (L₁ 35 mm)

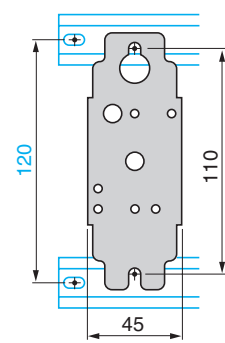
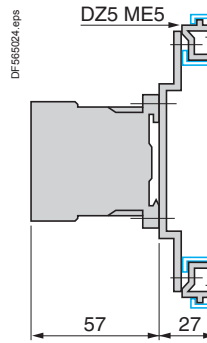


LA9 D973

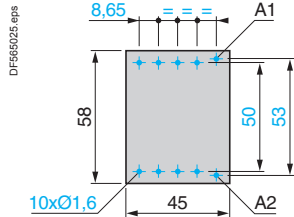
On one asymmetrical rail DZ5 MB with clip-on mounting plates



DX1 AP25

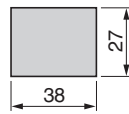
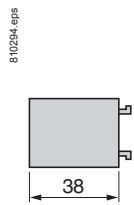


On printed circuit board

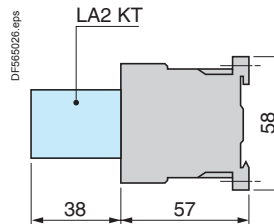


Electronic time delay contact blocks

LA2 KT

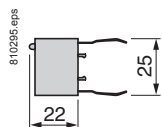


On contactor

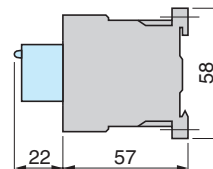


Suppressor modules

LA4 K●



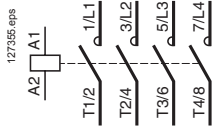
On contactor LC1 K or LP1 K



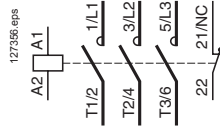
TeSys K

3-pole contactors

3 P + N/O

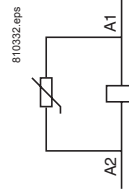


3 P + N/C

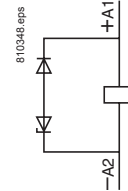


With integral suppression device

LC7 K

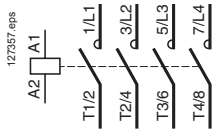


LP4 K

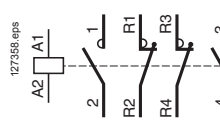


4-pole contactors

4 P

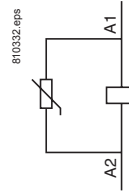


2 P N/O + 2 P N/C

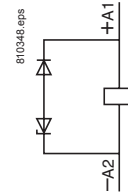


With integral suppression device

LC7 K



LP4 K



Instantaneous auxiliary contacts LA1 K

LA1 KN20, KN207, KN203

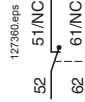
LA1 KN02, KN027, KN023

LA1 KN11, KN117, KN113

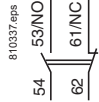
2 N/O



2 N/C



1 N/O + 1 N/C



LA1 KN40, KN407, KN403

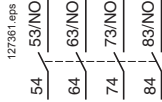
LA1 KN31, KN317, KN313

LA1 KN22, KN227, KN223

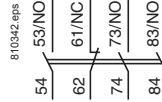
LA1 KN13, KN137, KN133

LA1 KN04, KN047, KN043

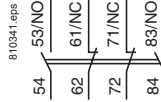
4 N/O



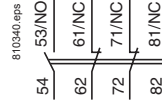
3 N/O + 1 N/C



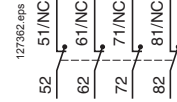
2 N/O + 2 N/C



1 N/O + 3 N/C



4 N/C



Terminal referencing conforming to standard EN 50012

LA1 KN02M

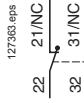
LA1 KN11M

LA1 KN31M

LA1 KN22M

LA1 KN13M

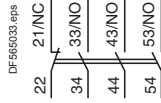
2 N/C



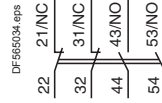
1 N/O + 1 N/C



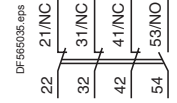
3 N/O + 1 N/C



2 N/O + 2 N/C

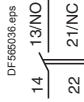


1 N/O + 3 N/C



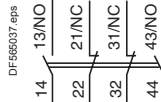
LA1 KN11P

1 N/O + 1 N/C



LA1 KN22P

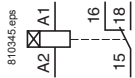
2 N/O + 2 N/C



Electronic time delay contact blocks

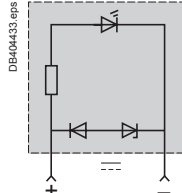
LA2 KT

1 C/O

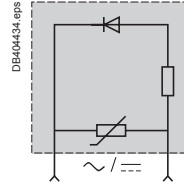


Suppressor modules

LA4 KC



LA4 KE



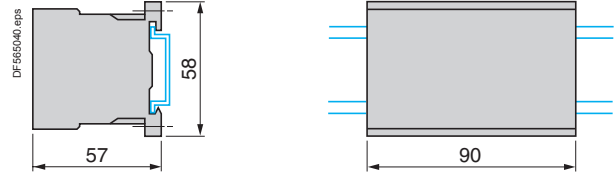
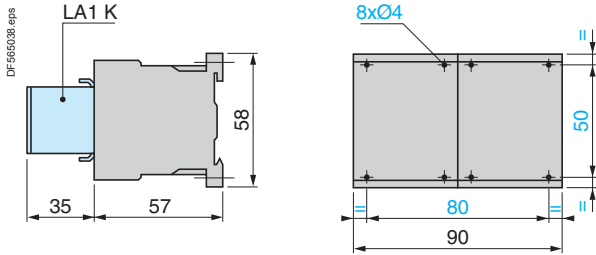
TeSys K

Reversing contactors

LC2 K, LC8 K, LP2 K, LP5 K

On panel

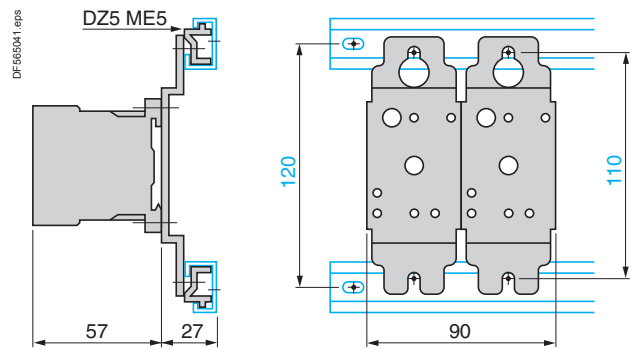
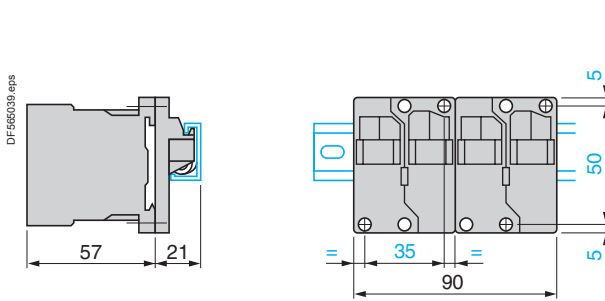
On mounting rail AM1 DP200 or AM1 DE200 (└ 35 mm)



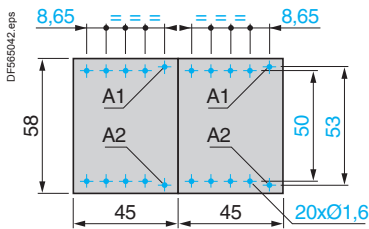
2 x LA9 D973

2 x DX1 AP25

On one asymmetrical mounting rail DZ5 MB with 2 clip-on mounting plates LA9 D973 or on 2 mounting plates DX1 AP25.



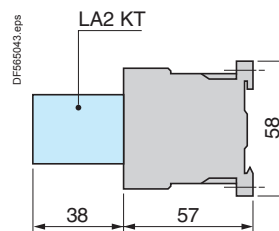
On printed circuit board for reversing contactors or 2 contactors mounted side by side.



Electronic time delay contact blocks

LA2 KT

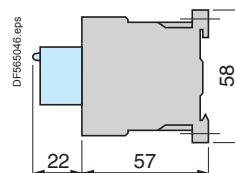
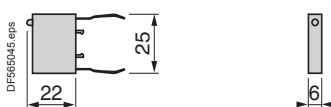
On reversing contactors



Suppressor modules

LA4 K

On reversing contactors LC2 K or LP2 K

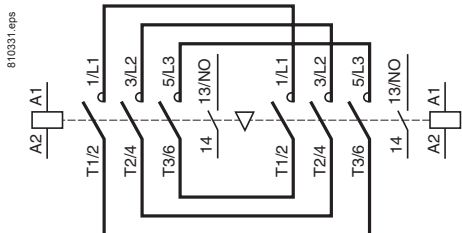


TeSys K

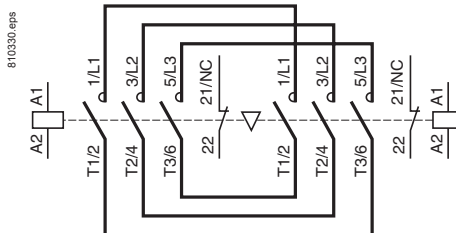
3-pole reversing contactors

With screw clamp connections

3 P + N/O



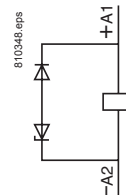
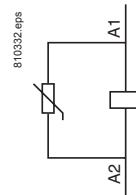
3 P + N/C



With integral suppression device

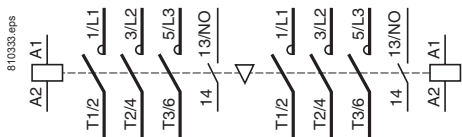
LC8 K

LP5 K

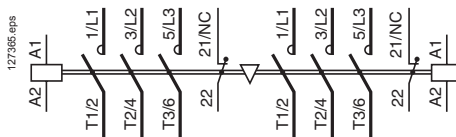


With Faston connectors or solder pins (printed circuit board)

3 P + N/O



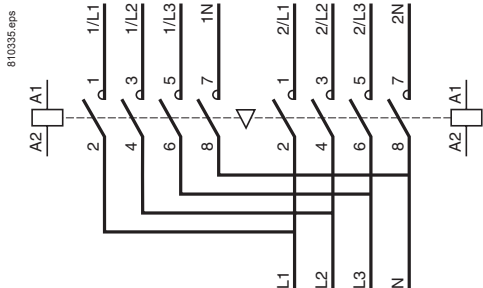
3 P + N/C



4-pole reversing contactors

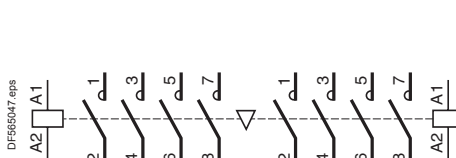
With screw clamp connections

4 P



With Faston connectors or solder pins (printed circuit board)

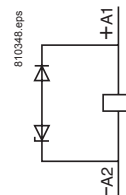
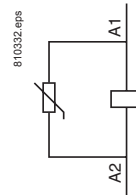
4 P



Integral suppression device

LC8 K

LP5 K



Instantaneous auxiliary contacts LA1 K

Terminal referencing conforming to standard EN 50012

LA1 KN20, KN207, KN203

LA1 KN02, KN027, KN023

LA1 KN11, KN117, KN113

LA1 KN02M

LA1 KN11M

LA1 KN11P

2 N/O

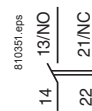
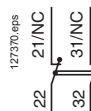
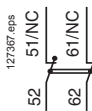
2 N/C

1 N/O + 1 N/C

2 N/C

1 N/O + 1 N/C

1 N/O + 1 N/C



LA1 KN40, KN407, KN403

LA1 KN31, KN317, KN313

LA1 KN22, KN227, KN223

LA1 KN13, KN137, KN133

LA1 KN04, KN047, KN043

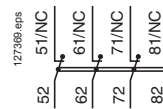
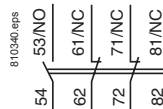
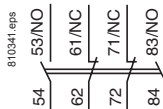
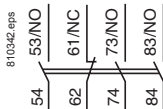
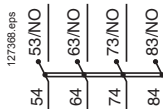
4 N/O

3 N/O + 1 N/C

2 N/O + 2 N/C

1 N/O + 3 N/C

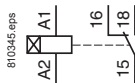
4 N/C



Electronic time delay contact blocks

LA2 KT

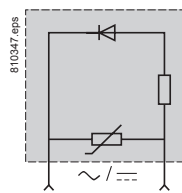
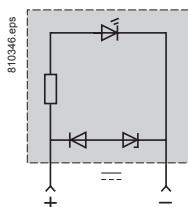
1 C/O



Suppressor modules

LA4 KC

LA4 KE



TeSys contactors

Mini-contactors TeSys LC1SKGC, for use in modular panels

TeSys SKGC

Environment			
Rated insulation voltage (Ui)	Conforming to IEC 60947, VDE 0110 gr C, BS 5424, CSA 22-2 n° 14, UL 508	V	690
Conforming to standards			IEC 60947, NF C 63-110, VDE 0660, BS 5424
Product certifications			UL, CSA
Protective treatment	Conforming to IEC 60068 (DIN 50015)		"TC" (Klimafest, Climateproof)
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact
Ambient air temperature around the device			
	Storage	°C	-50...+70
	Operation	°C	-20...+50
Maximum operating altitude	Without derating	m	2000
Operating position			<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Vertical axis</p> <p>Without derating</p> </div> <div style="text-align: center;"> <p>Horizontal axis</p> <p>Without derating</p> </div> </div>
Cabling, connectors			Min. Max.
	Solid conductor	mm²	1 x 1.5 or 2 x 1.5 1 x 6 or 2 x 4
	Flexible cable without cable end	mm²	1 x 0.5 or 2 x 0.35 1 x 6 or 2 x 2.5
	Flexible cable with cable end	mm²	1 x 0.35 or 2 x 0.35 1 x 6 or 2 x 1.5
Tightening torque	Pozidriv n° 1 head	N.m	0.8
Terminal referencing			Conforming to standards EN 50005

TeSys contactors

Mini-contactors TeSys LC1SKGC, for use in modular panels

TeSys SKGC

Pole characteristics					
Mini-contactor type			LC1 SKGC2	LC1 SKGC3 and LC1 SKGC4	
Conventional thermal current (I _{th})	For ambient temperature ≤ 55 °C	A	20	20	
Rated operational frequency		Hz	50/60		
Frequency limit of the operational current		Hz	up to 400		
Rated operational voltage (U _e)		V	690		
Rated making capacity	I rms conforming to NF C 63-110 and IEC 60947	A	50	85	
Rated breaking capacity (for U _e ≤ 400 V)	Conforming to NF C 63-110 and IEC 60947 (I rms)	A	40	68	
Permissible short time rating	In free air for a time "t" from cold state (θ ≤ 55 °C)	A	40	60	
Short-circuit protection	gl fuse U ≤ 440 V	A	20	20	
Average impedance per pole	At I _{th} and 50 Hz	mΩ	4	4	
Maximum rated operational current	For temperature ≤ 55 °C	AC-3 (U _e ≤ 400 V)	A	5	9
		AC-1	A	20	20
Use in category AC-1 resistive circuits, heating, lighting (U _e ≤ 440 V)	Increase in rated operational current by paralleling of 2 poles	A	32	32	

Auxiliary contact characteristics of mini-contactors				
Rated operational voltage (U _e)	Up to	V	690	
Rated insulation voltage (U _i)	Conforming to IEC 60947, BS 5424, VDE 0110 group C, CSA C 22-2 n° 14	V	690	
Conventional thermal current (I _{th})	For ambient temperature ≤ 55 °C	A	10	
Frequency of the operational current		Hz	Up to 400	
Short-circuit protection	Conforming to IEC 60947 and VDE 0660, gl fuse	A	10	

Operational power of contacts conforming to IEC 60947

a.c. supply, category AC-15

Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current (cos φ 0.7) = 10 times the power broken (cos φ 0.4).

	V	24	48	110/ 127	220/ 230	380/ 400	440
1 million operating cycles	VA	48	96	240	440	800	880
3 million operating cycles	VA	17	34	86	158	288	317
10 million operating cycles	VA	7	14	36	66	120	132
Occasional making capacity	VA	1000	2050	5000	10000	14000	13000

d.c. supply, category DC-13

Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

	V	24	48	110	220	440	440
1 million operating cycles	W	120	80	60	52	51	880
3 million operating cycles	W	55	38	30	28	26	317
10 million operating cycles	W	15	11	9	8	7	132
Occasional making capacity	W	720	600	400	300	230	13000

TeSys contactors

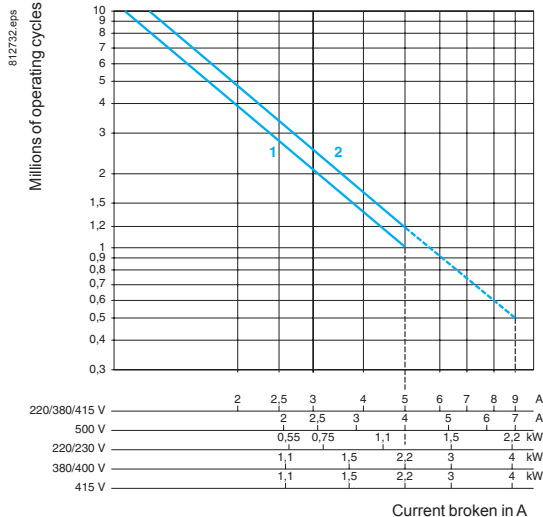
Mini-contactors TeSys LC1SKGC, for use in modular panels

TeSys SKGC

Control circuit characteristics					
Mini-contactor type		LC1 SKGC2	LC1 SKGC3 and LC1 SKGC4		
Rated control circuit voltage (Uc)	V	~ 24...400			
Control voltage limits (θ ≤ 55 °C)	Operation	0.85...1.1 Uc			
	For drop-out	≥ 0.20 Uc			
Average coil consumption at 20 °C and at Uc	Inrush	VA	16	23	
	Sealed	VA	4.2	4.9	
Heat dissipation	W	1.4	1.5		
Operating time at 20 °C and at Uc	Between coil energisation and	opening of the N/C contacts	ms	8...16	
		closing of the N/O contacts	ms	7...14	
	Between coil de-energisation and	opening of the N/O contacts	ms	6...8	
		closing of the N/C contacts	ms	8...10	
Maximum operating rate	In operating cycles per hour	1200			
Mechanical durability at Uc	50/60 Hz coil in millions of operating cycles	10			

Use in category AC-3 ($U_e \leq 440\text{ V}$)

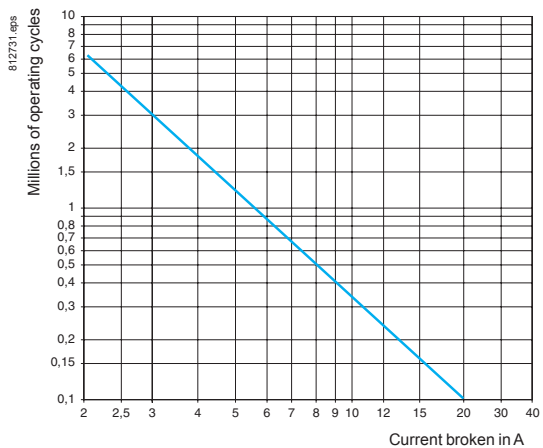
Control of 3-phase asynchronous squirrel cage motors with breaking whilst running. The current broken (I_c) in category AC-3 is equal to the rated operational current of the motor.



- 1. LC1 SKGC2
- 2. LC1 SKGC3 and SKGC4
- only up to 415 V

Use in category AC-1 ($U_e \leq 440\text{ V}$)

Control of resistive circuits ($\cos \varphi \geq 0.95$). The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.



TeSys contactors

Mini-contactors TeSys LC1 SKGC,
for use in modular panels

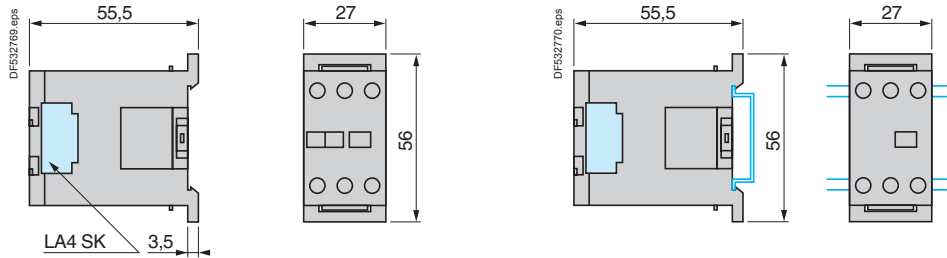
TeSys SKGC

Dimensions

Mini-contactors LC1 SKGC2

Mounting

On mounting rail AM1 DP200 or AM1 DE200 (└ 35 mm)



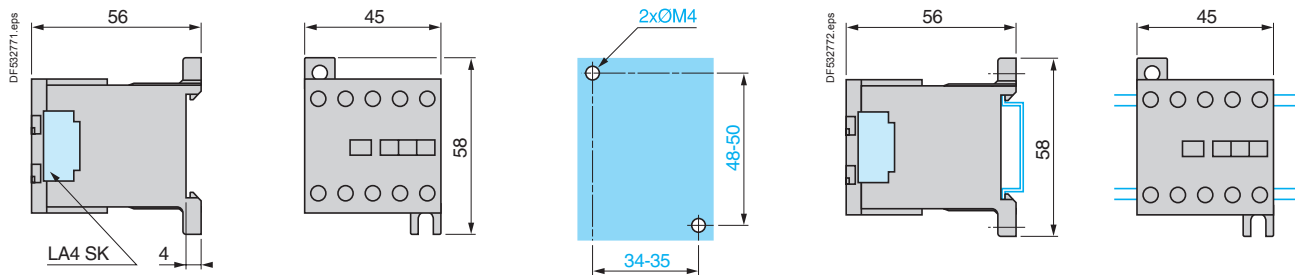
Dimensions

Mini-contactors LC1 SKGC3 and SKGC4

Mounting

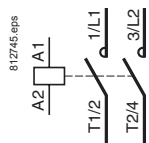
On panel

On mounting rail AM1 DP200 or AM1 DE200 (└ 35 mm)



2-pole mini-contactors

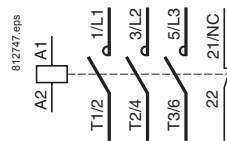
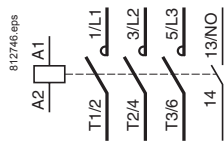
LC1 SKGC2



3-pole mini-contactors

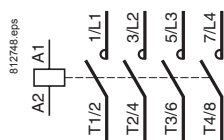
LC1 SKGC310

LC1 SKGC301



4-pole mini-contactors

LC1 SKGC400



TeSys GC



GC 25

Presentation

TeSys GC contactors are designed for use in modular panels and enclosures. These contactors feature:

■ **Easy installation:**

- quick clip-on fixing and locking onto 35 mm omega rail
- easy connection by means of ready-to-tighten, captive, pozidrive screw terminals.

■ **Compact size:**

All units have a common depth of 60 mm and width in modules of 17.5 mm (width of one module: 17.5 mm).

■ **User safety:**

- use of materials conforming to strictest fire safety standards
- live parts protected against direct finger contact
- completely safe operation
- state indication on front panel.

Standards

This range of modular contactors has been designed taking into account the requirements of international standard IEC 61095.

This standard is specific to "Electromagnetic contactors for domestic and similar use".

It has very strict requirements, meeting the expectations of users, with regard to the safety of equipment and persons in "premises and areas accessible to the public". Conformity with this standard makes it possible to obtain the following quality labels without the need for additional tests: NF-USE, VDE, CEBEC, etc.

Applications

TeSys GC modular contactors are designed for switching all single-phase, 3-phase or 4-phase loads up to 100 A.

Power switching

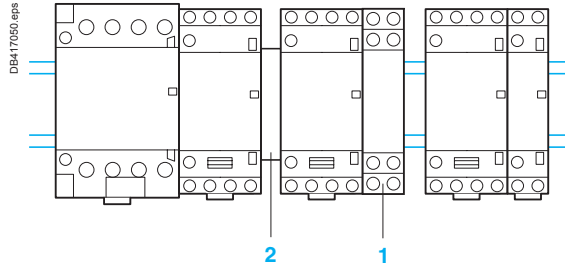
These contactors have multiple applications in industrial, agricultural and commercial premises, hospitals and the home, i.e. wherever switching of a specific supply is required:

- lighting
- heating
- ventilation
- motorised shutters or gates.

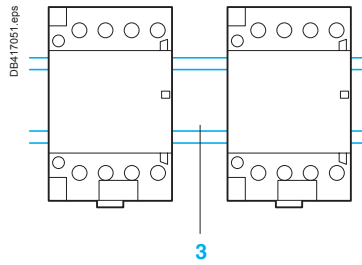
Setting-up precautions

The contactor controls must be bounce free. If not, connect a coil suppression block **1** (GAP 21 or 23) across the coil terminals y 250 V.

When several contactors which operate at the same time are mounted side by side, a GAC 5 ventilation 1/2 module **2** must be fitted every 2 contactors.



It is advisable to mount electronic units at the bottom of the modular panel and to separate them from electromechanical units by a space **3** equal to one module, or by 2 ventilation 1/2 modules (GAC 5).



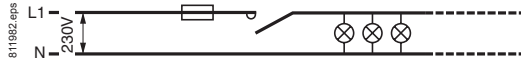
Derating of contactors mounted in a modular enclosure if the temperature within the enclosure is $> 40\text{ }^{\circ}\text{C}$.

Contactor rating	40 °C	50 °C	60 °C ⁽¹⁾
16 A	16 A	14 A	13 A
25 A	25 A	22 A	20 A
40 A	40 A	36 A	32 A
63 A	63 A	57 A	50 A
100 A	100 A	87 A	80 A

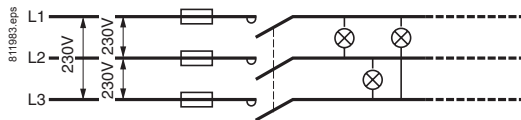
⁽¹⁾ Ventilation 1/2 module must be fitted.

Lighting (Maximum number of lamps depending on the power of each unit) Presentation of installations according to type of supply

■ Single-phase circuit, 230 V

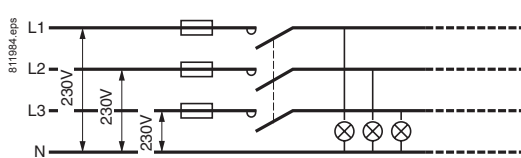


■ 3-phase circuit, 230 V



The maximum number of lamps which can be operated per phase is equal to the number of lamps in the "single phase 230 V" table divided by $\sqrt{3}$.

■ 3-phase circuit, 400 V (with neutral)



The maximum number of lamps which can be operated per phase is equal to the total number of lamps in the "single-phase 230 V" table.

Contactor rating for a single-phase 230 V circuit (single-pole)

Fluorescent lamps with starter

Single fitting	Non corrected					With parallel correction					Contactor rating
	P (W)	20	40	50	80	110	20	40	58	80	
I _B (A)	0.39	0.43	0.70	0.80	1.2	0.19	0.29	0.46	0.57	0.79	–
C (μF)	–	–	–	–	–	5	5	7	7	16	–
Maximum number of lamps	22	20	13	10	7	15	15	10	10	5	16 A
	30	28	17	15	10	20	20	15	15	7	25 A
	70	60	35	30	20	40	40	30	30	14	40 A
	100	90	56	48	32	60	60	43	43	20	63 A
Twin fitting	Non corrected					With series correction					Contactor rating
	P (W)	2 x 18	2 x 36	2 x 58	2 x 80	2 x 140	2 x 18	2 x 36	2 x 58	2 x 80	
I _B (A)	0.44	0.82	1.34	1.64	2.2	0.26	0.48	0.78	0.96	1.3	–
C (μF)	–	–	–	–	–	3.5	4.5	7	9	18	–
Maximum number of lamps	20	11	7	5	4	30	17	10	9	6	16 A
	30	16	10	8	6	46	25	16	13	10	25 A
	50	26	16	13	10	80	43	27	22	16	40 A
	75	42	25	21	16	123	67	42	34	25	63 A

High pressure mercury vapour lamps

	Non corrected						With parallel correction						Contactor rating	
P (W)	50	80	125	250	400	700	50	80	125	250	400	700		1000
I _B (A)	0.6	0.8	1.15	2.15	3.25	5.4	0.35	0.50	0.7	1.5	2.4	4	5.7	–
C (μF)	–	–	–	–	–	–	7	8	10	18	25	40	60	–
Maximum number of lamps	15	10	8	4	2	1	10	9	9	4	3	2	–	16 A
	20	15	10	6	4	2	15	13	10	6	4	2	1	25 A
	34	27	20	10	6	4	28	25	20	11	8	5	3	40 A
	53	40	28	15	10	6	43	38	30	17	12	7	5	63 A

I_B: value of current drawn by each lamp at its rated voltage.

C: unit capacitance for each lamp.

I_B and C correspond to values normally quoted by lamp manufacturers

Contactor rating for a single-phase 230 V circuit (single-pole) (continued)													
Low pressure sodium vapour lamps													
	Non corrected						With parallel correction						Contactor rating
P (W)	18	35	55	90	135	180	18	35	55	90	135	180	–
I_B (A)	0.35	1.4	1.4	2.1	3.1	3.1	0.35	0.6	0.6	0.9	0.9	0.9	–
C (μF)	–	–	–	–	–	–	5	20	20	26	45	40	–
Maximum number of lamps	18	4	5	3	2	2	14	3	3	2	1	1	16 A
	34	9	9	6	4	4	21	5	5	4	2	2	25 A
	57	14	14	9	6	6	40	10	10	8	4	5	40 A
	91	24	24	19	10	10	60	15	15	11	6	7	63 A
High pressure sodium vapour lamps													
	Non corrected						With parallel correction						Contactor rating
P (W)	70	150	250	400	1000		70	150	250	400	1000		–
I_B (A)	1	1.8	3	4.4	10.3		0.6	0.7	1.5	2.5	6		–
C (μF)	–	–	–	–	–		12	20	32	45	100		–
Maximum number of lamps	8	4	2	1	–		6	6	2	2	1		16 A
	12	7	4	3	1		9	9	3	4	2		25 A
	20	13	8	5	2		18	18	6	8	4		40 A
	32	18	11	8	3		25	25	9	12	6		63 A
Metal iodine or halogen vapour lamps													
	Non corrected						With parallel correction						Contactor rating
P (W)	35	70	150	250	400	1000	39	70	150	250	400	1000 2000	–
I_B (A)	0.3	0.5	1	1.5	2.5	6	0.3	0.5	1	1.5	2.5	6 5.5	–
C (μF)	–	–	–	–	–	–	6	12	20	32	45	85 60	–
Maximum number of lamps	27	16	8	5	3	1	12	6	4	3	2	– 1	16 A
	40	24	12	8	5	2	18	9	6	4	3	1 2	25 A
	68	42	20	14	8	4	31	16	10	7	5	3 3	40 A
	106	64	32	21	13	5	50	25	15	10	7	4 5	63 A
Incandescent and halogen lamps													
	Non corrected						With parallel correction						Contactor rating
P (W)	60	75	100	150	200	300	500	1000					–
I_B (A)	0.26	0.32	0.44	0.65	0.87	1.3	2.17	4.4					–
Maximum number of lamps	30	25	19	12	10	7	4	2					16 A
	45	38	28	18	14	10	6	3					25 A
	85	70	50	35	26	18	10	6					40 A
	125	100	73	50	37	25	15	8					63 A
Halogen lamps used with transformer													
	Non corrected						With parallel correction						Contactor rating
P (W)	60	80	105	150									–
I_B (A)	0.26	0.35	0.45	0.65									–
Maximum number of lamps	9	8	6	4									16 A
	14	12	9	6									25 A
	27	23	18	13									40 A
	40	35	27	19									63 A

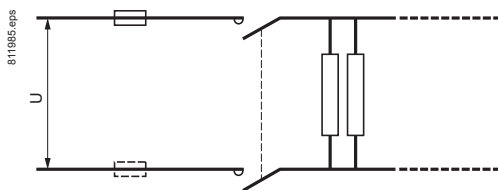
I_B : value of current drawn by each lamp at its rated voltage.

C: unit capacitance for each lamp.

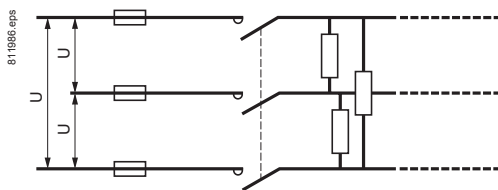
I_B and C correspond to values normally quoted by lamp manufacturers

Heating (AC-7a)

Single-phase, 2-pole switching



3-phase switching



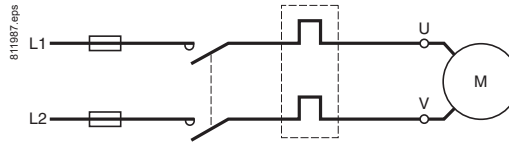
Heating by resistive elements or by infra-red radiators, convectors or radiators, heating ducts, industrial furnaces. The current peak between the hot and cold states must not exceed 2 to 3 I_n at the moment of switch-on.

Contactor selection according to power and required electrical life

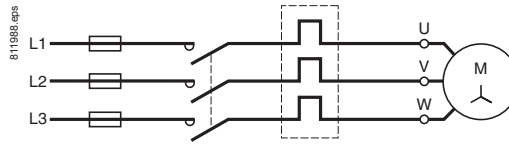
Electrical durability (in operating cycles)	Maximum power (kW)					Contactor rating
	100 x 10 ³	150 x 10 ³	200 x 10 ³	500 x 10 ³	10 ⁶	
Single-phase switching 230 V (2-pole)	3.5	3	2.2	1	0.8	16 A
	5.4	4.6	3.5	1.6	1.2	25 A
	8.6	7.4	5.6	2.6	1.9	40 A
	13.6	11.6	8.8	4	3	63 A
	21.6	18.4	14	6.4	4.8	100 A
3-phase switching 400 V (3-pole)	10	9	6.5	3.2	2.2	16 A
	16	14	10	5	3.5	25 A
	26	22	17	7.5	6	40 A
	41	35	26.5	12	9	63 A
	64.8	55.2	42	19.2	14.4	100 A

Motor control (AC-7b)

Single-phase circuit, 230 V



3-phase circuit, 400 V



Contactor selection according to maximum power in kW

230 V single-phase capacitor motor (2-pole)	400 V 3-phase motor	Contactor rating (I _{th})
0.55	2.2	16 A
1.1	4	25 A
2.2	7.5	40 A
4	11	63 A

TeSys GC

Environment			GC16	GC25	GC40	GC63	GC100
Contactor type	Conforming to IEC 61095	V	500				
	Conforming to VDE 0110	V	500				
Rated impulse withstand voltage (U _{imp})		kV	4 in enclosure				
Conforming to standards			IEC 61095, VDE 0637-3 and IEC 60947-5 for auxiliary contacts				
Product certifications			NF- USE, VDE, CEBEC, ÖVE				
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact (IP 20 open, IP 40 in enclosure)				
Protective treatment	Standard version		"TC"				
Ambient air temperature around the device	Storage	°C	-40...+70				
	Operation	°C	-5...+50 (0.85...1.1 U _c)				
Maximum operating altitude	Without derating	m	3000				
Operating positions	Without derating		±30° in relation to normal vertical mounting plane				
Shock resistance 1/2 sine wave = 10 ms	Contactor open		10 gn				
	Contactor closed		15 gn				
Vibration resistance 5...300 Hz	Contactor open		2 gn				
	Contactor closed		3 gn				
Flame resistance			Conforming to IEC 61095				

Pole characteristics			GC16	GC25	GC40	GC63	GC100	
Number of poles			2, 3 or 4					
Rated operational current (I _e) (U _e ≤ 440 V)	In AC-7a (heating)	A	16	25	40	63	100	
	In AC-7b (motor control)	A	5	8.5	15	25	–	
Rated operational voltage (U _e)	Up to	V	250 two-pole contactors, 415 three and four-pole contactors					
Frequency limits	Of the operating current	Hz	400					
Conventional thermal current (I _{th})	θ ≤ 50 °C	A	16	25	40	63	100	
Rated breaking and making capacity	Conforming to IEC 61095 (AC-7b) I _{rms} 400 V 3-phase	A	40	68	120	200	–	
Permissible short time rating no current flowing for preceding 15 minutes with θ ≤ 40 °C	For 10 s	A	128	200	320	504	800	
	For 30 s	A	40	62	100	157	250	
Short-circuit protection by fuse or circuit breaker U ≤ 440 V	gl fuse	A	16	25	40	63	100	
	Circuit breaker I ² t (at 3 kA rms prospective)	230 V	A²s	5000	10000	16000	18000	–
		400 V	A²s	9000	14000	17500	20000	–
Electrical durability in operating cycles	AC-7a, AC-7b		100000	100000	100000	100000	30000	
Average impedance per pole	At I _{th} and 50 Hz	mΩ	2.5	2.5	2	2	1	
Power dissipated per pole	For the above operational currents	W	0.65	1.6	3.2	8	10	
Maximum cabling c.s.a.	Flexible cable without cable end	1 conductor	mm²	6	6	25	25	35
		2 conductors	mm²	4	4	16	16	–
	Flexible cable with cable end	1 conductor	mm²	6	6	16	16	35
		2 conductors	mm²	1.5	1.5	4	4	–
	Solid cable without cable end	1 conductor	mm²	6	6	25	25	35
		2 conductors	mm²	4	4	6	6	10
Tightening torque	Power circuit connections	N.m	0.8	0.8	3.5	3.5	3.5	

TeSys GC

Control circuit characteristics

Contactor type			GC16, GC25 single or 2-pole	GC16, GC25 3 or 4-pole GC40, GC63 2-pole	GC40, GC63 3 or 4-pole GC100 2-pole	GC100 4-pole	
Rated control circuit voltage (Uc)	50 or 60 Hz	V	12...240 V, for other voltages, please consult your Regional Sales Office				
Control voltage limits ($\theta \leq 50\text{ }^\circ\text{C}$)	50 Hz coils	Operational	0.85...1.1 Uc				
		Drop-out	0.2...0.75 Uc				
Average coil consumption at 20 °C and at Uc	~ 50 Hz	Inrush	VA	15	34	53	106
		Sealed	VA	3.8	4.6	6.5	13
Maximum heat dissipation	50/60 Hz	W	1.3	1.6	2.1	4.2	
Operating time	Closing "C"	ms	10...30				
	Opening "O"	ms	10...25				
Mechanical durability	In operating cycles		10 ⁶				
Maximum operating rate at ambient temperature $\leq 50\text{ }^\circ\text{C}$	In operating cycles per hour		300				
Maximum cabling c.s.a.	Flexible cable without cable end	1 or 2 conductors	mm²	2.5			
		1 conductor	mm²	2.5			
	Flexible cable with cable end	2 conductors	mm²	1.5			
		Solid cable without cable end	1 or 2 conductors	mm²	1.5		
Tightening torque		N.m	0.8				

Instantaneous auxiliary contact characteristics

Rated operational voltage (Ue)	Up to	V	250			
Rated insulation voltage (Ui)	Conforming to IEC 60947-5	V	500			
		Conforming to VDE 0110	V	500		
Conventional thermal current (Ith)	For ambient $\theta \leq 50\text{ }^\circ\text{C}$	A	5			
Mechanical durability	Operating cycles		10 ⁶			
Maximum cabling c.s.a.	Flexible or solid conductor	mm²	2.5			
Tightening torque		N.m	0.8			

TeSys GC

Dimensions

Contactors

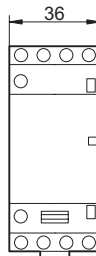
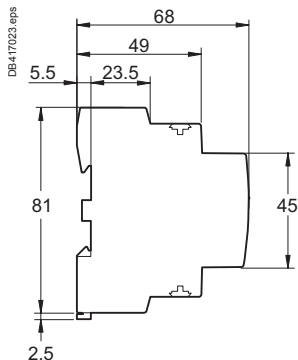
Common side view

GC 1610, 1611, 1620
GC 2502, 2510, 2511, 2520

1 module

GC 1622, 1640
GC 2504, 2522, 2530, 2540

2 modules



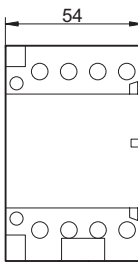
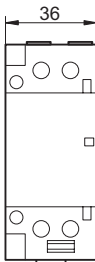
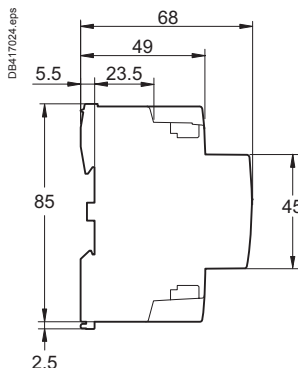
Common side view

GC 4002, 4011, 4020
GC 6302, 6311, 6320

2 modules

GC 4004, 4022, 4030, 4040
GC 6304, 6322, 6330, 6340

3 modules



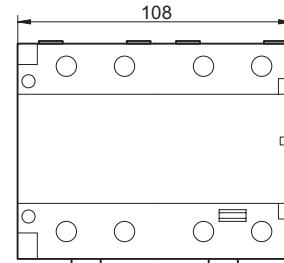
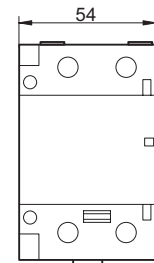
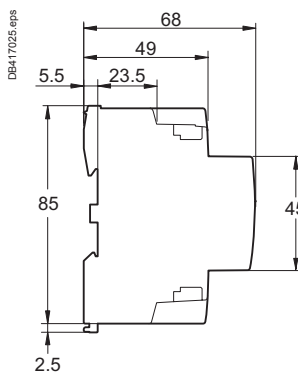
Common side view

GC 10020

3 modules

GC 10040

6 modules



TeSys GC

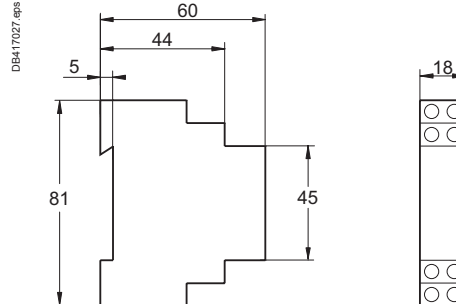
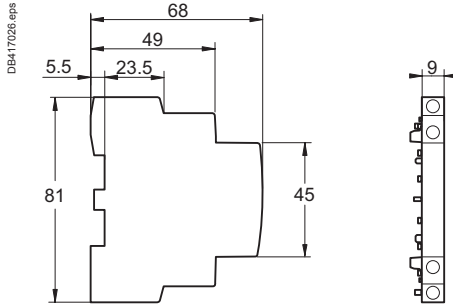
Dimensions

Auxiliary contacts

GAC 0511, 0531 and 0521

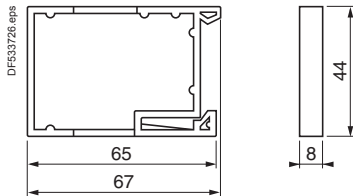
Coil suppression blocks

GAP 21 and 23



Clip-on ventilation 1/2 module

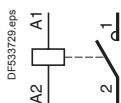
GAC 5



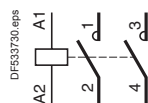
Schemes

Contactors

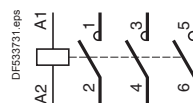
GC ●●10



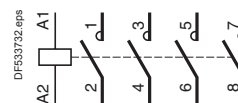
GC ●●20



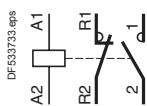
GC ●●30



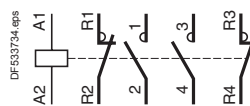
GC ●●40



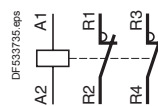
GC ●●11



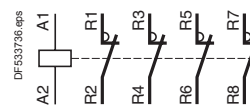
GC ●●22



GC ●●02

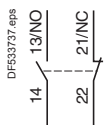


GC ●●04



Auxiliary contacts

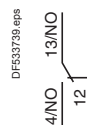
GAC 0521



GAC 0531



GAC 0511



TeSys GY



GY 25

Presentation

TeSys GY "dual tariff" contactors are designed for use in modular panels and enclosures.

These contactors feature:

■ **Easy installation:**

- quick clip-on fixing and locking onto 35 mm omega rail
- easy connection by means of ready-to-tighten captive, pozidrive screw terminals.

■ **Compact size**

All units have a common depth of 60 mm and width in modules of 17.5 mm (width of one module: 17.5 mm).

■ **User safety:**

- use of materials conforming to strictest fire safety standards
- live parts protected against direct finger contact
- completely safe operation
- state indication on front panel.

"Dual tariff" contactors are designed for use with Electricity Supply Authority dual tariffs.

They have a 4-position selector switch on the front panel:

"Stop" (O)	For switching off the load, e.g. for prolonged periods of absence.
"Off peak" Automatic start (A)	The contactor switches automatically during "off peak" hours as set by the Supply Authority remote control and thus supplies the load, (washing machine, dishwasher, convector heater, water heater) during this period, at an economy rate to the user.
"Peak time" Manual start (I)	In this position, the contactor supplies the load to cater for additional requirements for hot water, heating, etc., but at the standard rate. The contactor returns automatically to the "off-peak" position at the start of the "off-peak" period.
"Peak time" Manual override with lock	Facility for setting the contactor to continuous manual operation, ignoring the automation system and the Supply Authority control; setting and locking is achieved by means of a tool, with manual return to the "AUTO" position.

Standards

This range of modular contactors has been designed taking into account the requirements of international standard IEC 61095.

This standard is specific to "Electromagnetic contactors for domestic and similar use".

It has very strict requirements, meeting the expectations of users, with regard to the safety of equipment and persons in "premises and areas accessible to the public". Conformity with this standard makes it possible to obtain the following quality labels without the need for additional tests: NF-USE, VDE, CEBEC, etc.

"Dual tariff" modular contactors are designed for switching all single-phase, 3-phase or 4-phase loads up to 63 A.

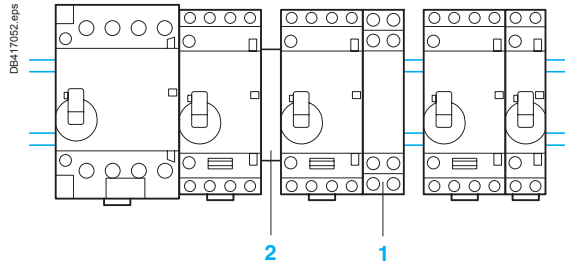
TeSys GY contactors have multiple applications in industrial, agricultural and commercial premises, hospitals and the home, i.e. wherever switching of a specific supply is required:

- lighting,
- heating, ventilation,
- motorised shutters or gates.

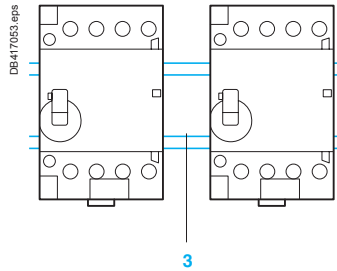
Setting-up precautions

The contactor controls must be bounce free. If not, connect a coil suppression block **1** (GAP 21 or 23) across the coil terminals ≤ 250 V.

When several contactors which operate at the same time are mounted side by side, a GAC 5 ventilation 1/2 module **2** must be fitted every 2 contactors.



It is advisable to mount electronic units at the bottom of the modular panel and to separate them from electromechanical units by a space equal to one module **3** or by 2 ventilation 1/2 modules GAC 5.



Derating of contactors mounted in a modular enclosure if the temperature within the enclosure is > 40 °C.

Contactor rating	40 °C	50 °C	60 °C ⁽¹⁾
16 A	16 A	14 A	13 A
25 A	25 A	22 A	20 A
40 A	40 A	36 A	32 A
63 A	63 A	57 A	50 A

⁽¹⁾ Ventilation 1/2 module must be fitted.

Modular equipment

TeSys GY "dual tariff" contactors

TeSys GY

Environment				GY 16	GY 25	GY 40	GY 63
Type							
Rated insulation voltage (Ui)	Conforming to IEC 61095	V	500				
	Conforming to VDE 0110	V	500				
Rated impulse withstand voltage (Uimp)		kV	4 in enclosure				
Conforming to standards			IEC 61095, VDE 0637-3 and IEC 60947-5 for auxiliary contacts				
Product certifications			NF-USE, VDE, CEBEC, ÖVE				
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 20 open, IP 40 in enclosure				
Protective treatment	Standard version		"TC"				
Ambient air temperature around the device	Storage	°C	-40...+70				
	Operation	°C	-5...+50 (0.85...1.1 Uc)				
Maximum operating altitude	Without derating	m	3000				
Operating positions	Without derating		±30° in relation to normal vertical mounting plane				
Shock resistance 1/2 sine wave = 11 ms	Contacteur open		10 gn				
	Contacteur closed		15 gn				
Vibration resistance 5...300 Hz	Contacteur open		2 gn				
	Contacteur closed		3 gn				
Flame resistance			Conforming to IEC 61095				

Pole characteristics				GY 16	GY 25	GY 40	GY 63
Number of poles			2, 3 or 4				
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-7a (heating)	A	16	25	40	63	
	In AC-7b (motor control)	A	5	8.5	15	25	
Rated operational voltage (Ue)	Up to	V	250 - 2-pole contactors, 415 - 3 and 4-pole contactors				
Frequency limits	Of the operating current	Hz	400				
Conventional thermal current (Ith)	θ ≤ 50 °C	A	16	25	40	63	
Rated breaking and making capacity	Conforming to IEC 61095 (AC-7b) I rms 400 V 3-phase	A	40	68	120	200	
Short time rating with no current flow for the previous 15 minutes with θ ≤ 40 °C	For 10 s	A	128	200	320	504	
	For 30 s	A	40	62	100	157	
Short-circuit protection by fuse or circuit breaker U ≤ 440 V	gI fuse	A	16	25	40	63	
	Circuit breaker I ² t (at 3 kA rms prospective)	A ² s	5000	10000	16000	18000	
Electrical durability in operating cycles	AC-7a, AC-7b		100000	100000	100000	100000	
Average impedance per pole	At Ith and 50 Hz	mΩ	2.5	2.5	2	2	
Power dissipated per pole	For the above operational currents	W	0.65	1.6	3.2	8	
Maximum cabling c.s.a.	Flexible cable without cable end	1 conductor	mm ²	6	6	25	25
		2 conductors	mm ²	4	4	16	16
	Flexible cable with cable end	1 conductor	mm ²	6	6	16	16
		2 conductors	mm ²	1.5	1.5	4	4
	Solid cable without cable end	1 conductor	mm ²	6	6	25	25
		2 conductors	mm ²	4	4	6	6
Tightening torque	Power circuit connections	N.m	0.8	0.8	3.5	3.5	

TeSys GY

Control circuit characteristics

Type			GY 16, GY 25 single or 2-pole		GY 16, GY 25 3 or 4-pole		GY 40, GY 63 3 or 4-pole	
					GY 40, GY 63 2-pole			
Rated control circuit voltage (Uc)	50 or 60 Hz	V	12...240 V, for other voltages, please consult your Regional Sales Office					
Control voltage limits (θ ≤ 50 °C) 50 Hz coils	Operational		0.85...1.1 Uc					
	Drop-out		0.2...0.75 Uc					
Average consumption at 20 °C and at Uc ~ 50 Hz	Inrush	VA	15	34			53	
	Sealed	VA	3.8	4.6			6.5	
Heat dissipation	50/60 Hz	W	1.3	1.6			2.1	
Operating time	Closing "C"	ms	10 ... 30					
	Opening "O"	ms	10 ... 25					
Mechanical durability	In operating cycles		10 ⁶					
Maximum operating rate at ambient temperature ≤ 50 °C	In operating cycles per hour		300					
Maximum cabling c.s.a.	Flexible cable without cable end	1 or 2 conductors	mm²	2.5				
		1 conductor	mm²	2.5				
	Flexible cable with cable end	2 conductors	mm²	1.5				
		1 or 2 conductors	mm²	1.5				
Tightening torque		N.m	0.8					

Instantaneous auxiliary contact characteristics

Rated operational voltage (Ue)	Up to	V	250					
Rated insulation voltage (Ui)	Conforming to IEC 60947-5	V	500					
	Conforming to VDE 0110	V	500					
Conventional thermal current (Ith)	For ambient θ ≤ 50 °C	A	5					
Mechanical durability	In operating cycles		10 ⁶					
Maximum cabling c.s.a.	Flexible or solid conductor	mm²	2.5					
Tightening torque		N.m	0.8					

TeSys GY

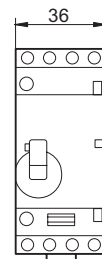
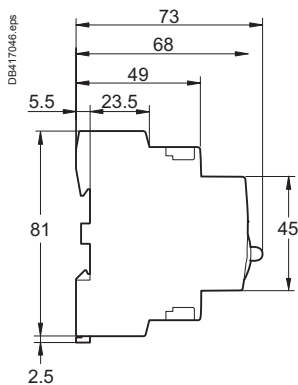
Dimensions

"Dual tariff" contactors

Common side view	GY 1620 GY 2520	GY 2530, 2540
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1 module

2 modules



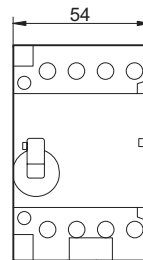
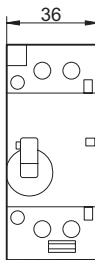
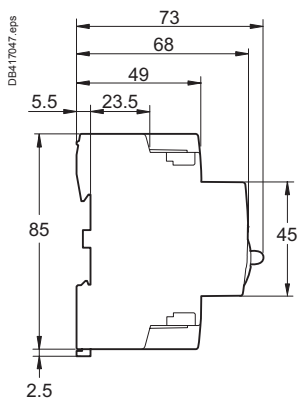
Common side view

**GY 4020
GY 6320**

**GY 4030, 4040
GY 6330, 6340**

2 modules

3 modules



TeSys GY

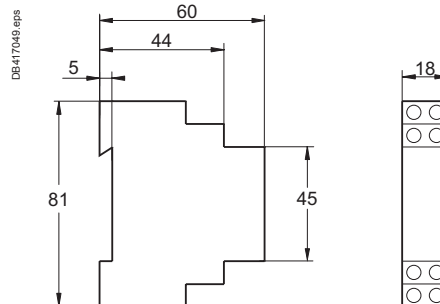
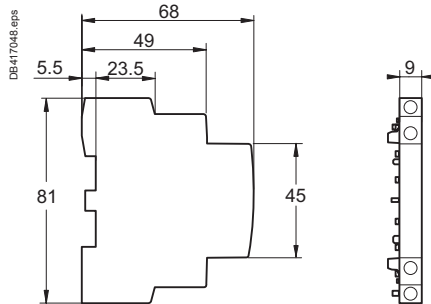
Dimensions

Auxiliary contacts

GAC 0511, 0531 and 0521

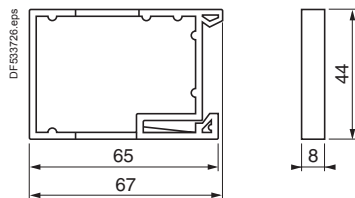
Coil suppression block

GAP 21 and 23



Clip-on ventilation 1/2 module

GAC 5



Schemes

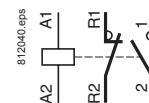
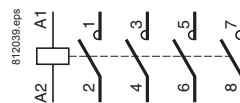
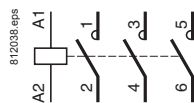
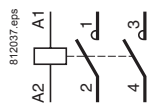
Contactors

GY ●●20

GY ●●30

GY ●●40

GY ●●11

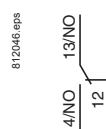
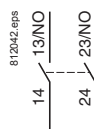
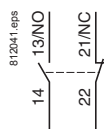


Auxiliary contacts

GAC 0521

GAC 0531

GAC 0511





GF 1611M7

Presentation

TeSys GF impulse relays are designed for use in modular enclosures.

They feature:

■ **Easy installation:**

- quick clip-on fixing and locking onto 35 mm omega rail
- easy connection by means of ready-to-tighten captive, pozidrive screw terminals.

■ **Compact size**

Units have a common depth of 60 mm and width of 18 mm.

■ **User safety:**

- live parts protected against direct finger contact
- completely safe operation
- state indication on front panel.

Standards

This range of modular impulse relays has been designed taking into account the requirements of international standard IEC 60669-2.

This standard is specific to "Impulse relays".

Conformity with this standard makes it possible to obtain the following quality labels without the need for additional tests: NF-USE, VDE, CEBC, etc.

Functions

Modular impulse relays are designed for opening and closing of circuits which are remotely controlled by impulses. The position is mechanically maintained.

These impulse relays are used in lighting circuits when there are more than two switching points.

Power switching

TeSys GF impulse relays have multiple applications in industrial, agricultural and commercial premises, hospitals and the home, i.e. wherever switching of a specific lighting supply is required.

Lighting circuits

Fluorescent lamps with starter

Single fitting	Non corrected			With parallel correction		
	18	36	58	18	36	58
Power in W	18	36	58	18	36	58
Number of lamps	70	35	21	50	25	16

Twin fitting	With series correction		
	2 x 18	2 x 36	2 x 58
Power in W	2 x 18	2 x 36	2 x 58
Number of lamps	56	28	17

Incandescent lamps: filament lamps

Power in W	40	60	75	100	200
Number of lamps	40	25	20	16	8

Incandescent lamps: halogen lamps

Power in W	300	500	1000	1500
Number of lamps	5	3	1	1

Incandescent lamps: very low voltage halogen lamps

Power in W	20	50	75	100
Number of lamps	70	28	19	4

Low pressure sodium vapour lamps

	Non corrected			
	Power in W	55	90	135
Number of lamps	24	15	10	7

High pressure sodium vapour lamps

	Non corrected		
	Power in W	250	400
Number of lamps	5	3	1

Heating circuits

Single-phase 230 V, 2-pole

Power in kW	3.6
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TeSys GF

Environment			
Rated insulation voltage (Ui)	Conforming to IEC 60947-1-5	V	400
	Conforming to VDE 0110	V	400
Rated impulse withstand voltage (Uimp)		kV	4 in enclosure
Conforming to standards			IEC 60669-1 and 60669-2, NF C 61-112
Product certifications			NF-USE, CEBEC, ASE, KEMA, N, S, D, FI, VDE
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 20 open, IP 40 in enclosure
Protective treatment	Standard version		"TC"
Ambient air temperature around the device	Storage	°C	-40...+80
	Operation	°C	-20...+50
Maximum operating altitude	Without derating	m	2000
Operating positions	Without derating		±90° in relation to normal vertical mounting plane
Shock resistance 1/2 sine wave = 10 ms	Impulse relay open		Please consult your Regional Sales Office
	Impulse relay closed		Please consult your Regional Sales Office
Vibration resistance 5...300 Hz	Impulse relay open		4 gn
	Impulse relay closed		4 gn

Pole characteristics							
Number of poles			1 or 2				
Rated operational current (Ie) (Ue ≤ 250 V)	In AC-7a (heating)	A	16				
Rated operational voltage		V	250				
Conventional thermal current (Ith)	θ ≤ 50 °C	A	16				
Permissible short time rating no current flowing for preceding 15 minutes with θ ≤ 40 °C	For 1 s	A	320				
	For 10 s	A	96				
	For 30 s	A	48				
Short-circuit protection by fuse or circuit breaker	gl fuse	A	16				
	Circuit breaker I ² t (at 3 kA rms prospective)	A ² s	5000				
Average impedance per pole	At Ith and 50 Hz	mΩ	4				
Power dissipated per pole		W	1				
Maximum cabling c.s.a.	Flexible cable without cable end	1 conductor	mm ²	Min.	0.5	Max.	6
		2 conductors	mm ²	0.5	4		
	Flexible cable with cable end	1 conductor	mm ²	0.5	6		
		2 conductors	mm ²	0.5	4		
	Solid cable without cable end	1 conductor	mm ²	0.5	6		
		2 conductors	mm ²	0.5	4		
Tightening torque	Power circuit connections	N.m	0.8				

TeSys GF

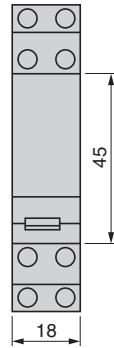
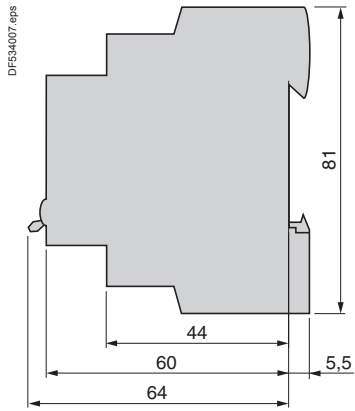
Control circuit characteristics

Rated control circuit voltage (Uc)		V	12...240 V, for other voltages, please consult your Regional Sales Office
Control voltage limits (θ < 50 °C)	Operating threshold, dual frequency 50/60 Hz	V	0.85...1.1 Uc
Average consumption at 20 °C and at Uc	Inrush at 50 Hz	VA	19
Operating time	Closing "C"	ms	70
	Opening "O"	ms	70
Minimum impulse time		ms	70
Mechanical durability			10 ⁶ operating cycles
Electrical durability	AC-21		200000 operating cycles
	AC-22		100000 operating cycles
Maximum operating rate	Operating cycles per hour		900
Maximum cabling c.s.a.	Flexible cable without cable end	1 or 2 conductors	mm² 2.5
	Flexible cable with cable end	1 conductor	mm² 2.5
		2 conductors	mm² 1.5
	Solid cable without cable end	1 or 2 conductors	mm² 1.5
Tightening torque		N.m	0.8

TeSys GF

Dimensions

GF 1610, GF 1611, GF 1620

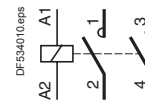
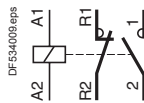
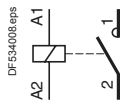


Schemes

GF 1610

GF 1611

GF 1620



Contactors

		Electrical durability: making and breaking conditions						Occasional duty: making and breaking conditions					
a.c. supply		Making			Breaking			Making			Breaking		
Typical applications	Utilisation category	I	U	cos φ	I	U	cos φ	I	U	cos φ	I	U	cos φ
Resistors, non inductive or slightly inductive loads	AC-1	le	Ue	0.95	le	Ue	0.95	1.5 le	1.05 Ue	0.8	1.5 le	1.05 Ue	0.8
Motors													
Slip ring motors: starting, breaking.	AC-2	2.5 le	Ue	0.65	2.5 le	Ue	0.65	4 le	1.05 Ue	0.65	4 le	1.05 Ue	0.65
Squirrel cage motors: starting, breaking whilst motor running.	AC-3												
	le ≤ ⁽¹⁾	6 le	Ue	0.65	1 le	0.17 Ue	0.65	10 le	1.05 Ue	0.45	8 le	1.05 Ue	0.45
	le > ⁽²⁾	6 le	Ue	0.35	1 le	0.17 Ue	0.35	10 le	1.05 Ue	0.35	8 le	1.05 Ue	0.35
Squirrel cage motors: starting, reversing, inching	AC-4												
	le ≤ ⁽¹⁾	6 le	Ue	0.65	6 le	Ue	0.65	12 le	1.05 Ue	0.45	10 le	1.05 Ue	0.45
	le > ⁽²⁾	6 le	Ue	0.35	6 le	Ue	0.35	12 le	1.05 Ue	0.35	10 le	1.05 Ue	0.35
d.c. supply													
Typical applications	Utilisation category	Making			Breaking			Making			Breaking		
		I	U	L/R (ms)	I	U	L/R (ms)	I	U	L/R (ms)	I	U	L/R (ms)
Resistors, non inductive or slightly inductive loads	DC-1	le	Ue	1	le	Ue	1	1.5 le	1.05 Ue	1	1.5 le	1.05 Ue	1
Shunt wound motors: starting, reversing, inching	DC-3	2.5 le	Ue	2	2.5 le	Ue	2	4 le	1.05 Ue	2.5	4 le	1.05 Ue	2.5
Series wound motors: starting, reversing, inching	DC-5	2.5 le	Ue	7.5	2.5 le	Ue	7.5	4 le	1.05 Ue	15	4 le	1.05 Ue	15
Control relays and auxiliary contacts													
		Electrical durability: making and breaking conditions						Occasional duty: making and breaking conditions					
a.c. supply		Making			Breaking			Making			Breaking		
Typical applications	Utilisation category	I	U	cos φ	I	U	cos φ	I	U	cos φ	I	U	cos φ
Electromagnets													
≤ 72 VA	AC-14	-	-	-	-	-	-	6 le	1.1 Ue	0.7	6 le	1.1 Ue	0.7
> 72 VA	AC-15	10 le	Ue	0.7	le	Ue	0.4	10 le	1.1 Ue	0.3	10 le	1.1 Ue	0.3
d.c. supply													
Typical applications	Utilisation category	Making			Breaking			Making			Breaking		
		I	U	L/R (ms)	I	U	L/R (ms)	I	U	L/R (ms)	I	U	L/R (ms)
Electromagnets	DC-13	le	Ue	6 P ⁽³⁾	le	Ue	6 P ⁽³⁾	1.1 le	1.1 Ue	6 P ⁽³⁾	1.1 le	1.1 Ue	6 P ⁽³⁾

(1) $le \leq 17 A$ for electrical durability, $le \leq 100 A$ for occasional duty.

(2) $le > 17 A$ for electrical durability, $le > 100 A$ for occasional duty.

(3) The value 6 P (in watts) is based on practical observations and is considered to represent the majority of d.c. magnetic loads up to the maximum limit of $P = 50 W$ i.e. $6 P = 300 ms = L/R$.

Above this, the loads are made up of smaller loads in parallel. The value 300 ms is therefore a maximum limit whatever the value of current drawn.

TeSys contactors

For the North American market

Conforming to UL and CSA

TeSys SK, K, D, GC, GY, GF

Starters for the North American market

In recent years, the North American market has started to harmonise UL, CSA and ANCE standards, as well as the industrial installation codes provided by national regulations (NEC for the United States, CEC for Canada and MEC for Mexico). ⁽¹⁾ Major improvements, carried out by the Canena ⁽²⁾ are aimed at harmonising product requirements based on IEC ⁽³⁾ standards. However, the North American codes use specific terminology for defining the functions of a starter. These functions can be fulfilled by standard IEC products, accompanied by appropriate certifications.

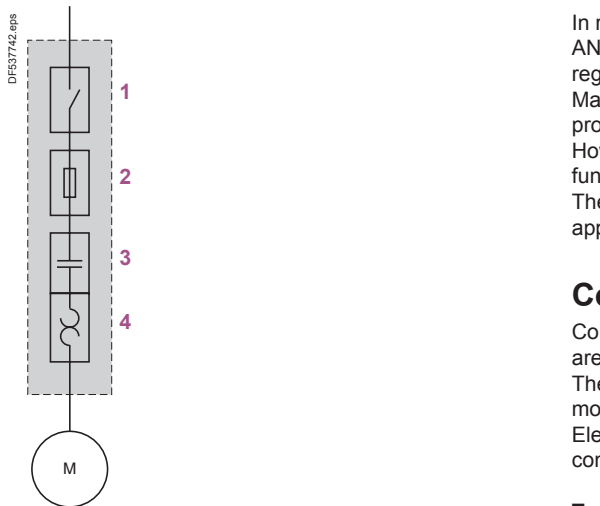
Combination Starters

Combination Starters are the most common type of packaged motor starter. They are called "Combination" because of their structure and their combined functions. The figure opposite shows the four combined functions that constitute a complete motor starter circuit, defined as a "Motor branch circuit" by the NEC (US National Electric Code) in article 430. Standard UL508 currently gives different types of combination starter that meet the requirements of a "Motor branch circuit".

Type E, called "**self-protected combination starter**", covers all these functions and can be controlled manually (thermal-magnetic circuit breaker) or remotely (starter-controller). Type E starters withstand faults within their declared nominal rating without sustaining damage, after which they can be put back into service. In addition, they can withstand more severe short-circuit and durability performance tests without welding or excessive wear of the contact tips.

Type F, called "**Combination motor starter**", consists of a type E manual starter (thermal-magnetic circuit breaker) combined with a contactor. These starters are evaluated by means of basic short-circuit tests, but are not considered as "self-protected".

For this combination, the type E starter must be marked "Combination Motor Controller when used with ...", followed by the reference of the load side contactor.



- 1 Motor Disconnect (Disconnect switch)
- 2 Motor Branch Circuit Protection (Short-circuit protection)
- 3 Motor Controller (Contactor)
- 4 Motor Overload Protection (Thermal overload relay)

(1) **UL**: Underwriters Laboratories, **CSA**: Canadian Standards Association, **ACNE**: Association of Standardization and Certification, **NEC**: National Electric Code, **CEC**: Canadian Electrical Code, **MEC**: Mexican Electrical Code.

(2) **Canena**: Council for Harmonization of Electrotechnical Standardization of North America.

(3) **IEC**: International Electrotechnical Commission.

TeSys contactors

For the North American market

Conforming to UL and CSA

TeSys SK, K, D, GC, GY, GF

Control panels

To help users properly coordinate their motor control equipment with their distribution system in the event of a fault, article 409 of the 2005 NEC requires panel builders to list the short-circuit withstand rating of their motor control panels. According to standard UL508A, manufacturers must use the short-circuit withstand value of the lowest rated device as the nominal withstand rating of the panel, unless the devices have been tested together for a higher coordinated rating. The minimum “**short-circuit current rating**” (SCCR), on motor control components for horsepower ratings of 50 hp or below is 5000 A.

Using a **type E** or **type F** combination starter eliminates the coordination problems of using individual components for the “motor branch circuit protection”, “motor controller” and “motor overload protection” functions. The panel builder uses the declared short-circuit current rating for the combination starter. This value is generally higher than 5000 A. This makes it easier to list the short-circuit current ratings and to check the compatibility of a UL508A motor control panel within a given distribution system.

Group protection

Article 430.53 of the NEC allows a single short-circuit protection device to be used for more than one motor circuit if the components used are marked and listed for such use.

Components suitable for use in group protection, known as “**motor group installations**”, can be marked in one of the following two ways:

Case n° 1

The contactor and the motor overload relay are both listed as suitable for group installation.

An inverse time circuit breaker can be used as the short-circuit protection device if it is also listed as suitable for group installation.

The panel builder must therefore make sure that the short-circuit protection device selected (fuses or inverse time circuit breaker) does not exceed the value allowed by article 430.40 for the smallest overload relay used in the circuit.

Once these conditions have been met, the panel builder can reduce the size of the conductor connecting the short-circuit protection device to the individual motor contactor/overload relay, to one third of the size of the upstream circuit conductor supplying the protection device.

The panel builder must limit the length of the motor starter conductor (connecting the short-circuit protection device to the motor contactor/overload relay) to a maximum of 7.6 m (25 feet).

Case n° 2

The motor contactor and overload relay are listed as suitable for “**tap conductor protection**” in group installations.

This category allows the panel designer to reduce the size of the conductor connecting the short-circuit protection device to the individual motor contactor/overload relay, to one tenth of the size of the upstream circuit conductor supplying the protection device.

The designer must limit the length of this conductor to a maximum of 3.05 m (10 feet).

In both cases, the supply circuits must not be less than 125 % of the connected motor FLA (Full Load Amps) rating.

For panel builders, using **type F** combination starters in group installations simplifies group motor considerations.

Each starter is a fully coordinated motor branch circuit.








The panel builder follows the same NEC requirements for sizing the supply conductors as those required for single motor branch circuits.

The size of the supply conductors can be reduced in accordance with the specifications of article 430.28.

This allows the same flexibility in conductor sizing as that offered in article 430.53 (D), without a requirement to check the short-circuit protection rating marked on the components and the overload relay limit.

A UL508A panel does not need a short-circuit protection device when each motor starter installed is a **type F**.

The upstream short-circuit protection device supplying the starter protects the panel. The panel builder only has to consider the panel/enclosure disconnect requirements specified by the NEC or local codes.

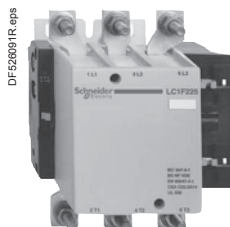
Contactors – TeSys F, V, FG, CR1F		
Type of product	Range	Pages
Contactors for AC-3 applications TeSys F	From 115 to 800 A	 B9/2
Contactors for AC-1 applications TeSys F	From 115 to 2100 A	 B9/3
Vacuum contactors– 1500 V TeSys V	From 160 to 610 A - AC-3 From 160 to 630 A - AC-1	 B9/4
Shockproof contactors TeSys FG	From 150 to 630 A	 B9/6
Magnetic latching contactors TeSys CR1F	From 150 to 630 A	 B9/7
Reversing pre-assembled contactors for AC-3 applications TeSys F	From 115 to 265 A	 B9/8
Changeover pre-assembled contactor pairs for AC-1 applications TeSys F	From 200 to 350 A	 B9/9
Auxiliary contact blocks Accessories – spare parts - capacitive devices TeSys F		B9/11
Coils TeSys F		B9/17
Accessories, coils for shockproof and magnetic latching contactors TeSys FG, TeSys CR1F		B9/27
Accessories for reversing and changeover contactor assemblies TeSys LA9F		B9/36
Technical Data for Designers		B9/45

TeSys contactors

TeSys F contactors for motor control in utilisation category AC-3 (115 to 800 A)

Control circuit: a.c. or d.c.

TeSys F



LC1 F225



LC1 F630

3-pole contactors

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3								Rated operational current in AC-3	Basic reference, to be completed by adding the voltage code (2) Screw fixing, cabling (1)	Weight
220 V	380 V	660 V			440 V up to					
kW	kW	kW	kW	kW	kW	kW	A		kg	
30	55	59	59	75	80	65	115	LC1F115●●	3.430	
40	75	80	80	90	100	65	150	LC1F150●●	3.430	
55	90	100	100	110	110	100	185	LC1F185●●	4.650	
63	110	110	110	129	129	100	225	LC1F225●●	4.750	
75	132	140	140	160	160	147	265	LC1F265●●	7.440	
100	160	180	200	200	220	160	330	LC1F330●●	8.600	
110	200	220	250	257	280	185	400	LC1F400●●	9.100	
147	250	280	295	355	335	335	500	LC1F500●●	11.350	
200	335	375	400	400	450	450	630	LC1F630●●	18.600	
220	400	425	425	450	475	450	780	LC1F780●●	39.500	
250	450	450	450	450	475	450	800	LC1F800●●	18.750	

Note: auxiliary contact blocks, modules and accessories: see pages B9/10 to B9/27.

(1) Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately, except on contactors LC1 F780 (see page B9/14).

(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts ~	24	48	110	115	120	208	220	230	240	380	400	415	440
LC1 F115...F225													
50 Hz (coil LX1)		B5	E5	F5	FE5	–	M5	P5	U5	Q5	V5	N5	–
60 Hz (coil LX1)		–	E6	F6	–	G6	L6	M6	–	U6	Q6	–	R6
40...400 Hz (coil LX9)		–	E7	F7	FE7	G7	L7	M7	P7	U7	Q7	V7	N7
LC1 F265...F330													
40...400 Hz (coil LX1)		B7	E7	F7	FE7	G7	L7	M7	P7	U7	Q7	V7	N7
LC1 F400...F630													
40...400 Hz (coil LX1)		–	E7	F7	FE7	G7 ⁽³⁾	L7	M7	P7	U7	Q7	V7	N7
LC1 F780													
40...400 Hz (coil LX1)		–	–	F7	FE7	F7	L7	M7	P7	U7	Q7	V7	N7
LC1 F800													
40...400 Hz (coil LX4) ⁽⁴⁾		–	–	FW	FW	FW	–	MW	MW	MW	QW	QW	QW
Volts ☰	24	48	110	125	220	230	250	400	440				
LC1 F115...F330													
(coil LX4 F)		BD	ED	FD	GD	MD	MD	UD	–	RD			
LC1 F400...F630													
(coil LX4 F)		–	ED	FD	GD	MD	–	UD	–	RD			
LC1 F780													
(coil LX4 F)		–	–	FD	GD	MD	–	UD	–	RD			
LC1 F800													
(coil LX4 F)		–	–	FW	FW	MW	MW	–	QW	–			

(3) F7 for LC1F630.

(4) Coil LX4 F8●● + rectifier DR5TE●●.

TeSys contactors

TeSys F contactors for motor control in utilisation category AC-1 (115 to 2100 A)
Control circuit: a.c. or d.c.

TeSys F



LC1 F1854



LC1 F4004



LC1 F6304




LC1 F1700



LC1 F2100

2, 3 or 4-pole contactors

Maximum current in AC-1 ($\theta \leq 40^\circ\text{C}$)	Number of poles 	Basic reference, to be completed by adding the voltage code ⁽²⁾ Screw fixing, cabling ⁽¹⁾	Weight
A			kg
200	3	LC1F115●●	3.430
	4	LC1F1154●●	3.830
250	3	LC1F150●●	3.430
	4	LC1F1504●●	3.830
275	3	LC1F185●●	4.650
	4	LC1F1854●●	5.450
315	3	LC1F225●●	4.750
	4	LC1F2254●●	5.550
350	3	LC1F265●●	7.440
	4	LC1F2654●●	8.540
400	3	LC1F330●●	8.600
	4	LC1F3304●●	9.500
500	2	LC1F4002●●	8.000
	3	LC1F400●●	9.100
	4	LC1F4004●●	10.200
700	2	LC1F5002●●	9.750
	3	LC1F500●●	11.350
	4	LC1F5004●●	12.950
1000	2	LC1F6302●●	15.500
	3	LC1F630●●	18.600
	4	LC1F6304●●	21.500
1260	3	LC1F1250●●	19.000
1400	3	LC1F1400●●	29.000
1600	3	LC1F780●●	39.500
	4	LC1F7804●●	48.000
1700	3	LC1F1700●●	30.000
2100 ⁽³⁾	3	LC1F2100●●	31.000

Note: auxiliary contact blocks, modules and accessories: see pages B9/10 to B9/27.

⁽¹⁾ Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately (except LC1 F780, LC1 F1250, LC1 F1400, LC1 F1700 and LC1 F2100), see page "TeSys contactors", page B9/14.

⁽²⁾ Standard control circuit voltages, see previous page.

⁽³⁾ With set of right-angled connectors LA9 F2100 (see page B9/16).

TeSys contactors

3-pole vacuum contactors and reversing contactors

Power and control circuits a.c. supply

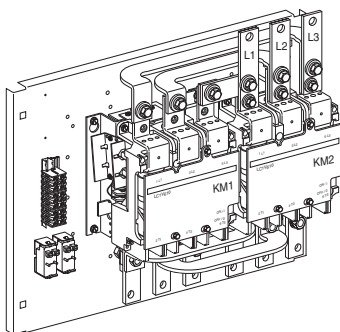
TeSys V

PF526356R.eps



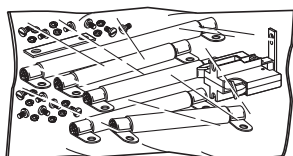
LC1 V320

510227.eps



LC2 V610

510213.eps



LA9 V974

Vacuum contactors

Standard power ratings 50/60 Hz in category AC-3					Rated operational current I _e	Instan- taneous auxiliary contacts	Control circuit voltage (50/60 Hz)	Basic reference ⁽¹⁾	Weight	
230 V	400 V	525 V	690 V	1000 V						AC-3
kW	kW	kW	kW	kW	A	A			kg	
45	75	110	150	200	160	160	2	1	⁽¹⁾ LC1V160●●	3.800
90	160	220	280	400	320	320	1	1	⁽¹⁾ LC1V320●●	10.500
160	300	400	560	800	610	630	1	1	⁽¹⁾ LC1V610●●	13.000

Reversing vacuum contactors

The reversing contactor range comprises :

- for 160 A rating, a kit with set of power connections allowing assembly of the starter
- for 320 and 610 A ratings, a complete starter, ready for use.

Standard power ratings 50/60 Hz in category AC-3					Rated operational current I _e	Instan- taneous auxiliary contacts	Control circuit voltage (50/60 Hz)	Basic reference ⁽¹⁾	Weight		
230 V	400 V	525 V	690 V	1000 V						AC-3	AC-1
kW	kW	kW	kW	kW	A	A			kg		
45	75	110	150	200	160	160	2	1	–	LA9V974 ⁽²⁾	1.200
90	160	220	280	400	320	320	1	1	110-120 V	LC2V320FE7	30
									220-240 V	LC2V320P7	30
									380-415 V	LC2V320V7	30
160	300	400	560	800	610	630	1	1	110-120 V	LC2V610FE7	36
									220-240 V	LC2V610P7	36

⁽¹⁾ Basic reference; add code indicating control circuit voltage.

Standard control circuit voltages:

Volts 50/60 Hz	110...120	220...240	380...415	440...480	550...600
Item	FE7	P7	V7	R7	X7

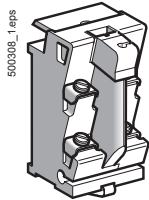
⁽²⁾ Kit containing a mechanical interlock, a set of power connections and a fixing plate.
To build a complete reversing contactor, order contactors LC1 V160●● separately.

TeSys contactors

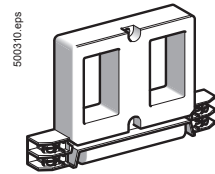
3-pole vacuum contactors and reversing contactors

Power and control circuits a.c. supply

TeSys V





LA1 VN11



LX1 V320●●

Instantaneous auxiliary contact blocks ⁽¹⁾

Number of contacts	Maximum number of blocks per contactor	Auxiliary contacts		Reference
				
2	4	1	1	LA1VN11
		–	2	LA1VN02
		2	–	LA1VN20
		1	1	LA1VN11X ⁽²⁾

50/60 Hz coils

Rated voltage V	Voltage code	Reference
For contactors LC1 V160		
110...120	FE7	LX1V160FE7
220...240	P7	LX1V160P7
380...415	V7	LX1V160V7
440...480	R7	LX1V160R7
550...600	X7	LX1V160X7
For contactors LC1 V320		
110...120	FE7	LX1V320FE7
220...240	P7	LX1V320P7
380...415	V7	LX1V320V7
440...480	R7	LX1V320R7
550...600	X7	LX1V320X7
For contactors LC1 V610		
110...120	FE7	LX1V610FE7
220...240	P7	LX1V610P7
380...415	V7	LX1V610V7
440...480	R7	LX1V610R7
550...600	X7	LX1V610X7

⁽¹⁾ LC1 V160: auxiliary contact blocks mounted at the top of the contactor, with no change to the overall dimensions.

LC1 V320 or LC1 V610: 2 auxiliary contact blocks mounted on the RH and LH side of the contactor, with no change to the overall dimensions.

⁽²⁾ For LC1 V160: 1 N/C contact for the coil + 1 N/O contact.

TeSys contactors

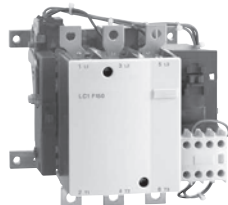
3-pole shockproof contactors LC1 FG

For control of motors and distribution circuits

Control circuit: a.c.

TeSys FG

PF526281R.eps



LC1 FG150

PF526282R.eps



LC1 FG185

PF526283R.eps



LC1 FG265

3-pole shockproof contactors

Standard power ratings of 3-phase motors
50-60 Hz in category AC-3

220 V 380 V
230 V 400 V 415 V 440 V 500 V 660 V
690 V 1000 V

kW kW kW kW kW kW kW

40 75 80 80 90 100 65

55 90 100 100 110 110 100

75 132 140 140 160 160 147

110 200 220 250 257 280 185

147 250 280 295 355 335 335

200 335 375 400 400 450 450

Rated
operational
current in
cat. AC-3,
440 V/AC-1
up to

A

150/250

185/275

265/350

400/500

500/700

630/1000



(1)

DCN

ref.

Basic reference,
to be completed by
adding the voltage code (3)

Screw fixing,
cabling (2)

Weight

kg

CR182 LC1FG150●● 3.430

CR242 LC1FG185●● 4.650

CR302 LC1FG265●● 7.440

CR432 LC1FG400●● 9.100

CR582 LC1FG500●● 11.350

CR852 LC1FG630●● 18.600

Note: these contactors have instantaneous auxiliary contact blocks with 2 N/O contacts, 1 N/C contact and one coil maintaining contact.

(1) Devices approved by the DCN (French naval shipyard department) and authorised for on-board use.

(2) Power terminals can, if required, be protected against direct finger contact by the addition of shrouds, to be ordered separately.

(3) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

		(1)											
Volt ~		48	110	115	120	208	220	230	240	380	400	415	440
LC1 FG 150...FG185	50 Hz (coil LX1)	E5	F5	F5	-	-	M5	P5	U5	Q5	V5	N5	-
	60 Hz (coil LX1)	E6	F6	-	-	L6	M6	-	U6	Q6	-	-	R6
	50/60 Hz (coil LX9)	E7	F7	F7	G6	L7	M7	P7	U7	Q7	V7	N7	R7
LC1 FG265	40...400 Hz (coil LX1)	E7	F7	F7	G7	L7	M7	P7	U7	Q7	V7	N7	R7
LC1 FG400...FG500	40...400 Hz (coil LX1)	-	F7	F7	G7	L7	M7	P7	U7	Q7	V7	N7	R7
LC1 FG630	40...400 Hz (coil LX1)	-	F7	F7	F7	L7	M7	P7	U7	Q7	V7	N7	R7

TeSys contactors

Magnetic latching contactors

Control circuit: a.c. or d.c. supply

TeSys CR1F

PF526337F.eps





CR1 F1854

PF526338F.eps



CR1 F500

Maximum thermal current in category AC-1 40 °C	Rated operational current in category AC-3 (440 V max)	Number of poles	Instantaneous auxiliary contacts		Basic reference, to be completed by adding the voltage code ⁽¹⁾	Weight
						
A	A					kg
250	150	3	–	–	CR1F150●●	3.500
		4	–	–	CR1F1504●●	3.800
275	185	3	–	–	CR1F185●●	4.600
		4	–	–	CR1F1854●●	5.400
350	265	3	–	–	CR1F265●●	7.400
		4	–	–	CR1F2654●●	8.500
500	400	3	–	–	CR1F400●●	9.100
		4	–	–	CR1F4004●●	10.200
700	500	3	–	–	CR1F500●●	11.300
		4	–	–	CR1F5004●●	12.900
1000	630	3	–	–	CR1F630●●	18.600
		4	–	–	CR1F6304●●	21.500

⁽¹⁾ Standard control circuit voltages: see page opposite.

TeSys contactors

TeSys F reversing contactors for motor control in utilisation category AC-3 (115 to 265 A), pre-assembled
Control circuit: a.c. or d.c.



LC2F115

3-pole reversing contactors (horizontally mounted) ⁽¹⁾

Pre-wired power connections

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3							Operational current in AC-3	Maximum operational voltage	Contactors supplied without coil ⁽²⁾ Complete reference Fixing, cabling ⁽³⁾	Weight
220 V 380 V 230 V 400 V 415 V 440 V 500 V 690 V 1000 V							440 V up to			
kW	kW	kW	kW	kW	kW	kW	A	V		kg
30	55	59	59	75	80	65	115	1000	LC2F115	7.560
40	75	80	80	90	100	65	150	1000	LC2F150	7.560
55	90	100	100	110	110	100	185	1000	LC2F185	10.100
63	110	110	110	129	129	100	225	1000	LC2F225	14.200
75	132	140	140	160	160	147	265	1000	LC2F265	16.480

Accessories (to be ordered separately)

Description	For reversing contactors	Quantity required	Reference
Power terminal protection shrouds	LC2 F115	2	LA9F701
	LC2 F150, F185	2	LA9F702
	LC2 F225, F265	2	LA9F703
Auxiliary contact blocks and add-on modules	–	–	See pages B9/10 to B9/14

⁽¹⁾ Fitted with a mechanical interlock without electrical interlocking. Order separately 2 auxiliary contact blocks **LADN•1** to obtain electrical interlocking between the 2 contactors, see page B9/11. For accessories, see pages B9/12 to B9/14.

⁽²⁾ Coils to be ordered separately:
- a.c. supply, see pages B9/17 to B9/4,
- d.c. supply, see pages B9/5 and B9/24.

⁽³⁾ Screw fixing.
Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately, see above.

TeSys contactors

TeSys F changeover contactors for motor control in utilisation category AC-1 (200 to 350 A), pre-assembled
Control circuit: a.c. or d.c.



LC2 F1854

4-pole changeover contactor pairs (horizontally mounted) ⁽¹⁾

Pre-wired power connections

Utilisation category AC-1 Non inductive loads Maximum operational current $\theta < 40\text{ }^{\circ}\text{C}$	Maximum operational voltage	Contactors supplied without coil ⁽²⁾ Complete reference Fixing, cabling ⁽³⁾	Weight
A	V		kg
200	1000	LC2F1154	8.860
250	1000	LC2F1504	8.860
275	1000	LC2F1854	12.100
315	1000	LC2F2254	15.200
350	1000	LC2F2654	19.480

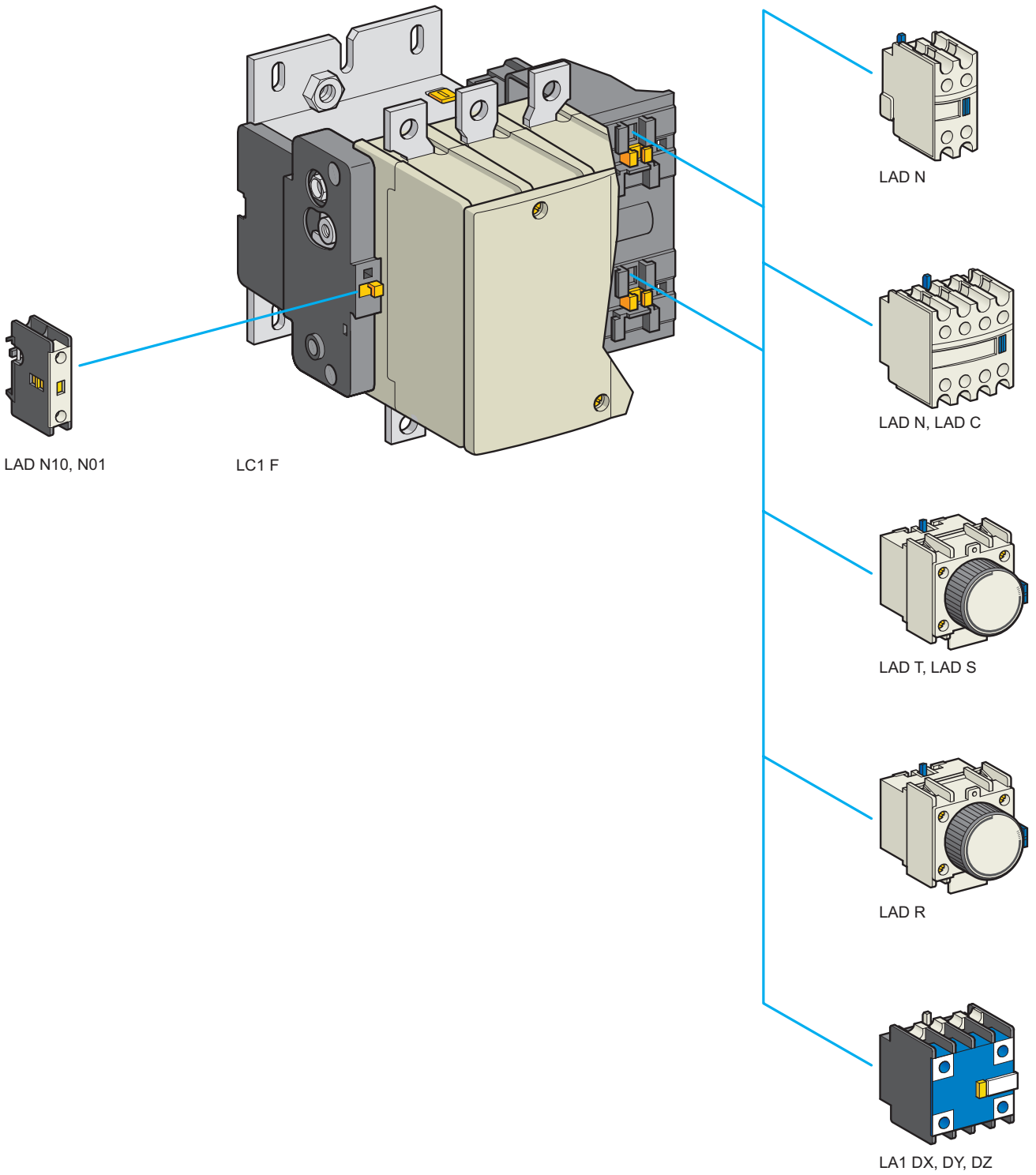
Accessories (to be ordered separately)

Description	For changeover pairs	Quantity required	Reference
Power terminal protection shrouds	LC2 F1154	2	LA9F706
	LC2 F1504, F1854	2	LA9F707
	LC2 F2254, F2654	2	LA9F708
Auxiliary contact blocks and add-on modules	–	–	See pages B9/10 to B9/14

⁽¹⁾ Fitted with a mechanical interlock without electrical interlocking. Order separately 2 auxiliary contact blocks **LAD N•1** to obtain electrical interlocking between the 2 contactors, see page B9/11. For accessories, see pages B9/12 to B9/14.

⁽²⁾ Coils to be ordered separately:
- a.c. supply, see pages B9/17 to B9/4,
- d.c. supply, see pages B9/5 and B9/24.

⁽³⁾ Screw fixing.
Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately, see above.



TeSys contactors





TeSys F contactors

Auxiliary contact blocks

TeSys F

Instantaneous auxiliary contact blocks

For use in normal operating environments

Number of contacts	Maximum number of blocks per contactor Clip-on mounting	Composition				Reference
						
1	1	-	-	1	-	LADN10
		-	-	-	1	LADN01
2	2	-	-	1	1	LADN11
		-	-	2	-	LADN20
		-	-	-	2	LADN02
4	2	-	-	2	2	LADN22
		-	-	1	3	LADN13
		-	-	4	-	LADN40
		-	-	-	4	LADN04
		-	-	3	1	LADN31
		-	-	2	2 ⁽¹⁾	LADC22

With terminal referencing conforming to EN 50012





2	2	-	-	1	1	LADN11P
		-	-	1	1	LADN11G
4	2	-	-	2	2	LADN22P
		-	-	2	2	LADN22G

Instantaneous auxiliary contact blocks for connection by lugs

This type of connection is not possible for blocks with 1 contact or blocks with dust and damp protected contacts. For all other instantaneous auxiliary contact blocks, add the figure 6 to the end of the references selected above. Example: LAD N11 becomes LAD N116.

Instantaneous auxiliary contact blocks with dust and damp protected contacts

Recommended for use in particularly harsh industrial environments

Number of contacts	Maximum number of blocks per contactor Clip-on mounting	Composition				Reference
						
2	2	2	-	-	-	LA1DX20
		2	2 ⁽²⁾	-	-	LA1DY20
4	2	2	-	2	-	LA1DZ40
		2	-	1	1	LA1DZ31

Time delay auxiliary contact blocks

Number of contacts	Maximum number of blocks per contactor Clip-on mounting	Time delay		Reference
		Type	Range s	
1 N/O +	2	On-delay	0.1...3 ⁽³⁾	LADT0
			0.1...30	LADT2
			10...180	LADT4
			1...30 ⁽⁴⁾	LADS2
1 N/C	2	Off-delay	0.1...3 ⁽³⁾	LADR0
			0.1...30	LADR2
			10...180	LADR4

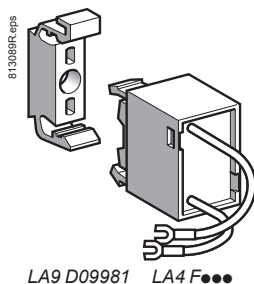
(1) Including 1 N/O + 1 N/C make before break.

(2) Device fitted with 4 earth screen continuity terminals.

(3) With extended scale from 0.1 to 0.6 s.

(4) With switching time of 40 ms ± 15 ms between opening of the N/C contact and closing of the N/O contact.

TeSys F



LA9 D09981 LA4 F...

Suppressor blocks

RC circuits (resistor-capacitor)

- Effective protection for circuits highly sensitive to "high frequency" interference. For use only in cases where the voltage is virtually sinusoidal, i.e. less than 5 % total harmonic distortion.
- Voltage limited to 3 U_c max. and oscillating frequency limited to 400 Hz max.
- Slight increase in drop-out time (1.1 to 1.3 times the normal time).

Mounting	U_c		Reference
Clip-on mounting on all ratings and all a.c. coils.	~	24...48 V	LA4FRCE
		50...110 V	LA4FRCF
		127...240 V	LA4FRCP
		265...415 V	LA4FRCV
Suppressor block bracket			LA9D09981

Varistors (peak limiting)

- Protection provided by limiting the transient voltage to 2 U_c max.
- Maximum reduction of transient voltage peaks.

Mounting	U_c		Reference
Clip-on mounting on all ratings and all coils.	~ or ---	24...48 V	LA4FVE
		50...110 V	LA4FVF
		127...240 V	LA4FVP
		265...415 V	LA4FVV

Diodes

- No overvoltage or oscillating frequencies.
- Increase in drop-out time (3 to 4 times the normal time).
- Polarised component.

Mounting	U_c		Reference
Clip-on mounting on all ratings and all d.c. coils.	---	24...48 V	LA4FDE
		55...110 V	LA4FDF
		125...250 V	LA4FDP
		280...440 V	LA4FDV

Bidirectional peak limiting diodes (transil)

- Protection provided by limiting the transient voltage to between 2 and 2.5 times U_c max.
- Maximum reduction of transient voltage peaks.

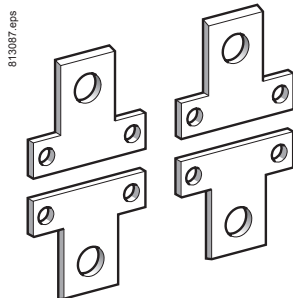
Mounting	U_c		Reference
Clip-on mounting on all ratings and all coils.	~ or ---	24...48 V	LA4FTE
		50...110 V	LA4FTF
		127...240 V	LA4FTP
		265...415 V	LA4FTV

Connection accessories

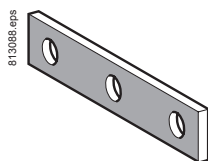
For use on 4-pole contactors	Set of 4 links	Weight kg
	Set reference	
Links for parallel connection of poles (in pairs)		
LC1 F1154	LA9FF602	0.200
LC1 F1504, F1854	LA9FG602	0.350
LC1 F2254, F2654, F3304, F4004	LA9FH602	1.000
LC1 F5004	LA9FK602	1.750
LC1 F6304	LA9FL602	3.000
Links for "star" connection of 3 poles		
LC1 F115	LA9FF601	0.035
LC1 F150, F185	LA9FG601	0.050
LC1 F225, F265, F330, F400	LA9FH601	0.120
LC1 F500	LA9FK601	0.180
LC1 F630, F800	LA9FL601	0.550

Control circuit voltage take-off from power terminals

For use with contactors	Mounted on bolt size	Sold in lots of	Unit reference
LC1 F115	M6	10	DZ3FA3
LC1 F150, F185	M8	10	DZ3GA3
LC1 F225...F500	M10	10	DZ3HA3
LC1 F630, F800	M12	10	DZ3JA3



LA9 F...602

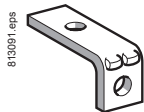


LA9 F...601

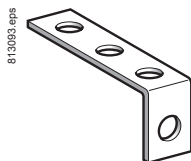


DZ3 FA3

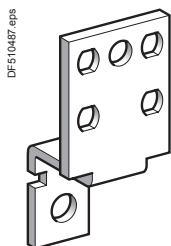
TeSys F



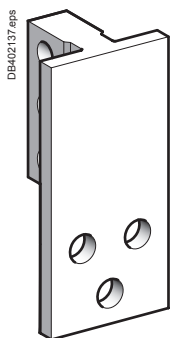
LA9 F981



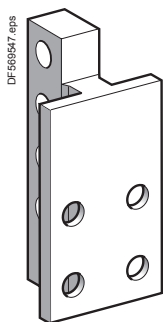
LA9 F979



LA9 FL980



LA9 F1250



LA9 F2100

Right-angled connectors

For contactors or thermal overload relays

For use with		With connector plates		Set of 3 connectors	
Contactors	Thermal overload relays ⁽¹⁾	Width	Type	Set reference	Weight kg
LC1 F115	LR9 F567, LR9 F67	15 mm	Rear	LA9FF981	0.060
			Side	LA9FF979	0.240
			Large surface area	LA9FF980	0.150
LC1 F150, F185	LR9 F569, F571, LR9 F69, F71	20 mm	Rear	LA9FG981	0.080
			Side	LA9FG979	0.350
			Large surface area	LA9FG980	0.200
LC1 F225, F265, F330, F400	LR9 F775, LR9 F75	25 mm	Rear	LA9FJ981	0.430
			Side	LA9FJ979	0.750
			Large surface area	LA9FJ980	0.490
LC1 F500	LR9 F779, F781, LR9 F79, F81	30 mm	Rear	LA9FK981	0.480
			Side	LA9FK979	0.920
			Large surface area	LA9FK980	0.800
LC1 F630, F800	LR9 F781, LR9 F81	40 mm	Rear	LA9FL981	1.210
			Side	LA9FL979	2.570
			Large surface area	LA9FL980	3.190
For use with		With connector plates		Set of 6 connectors	
Contactors		Width	Type	Set reference	Weight kg
LC1 F1250		60 mm	Rear	LA9F1250	5.480
LC1 F1400, F1700, F2100		60 mm	Rear	LA9F2100	9.550

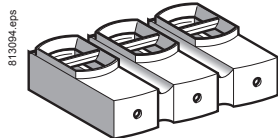
Connection accessories

For reversing contactors or "star-delta" contactors combined with a thermal overload relay

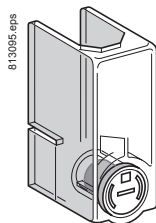
For use with		Width of connector plates	Set of 3 busbars
Contactors	Thermal overload relays ⁽¹⁾		Set reference
LC1 F115	LR9 F557, F563 LR9 F567, F569 LR9 F69, F71	15 mm	LA7F401
LC1 F150 and F185	LR9 F557, F563	20 mm	LA7F402
LC1 F185	LR9 F571, LR9 F71	25 mm	LA7F407
LC1 F225 and F265	LR9 F571, LR9 F71	25 mm	LA7F403
	LR9 F775, F779 LR9 F75, F79	25 mm	LA7F404
LC1 F330 and F400	LR9 F775, F779 LR9 F75, F79	25 mm	LA7F404
LC1 F400	LR9 F781, LR9 F81	25 mm	LA7F404
LC1 F500	LR9 F775, F779 LR9 F781 LR9 F75, F79, F81	30 mm	LA7F405
LC1 F630, F800	LR9 F781, LR9 F81	40 mm	LA7F406

(1) For protection relays class 10, replace the ● with a 3 and for class 20, replace the ● with a 5.

TeSys F



LA9 F103



LA9 F701

Insulated terminal blocks

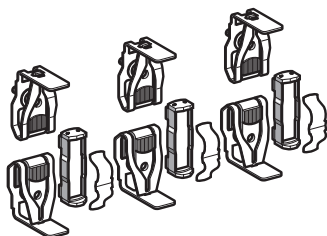
For use on 3-pole contactors	Connection	Tightening tool	Set of 2 blocks Set reference
LC1 F115, F150, F185	1 x 16...150 mm ² or 2 x 16...95 mm ²	4 mm hexagonal socket key	LA9F103

Power terminal protection shrouds

For use on 2, 3 and 4-pole contactors	Number of shrouds per set	Set reference
LC1 F115	6	LA9F701
LC1 F150, F185	6	LA9F702
LC1 F225, F265, F330, F400 and F4002 F500 and F5002	6	LA9F703
LC1 F630, F6302 and F800	6	LA9F704
LC1 F1154	8	LA9F706
LC1 F1504 and F1854	8	LA9F707
LC1 F2254, F2654, F3304, F4004, F5004	8	LA9F708
LC1 F6304	8	LA9F709

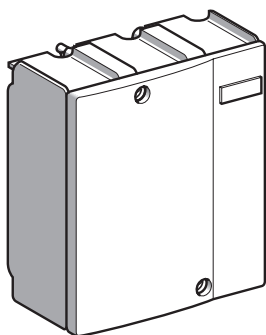
TeSys F

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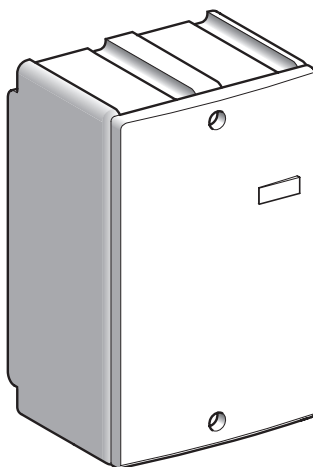
LA5 FG431

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LA5 F40050

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LA5 F210050

Sets of contacts

Per pole: 2 fixed contacts, 1 moving contact, 2 deflectors, 1 back-plate, clamping screws and washers.

For contactor	Type	Replacement for	Reference	Weight kg
2-pole	LC1 F4002	2 poles	LA5F400802	1.350
	LC1 F5002	2 poles	LA5F500802	1.950
	LC1 F6302	2 poles	LA5F630802	4.700
	LC1 F6302S011	2 poles	LA5F630802S011	4.800
3-pole	LC1 F115. F150	3 poles	LA5FF431	0.270
	LC1 F185. F225	3 poles	LA5FG431	0.350
	LC1 F265	3 poles	LA5FH431	0.660
	LC1 F330. F400	3 poles	LA5F400803	2.000
	LC1 F500	3 poles	LA5F500803	2.950
	LC1 F630	3 poles	LA5F630803	6.100
	LC1 F780	1 pole	LA5F780801 ⁽¹⁾	4.700
		3 poles	LA5F780803	13.200
LC1 F800	3 poles	LA5F800803	6.100	
	LC1 F630S011	3 poles	LA5F630803S011	6.200
4-pole	LC1 F1504. F1154	4 poles	LA5FF441	0.360
	LC1 F1854. F2254	4 poles	LA5FG441	0.465
	LC1 F2654	4 poles	LA5FH441	0.880
	LC1 F3304. F4004	4 poles	LA5F400804	2.700
	LC1 F5004	4 poles	LA5F500804	3.900
	LC1 F6304	4 poles	LA5F630804	8.150
	LC1 F7804	1 pole	LA5F780801 ⁽¹⁾	4.700
		4 poles	LA5F780804	17.300
	LC1 F6304S011	4 poles	LA5F630804S011	8.400

Arc chambers

For contactor	Type	Replacement for	Reference	Weight kg
2-pole	LC1 F4002	2 poles	LA5F400250	0.870
	LC1 F5002	2 poles	LA5F500250	1.250
	LC1 F6302	2 poles	LA5F630250	2.100
	LC1 F6302S011	2 poles	LA5F630250	2.100
3-pole	LC1 F115	3 poles	LA5F11550	0.490
	LC1 F150	3 poles	LA5F15050	0.490
	LC1 F185	3 poles	LA5F18550	0.670
	LC1 F225	3 poles	LA5F22550	0.670
	LC1 F265	3 poles	LA5F26550	0.920
	LC1 F330	3 poles	LA5F33050	1.300
	LC1 F400	3 poles	LA5F40050	1.300
	LC1 F500	3 poles	LA5F50050	1.850
	LC1 F630	3 poles	LA5F63050	3.150
	LC1 F780	1 pole	LA5F780150 ⁽¹⁾	2.100
	LC1 F800	3 poles	LA5F80050	3.150
	LC1 F630S011	3 poles	LA5F63050	3.150
	LC1 F1250	3 poles	LA5F125050	3.150
	LC1 F1400	6 poles	LA5F140050 ⁽²⁾	3.750
LC1 F1700	6 poles	LA5F170050 ⁽²⁾	3.750	
LC1 F2100	6 poles	LA5F210050 ⁽²⁾	3.750	
4-pole	LC1 F1154	4 poles	LA5F115450	0.660
	LC1 F1504	4 poles	LA5F150450	0.660
	LC1 F1854	4 poles	LA5F185450	0.910
	LC1 F2254	4 poles	LA5F225450	1.000
	LC1 F2654	4 poles	LA5F265450	1.220
	LC1 F3304	4 poles	LA5F330450	1.740
	LC1 F4004	4 poles	LA5F400450 ⁽³⁾	1.740
	LC1 F5004	4 poles	LA5F500450 ⁽³⁾	2.500
	LC1 F6304	4 poles	LA5F630450 ⁽⁴⁾	4.200
	LC1 F7804	1 pole	LA5F780150 ⁽¹⁾	2.100
	LC1 F6304S011	4 poles	LA5F630450	4.200

⁽¹⁾ Comprising 2 identical items per pole.

⁽²⁾ Comprising three 2-pole arc chambers.

⁽³⁾ Comprising two 2-pole arc chambers.

⁽⁴⁾ Comprising single-pole arc chambers.

TeSys contactors

Capacitive delayed opening devices

For TeSys F contactors

TeSys F



LAZ R90F

References

These devices prevent inadvertent opening of a contactor in the event of a brief volt drop or momentary supply failure.

Control circuit : d.c. supply

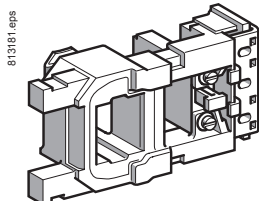
For use with contactor		Corresponding delayed opening device			
Type	With coil	Supply voltage 50/60 Hz	Non-adjustable delay time (Tr)	Reference	
		V	s		
LC1 F115 or LC1 F150	LX4 FF110	110	2...5	LAZR90F	
	LX4 FF125	127	2...5	LAZR90F	
	LX4 FF220	220	2...5	LAZR90M	
	LX4 FF250	240	2...5	LAZR90M	
	LX4 FF375	380...415	2...5	LAZR90Q	
LC1 F185 or LC1 F225	LX4 FG110	110	2...5	LAZR90F	
	LX4 FG125	127	2...5	LAZR90F	
	LX4 FG220	220	2...5	LAZR90M	
	LX4 FG250	240	2...5	LAZR90M	
	LX4 FG375	380...415	2...5	LAZR90Q	
LC1 F265 or LC1 F330	LX4 FH110	110	2...5	LAZR90F	
	LX4 FH125	127	2...5	LAZR90F	
	LX4 FH220	220	2...5	LAZR90M	
	LX4 FH250	240	2...5	LAZR90M	
	LX4 FH375	380...415	2...5	LAZR90Q	
LC1 F400	LX4 FJ110	110	1...2	LAZR90F	
	LX4 FJ125	127	1...2	LAZR90F	
	LX4 FJ220	220	1...2	LAZR90M	
	LX4 FJ250	240	1...2	LAZR90M	
	LX4 FJ375	380	1...2	LAZR90Q	
LC1 F500	LX4 FJ400	415	1...2	LAZR90Q	
	LX4 FJ440	440	1...2	LAZR90Q	
	LC1 F630	LX4 FK110	110	1...2	LAZR90F
		LX4 FK125	127	1...2	LAZR90F
		LX4 FK220	220	1...2	LAZR90M
LX4 FK250		240	1...2	LAZR90M	
LX4 FK375		380	1...2	LAZR90Q	
LC1 F630	LX4 FK400	415	1...2	LAZR90Q	
	LX4 FK440	440	1...2	LAZR90Q	
	LC1 F630	LX4 FL110	110	1...2	LAZR90F
		LX4 FL125	127	1...2	LAZR90F
		LX4 FL220	220	1...2	LAZR90M
LX4 FL250		240	1...2	LAZR90M	
LX4 FL375		380	1...2	LAZR90Q	
LC1 F630	LX4 FL400	415	1...2	LAZR90Q	
	LX4 FL440	440	1...2	LAZR90Q	

Add-on blocks for delayed opening devices

Application	For use with delayed opening device	Operational voltage	Non- adjustable delay time	Reference
		V	s	
To double the delay time	LAZ R90F	110...127	Tr x 2	LAZR91F
	LAZ R90M	220...240	Tr x 2	LAZR91M
	LAZ R90Q	380...440	Tr x 2	LAZR91Q

Other versions

Delayed opening devices for use with other types of contactor. Please consult your Regional Sales Office.



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LX1 FF●●●

References

Maximum ambient air temperature: 55 °C. Above this, use an LX9 F coil, see page B9/22.

Operating cycles/hour ($\theta \leq 55$ °C): ≤ 2400 .

Control circuit voltage		Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Voltage code	Reference
Uc - 50 Hz	Uc - 60 Hz				
V	V	Ω	H		
For contactors LC1 F115 and LC1 F150					
24	–	0.27	0.04	B5	LX1FF024
42	–	0.94	0.13	D5	LX1FF042
–	48	0.78	0.11	E6	LX1FF040
48	–	1.17	0.16	E5	LX1FF048
–	110	4.55	0.59	F6	LX1FF092
–	120	4.77	0.64	G6	LX1FF095
110	–	6.38	0.86	F5	LX1FF110
115	–	6.38	0.86	FE5	LX1FF110
127/132	–	9.14	1.15	G5	LX1FF127
–	200/208	14.5	1.87	L6	LX1FF162
–	220	18.4	2.38	M6	LX1FF184
–	240	18.9	2.5	U6	LX1FF187
220	265/277	28.1	3.44	M5	LX1FF220
230	–	28.1	3.44	P5	LX1FF220
240	–	31.1	4.1	U5	LX1FF240
–	380	57.2	7.05	Q6	LX1FF316
–	440	72.6	9.21	R6	LX1FF360
380	460/480	86.9	10.3	Q5	LX1FF380
400	–	86.9	10.3	V5	LX1FF380
415	–	95.1	12	N5	LX1FF415
500	–	141	17	S5	LX1FF500
–	660	172	20.3	Y6	LX1FF550
660/690	–	254	28.9	Y5	LX1FF660
–	1000	414	48.9	–	LX1FF850
1000	–	610	68.5	–	LX1FF1000

Specifications

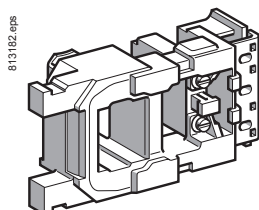
Average consumption at 20 °C:

■ inrush 50 Hz: 550 VA; 60 Hz: 660 VA

■ sealed 50 Hz: 45 VA; 60 Hz: 55 VA, $\cos \varphi = 0.3$.

Heat dissipation: 12...16 W.

Operating time at U_c: closing = 23...35 ms, opening = 5...15 ms.



813182_eps

LX1 FG●●●

For contactors LC1 F185 and LC1 F225					
24	–	0.18	0.03	B5	LX1FG024
42	–	0.57	0.09	–	LX1FG042
–	48	0.47	0.08	E6	LX1FG040
48	–	0.71	0.12	E5	LX1FG048
–	110	2.74	0.44	F6	LX1FG092
–	115/120	2.87	0.49	G6	LX1FG095
110	–	4.18	0.65	F5	LX1FG110
115	–	4.18	0.65	FE5	LX1FG110
127/132	–	5.35	0.86	G5	LX1FG127
–	200/208	8.8	1.41	L6	LX1FG162
–	220	11.1	1.8	M6	LX1FG184
–	240	11.4	1.87	U6	LX1FG187
220	265/277	16.5	2.59	M5	LX1FG220
230	–	16.5	2.59	P5	LX1FG220
240	–	20.1	3.09	U5	LX1FG240
–	380	34	5.32	Q6	LX1FG316
–	440	43.5	6.94	R6	LX1FG360
380	460/480	51.3	7.75	Q5	LX1FG380
400	–	51.3	7.75	V5	LX1FG380
415	–	62.3	9.06	N5	LX1FG415
500	–	82.7	12.8	S5	LX1FG500
–	660	103	15.3	Y6	LX1FG550
660/690	–	154	21.8	Y5	LX1FG660
–	1000	249	36.6	–	LX1FG850
1000	–	370	51.6	–	LX1FG1000

Specifications

Average consumption at 20 °C:

■ inrush 50 Hz: 805 VA; 60 Hz: 970 VA

■ sealed 50 Hz: 55 VA; 60 Hz: 66 VA, $\cos \varphi = 0.3$.

Heat dissipation: 18...24 W.

Operating time at U_c: closing = 20...35 ms, opening = 7...15 ms.

References

Low sealed consumption.

Operate on networks with harmonic numbers ≤ 7 .

Operating cycles/hour ($0 \leq 55 \text{ }^\circ\text{C}$): ≤ 2400 .

Control circuit voltage U_c	Average resistance at $20 \text{ }^\circ\text{C} \pm 10 \%$		Inductance of closed circuit H	Voltage code	Reference
	Inrush	Sealed			
V	Ω	Ω	H		
For contactors LC1 F265 and LC1 F330					
24	0.8	20	(1)	B7	LX1FH0242
48	2.96	67	(1)	E7	LX1FH0482
110	18.7	440	(1)	F7	LX1FH1102
115	18.7	440	(1)	FE7	LX1FH1102
120/127	22.9	536	(1)	G7	LX1FH1272
200/208	58.4	1366	(1)	L7	LX1FH2002
220	70.6	1578	(1)	M7	LX1FH2202
230	70.6	1578	(1)	P7	LX1FH2202
240	87.94	1968	(1)	U7	LX1FH2402
277	113	2444	(1)	W7	LX1FH2772
380	217	4631	(1)	Q7	LX1FH3802
400	217	4631	(1)	V7	LX1FH3802
415	217	4631	(1)	N7	LX1FH3802
440	265	6731	(1)	R7	LX1FH4402
480/500	329	8543	(1)	S7	LX1FH5002
600/660	296	10245	(1)	X7	LX1FH6002
1000	696	25880	(1)	–	LX1FH10002

Specifications

Average consumption at $20 \text{ }^\circ\text{C}$ for 50 or 60 Hz and $\cos \varphi = 0.9$:

■ inrush: 600...700 VA

■ sealed: 8...10 VA.

Heat dissipation: 8 W.

Operating time at U_c : closing = 40...65 ms, opening = 100...170 ms.

For contactor LC1 F400					
48	1.6	29.5	0.18	E7	LX1FJ048
110/120	9.8	230	1.35	F7	LX1FJ110
115	9.8	230	1.35	FE7	LX1FJ110
120/127	12.8	280	1.75	G7	LX1FJ127
200/208	30	815	4.1	L7	LX1FJ200
220	37	1030	5.1	M7	LX1FJ220
230	37	1030	5.1	P7	LX1FJ220
240	47.5	1320	6.4	U7	LX1FJ240
265/277	61	1700	8.1	W7	LX1FJ280
380	120	3310	15.8	Q7	LX1FJ380
400	120	3310	15.8	V7	LX1FJ380
415	145	4070	19.4	N7	LX1FJ415
440	145	4070	19.4	R7	LX1FJ415
500	190	4980	25.5	S7	LX1FJ500
550/600	243	6310	27.4	X7	LX1FJ600
1000	720	19420	84.6	–	LX1FJ1000

Specifications

Average consumption at $20 \text{ }^\circ\text{C}$ for 50 or 60 Hz and $\cos \varphi = 0.9$:

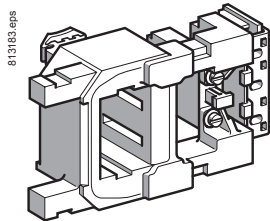
■ inrush: 1000...1150 VA

■ sealed: 12...18 VA.

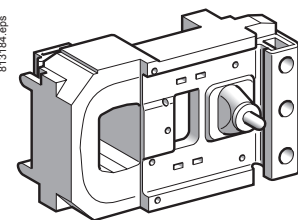
Heat dissipation: 14 W.

Operating time at U_c : closing = 40...75 ms, opening = 100...170 ms.

(1) Please consult your Regional Sales Office.



LX1 FH●●●2



LX1 FJ●●●

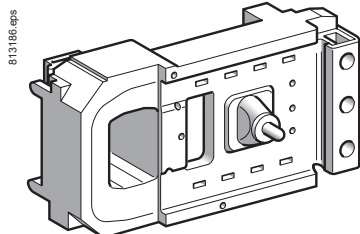
TeSys F

References

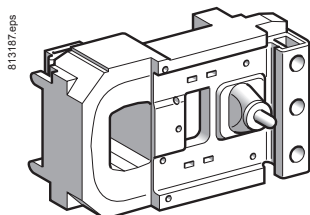
Low sealed consumption.

Operate on networks with harmonic numbers ≤ 7 .

Control circuit voltage Uc	Average resistance at 20 °C $\pm 10\%$		Inductance of closed circuit H	Voltage code	Reference	Weight kg
	Inrush Ω	Sealed Ω				
V	Ω	Ω	H			kg
For contactor LC1 F500						
48	1.9	33.5	0.19	E7	LX1FK048	1.150
110/120	9.55	260	1.25	F7	LX1FK110	1.150
115	9.55	260	1.25	FE7	LX1FK110	1.150
120/127	11.5	315	1.5	G7	LX1FK127	1.150
200/208	29	735	3.75	L7	LX1FK200	1.150
220	35.5	915	4.55	M7	LX1FK220	1.150
230	35.5	915	4.55	P7	LX1FK220	1.150
240	44.5	1160	5.75	U7	LX1FK240	1.150
265/277	56.5	1490	7.3	W7	LX1FK280	1.150
380	112	2980	14.7	Q7	LX1FK380	1.150
400	112	2980	14.7	V7	LX1FK380	1.150
415	143	3730	18.4	N7	LX1FK415	1.150
440	143	3730	18.4	R7	LX1FK415	1.150
500	172	4590	22.8	S7	LX1FK500	1.150
550/600	232	5660	23.9	X7	LX1FK600	1.150
1000	679	16960	72	–	LX1FK1000	1.150



LX1 FK●●●



LX1 FL●●●

Specifications

Average consumption at 20 °C for 50 or 60 Hz, $\cos \varphi = 0.9$:

■ inrush: 1050...1150 VA,

■ sealed: 16...20 VA.

Operating cycles/hour ($\theta \leq 55$ °C): ≤ 2400 .

Heat dissipation: 18 W.

Operating time at U_c: closing = 40...75 ms, opening = 100...170 ms.

For contactor LC1 F630 and LC1 F1250

48	1.1	17.1	0.09	E7	LX1FL048 ⁽¹⁾	1.500
110/120	6.45	165	1.85	F7	LX1FL110	1.500
115	6.45	165	1.85	FE7	LX1FL110	1.500
127	8.1	205	1.05	G7	LX1FL127	1.500
200/208	20.5	605	2.65	L7	LX1FL200	1.500
220	25.5	730	3.35	M7	LX1FL220	1.500
230	25.5	730	3.35	P7	LX1FL220	1.500
240	25.5	730	3.35	U7	LX1FL220	1.500
265/277	31	900	4.1	W7	LX1FL260	1.500
380	78	2360	10.5	Q7	LX1FL380	1.500
400	78	2360	10.5	V7	LX1FL380	1.500
415	96	2960	13	N7	LX1FL415	1.500
440	96	2960	13	R7	LX1FL415	1.500
500	120	3660	16.5	S7	LX1FL500	1.500
550/600	155	4560	19.5	X7	LX1FL600	1.500
1000	474	12880	56.2	–	LX1FL1000 ⁽¹⁾	1.500

⁽¹⁾ Incompatible with LC1F1250.

Specifications

Average consumption at 20 °C for 50 or 60 Hz, $\cos \varphi = 0.9$:

■ inrush: 1500...1730 VA,

■ sealed: 20...25 VA.

Operating cycles/hour ($\theta \leq 55$ °C): 1200.

Heat dissipation: 20 W.

Operating time at U_c: closing = 40...80 ms, opening = 100...200 ms.

References

Low sealed consumption.

Operate on networks with harmonic numbers ≤ 7 .

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Voltage code	Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			kg
For contactor LC1 F780						
110/120	4.95 ⁽²⁾	230 ⁽²⁾	0.21	F7	LX1FX110 ⁽¹⁾	3.000
115	4.95 ⁽²⁾	230 ⁽²⁾	0.21	FE7	LX1FX110 ⁽¹⁾	3.000
127	6.1 ⁽²⁾	280 ⁽²⁾	0.26	G7	LX1FX127 ⁽¹⁾	3.000
200/208	15.5 ⁽²⁾	750 ⁽²⁾	0.66	L7	LX1FX200 ⁽¹⁾	3.000
220	19.5 ⁽²⁾	920 ⁽²⁾	0.82	M7	LX1FX220 ⁽¹⁾	3.000
230	19.5 ⁽²⁾	920 ⁽²⁾	0.82	P7	LX1FX220 ⁽¹⁾	3.000
240	19.5 ⁽²⁾	920 ⁽²⁾	0.82	U7	LX1FX220 ⁽¹⁾	3.000
265/277	29.8 ⁽²⁾	1330 ⁽²⁾	1.25	W7	LX1FX280 ⁽¹⁾	3.000
380	60.9 ⁽²⁾	2780 ⁽²⁾	2.3	Q7	LX1FX380 ⁽¹⁾	3.000
400	60.9 ⁽²⁾	2780 ⁽²⁾	2.3	V7	LX1FX380 ⁽¹⁾	3.000
415/480	74.3 ⁽²⁾	3340 ⁽²⁾	2.8	N7	LX1FX415 ⁽¹⁾	3.000
440	74.3 ⁽²⁾	3340 ⁽²⁾	2.8	R7	LX1FX415 ⁽¹⁾	3.000
500	92 ⁽²⁾	4180 ⁽²⁾	3.5	S7	LX1FX500 ⁽¹⁾	3.000

Specifications

Average consumption at 20 °C for 50 or 60 Hz, $\cos \varphi = 0.9$:

■ inrush: 1900...2300 VA, sealed: 44...55 VA.

Operating cycles/hour ($\theta \leq 55$ °C): 600.

Heat dissipation: 2 x 22 W.

Operating time at U_c : closing = 40...80 ms, opening = 130...230 ms.

Control circuit voltage U_c	Voltage code	Rectifier Reference ⁽³⁾	Coil Reference	Weight
V				kg
For contactor LC1 F800				
110/127	FE7	DR5TE4U	LX4F8FW	1.650
220/240	P7	DR5TE4U	LX4F8MW	1.650
380/440	V7	DR5TE4S	LX4F8QW	1.650

Specifications

Operating cycles/hour ($\theta \leq 55$ °C): 600.

Average consumption at 20 °C for 50 or 60 Hz, $\cos \varphi = 0.8$:

■ inrush: 1700 VA, sealed: 12 VA.

Operating time at U_c : closing = 60...80 ms, opening = 160...180 ms.

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Voltage code	Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			kg
For contactors LC1 F1400, LC1 F1700 and LC1 F2100						
110	5.92	106	0.72	F7	LX1FK065 ⁽⁴⁾	1.150
120	5.92	106	0.72	G7	LX1FK070 ⁽⁴⁾	1.150
220	9.55	260	1.25	M7	LX1FK110 ⁽⁴⁾	1.150
230	9.55	260	1.25	P7	LX1FK110 ⁽⁴⁾	1.150
240	11.5	315	1.50	U7	LX1FK127 ⁽⁴⁾	1.150
277	16.5	420	2.25	W7	LX1FK140 ⁽⁴⁾	1.150
380	29	735	3.75	Q7	LX1FK200 ⁽⁴⁾	1.150
400	29	735	3.75	V7	LX1FK200 ⁽⁴⁾	1.150
415	35.5	915	4.55	N7	LX1FK220 ⁽⁴⁾	1.150
440	35.5	915	4.55	R7	LX1FK220 ⁽⁴⁾	1.150
500	44.5	1160	5.75	S7	LX1FK240 ⁽⁴⁾	1.150

Specifications

Average consumption at 20 °C for 50 or 60 Hz, $\cos \varphi = 0.9$:

■ inrush: 1600...2400 VA, sealed: 29...37 VA.

Operating cycles/hour ($\theta \leq 55$ °C): 600.

Heat dissipation: 2 x 18 W.

Operating time at U_c : closing = 40...75 ms, opening = 100...170 ms.

(1) Reference of set of 2 identical coils, to be connected in series.

(2) Value for the 2 coils in series.

(3) Rectifier to be ordered separately: 0.100 kg.

(4) Order 2 coils and connect them in series.

References

Low sealed consumption.

High tolerance to inrush voltage drops.

Immune to micro-breaks (mains supply or contact chain).

Operate on networks with harmonic numbers ≤ 7 .

Control circuit voltage U _c	Average resistance at 20 °C $\pm 10\%$		Inductance of closed circuit	Voltage code	Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			
For contactors LC1 F115 and LC1 F150						
48	3.03	80.2	0.3	E7	LX9FF048	
110	14.8	579	2.08	F7	LX9FF110	
115	14.8	579	2.08	FE7	LX9FF110	
120/127	19	746	2.65	G7	LX9FF127	
208	45	1788	5.95	L7	LX9FF200	
220	59.4	2190	7.7	M7	LX9FF220	
230	59.4	2190	7.7	P7	LX9FF220	
240	73.5	2750	9.68	U7	LX9FF240	
380	173	6540	23	Q7	LX9FF380	
400	173	6540	23	V7	LX9FF380	
415	218	8460	30	N7	LX9FF415	
440	218	8460	30	R7	LX9FF415	
500	262	10300	36	S7	LX9FF500	

Specifications

Average consumption at 20 °C: inrush: 690...855 VA, sealed: 6.6...8.1 VA.

Heat dissipation: 5.9...7.2 W.

Operating cycles/hour ($\theta \leq 55$ °C): < 2400.

Operating time at U_c: closing = 35 ms, opening = 130 ms.

For contactors LC1 F185 and LC1 F225						
Control circuit voltage U _c	Average resistance at 20 °C $\pm 10\%$ Inrush	Average resistance at 20 °C $\pm 10\%$ Sealed	Inductance of closed circuit	Voltage code	Reference	Weight
V	Ω	Ω	H			
48	2.2	60	0.23	E7	LX9FG048	
110	10.4	411	1.46	F7	LX9FG110	
115	10.4	411	1.46	FE7	LX9FG110	
120/127	13	520	1.85	G7	LX9FG127	
208	33	1339	4.9	L7	LX9FG200	
220	42.1	1680	5.84	M7	LX9FG220	
230	42.1	1680	5.84	P7	LX9FG220	
240	50.6	2060	7.22	U7	LX9FG240	
380	128	4730	16.4	Q7	LX9FG380	
400	128	4730	16.4	V7	LX9FG380	
415	157	5930	20.6	N7	LX9FG415	
440	157	5930	20.6	R7	LX9FG415	
500	194	7550	26.3	S7	LX9FG500	

Specifications

Average consumption at 20 °C: inrush: 950...1180 VA, sealed: 8.9...10.9 VA.

Heat dissipation: 8...9.8 W.

Operating cycles/hour ($\theta \leq 55$ °C): < 2400.

Operating time at U_c: closing = 35 ms, opening = 130 ms.

For contactors LC1 F265 and LC1 F330						
Control circuit voltage U _c	Average resistance at 20 °C $\pm 10\%$ Inrush	Average resistance at 20 °C $\pm 10\%$ Sealed	Inductance of closed circuit	Voltage code	Reference	Weight
V	Ω	Ω	H			
48	2.96	72	(2)	–	LX9FH0482	
110/115	18.7	415	(2)	–	LX9FH1102	
120/127	22.9	156	(2)	–	LX9FH1272	
220/230	71.6	1621	(2)	–	LX9FH2202	
240	88	1968	(2)	–	LX9FH2402	
380/415	222	5075	(2)	–	LX9FH3802	
500	345	7990	(2)	–	LX9FH5002	

Specifications

Average consumption at 20 °C: inrush: 560...660 VA, sealed: 8...10 VA.

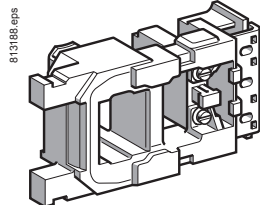
Heat dissipation: 8.4...10.4 W.

Operating cycles/hour ($\theta \leq 55$ °C): < 3600.

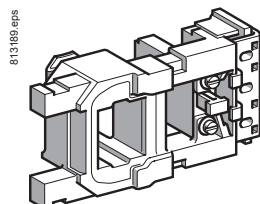
Operating time at U_c: closing = 45 ms, opening = 25 ms.

(1) Application examples: hoisting (inching, high operating rates), Main-Standby (unstable mains supplies). These coils are particularly suited for use at higher operating temperatures (mounting in non-ventilated compartments, enclosures, etc.).

(2) Please consult your Regional Sales Office.



LX9 FF●●●



LX9 FG●●●

References

Coils with short operating times (at U_c):

- N/O: 60 ms
- N/C: 50 ms (\sim side); 20 ms (\dashv side).

Coils with high operating rates ($\theta \leq 70$ °C):

- 3600 operating cycles/hour
- 1800 for LC1 F630.

Coils with low inrush consumption.

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Rectifier Reference ⁽¹⁾	Coil Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			kg
For contactor LC1 F400						
48	4.03	43	0.22	DR5TF4V	LX9FJ917	0.970
110	25.7	246	1.3	DR5TE4U	LX9FJ925	0.970
127	32.3	302	1.7	DR5TE4U	LX9FJ926	0.970
220/230	99.5	919	5	DR5TE4U	LX9FJ931	0.970
380/415	311	3011	15	DR5TE4S	LX9FJ936	0.970
440	386	3690	19	DR5TE4S	LX9FJ937	0.970
500	478	4380	23	DR5TE4S	LX9FJ938	0.970

Specifications

Average consumption:

- inrush: 500 VA
- sealed: 23 VA.

Heat dissipation: 11.4...13.9 W.

For contactor LC1 F500

48	3.73	30.7	0.18	DR5TF4V	LX9FK917	1.080
110	24	204	1.1	DR5TE4U	LX9FK925	1.080
127	29.8	250	1.4	DR5TE4U	LX9FK926	1.080
220/230	89.9	770	4	DR5TE4U	LX9FK931	1.080
380/415	274	2075	12	DR5TE4S	LX9FK936	1.080
440	361	3060	16	DR5TE4S	LX9FK937	1.080
500	448	3750	19	DR5TE4S	LX9FK938	1.080

Specifications

Average consumption:

- inrush: 550 VA
- sealed: 31 VA.

Heat dissipation: 15...18.3 W.

For contactor LC1 F630

48	2.81	20.8	0.17	DR5TF4V	LX9FL917	1.450
110	13.5	114	0.77	DR5TE4U	LX9FL924	1.450
127	20.8	167	1.2	DR5TE4U	LX9FL926	1.450
220	52	425	2.9	DR5TE4U	LX9FL930	1.450
220/240	64.5	518	3.6	DR5TE4U	LX9FL931	1.450
380/400	163	1360	8.8	DR5TE4S	LX9FL935	1.450
415/440	204	1670	11	DR5TE4S	LX9FL936	1.450
500	312	2510	17	DR5TE4S	LX9FL938	1.450

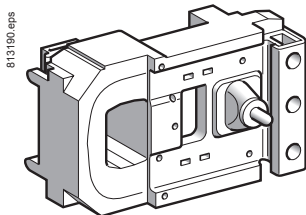
Specifications

Average consumption:

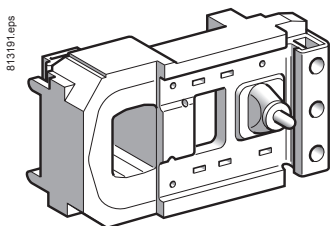
- inrush: 830 VA
- sealed: 47 VA.

Heat dissipation: 22.8...27.8 W.

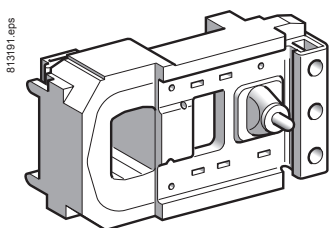
⁽¹⁾ Rectifier to be ordered separately: 0.100 kg.



LX9 FJ●●●



LX9 FK●●●



LX9 FL●●●

References

Low sealed consumption.

Operating cycles/hour ($\theta \leq 55 \text{ }^\circ\text{C}$): ≤ 2400 .

Control circuit voltage U_c	Average resistance at $20 \text{ }^\circ\text{C} \pm 10 \%$		Inductance of closed circuit	Voltage code	Reference
	Inrush	Sealed			
V	Ω	Ω	H		
For contactors LC1 F115 and LC1 F150					
24	1.12	177	11	BD	LX4FF024
48	4.52	715	42.7	ED	LX4FF048
110	21.7	2940	179	FD	LX4FF110
125	26.8	3560	223	GD	LX4FF125
220/230	84	11100	704	MD	LX4FF220
250	105	13000	868	UD	LX4FF250
440/460	301	48200	4000	RD	LX4FF440

Specifications

Average consumption:

- inrush: 543...665 W,
- sealed: 3.94...4.83 W.

Operating time at U_c : closing = 30...40 ms, opening = 30...50 ms.

For contactors LC1 F185 and LC1 F225					
24	0.79	169	14.9	BD	LX4FG024
48	3.2	662	55.3	ED	LX4FG048
110	14.9	2810	241	FD	LX4FG110
125	19	3320	289	GD	LX4FG125
220/230	57.7	10200	890	MD	LX4FG220
250	76	12400	1140	UD	LX4FG250
440/460	223	39700	4210	RD	LX4FG440

Specifications

Average consumption:

- inrush: 737...902 W,
- sealed: 4.13...5.07 W.

Operating time at U_c : closing = 30...40 ms, opening = 30...50 ms.

For contactors LC1 F265 and LC1 F330					
24	0.9	192	26.3	BD	LX4FH024
48	3.49	707	92.9	ED	LX4FH048
110	16.8	3180	424	FD	LX4FH110
125	20.8	3840	530	GD	LX4FH125
220/230	65.7	11500	1590	MD	LX4FH220
250	84	13900	1910	UD	LX4FH250
440/460	255	44000	7570	RD	LX4FH440

Specifications

Average consumption:

- inrush: 655...803 W,
- sealed: 3.68...4.53 W.

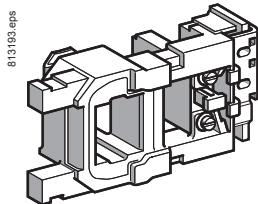
Operating time at U_c : closing = 40...50 ms, opening = 40...65 ms.

For contactor LC1 F400					
48	2.5	558	56	ED	LX4FJ048
110	12.7	2660	270	FD	LX4FJ110
125	15.8	3130	330	GD	LX4FJ125
220	47	8820	910	MD	LX4FJ220
250	61	10500	1200	UD	LX4FJ250
440	236	33750	4435	RD	LX4FJ440

Specifications

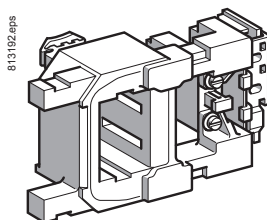
Average consumption:

- inrush: 920...1140 W,
- sealed: 4...7.5 W.

Operating time at U_c : closing = 50...60 ms, opening = 45...60 ms.

813193.eps

LX4 FF●●●



813192.eps

LX4 FH●●●

References

Low sealed consumption.

Control circuit voltage U _c	Average resistance at 20 °C ±10 %		Inductance of closed circuit	Voltage code	Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			kg
For contactor LC1 F500						
48	2.35	515	67	ED	LX4FK048	1.080
110	11.5	2450	280	FD	LX4FK110	1.080
125	15	2930	400	GD	LX4FK125	1.080
220	44	8150	1080	MD	LX4FK220	1.080
250	56	9650	1350	UD	LX4FK250	1.080
440	225	31300	5270	RD	LX4FK440	1.080

Specifications

Average consumption:

- inrush: 990...1220 W,
- sealed: 4.54...8 W.

Operating cycles/hour ($\theta \leq 55$ °C): 2400.Operating time at U_c: closing = 50...60 ms, opening = 45...60 ms.

For contactor LC1 F630 and LC1 F1250

48	1.7	353	40.5	ED	LX4FL048	1.450
110	8.1	1680	180	FD	LX4FL110	1.450
125	10	2110	230	GD	LX4FL125 ⁽¹⁾	1.450
220	31	5160	650	MD	LX4FL220	1.450
250	38	6080	815	UD	LX4FL250	1.450
440	152	23120	2910	RD	LX4FL440 ⁽¹⁾	1.450

⁽¹⁾ Incompatible with LC1 F1250.

Specifications

Average consumption:

- inrush: 1420...1920 W,
- sealed: 6.5...12.5 W.

Operating cycles/hour ($\theta \leq 55$ °C): 1200.Operating time at U_c: closing = 60...70 ms, opening = 40...50 ms.

For contactor LC1 F780

110	6.1 ⁽²⁾	280 ⁽³⁾	0.26	FD	LX4FX110 ⁽²⁾	3.000
125	7.7 ⁽²⁾	410 ⁽³⁾	0.33	GD	LX4FX125 ⁽²⁾	3.000
220	24.6 ⁽²⁾	1100 ⁽³⁾	1	MD	LX4FX220 ⁽²⁾	3.000
250	29.8 ⁽²⁾	1330 ⁽³⁾	1.25	UD	LX4FX250 ⁽²⁾	3.000
440	92 ⁽²⁾	4180 ⁽³⁾	3.5	RD	LX4FX440 ⁽²⁾	3.000

Specifications

Average consumption:

- inrush: 1960...2420 W
- sealed: 42...52 W.

Operating cycles/hour ($\theta \leq 55$ °C): 600.Operating time at U_c: closing = 70...80 ms, opening = 100...130 ms.

For contactor LC1 F800

110/120	–	–	–	FW	LX4F8FW	1.650
220/240	–	–	–	MW	LX4F8MW	1.650
380/400	–	–	–	QW	LX4F8QW	1.650

Specifications

Heat dissipation: 25 W.

Operating time at U_c: closing = 60...80 ms, opening = 40...50 ms.

For contactors LC1 F1400, LC1 F1700 and LC1 F2100

110	2.94	734	98	FD	LX4FK055 ⁽⁴⁾	1.080
125	3.73	916	122	GD	LX4FK065 ⁽⁴⁾	1.080
220	11.5	2450	280	MD	LX4FK110 ⁽⁴⁾	1.080
250	15	2930	400	UD	LX4FK125 ⁽⁴⁾	1.080
440	44	8150	1080	RD	LX4FK220 ⁽⁴⁾	1.080

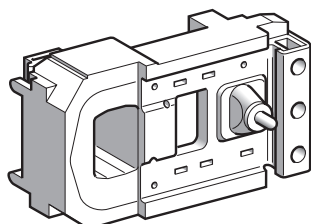
Specifications

Average consumption:

- inrush: 2000...2200 W,
- sealed: 8...10 W.

Operating cycles/hour ($\theta \leq 55$ °C): 600.Operating time at U_c: closing = 50...60 ms, opening = 45...60 ms.⁽²⁾ Reference of set of 2 identical coils, to be connected in series.⁽³⁾ Value for the 2 coils in series.⁽⁴⁾ Order 2 coils and connect them in series.

813194.eps



LX4 FK●●●

References

Coils with short operating times (at U_c):

- N/O: 60 ms
- N/C: 20 ms.

Coils with high operating rates ($\theta \leq 70$ °C):

- 3600 operating cycles/hour
- 1800 for LC1 F630.

Coils with low inrush consumption.

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Resistor ⁽¹⁾ Qty required	Coil		Weight
	Inrush	Sealed			Reference	Reference	
V	Ω	Ω	H				kg
For contactor LC1 F400							
48	5.11	99	0.27	1	DR2SC0047	LX9FJ918	0.970
110	32.3	632	1.7	1	DR2SC0330	LX9FJ926	0.970
125	39.4	760	2	1	DR2SC0390	LX9FJ927	0.970
220	123	2320	6.1	1	DR2SC1200	LX9FJ932	0.970
440/460	478	9080	23	1	DR2SC4700	LX9FJ938	0.970

Specifications

Average consumption:

- inrush: 430 W
- sealed: 22 W.

For contactor LC1 F500

48	4.67	76.7	0.22	1	DR2SC0039	LX9FK918	1.080
110	29.8	470	1.4	1	DR2SC0220	LX9FK926	1.080
125	37.4	637	1.7	1	DR2SC0330	LX9FK927	1.080
220	115	1935	5.1	1	DR2SC1000	LX9FK932	1.080
440/460	448	7050	19	1	DR2SC3300	LX9FK938	1.080

Specifications

Average consumption:

- inrush: 470 W
- sealed: 29 W.

For contactor LC1 F630

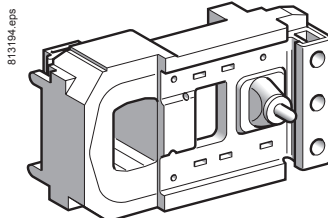
48	3.43	52.9	0.20	2	DR2SC0047	LX9FL918	1.450
110	17.2	272	0.98	2	DR2SC0270	LX9FL925	1.450
125	20.8	333	1.2	2	DR2SC0330	LX9FL926	1.450
220	64.5	1018	3.6	2	DR2SC1000	LX9FL931	1.450
440/460	260	4010	14	2	DR2SC3900	LX9FL937	1.450

Specifications

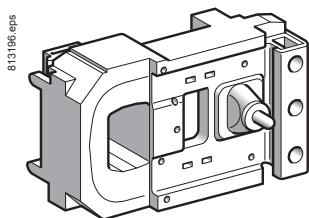
Average consumption:

- inrush: 733 W
- sealed: 48 W.

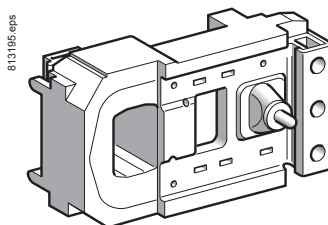
(1) Resistor to be ordered separately, weight of resistor: 0.030 kg.



LX9 FJ●●●



LX9 FK●●●



LX9 FL●●●

TeSys contactors

TeSys F contactors

Wide range d.c. supply coils for specific applications

TeSys F

References

Wide range coils: 0.7...1.25 Uc.

Operating cycles/hour: ≤ 60 ⁽¹⁾.

Ambient temperature (operation): -55 to +70 °C.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %		Inductance of closed circuit H	Reference
	Inrush Ω	Sealed Ω		
V	Ω	Ω	H	
For contactors LC1 F115 and LC1 F150				
24	0.71	120	7.4	LX4FF020
48	2.86	392	27	LX4FF040
72	7.05	1055	66	LX4FF060
110	13.2	1970	121	LX4FF090
125	16.9	2340	149	LX4FF100

Specifications

Average consumption:

- inrush: 415...1300 W
- sealed: 3...9 W.

For contactors LC1 F185 and LC1 F225				
24	0.52	112	9.3	LX4FG020
48	2	359	34.4	LX4FG040
72	5.07	984	85	LX4FG060
110	9.66	1840	157	LX4FG090
125	12	2230	196	LX4FG100

Specifications

Average consumption:

- inrush: 580...1820 W
- sealed: 3.1...9.5 W.

For contactors LC1 F265 and LC1 F330				
24	0.58	129	17.3	LX4FH020
48	2.19	400	59.5	LX4FH040
72	5.58	1110	149	LX4FH060
110	11	2120	287	LX4FH090
125	13.8	2520	353	LX4FH100

Specifications

Average consumption:

- inrush: 515...1600 W
- sealed: 2.7...8.5 W.

Operational voltage V	Average resistance at 20 °C ± 10 % Ω	Inductance of closed circuit H	Coil	Economy resistor		Reference of the assembly ⁽²⁾
			Reference	No.	Ω	
For contactor LC1 F400						
24	1.05	0.049	LX2 FJW11	3	56	DR2 SC0056 LX5FJW11
48	4.8	0.22	LX2 FJW18	3	220	DR2 SC0220 LX5FJW18
72	9.6	0.44	LX2 FJW21	3	470	DR2 SC0470 LX5FJW21

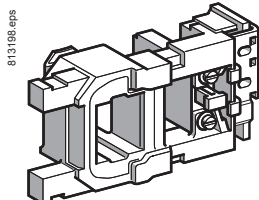
Specifications

Average consumption:

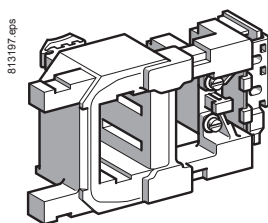
- inrush: 290...860 W
- sealed: 16...47 W.

(1) The mechanical durability of the contactor is limited to 1 million operating cycles.

(2) The set comprises: 1 coil **LX2 FJ** and 3 resistors **DR2 SC**.



LX4 FF●●●

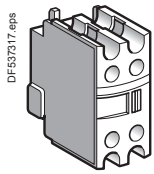


LX4 FH●●●

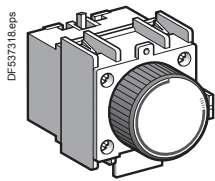
TeSys contactors

Auxiliary contact blocks for 3-pole shockproof contactors LC1 FG

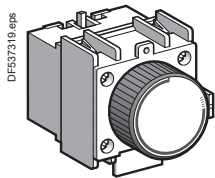
TeSys F



LAD N●●



LAD T●



LAD R●

Instantaneous auxiliary contact blocks

For use in normal operating environments

Number of contacts	Max. number of blocks per contactor Clip-on mounting	Composition				Reference	
1	1	-	-	1	-	LADN10	(1)
		-	-	-	1	LADN01	(1)
4	1	-	-	2	2	LADN22	(1)
		-	-	4	-	LADN40	(1)
		-	-	-	4	LADN04	(1)
		-	-	3	1	LADN31	(1)

Time delay auxiliary contact blocks

Number of contacts	Max. number of blocks per contactor Clip-on mounting	Time delay		Reference	
		Type	Range		
1 N/O + 1 N/C	1	On-delay	0.1...3 (2)	LADT0	
			0.1...30	LADT2	(1)
			10...180	LADT4	
		Off-delay	1...30 (3)	LADS2	
			0.1...3 (2)	LADR0	
			0.1...30	LADR2	(1)
			10...180	LADR4	

(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.

(2) With extended scale from 0.1 to 0.6 s.

(3) With switching time of 40 ms ±15 ms between opening of the N/C contact and closing of the N/O contact.

TeSys contactors


Coils for 3-pole shockproof contactors LC1 FG

Spare or replacement parts

a.c. supply 50/60 Hz

TeSys F

References

Control circuit voltage U _c		Voltage code	Coil reference	
50 Hz	60 Hz			
V	V			
Coils for contactors LC1 FG150				
–	48	E6	LX1FF040	
48	–	E5	LX1FF048	
–	110	F6	LX1FF092	
–	115/120	G6	LX1FF095	(1)
110/115	–	F5	LX1FF110	
120	–	FE5	LX1FF120	
–	208	L6	LX1FF170	
–	320	M6	LX1FF184	
–	230/240	U6	LX1FF187	
208	–	LE5	LX1FF200	
220/230	–	M5	LX1FF220	
240	–	U5	LX1FF240	
–	380	Q6	LX1FF316	
–	415	N6	LX1FF340	
–	440	R6	LX1FF360	
380	–	Q5	LX1FF380	
415/440	–	N5	LX1FF415	

Specifications

Average consumption at 20 °C:

- inrush 50 Hz: 550 VA; 60 Hz: 660 VA
 - sealed 50 Hz: 45 VA; 60 Hz: 55 VA, $\cos \varphi = 0.32$.
- Operating cycles/hour ($\theta = 55$ °C): 2400.

Coils for contactors LC1 FG185

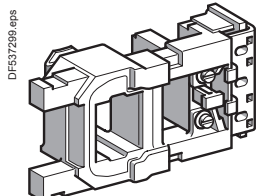
–	48	E6	LX1FG040	
48	–	E5	LX1FG048	
–	110	F6	LX1FG092	
–	115/120	G6	LX1FG095	(1)
110/115	–	F5	LX1FG110	
120	–	FE5	LX1FG120	
–	208	L6	LX1FG170	
–	320	M6	LX1FG184	
–	230/240	U6	LX1FG187	
208	–	LE5	LX1FG200	
220/230	–	M5	LX1FG220	
240	–	U5	LX1FG240	
–	380	Q6	LX1FG316	
–	415	N6	LX1FG340	
–	440	R6	LX1FG360	
380	–	Q5	LX1FG380	
415/440	–	N5	LX1FG415	

Specifications

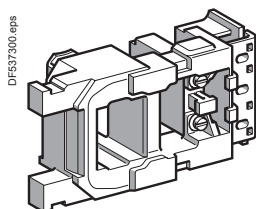
Average consumption at 20 °C:

- inrush 50 Hz: 805 VA; 60 Hz: 970 VA
 - sealed 50 Hz: 55 VA; 60 Hz: 66 VA, $\cos \varphi = 0.34$.
- Operating cycles/hour ($\theta = 55$ °C): 2400.

(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.



LX1 FF●●●



LX1 FG●●●

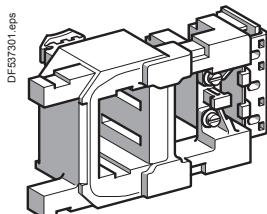
TeSys contactors

Coils for 3-pole shockproof contactors LC1 FG

Spare or replacement parts

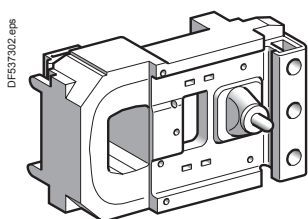
a.c. supply 50/60 Hz

TeSys F



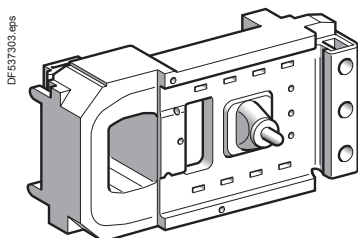
DF537301.eps

LX1 FH●●●



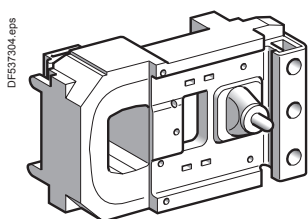
DF537302.eps

LX1 FJ●●●



DF537303.eps


LX1 FK●●●



DF537304.eps

LX1 FL●●●

References

Control circuit voltage U _c 50 and 60 Hz	Voltage code	Coil reference		Weight
V				kg
Coils for contactors LC1 FG265				
110/120	F7	LX1FH1102	(1)	0.740
208	L7	LX1FH2002		0.740
220/230	M7	LX1FH2202		0.740
240	U7	LX1FH2402		0.740
380/415	Q7	LX1FH3802		0.740

Specifications

Average consumption at 20 °C:

- inrush 50 or 60 Hz: 600 to 700 VA
- sealed 50 or 60 Hz: 8 to 10 VA, $\cos \varphi = 0.9$.

Operating cycles/hour ($\theta = 55$ °C): 2400.

Coils for contactors LC1 FG400

110/120	F7	LX1FJ110	(1)	1.000
208	L7	LX1FJ200		1.000
220/230	M7	LX1FJ220		1.000
230/240	U7	LX1FJ240		1.000
380/400	Q7	LX1FJ380		1.000
415/440	N7	LX1FJ415		1.000

Specifications

Average consumption at 20 °C:

- inrush 50 or 60 Hz: 1000 to 1150 VA
- sealed 50 or 60 Hz: 12 to 18 VA, $\cos \varphi = 0.9$.

Operating cycles/hour ($\theta = 55$ °C): 2400.

Coils for contactors LC1 FG500

110/120	F7	LX1FK110	(1)	1.150
208	L7	LX1FK200		1.150
220/230	M7	LX1FK220		1.150
230/240	U7	LX1FK240		1.150
380/400	Q7	LX1FK380		1.150
415/440	N7	LX1FK415		1.150

Specifications

Average consumption at 20 °C:

- inrush 50 or 60 Hz: 1050 to 1150 VA
- sealed 50 or 60 Hz: 16 to 20 VA, $\cos \varphi = 0.9$.

Operating cycles/hour ($\theta = 55$ °C): 2400.

Coils for contactors LC1 FG630

110/120	F7	LX1FL110	(1)	1.500
208	L7	LX1FL200		1.500
220/230	M7	LX1FL220		1.500
380/400	Q7	LX1FL380		1.500
415/440	N7	LX1FL415		1.500

Specifications

Average consumption at 20 °C:

- inrush 50 or 60 Hz: 1500 to 1730 VA
- sealed 50 or 60 Hz: 20 to 25 VA, $\cos \varphi = 0.9$.

Operating cycles/hour ($\theta = 55$ °C): 1200.

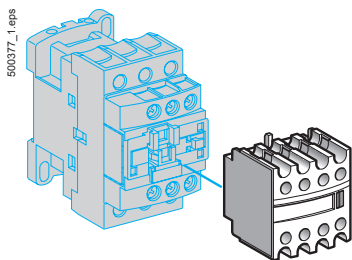
(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.

TeSys contactors

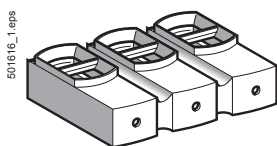
Magnetic latching contactors

Accessories

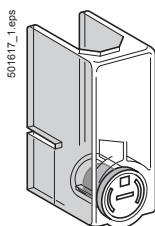
TeSys FG, TeSys CR1 F



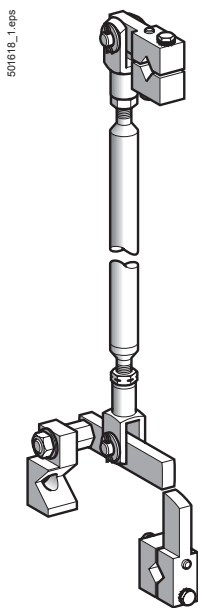
LAD N



LA9 F103



LA9 F70



EZ2 LB0601

Accessories for contactors CR1 F

Description	Number of contacts or shrouds	For use on	Reference
Instantaneous auxiliary contacts	(1)	CR1 F	LADN (1)
Time delay auxiliary contacts	(1)	CR1 F	LAD• (1)
Contact blocks with protected terminals for 3-pole contactors (for mounting on contactors with closed arc chamber)	Set of 2 blocks	CR1 F150 and CR1 F185	LA9F103
Power terminal protection shrouds	Set of 6 shrouds for 3-pole contactors	CR1 F150 and CR1 F185	LA9F702
		CR1 F265 to CR1 F500	LA9F703
		CR1 F630	LA9F704
	Set of 8 shrouds for 4-pole contactors	CR1 F1504 and CR1 F1854	LA9F707
		CR1 F2654 to CR1 F5004	LA9F708
		CR1 F6304	LA9F709

Description	Application	Reference
Mechanical interlock and power connections	For assembly of reversing contactors and changeover contactor pairs	See pages B9/31 and B9/32

Accessories for contactors CR1 B

Description	Application	Reference	Weight kg
Mechanical interlock with mounting accessories (3)	For vertical assembly of reversing contactors and changeover contactor pairs	EZ2LB0601	1.560
Kit containing 2 bar mounting brackets	For mounting on 120 or 150 mm centres	LA9B103	1.620

(1) For maximum number per contactor and complete reference, see page B9/11.

(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	48	110	125	127	220	230	240	250	380	400	415	440	500
For contactors CR1 F													
~ 50/60 Hz	E7	F7	-	G7	M7	M7	U7	-	Q7	Q7	N7	-	-
~ 400 Hz	E7	F7	-	G7	M7	M7	-	-	-	-	-	-	-
---	E7	F7	-	G7	M7	M7	-	-	-	-	-	-	-
--- low consumption	EZ7	FZ7	-	GZ7	MZ7	MZ7	-	-	-	-	-	-	-

For contactors CR1 B

~ 50...400 Hz	-	F	-	G	M	M	U	-	Q	V	N	R	S
---	-	FD	GD	-	MD	-	UD	UCD	-	-	-	RD	SD

(3) Positive mechanical interlocking between 2 vertically mounted contactors of identical or different ratings. Connecting rods and cranks assembled on right-hand sides, crank pins on the pole side.

Vertical fixing centre distance between the two contactors: 600 mm.

TeSys contactors

Magnetic latching contactors

Components for assembling reversing contactors and changeover contactor pairs CR1 F

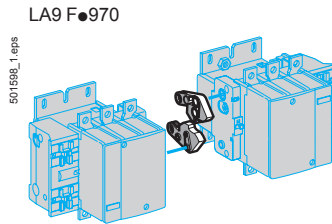
Horizontally or vertically mounted

TeSys FG, TeSys CR1F

Horizontally mounted

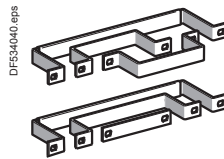
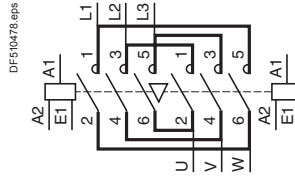
Mechanical interlocks

Reversers assembled using 2 contactors of identical rating, type:
CR1 F150
CR1 F185
CR1 F265
CR1 F400
CR1 F500
CR1 F630

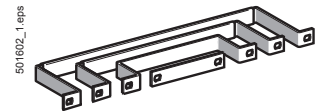
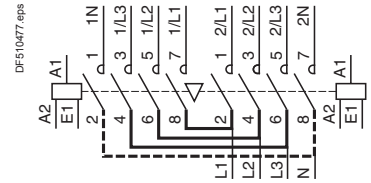


Sets of power connections

Reversing contactors
 LA9 F●976



3 or 4-pole changeover contactor pairs
 LA9 F●977 or LA9 F●982

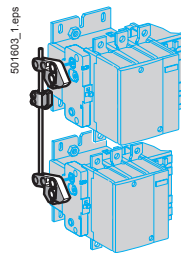


Vertically mounted

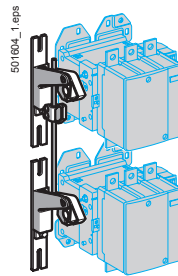
Mechanical interlocks

Reversers assembled using 2 contactors of identical rating, type:
CR1 F150
CR1 F185
CR1 F265
CR1 F400
CR1 F500
CR1 F630

LA9 FF4F Assembly A
 LA9 FG4G

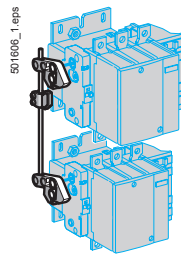


LA9 FH4H Assembly C
 LA9 FJ4J
 LA9 FK4K
 LA9 FL4L

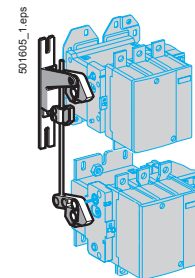


Reversers assembled using 2 contactors of different ratings, type:
CR1 F150
CR1 F185
CR1 F265
CR1 F400
CR1 F500
CR1 F630

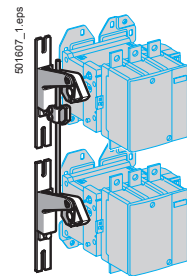
LA9 FG4F Assembly A



LA9 FH4F Assembly B
 LA9 FJ4F
 LA9 FK4F
 LA9 FL4F
 LA9 FH4G
 LA9 FJ4G
 LA9 FK4G
 LA9 FL4G

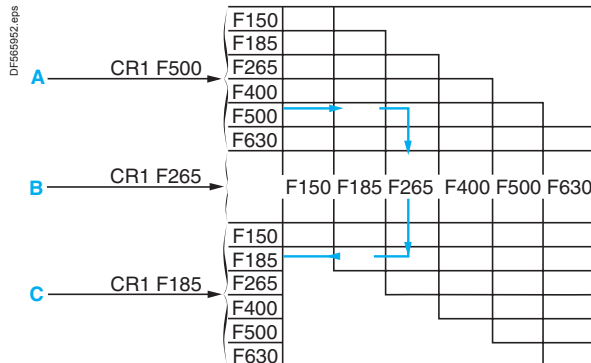
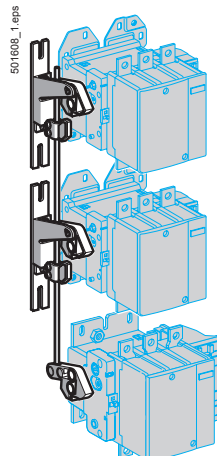


LA9 FJ4H Assembly C
 LA9 FK4H
 LA9 FL4H
 LA9 FK4J
 LA9 FL4J
 LA9 FK4K



Reversers assembled using 3 contactors of identical or different ratings

LA9 F●4●4●



Warning: the contactor ratings must be in decreasing size from top to bottom.

High power contactors

TeSys contactors

Magnetic latching contactors

Components for assembling reversing contactors and changeover contactor pairs

CR1 F

TeSys FG, TeSys CR1 F

For assembly of 3-pole reversing contactors for motor control ⁽¹⁾

Reversers assembled using 2 contactors of identical rating

Contactor type	Set of power connections			Mechanical interlock	
	3-pole Reference	4-pole Reference	Weight kg	Kit reference	Weight kg
Horizontally mounted					
CR1 F150	LA9FF976	–	0.600	LA9FF970	0.060
CR1 F185	LA9FG976	–	0.780	LA9FG970	0.060
CR1 F265	LA9FH976	–	1.500	LA9FJ970	0.140
CR1 F400	LA9FJ976	–	2.100	LA9FJ970	0.140
CR1 F500	LA9FK976	–	2.350	LA9FJ970	0.140
CR1 F630	LA9FL976	–	3.800	LA9FL970	0.150
Vertically mounted					
CR1 F150	⁽²⁾	–	–	LA9FF4F	0.345
CR1 F185	⁽²⁾	–	–	LA9FG4G	0.350
CR1 F265	⁽²⁾	–	–	LA9FH4H	1.060
CR1 F400	⁽²⁾	–	–	LA9FJ4J	1.200
CR1 F500	⁽²⁾	–	–	LA9FK4K	1.200
CR1 F630	⁽²⁾	–	–	LA9FL4L	1.220

For assembly of 4-pole changeover contactor pairs

Horizontally mounted					
CR1 F1504	LA9FF982	LA9FF977	0.460	LA9FF970	0.060
CR1 F1854	LA9FG982	LA9FG977	0.610	LA9FG970	0.060
CR1 F2654	LA9FH982	LA9FH977	1.200	LA9FJ970	0.140
CR1 F4004	LA9FJ982	LA9FJ977	1.800	LA9FJ970	0.140
CR1 F5004	LA9FK982	LA9FK977	2.300	LA9FJ970	0.140
CR1 F6304	LA9FL982	LA9FL977	3.400	LA9FL970	0.150
Vertically mounted					
CR1 F1504	⁽²⁾	–	–	LA9FF4F	0.345
CR1 F1854	⁽²⁾	–	–	LA9FG4G	0.350
CR1 F2654	⁽²⁾	–	–	LA9FH4H	1.060
CR1 F4004	⁽²⁾	–	–	LA9FJ4J	1.200
CR1 F5004	⁽²⁾	–	–	LA9FK4K	1.200
CR1 F6304	⁽²⁾	–	–	LA9FL4L	1.220

Reversers assembled using 2 contactors of different ratings

Contactor type	Set of power connections		Mechanical interlock	
	At bottom	At top	Kit reference	Weight kg
Vertically mounted ⁽³⁾				
CR1 F150 or F1504		CR1 F185 or F1854	LA9FG4F	0.350
		CR1 F265 or F2654	LA9FH4F	0.870
		CR1 F400 or F4004	LA9FJ4F	0.930
		CR1 F500 or F5004	LA9FK4F	0.940
		CR1 F630 or F6304	LA9FL4F	0.940
CR1 F185 or F1854		CR1 F265 or F2654	LA9FH4G	0.860
		CR1 F400 or F4004	LA9FJ4G	0.940
		CR1 F500 or F5004	LA9FK4G	0.940
		CR1 F630 or F6304	LA9FL4G	0.950
CR1 F265 or F2654		CR1 F400 or F4004	LA9FJ4H	1.130
		CR1 F500 or F5004	LA9FK4H	1.130
		CR1 F630 or F6304	LA9FL4H	1.140
CR1 F400 or F4004		CR1 F500 or F5004	LA9FK4J	1.200
		CR1 F630 or F6304	LA9FL4J	1.210
CR1 F500 or F5004	CR1 F630 or F6304	LA9FL4K	1.210	

For assembly of 3 or 4-pole changeover contactor pairs

For assembly of 3 or 4-pole reversing contactors

Using 3 contactors (vertically mounted) of identical or different ratings		Mechanical interlock
		Kit reference ⁽⁴⁾
The contactor ratings must be in decreasing size from top to bottom.		LA9F●4●4●

⁽¹⁾ A 3-pole reversing contactor for motor control can be converted into a 3-pole changeover contactor pair by removing the upper connecting links.

⁽²⁾ All power connections are to be made by the customer.

⁽³⁾ With identical or different number of poles. Power connections to be made by the customer.

⁽⁴⁾ Complete the reference by replacing the first dot with the code for the upper contactor, the second dot with the code for the middle contactor and the third dot with the code for the bottom contactor.

Contactors	CR1 F150	CR1 F185	CR1 F265	CR1 F400	CR1 F500	CR1 F630
Code	F	G	H	J	K	L

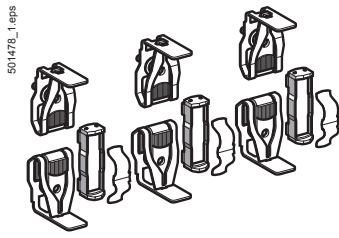
Example: mechanical interlock for reversing contactor made up of 3 different contactors: CR1 F500 top, CR1 F26 middle and CR1 F185 bottom: **LA9 FK4H4G**.

TeSys contactors

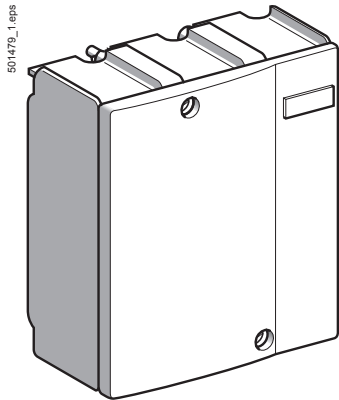
Magnetic latching contactors

Accessories and replacement parts for contactors CR1 F

TeSys FG, TeSys CR1F



LA5 FG431



LA5 F40050

References

Description	For contactor	Reference	Reference	Weight kg		
Complete sets of contacts for 3 or 4 poles ⁽¹⁾	3-pole	CR1 F150	LA5FF431	0.270		
		CR1 F185	LA5FG431	0.350		
		CR1 F265	LA5FH431	0.660		
		CR1 F400	LA5F400803	0.660		
		CR1 F500	LA5F500803	0.660		
		CR1 F630	LA5F630803	0.660		
	4-pole	CR1 F1504	LA5FF441	0.360		
		CR1 F1854	LA5FG441	0.465		
		CR1 F2654	LA5FH441	0.880		
		CR1 F4004	LA5F400804	0.465		
		CR1 F5004	LA5F500804	0.465		
		CR1 F6304	LA5F630804	0.465		
		Arc chambers	3-pole	CR1 F150	LA5F15050	0.490
				CR1 F185	LA5F18550	0.670
CR1 F265	LA5F26550			0.920		
CR1 F400	LA5F40050			1.300		
CR1 F500	LA5F50050			1.850		
CR1 F630	LA5F63050			3.150		
4-pole	CR1 F1504		LA5F150450	0.660		
	CR1 F1854		LA5F185450	0.910		
	CR1 F2654		LA5F265450	1.220		
	CR1 F4004		LA5F400450	1.740		
	CR1 F5004		LA5F500450	2.500		
	CR1 F6304		LA5F630450	4.200		

⁽¹⁾ Set containing the following (per pole): 2 fixed contacts, 1 moving contact, 2 defectors, 1 back-plate, clamping screws and washers.

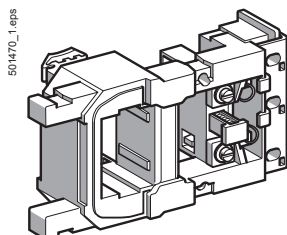
TeSys contactors

Magnetic latching contactors

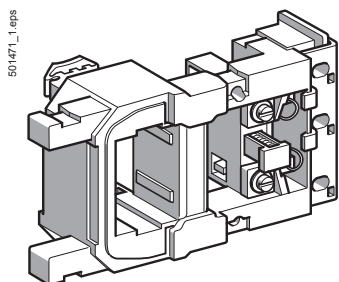
Coils for contactors CR1 F

TeSys FG, TeSys CR1F

Standard coils						
Usual voltages		Resistance of winding at $\theta = 20\text{ °C}$		Reference	Voltage code	Weight kg
50...400 Hz or ---	50 Hz, 60 Hz	Latching	Unlatching			
V	V	Ω	Ω			
For contactors CR1 F150						
48	–	1.98	230.8	LX0FF005	E7	0.440
110	–	9.35	1453	LX0FF006	F7	0.440
127	–	11.61	1788	LX0FF007	G7	0.440
208	–	23.50	4098	LX0FF020	L7	0.440
220/230	–	37.55	5139	LX0FF008	M7	0.440
–	240	45.16	6544	LX0FF009	U7	0.440
–	380/400	114.10	12 447	LX0FF010	Q7	0.440
–	415	139.50	16 717	LX0FF011	N7	0.440
For contactors CR1 F185						
48	–	1.42	220	LX0FG005	E7	0.560
110	–	6.92	1339	LX0FG006	F7	0.560
127	–	8.45	1676	LX0FG007	G7	0.560
208	–	21.30	3169	LX0FG020	L7	0.560
220/230	–	26.27	4729	LX0FG008	M7	0.560
–	240	32.95	4729	LX0FG009	U7	0.560
–	380/400	82.29	11 885	LX0FG010	Q7	0.560
–	415	102.30	14 305	LX0FG011	N7	0.560
For contactors CR1 F265						
48	–	1.34	183.4	LX0FH005	E7	0.780
110	–	6.90	1031	LX0FH006	F7	0.780
127	–	8.56	1325	LX0FH007	G7	0.780
208	–	20.20	2654	LX0FH020	L7	0.780
220/230	–	25.77	4090	LX0FH008	M7	0.780
–	240	33.03	5002	LX0FH009	U7	0.780
–	380/400	78.39	11 803	LX0FH010	Q7	0.780
–	415	102.9	15 006	LX0FH011	N7	0.780
For contactors CR1 F400						
48	–	1.32	90.5	LX0FJ005	E7	1.120
110	–	8.09	813	LX0FJ006	F7	1.120
127	–	9.79	1027	LX0FJ007	G7	1.120
208	–	24.40	2643	LX0FJ020	L7	1.120
220/230	–	30.14	3309	LX0FJ008	M7	1.120
–	240	37.02	4074	LX0FJ009	U7	1.120
–	380/400	94.80	9380	LX0FJ010	Q7	1.120
–	415	121.10	11 763	LX0FJ011	N7	1.120
For contactors CR1 F500						
48	–	1.57	166	LX0FK005	E7	1.220
110	–	7.53	916	LX0FK006	F7	1.220
127	–	9.56	1159	LX0FK007	G7	1.220
208	–	23.60	2981	LX0FK020	L7	1.220
220/230	–	28.81	3733	LX0FK008	M7	1.220
–	240	35.67	4595	LX0FK009	U7	1.220
–	380/400	89.56	10 570	LX0FK010	Q7	1.220
–	415	112.06	13 256	LX0FK011	N7	1.220
For contactors CR1 F630						
48	–	0.87	204	LX0FL005	E7	1.460
110	–	5.20	1423	LX0FL006	F7	1.460
127	–	6.45	1830	LX0FL007	G7	1.460
208	–	20.20	2961	LX0FL020	L7	1.460
220/230	–	25.36	4603	LX0FL008	M7	1.460
–	240	25.36	5658	LX0FL009	U7	1.460
–	380/400	60.95	10 676	LX0FL010	Q7	1.460
–	415	77.97	13 003	LX0FL011	N7	1.460



LX0 FF009



LX0 FH009

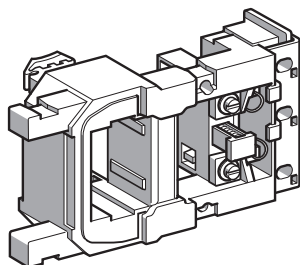
TeSys contactors

Magnetic latching contactors

Coils for contactors CR1 F

TeSys FG, TeSys CR1F

501472_1.eps



LX0 FF030

Special coils

Coils with two windings with common point, allowing the use of two separate power sources for latching and unlatching.

Coil voltages at 50 Hz, 60 Hz, 400 Hz or ---		Resistance of winding at $\theta = 20\text{ }^{\circ}\text{C}$		Reference	Voltage code	Weight
Latching	Unlatching	Latching	Unlatching			
V	V	Ω	Ω			kg
For contactors CR1 F150						
220	24	29.5	39.5	LX0FF224	MB7	0.440
For contactors CR1 F185						
220	24	26.5	19	LX0FG224	MB7	0.560
For contactors CR1 F265						
220	24	26	29.5	LX0FH224	MB7	0.780
For contactors CR1 F400						
220	24	30	23	LX0FJ224	MB7	1.120
For contactors CR1 F500						
220	24	29	26	LX0FK224	MB7	1.220
For contactors CR1 F630						
220	24	26	41	LX0FL224	MB7	1.460

Coils with low inrush consumption

Usual voltages ---	Resistance of winding at $\theta = 20\text{ }^{\circ}\text{C}$		Reference	Voltage code	Weight
	Latching	Unlatching			
V	Ω	Ω			kg
For contactors CR1 F150					
48	4.56	140.56	LX0FF055	EZ7	0.440
110	22.37	706.44	LX0FF056	FZ7	0.440
127	35.54	1086.36	LX0FF057	GZ7	0.440
220	89.85	3342.51	LX0FF058	MZ7	0.440
For contactors CR1 F185					
48	5.19	106.54	LX0FG055	EZ7	0.570
110	25.50	536.26	LX0FG056	FZ7	0.570
127	32.75	732.64	LX0FG057	GZ7	0.570
220	102.44	2378.62	LX0FG058	MZ7	0.570
For contactors CR1 F265					
48	5.19	74.26	LX0FH055	EZ7	0.800
110	25	364.61	LX0FH056	FZ7	0.800
127	30.98	458.45	LX0FH057	GZ7	0.800
220	97.89	1344.46	LX0FH058	MZ7	0.800
For contactors CR1 F400					
48	5.05	36.36	LX0FJ055	EZ7	1.150
110	25.39	171.49	LX0FJ056	FZ7	1.150
127	31.86	221.20	LX0FJ057	GZ7	1.150
220	98.19	648.79	LX0FJ058	MZ7	1.150
For contactors CR1 F500					
48	4.42	41	LX0FK055	EZ7	1.270
110	22.74	193.36	LX0FK056	FZ7	1.270
127	28.25	313.60	LX0FK057	GZ7	1.270
220	85.12	918.68	LX0FK058	MZ7	1.270
For contactors CR1 F630					
48	3.94	59.17	LX0FL055	EZ7	1.500
110	19.36	365.33	LX0FL056	FZ7	1.500
127	25.39	452.27	LX0FL057	GZ7	1.500
220	74.44	1071.43	LX0FL058	MZ7	1.500

TeSys contactors

TeSys F reversing contactors and changeover contactor pairs

Components for assembling 3-pole reversing contactors and changeover contactor pairs, for customer assembly

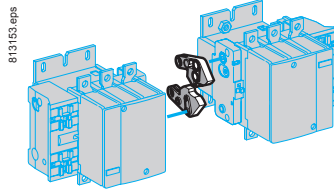
TeSys LA9F

Horizontally mounted Mechanical interlocks Sets of power connections

Reversers assembled using 2 contactors of identical rating, type :

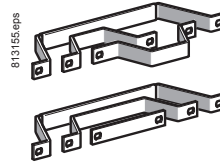
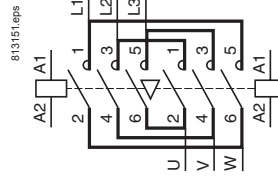
- LC1 F115
- LC1 F150
- LC1 F185
- LC1 F225
- LC1 F265
- LC1 F330
- LC1 F400
- LC1 F500
- LC1 F630
- LC1 F800

LA9 F●970 (2)



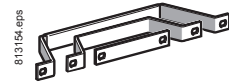
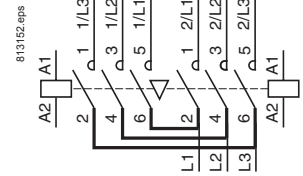
Reversing contactors

LA9 F●●●76 (2)



3-pole changeover contactor pairs (1)

LA9 F●●●82 (2)

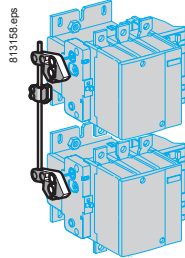


Vertically mounted Mechanical interlocks

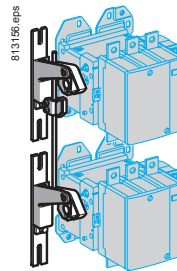
Reversers assembled using 2 contactors of identical rating, type :

- LC1 F115
- LC1 F150
- LC1 F185
- LC1 F225
- LC1 F265
- LC1 F330
- LC1 F400
- LC1 F500
- LC1 F630
- LC1 F800

LA9 FF4F
LA9 FG4G

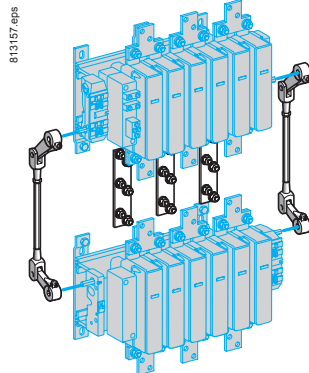


LA9 FH4H
LA9 FJ4J
LA9 FK4K
LA9 FL4L



LC1 F780

LA9 FX970



(1) For 4-pole changeover contactor pairs, see pages B9/38 and B9/39.
 (2) Complete references: see page B9/37.

TeSys contactors

TeSys F reversing contactors and changeover contactor pairs

Control circuit: a.c. or d.c.

TeSys LA9F

Reversers assembled using 2 contactors of identical rating

Contactor type ⁽¹⁾	Set of power connections		Mechanical interlock	
	Reference	Weight kg	Kit reference	Weight kg
For assembly of 3-pole reversing contactors for motor control				
Horizontally mounted				
LC1 F115	LA9FF976	0.600	LA9FF970	0.060
LC1 F150	LA9F15076	0.600	LA9FF970	0.060
LC1 F185	LA9FG976	0.780	LA9FG970	0.060
LC1 F225	LA9F22576	1.500	LA9FG970	0.060
LC1 F265	LA9FH976	1.500	LA9FJ970	0.140
LC1 F330	LA9FJ976	2.100	LA9FJ970	0.140
LC1 F400	LA9FJ976	2.100	LA9FJ970	0.140
LC1 F500	LA9FK976	2.350	LA9FJ970	0.140
LC1 F630 or F800	LA9FL976	3.800	LA9FL970	0.150

Vertically mounted

LC1 F115 or F150	⁽²⁾	–	LA9FF4F	0.345
LC1 F185	⁽²⁾	–	LA9FG4G	0.350
LC1 F225	⁽²⁾	–	LA9FG4G	0.350
LC1 F265 or F330	⁽²⁾	–	LA9FH4H	1.060
LC1 F400	⁽²⁾	–	LA9FJ4J	1.200
LC1 F500	⁽²⁾	–	LA9FK4K	1.200
LC1 F630 or F800	⁽²⁾	–	LA9FL4L	1.220
LC1 F780	⁽³⁾	–	LA9FX970 ⁽³⁾	6.100

For assembly of 3-pole changeover contactor pairs ⁽⁴⁾

Horizontally mounted				
LC1 F115	LA9FF982	0.460	LA9FF970	0.060
LC1 F150	LA9F15082	0.460	LA9FF970	0.060
LC1 F185	LA9FG982	0.610	LA9FG970	0.060
LC1 F225	LA9F22582	1.200	LA9FG970	0.060
LC1 F265	LA9FH982	1.200	LA9FJ970	0.140
LC1 F330	LA9FJ982	1.800	LA9FJ970	0.140
LC1 F400	LA9FJ982	1.800	LA9FJ970	0.140
LC1 F500	LA9FK982	2.300	LA9FJ970	0.140
LC1 F630 or F800	LA9FL982	3.400	LA9FL970	0.150

Vertically mounted

LC1 F115 or F150	⁽²⁾	–	LA9FF4F	0.345
LC1 F185	⁽²⁾	–	LA9FG4G	0.350
LC1 F225	⁽²⁾	–	LA9FG4G	0.350
LC1 F265 or F330	⁽²⁾	–	LA9FH4H	1.060
LC1 F400	⁽²⁾	–	LA9FJ4J	1.200
LC1 F500	⁽²⁾	–	LA9FK4K	1.200
LC1 F630 or F800	⁽²⁾	–	LA9FL4L	1.220
LC1 F780	⁽³⁾	–	LA9FX970 ⁽³⁾	7.800

⁽¹⁾ To order the 2 contactors: see pages B9/2 and B9/3. For the 2 auxiliary contact blocks **LAD N•1** required to obtain electrical interlocking between the 2 contactors, see page B9/11. For accessories, see pages B9/12 to B9/14.

⁽²⁾ With the exception of contactors **LC1 F780**, all power connections are to be made by the customer.

⁽³⁾ Double mechanical interlock mechanism with 2 interlock connecting rods and 3 power connecting links.

⁽⁴⁾ For assembly of 4-pole changeover contactor pairs, see pages B9/38 and B9/39.

TeSys contactors

TeSys F changeover contactor pairs
Components for assembling 3 and 4-pole
changeover contactor pairs, for customer
assembly

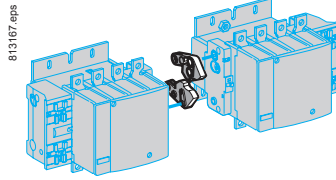
TeSys LA9F

Horizontally mounted Mechanical interlocks Sets of power connections

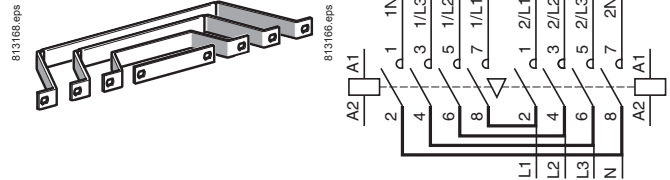
Contactor pairs assembled using 2 contactors of identical rating, type :

- LC1 F1154
- LC1 F1504
- LC1 F1854
- LC1 F2254
- LC1 F2654
- LC1 F3304
- LC1 F4004
- LC1 F5004
- LC1 F6304

LA9 F●970



4-pole changeover contactor pairs (1)
LA9 F●●●77

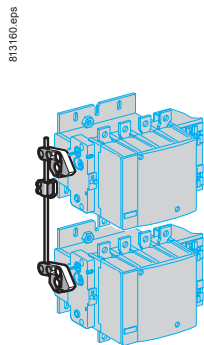


Vertically mounted Mechanical interlocks

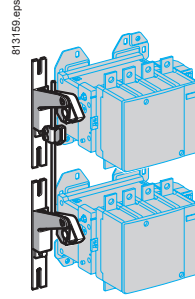
Contactor pairs assembled using 2 contactors of identical rating, type :

- LC1 F1154
- LC1 F1504
- LC1 F1854
- LC1 F2254
- LC1 F2654
- LC1 F3304
- LC1 F4004
- LC1 F5004
- LC1 F6304

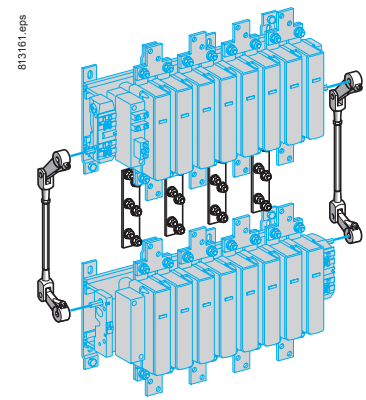
Assembly A
LA9 FF4F
LA9 FG4G



Assembly B
LA9 FH4H
LA9 FJ4J
LA9 FK4K
LA9 FL4L



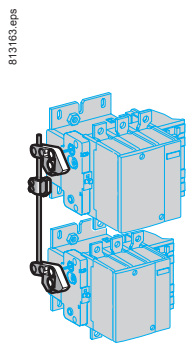
Assembly C
LA9 FX971



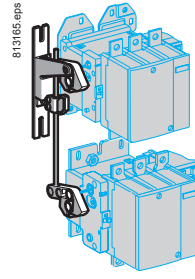
Contactor pairs assembled using 2 contactors of different ratings, type :

- LC1 F115 or F1154
- LC1 F150 or F1504
- LC1 F185 or F1854
- LC1 F225 or F2254
- LC1 F265 or F2654
- LC1 F330 or F3304
- LC1 F400 or F4004
- LC1 F500 or F5004
- LC1 F630 or F6304
- LC1 F800

Assembly A
LA9 FG4F

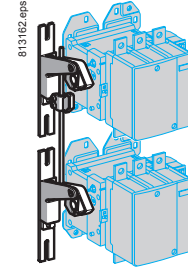


Assembly B
LA9 FH4F, LA9 FH4G
LA9 FJ4F, LA9 FJ4G
LA9 FK4F, LA9 FK4G
LA9 FL4F, LA9 FL4G



Assembly C

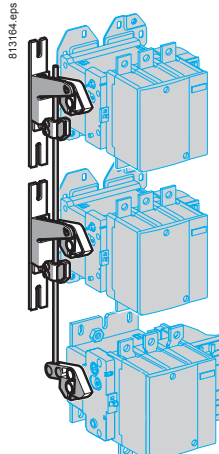
- LA9 FJ4H
- LA9 FK4H, LA9 FK4J
- LA9 FL4H, LA9 FL4J and LA9 FL4K



Contactor pairs assembled using 3 contactors of identical or different ratings, type :

- LC1 F115 or F1154
- LC1 F150 or F1504
- LC1 F185 or F1854
- LC1 F225 or F2254
- LC1 F265 or F2654
- LC1 F330 or F3304
- LC1 F400 or F4004
- LC1 F500 or F5004
- LC1 F630 or F6304
- LC1 F800

LA9 F●4●4● : see pages B9/40 and B9/41.



Important: the contactor ratings must be in decreasing size from top to bottom.

(1) For 3-pole changeover contactor pairs, see pages B9/36 and B9/37.

TeSys contactors

TeSys F changeover contactor pairs
Components for assembling 3 and 4-pole
changeover contactor pairs, for customer
assembly

Contactor pairs assembled using 2 contactors of identical rating

For assembly of 4-pole changeover contactor pairs ⁽¹⁾

Contactor type ⁽²⁾	Set of power connections		Mechanical interlock	
	Reference	Weight kg	Kit reference	Weight kg
Horizontally mounted				
LC1 F1154	LA9FF977	0.460	LA9FF970	0.060
LC1 F1504	LA9F15077	0.460	LA9FF970	0.060
LC1 F1854	LA9FG977	0.610	LA9FG970	0.060
LC1 F2254	LA9F22577	1.200	LA9FG970	0.060
LC1 F2654	LA9FH977	1.200	LA9FJ970	0.140
LC1 F3304	LA9FJ977	1.800	LA9FJ970	0.140
LC1 F4004	LA9FJ977	1.800	LA9FJ970	0.140
LC1 F5004	LA9FK977	2.300	LA9FJ970	0.140
LC1 F6304	LA9FL977	3.400	LA9FL970	0.150
Vertically mounted				
LC1 F1154 or F1504	⁽³⁾	–	LA9FF4F	0.345
LC1 F1854	⁽³⁾	–	LA9FG4G	0.350
LC1 F2254	⁽³⁾	–	LA9FG4G	0.350
LC1 F2654 or F3304	⁽³⁾	–	LA9FH4H	1.060
LC1 F4004	⁽³⁾	–	LA9FJ4J	1.200
LC1 F5004	⁽³⁾	–	LA9FK4K	1.200
LC1 F6304	⁽³⁾	–	LA9FL4L	1.220
LC1 F7804	⁽⁴⁾	–	LA9FX971 ⁽⁴⁾	7.800

Contactor pairs assembled using 2 contactors of different ratings

For assembly of 3 or 4-pole changeover contactor pairs

Contactor type ⁽¹⁾	Set of power connections		Mechanical interlock	
	At bottom	At top	Kit reference	Weight kg
Vertically mounted				
LC1 F115 or F1154 or LC1 F150 or F1504	LC1 F185 or F1854		LA9FG4F	0.350
	LC1 F225 or F2254		LA9FG4F	0.350
	LC1 F265 or F2654		LA9FH4F	0.870
	LC1 F330 or F3304		LA9FH4F	0.870
	LC1 F400 or F4004		LA9FJ4F	0.930
	LC1 F500 or F5004		LA9FK4F	0.940
LC1 F185 or F1854 or LC1 F225 or F2254	LC1 F630, F6304 or F800		LA9FL4F	0.940
	LC1 F265 or F2654		LA9FH4G	0.860
	LC1 F330 or F3304		LA9FH4G	0.860
	LC1 F400 or F4004		LA9FJ4G	0.940
	LC1 F500 or F5004		LA9FK4G	0.940
	LC1 F630, F6304 or F800		LA9FL4G	0.950
LC1 F265 or F2654 or LC1 F330 or F3304	LC1 F400 or F4004		LA9FJ4H	1.130
	LC1 F500 or F5004		LA9FK4H	1.130
LC1 F400 or F4004	LC1 F630, F6304 or F800		LA9FL4H	1.140
	LC1 F500 or F5004		LA9FK4J	1.200
LC1 F500 or F5004	LC1 F630 or F6304 or F800		LA9FL4J	1.210
	LC1 F630 or F6304 or F800		LA9FL4K	1.210

For assembly of reversers using 3 contactors, vertically mounted

See pages B9/40 and B9/41.

⁽¹⁾ For assembly of 3-pole changeover contactor pairs, see pages B9/36 and B9/38.

⁽²⁾ To order the 2 contactors: see pages B9/2 and B9/3. For the 2 auxiliary contact blocks **LAD No 1** required to obtain electrical interlocking between the 2 contactors, see page B9/11. For accessories, see pages B9/12 to B9/14.

⁽³⁾ All power connections are to be made by the customer.

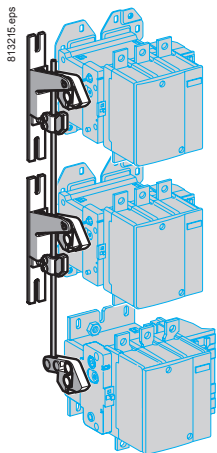
⁽⁴⁾ Double mechanical interlock mechanism with 2 interlock connecting rods and 4 power connecting links.

TeSys contactors

TeSys F contactors

Accessories for assembly of reversing contactors and changeover contactor pairs using 3 contactors, vertically mounted - for customer assembly

TeSys LA9F



LA9 F•4•4•

Closing of one of the 3 contactors prevents closing of the other 2.

Mechanical interlock kits

Contactor type ⁽¹⁾			Mechanical interlock ⁽²⁾	
Top	Middle	Bottom	Kit reference ⁽³⁾	Weight kg
LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9FF4F4F	0.554
LC1 F185, F225, F1854 or F2254	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9FG4F4F	0.559
		LC1 F185, F225, F1854 or F2254	LA9FG4G4F	0.559
		LC1 F185, F225, F1854 or F2254	LA9FG4G4G	0.562
LC1 F265, F330, F2654 or F3304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9FH4F4F	1.350
		LC1 F185, F225, F1854 or F2254	LA9FH4G4F	1.375
		LC1 F185, F225, F1854 or F2254	LA9FH4G4G	1.375
		LC1 F265, F330, F2654 or F3304	LA9FH4H4F	1.524
LC1 F400, F4002 or F4004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9FH4H4G	1.527
		LC1 F185, F225, F1854 or F2254	LA9FH4H4H	1.684
		LC1 F265, F330, F2654 or F3304	LA9FJ4F4F	1.421
		LC1 F185, F225, F1854 or F2254	LA9FJ4G4F	1.424
		LC1 F185, F225, F1854 or F2254	LA9FJ4G4G	1.428
		LC1 F265, F330, F2654 or F3304	LA9FJ4H4F	1.595
LC1 F500, F5002 or F5004 (continued on page B9/41)	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9FJ4H4G	1.598
		LC1 F185, F225, F1854 or F2254	LA9FJ4H4H	1.755
		LC1 F400, F4002 or F4004	LA9FJ4J4F	1.666
		LC1 F185, F225, F1854 or F2254	LA9FJ4J4G	1.669
		LC1 F265, F330, F2654 or F3304	LA9FJ4J4H	1.829
		LC1-F400, F4002 or F4004	LA9FJ4J4J	1.890
LC1 F500, F5002 or F5004 (continued on page B9/41)	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9FK4F4F	1.421
		LC1 F185, F225, F1854 or F2254	LA9FK4G4F	1.424
		LC1 F185, F225, F1854 or F2254	LA9FK4G4G	1.428
		LC1 F265, F330, F2654 or F3304	LA9FK4H4F	1.595
		LC1 F185, F225, F1854 or F2254	LA9FK4H4G	1.598
		LC1 F265, F330, F2654 or F3304	LA9FK4H4H	1.755
LC1 F400, F4002 or F4004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9FK4J4F	1.666
		LC1 F185, F225, F1854 or F2254	LA9FK4J4G	1.669
		LC1 F265, F330, F2654 or F3304	LA9FK4J4H	1.829
		LC1 F400, F4002 or F4004	LA9FK4J4J	1.896
		LC1 F500, F5002 or F5004	LA9FK4K4F	1.666

(1) To order the 3 contactors, see pages B9/36 and B9/38. For auxiliary contact blocks LAD N02 used for electrical locking, see page B9/11. For accessories, see pages B9/12 to B9/14.

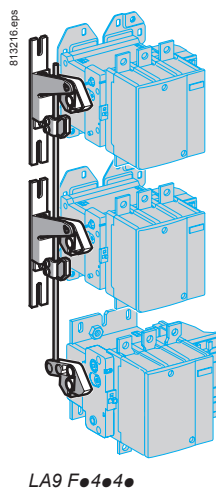
(2) Minimum distances between contactors, see page B9/41.

(3) The kit contains the lever arms, the 2 x Ø8 mm rods and all parts required for assembly.

TeSys contactors

TeSys F contactors

Accessories for assembly of reversing contactors and changeover contactor pairs using 3 contactors, vertically mounted - for customer assembly



Mechanical interlock kits (continued)

Contactor type ⁽¹⁾			Mechanical interlock ⁽²⁾		
Top	Middle	Bottom	Kit reference ⁽³⁾	Weight kg	
LC1 F500, F5002 or F5004 (continued)	LC1 F500, F5002 or F5004	LC1 F185, F225, F1854 or F2254	LA9FK4K4G	1.669	
		LC1 F265, F330, F2654 or F3304	LA9FK4K4H	1.825	
		LC1 F400, F4002 or F4004	LA9FK4K4J	1.896	
		LC1-F500, F5002 or F5004	LA9FK4K4K	1.896	
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9FL4F4F	1.428	
		LC1 F185, F225, F1854 or F2254	LA9FL4G4F	1.431	
	LC1 F265, F330, F2654 or F3304	LC1 F185, F225, F1854 or F2254	LA9FL4G4G	1.436	
		LC1 F115, F150, F1154 or F1504	LA9FL4H4F	1.602	
		LC1 F185, F225, F1854 or F2254	LA9FL4H4G	1.606	
	LC1 F400, F4002 or F4004	LC1 F115, F150, F1154 or F1504	LC1 F185, F225, F1854 or F2254	LA9FL4H4H	1.751
			LC1 F265, F330, F2654 or F3304	LA9FL4J4F	1.673
		LC1 F185, F225, F1854 or F2254	LC1 F265, F330, F2654 or F3304	LA9FL4J4G	1.676
			LC1 F400, F4002 or F4004	LA9FL4J4H	1.832
	LC1-F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F400, F4002 or F4004	LA9FL4J4J	1.903
			LC1 F115, F150, F1154 or F1504	LA9FK4K4F	1.666
		LC1 F185, F225, F1854 or F2254	LC1 F115, F150, F1154 or F1504	LA9FK4K4G	1.669
LC1 F265, F330, F2654 or F3304			LA9FK4K4H	1.825	
LC1 F400, F4002 or F4004		LC1 F115, F150, F1154 or F1504	LA9FK4K4J	1.896	
		LC1-F500, F5002 or F5004	LA9FK4K4K	1.896	
LC1 F630, F800, F6302, or F6304		LC1 F115, F150, F1154 or F1504	LC1 F630, F800, F6302, or F6304	LA9FL4L4F	1.680
			LC1 F185, F225, F1854 or F2254	LA9FL4L4G	1.683
	LC1 F265, F330, F2654 or F3304	LC1 F115, F150, F1154 or F1504	LA9FL4L4H	1.910	
		LC1 F400, F4002 or F4004	LA9FL4L4J	1.896	
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LA9FL4L4K	1.896		
	LC1 F630, F800, F6302, or F6304	LA9FL4L4L	1.920		

(1) To order the 3 contactors, see pages B9/36 and B9/38. For auxiliary contact blocks **LAD N02** used for electrical locking, see page B9/11. For accessories, see pages B9/12 to B9/14.

(2) Minimum distances between contactors.

This is the distance, in mm, between the centres of two adjacent contactors (between the top and middle contactors or between the middle and bottom contactors).

Contactor Bottom or top	Middle					
	LC1 F115 or F150	LC1 F185 or F225	LC1 F265 or F330	LC1 F400	LC1 F500	LC1 F630 or F800
LC1 F115 or F150	200	210	240	250	270	320
LC1 F185 or F225	210	220	250	250	270	330
LC1 F265 or F330	240	250	250	260	280	350
LC1 F400	250	250	260	260	280	320
LC1 F500	270	270	280	280	300	340
LC1 F630 or F800	320	330	350	320	340	380

(3) The kit contains the lever arms, the 2 x Ø8 mm rods and all parts required for assembly.

TeSys contactors

High power changeover contactor pairs for distribution

Control circuit: a.c. or d.c.

TeSys LA9F

General

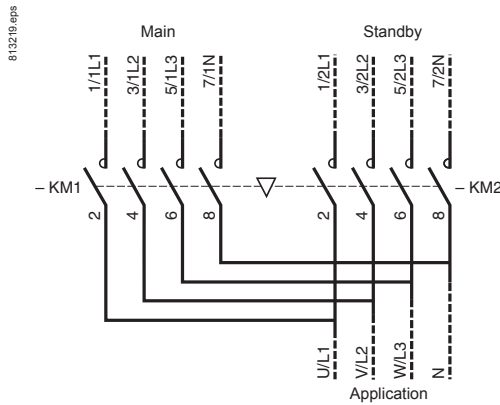
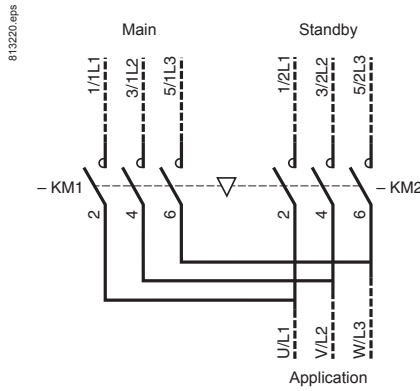
A changeover contactor pair ensures continuity of operation of an installation and energy management.

It switches between:

- a power supply source M (main) which normally supplies the installation
- and a power supply source S (standby) which may be an incoming line from an additional network or a generating set.

The supply sources may be 3-phase or 3-phase + neutral.

Supply - 3-phase



The 2 contactors must be mechanically and electrically interlocked to prevent any paralleling, even transitory, of the two supplies.

TeSys contactors

High power changeover contactor pairs for distribution

Control circuit: a.c. or d.c.

TeSys LA9F

Changeover contactor pairs for customer assembly: 3-phase

Vertically mounted.

Maximum operational voltage: 1000 V.

Utilisation category: AC-1.

Maximum temperature in the vicinity of the devices: 40 °C.

Maximum operational current		Contactors ⁽¹⁾		Mechanical interlock ⁽²⁾
Main	Standby	Main	Standby	Reference
3-phase	3-phase	Reference	Reference	Reference
1600 A	1000 A	LC1F780	LC1F6309	LA9FX970
1600 A	1600 A	LC1F780	LC1F780	LA9FX970

Changeover contactor pairs for customer assembly: 3-phase + neutral

Vertically mounted.

Maximum operational voltage: 1000 V.

Utilisation category: AC-1.

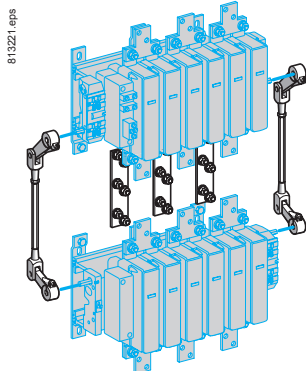
Maximum temperature in the vicinity of the devices: 40 °C.

Maximum operational current		Contactors ⁽¹⁾		Mechanical interlock ⁽²⁾
Main	Standby	Main	Standby	Reference
3-phase + N	3-phase + N	Reference	Reference	Reference
1600 A + 1000 A	1000 A + 1000 A	LC1F78041	LC1F63049	LA9FX970 ⁽³⁾
1600 A + 1000 A	1600 A + 1000 A	LC1F78041	LC1F78040	LA9FX970 ⁽³⁾
1600 A + 1600 A	1000 A + 1000 A	LC1F7804	LC1F63049	LA9FX971
1600 A + 1600 A	1600 A + 1600 A	LC1F7804	LC1F7804	LA9FX971

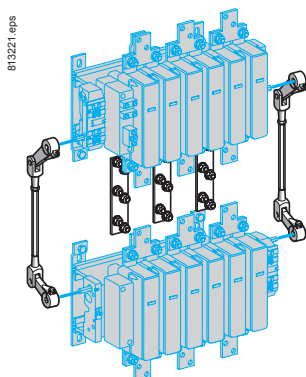
⁽¹⁾ Coils to be ordered separately, see pages B9/17 to B9/26.

⁽²⁾ Double mechanical interlock mechanism with 2 interlock connecting rods and 4 power connecting links. To order the the 2 auxiliary contact blocks **LAD N•1** required to obtain electrical interlocking between the 2 contactors: see page B9/11.

⁽³⁾ Neutral connecting link not supplied (to be ordered separately).



LA9 FX970



LA9 FX971

Technical Data for Designers

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- > dimensions B9/54 to B9/59
- > schemes..... B9/60 and B9/61

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and characteristics..... B9/62 and B9/63
- > dimensions B9/64 and B9/65
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- > presentation
and selection B9/68 to B9/75
- > characteristics B9/76 to B9/83
- > dimensions
and schemes..... B9/84 and B9/85

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TeSys F - high power changeover contactor pairs for distribution:

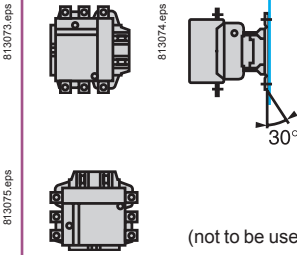
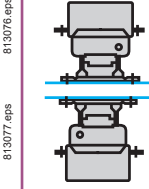
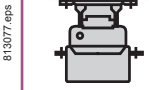
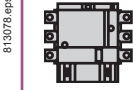
- > dimensions B9/104 and B9/105
- > schemes..... B9/105

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: a.c. or d.c.

TeSys F

Environment				LC1 F115	LC1 F150	LC1 F185
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	1000	1000	1000	
	Conforming to VDE 0110 gr C	V	1500	1500	1500	
Rated impulse withstand voltage (Uimp)	Coil not connected to the power circuit	kV	8	8	8	
Conforming to standards			EN 60947-1, EN 60947-4-1, IEC 60947-1, IEC 60947-4-1, JEM 1038			
Product certifications			CSA, UL, BV, GL, DNV, RINA, RMROS, LROS, CCC			
Degree of protection	Conforming to IEC 60529		IP 2X front face with shrouds LA9 F			
	Conforming to VDE 0106		Front face protected against direct finger contact with shrouds LA9 F			
Protective treatment	Standard version		"TH"			
Ambient air temperature around the device	Storage	°C	-60...+80			
	Operation	°C	-5...+55			
	Permissible at Uc ⁽¹⁾	°C	-40...+70			
Maximum operating altitude	Without derating	m	3000			
Operating positions	Without derating		 <p>(not to be used for LC1 F780, F1700 and F2100)</p>			
			 <p>Apply the following derating coefficients: 0.75 on the pull-in voltage, 0.9 on the drop-out voltage and 0.8 on the operational current in AC-1.</p>			
	With derating		 <p>Apply the following derating coefficients: 1.15 on the pull-in voltage, 1.1 on the drop-out voltage and 0.8 on the operational current in AC-1.</p> <p>In either case: neither the making and breaking capacities nor the electrical and mechanical durabilities can be assured.</p>			
Not to be used						
Shock resistance ⁽²⁾ 1/2 sine wave = 11 ms	Contactor open		9 gn	9 gn	7 gn	
	Contactor closed		15 gn	15 gn	15 gn	
Vibration resistance ⁽²⁾ 5...300 Hz	Contactor open		2 gn	2 gn	2 gn	
	Contactor closed		6 gn	6 gn	5 gn	

(1) In these conditions, it is recommended that LX9 F coils be used for contactor sizes F115 to F225.

(2) In the least favourable direction, without change of contact state (coil at Uc). Where higher resistance to mechanical shock is required, select shock-proof contactors. Please consult your Regional Sales Office.

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: a.c. or d.c.

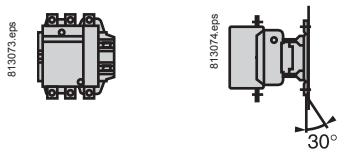
TeSys F

LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
8	8	8	8	8	8	8	8	8	8	8	8

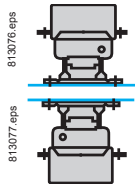
EN 60947-1, EN 60947-4-1, IEC 60947-1, IEC 60947-4-1, JEM 1038

CSA, UL, BV, GL, DNV, RINA, RMROS, LROS, CCC	UL, CSA, GL, LROS	CSA, CCC, ETL-UL
IP 20 front face with shrouds LA9 F		-
Front face protected against direct finger contact with shrouds LA9 F		-
"TH"		
-60...+80	-60...+80	-60...+80
-5...+55	-5...+55	-5...+40
-40...+70	-5...+55	-40...+60

3000



(not to be used for LC1 F780, F1400, F1700 and F2100)

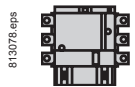


Apply the following derating coefficients: 0.75 on the pull-in voltage, 0.9 on the drop-out voltage and 0.8 on the operational current in AC-1.

Apply the following derating coefficients: 1.15 on the pull-in voltage, 1.1 on the drop-out voltage and 0.8 on the operational current in AC-1.

In either case: neither the making and breaking capacities nor the electrical and mechanical durabilities can be assured.

Not to be used



7 gn	6 gn	6 gn	6 gn	9 gn	6 gn	5 gn	6 gn	6 gn	6 gn	6 gn	6 gn
15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn
2 gn	2 gn	2 gn	1.5 gn	2 gn	2 gn	2.5 gn	2 gn	2 gn	2 gn	2 gn	2 gn
5 gn	5 gn	5 gn	5 gn	4 gn	4 gn	5.5 gn	4 gn	4 gn	4 gn	4 gn	4 gn

TeSys F

Pole characteristics							
Contactor type			LC1 F115	LC1 F150	LC1 F185	LC1 F225	LC1 F265
Number of poles			3 or 4	3 or 4	3 or 4	3 or 4	3 or 4
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, θ ≤ 55 °C	A	115	150	185	225	265
	In AC-1, θ ≤ 40 °C	A	200	250	275	315	350
Rated operational voltage (Ue)	Up to	V	1000	1000	1000	1000	1000
Frequency limits	Of the operational current ⁽¹⁾	Hz	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200
Conventional thermal current	θ ≤ 40 °C	A	200	250	275	315	350
Rated making capacity	I rms conforming to IEC 60947-4-1	A	Making current: 10 x I in AC-3 or 12 x I in AC-4				
Rated breaking capacity	I rms conforming to IEC 60947-4-1	A	Making and breaking current: 8 x I in AC-3 or 10 x I in AC-4				
Maximum permissible current No current flowing for previous 60 minutes, at θ ≤ 40 °C	For 10 s	A	1100	1200	1500	1800	2200
	For 30 s	A	640	700	920	1000	1230
	For 1 min	A	520	600	740	850	950
	For 3 min	A	400	450	500	560	620
	For 10 min	A	320	350	400	440	480
Short-circuit protection by fuses U ≤ 440 V	Motor circuit (type aM)	A	125	160	200	250	315
	With thermal overload relay (type gG)	A	200	200	315	315	500
	gG fuses	A	200	250	315	315	400
Average impedance per pole	At Ith and 50 Hz	mΩ	0.37	0.35	0.33	0.32	0.3
Power dissipation per pole for the above operational currents	AC-3	W	5	8	12	16	21
	AC-1	W	15	22	25	32	37
Connection			Maximum c.s.a.				
Bar	Number of bars		2	2	2	2	2
	Bar	mm	20 x 3	25 x 3	25 x 3	32 x 4	32 x 4
Cable with lug		mm²	95	120	150	185	240
Cable with connector		mm²	95	120	150	185	240
Bolt diameter		mm	Ø6	Ø8	Ø8	Ø10	Ø10
Tightening torque	Power circuit connections	N.m	10	18	18	35	35

(1) Sine wave without interference. Above these values, please consult your Regional Sales Office.

(2) With set of right-angled connectors LA9 F2100 (see page B9/13).

(3) Paralleling of poles must be carried out only in accordance with the fuse manufacturer's recommendations.

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: a.c. or d.c.

TeSys F

LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100
3 or 4	2, 3 or 4	2, 3 or 4	2, 3 or 4	3 or 4	3	3	3	3	3
330	400	500	630	780	800	-	-	-	-
400	500	700	1000	1600	1000	1260	1400	1700	2100 ⁽²⁾
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200
400	500	700	1000	1600	1000	1260	1400	1700	2100 ⁽²⁾
Making current: 10 x I in AC-3 or 12 x I in AC-4						Making current: 1.5 x I in AC-1			
Making and breaking current: 8 x I in AC-3 or 10 x I in AC-4						Making and breaking current: 1.5 x I in AC-1			
2650	3600	4200	5050	6250	5500	8000	8000	10000	10000
1800	2400	3200	4400	5600	4600	5200	6000	7500	7500
1300	1700	2400	3400	4600	3600	4000	4500	5500	5500
900	1200	1500	2200	3000	2600	3000	4000	4200	4200
750	1000	1200	1600	2200	1700	2000	2600	3000	3000
400	400	500	630	800	800	-	-	-	-
500	630	800	800	1000	1000	-	-	-	-
500	500	800	1000	2 x 800 ⁽³⁾	1000	1000	2 x 800 ⁽³⁾	2 x 800 ⁽³⁾	2 x 1000 ⁽³⁾
0.28	0.26	0.18	0.12	0.10	0.12	0.12	0.10	0.10	0.10
31	42	45	48	60	77	-	-	-	-
44	65	88	120	250	120	120	150	200	200
Maximum c.s.a.									
2	2	2	2	2	2	2	2	3	4
30 x 5	30 x 5	40 x 5	60 x 5	100 x 5	60 x 5	100 x 5	100 x 5	100 x 5	100 x 5
240	2 x 150	2 x 240	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
Ø10	Ø10	Ø10	Ø12	2 x Ø12	Ø12	3 x Ø12 (Ø11.5 with set of right-angled connectors LA9 F1250)	4 x Ø12 (Ø11.5 with set of right-angled connectors LA9 F2100)		
35	35	35	58	58	58	58 (35 with set of right-angled connectors LA9 F1250)	58 (35 with set of right-angled connectors LA9 F2100)		

TeSys F

Control circuit characteristics with LX1 or LX9 coil			LC1 F115	LC1 F150	LC1 F185	LC1 F225	LC1 F265
Contactor type							
Rated control circuit voltage (Uc)	50 or 60 Hz	V	24...1000				
Control voltage limits ($\theta \leq 55^\circ\text{C}$) 50 or 60 Hz coils	Operation		0.85...1.1 Uc				–
	Drop-out		0.35...0.55 Uc				–
40...400 Hz coils	Operation		–				0.85...1.1 Uc
	Drop-out		–				0.35...0.55 Uc
Average consumption at 20 °C and at Uc							
~ 50 Hz Inrush	50 Hz coil	VA	550	550	805	805	–
	40...400 Hz coil	VA	–	–	–	–	650
	Cos φ		0.3	0.3	0.3	0.3	0.9
Sealed	50 Hz coil	VA	45	45	55	55	–
	40...400 Hz coil	VA	–	–	–	–	10
	Cos φ		0.3	0.3	0.3	0.3	0.9
~ 60 Hz Inrush	60 Hz coil	VA	660	660	970	970	–
	40...400 Hz coil	VA	–	–	–	–	650
	Cos φ		0.3	0.3	0.3	0.3	0.9
Sealed	60 Hz coil	VA	55	55	66	66	–
	40...400 Hz coil	VA	–	–	–	–	10
	Cos φ		0.3	0.3	0.3	0.3	0.9
Heat dissipation		W	12...16	12...16	18...24	18...24	8
Operating time ⁽¹⁾	Closing "C"	ms	23...35	23...35	20...35	20...35	40...65
	Opening "O"	ms	5...15	5...15	7...15	7...15	100...170
Mechanical durability at Uc	In millions of operating cycles		10	10	10	10	10
Maximum operating rate at ambient temperature $\leq 55^\circ\text{C}$	In operating cycles per hour		2400	2400	2400	2400	2400
Connection			Min/max c.s.a.				
Flexible cable without cable end	1 or 2 conductors	mm²	1/4	1/4	1/4	1/4	1/4
	1 conductor	mm²	1/4	1/4	1/4	1/4	1/4
Flexible cable with cable end	2 conductors	mm²	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5
	1 or 2 conductors	mm²	1/4	1/4	1/4	1/4	1/4
Solid cable without cable end	1 or 2 conductors	mm²	1/4	1/4	1/4	1/4	1/4
Tightening torque		N.m	1.2	1.2	1.2	1.2	1.2
Mechanical latching	Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors. For similar type of operation, use magnetic latching contactors CR1 F. See pages B9/30 to B9/35.						

(1) The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

(2) Control circuit characteristics with LX1 coil.

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: a.c.

TeSys F

LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100
24...1000	48...1000		48...1000	110...500	110...400	110...600	110...500 ⁽²⁾	110...500 ⁽²⁾	110...500 ⁽²⁾
-									
-									
0.85...1.1 Uc	0.85...1.1 Uc		0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc
0.35...0.55 Uc	0.3...0.5 Uc		0.25...0.5 Uc	0.2...0.4 Uc	0.3...0.5 Uc	0.25...0.5 Uc	0.3...0.5 Uc	0.3...0.5 Uc	0.3...0.5 Uc
-									
650	1075	1100	1650	2100	1700	1650	2200	2200	2200
0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
-									
10	15	18	22	50	12	22	36	36	36
0.9	0.9	0.9	0.9	0.9	-	0.9	0.9	0.9	0.9
-									
650	1075	1100	1650	2100	1700	1650	2200	2200	2200
0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
-									
10	15	18	22	50	12	22	36	36	36
0.9	0.9	0.9	0.9	0.9	-	0.9	0.9	0.9	0.9
-									
8	14	18	20	2 x 22	25	20	2 x 18	2 x 18	2 x 18
40...65	40...75	40...75	40...80	40...80	60...80	40...80	40...75	40...75	40...75
100...170	100...170	100...170	100...200	130...230	150...180	100...200	100...170	100...170	100...170
10	10	10	5	5	5	1	0.5	0.5	0.5
2400	2400	2400	1200	600	600	1200	600	600	600
Min/max c.s.a.									
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors.
 For similar type of operation, use magnetic latching contactors CR1 F.
 See pages B9/30 to B9/35.

TeSys F

Control circuit characteristics with LX4 coil							
Contactor type			LC1 F115	LC1 F150	LC1 F185	LC1 F225	LC1 F265
Rated control circuit voltage (Uc) ---		V	24...460	24...460	24...460	24...460	24...460
Control voltage limits (θ ≤ 55 °C)	Operation		0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc
	Drop-out		0.15...0.2 Uc	0.15...0.2 Uc	0.15...0.2 Uc	0.15...0.2 Uc	0.15...0.2 Uc
Average consumption at 20 °C and at Uc	--- Inrush	W	560	560	800	800	750
		W	4.5	4.5	5	5	5
Average operating time at Uc ⁽¹⁾	Closing "C"	ms	30...40	30...40	30...40	30...40	40...50
	Opening "O"	ms	30...50	30...50	30...50	30...50	40...65
<i>Note: the arcing time depends on the circuit switched by the poles. For all normal 3-phase applications, the arcing time is less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.</i>							
Mechanical durability at Uc	In millions of operating cycles		10	10	10	10	10
Maximum operating rate at ambient temperature ≤ 55 °C	In operating cycles per hour		2400	2400	2400	2400	2400
Cabling			Min/max c.s.a.				
Flexible cable without cable end	1 conductor	mm²	1/4	1/4	1/4	1/4	1/4
	2 conductors	mm²	1/4	1/4	1/4	1/4	1/4
Flexible cable with cable end	1 conductor	mm²	1/4	1/4	1/4	1/4	1/4
	2 conductors	mm²	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5
Solid cable without cable end	1 conductor	mm²	1/4	1/4	1/4	1/4	1/4
	2 conductors	mm²	1/4	1/4	1/4	1/4	1/4
Tightening torque		N.m	1.2	1.2	1.2	1.2	1.2
Mechanical latching		Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors. For similar type of operation, use magnetic latching contactors CR1 F. See pages B9/30 to B9/35.					

(1) The operating times depend on the type of contactor electromagnet and its control mode.
The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: d.c

TeSys F

LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100
24...460	48...440	48...440	48...440	110...440	110...400	48...250	110...440	110...440	110...440
0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc
0.15...0.2 Uc	0.2...0.35 Uc	0.2...0.35 Uc	0.2...0.35 Uc	0.2...0.4 Uc	0.3...0.5 Uc	0.2...0.35 Uc	0.2...0.35 Uc	0.2...0.35 Uc	0.2...0.35 Uc
750	1000	1100	1600	2 x 1000	1900	1600	2100	2100	2100
5	6	6	9	2 x 21	12	9	10	10	10
40...50	50...60	50...60	60...70	70...80	60...80	60...70	50...60	50...60	50...60
40...65	45...60	45...60	40...50	100...130	40...50	40...50	45...60	45...60	45...60

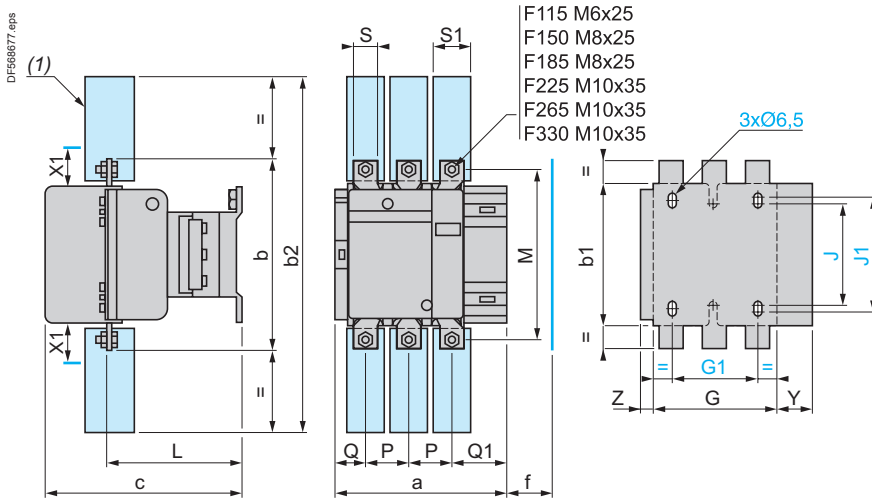
Note: the arcing time depends on the circuit switched by the poles. For all normal 3-phase applications, the arcing time is less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.

10	10	10	5	5	5	1	0.5	0.5	0.5
2400	2400	2400	1200	600	600	1200	600	600	600
Min/max c.s.a.									
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors. For similar type of operation, use magnetic latching contactors CR1 F. See pages B9/30 to B9/35.

TeSys F

LC1 F115 to F330



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

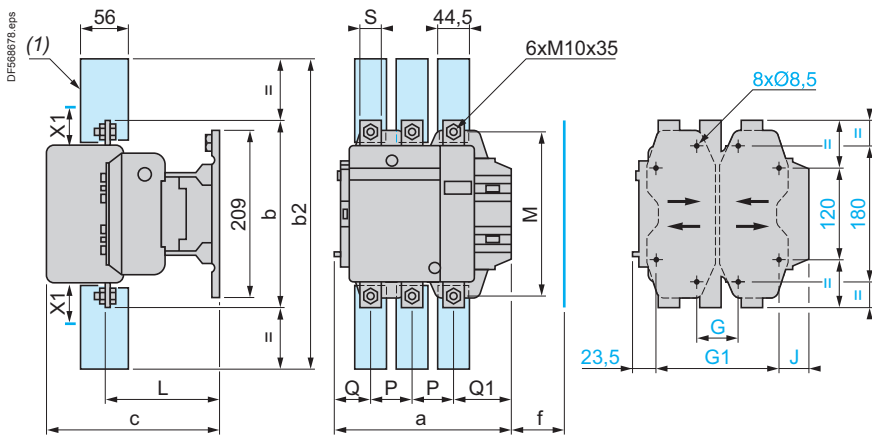
LC1	200...500 V	600...1000 V
F115, F150	10	15
F185	10	15
F225, F265	10	15
F330	10	15

(1) Power terminal protection shroud (see page B9/14).

LC1		a	b	b1	b2	c	f	G	G1	J	J1	L	M	P	Q	Q1	S	S1	Y	Z
F115	3P	163.5	162	137	265	171	131	106	80	106	120	107	147	37	29.5	60	20	26	44	13.5
	4P	200.5	162	137	265	171	131	143	80	106	120	107	147	37	29.5	60	20	26	44	13.5
F150	3P	163.5	170	137	301	171	131	106	80	106	120	107	150	40	26	57.5	20	34	44	13.5
	4P	200.5	170	137	301	171	131	143	80	106	120	107	150	40	26	55.5	20	34	44	13.5
F185	3P	168.5	174	137	305	181	130	111	80	106	120	113.5	154	40	29	59.5	20	34	44	13.5
	4P	208.5	174	137	305	181	130	151	80	106	120	113.5	154	40	29	59.5	20	34	44	13.5
F225	3P	168.5	197	137	364	181	130	111	80	106	120	113.5	172	48	21	51.5	25	44.5	44	13.5
	4P	208.5	197	137	364	181	130	151	80	106	120	113.5	172	48	17	47.5	25	44.5	44	13.5
F265	3P	201.5	203	145	375	213	147	142	96	106	120	141	178	48	39	66.5	25	44.5	38	21.5
	4P	244.5	203	145	375	213	147	190	96	106	120	141	178	48	34	66.5	25	44.5	38	21.5
F330	3P	213	206	145	375	219	147	154.5	96	106	120	145	181	48	43	74	25	44.5	38	20.5
	4P	261	206	145	375	219	147	202.5	96	106	120	145	181	48	43	74	25	44.5	38	20.5

f = minimum distance required for coil removal.

LC1 F400 and F500



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	600...1000 V
F400	15	20
F500	15	20

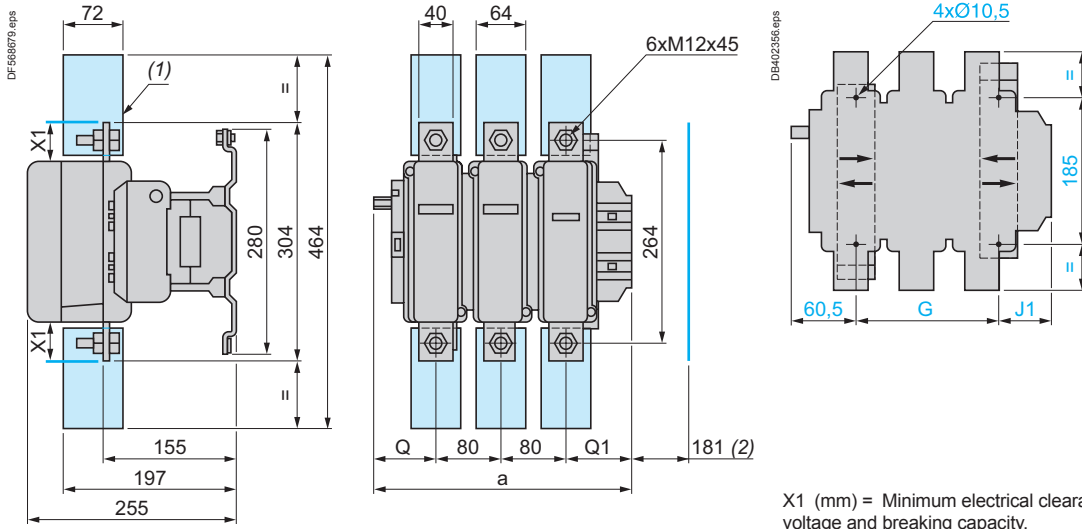
(1) Power terminal protection shroud (see page B9/14).

LC1		a	b	b2	c	f	G	G	G	G1	G1	G1	J	L	M	P	Q	Q1	S	
							supplied	min.	max.	supplied	min.	max.								
F400	2P	213	206	375	219	146	80	66	102	170	156	192	19.5	145	181	48	69	96	25	
	3P	213	206	375	219	146	80	66	102	170	156	192	19.5	145	181	48	43	74	25	
	4P	261	206	375	219	146	80	66	150	170	156	240	67.5	145	181	48	43	74	25	
F500	2P	233	238	400	232	150	80	66	120	170	156	210	39.5	146	208	55	76	102	30	
	3P	233	238	400	232	150	80	66	120	170	156	210	39.5	146	208	55	46	77	30	
	4P	288	238	400	232	150	140	66	175	230	156	265	34.5	146	208	55	46	77	30	

f = minimum distance required for coil removal.

TeSys F

LC1 F630 and F800



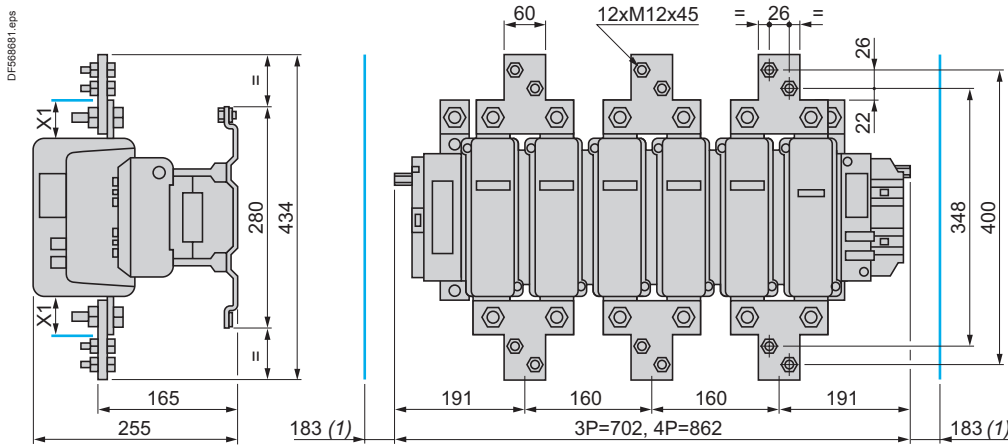
X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1		a	G	G	G	J1	Q	Q1
			supplied min.	min.	max.			
F630	2P	309	180	100	195	68.5	102	127
F630, F800	3P	309	180	100	195	68.5	60	89
F630	4P	389	240	150	275	68.5	60	89

LC1 F630	200...500 V	690...1000 V	200...690 V	1000 V
LC1 F630	20	30	-	-
LC1 F800	-	-	10	20

(1) Power terminal protection shroud (see page B9/14).
 (2) Minimum distance required for coil removal.

LC1 F780



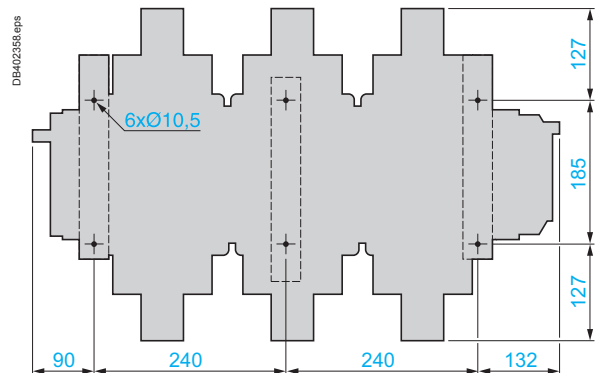
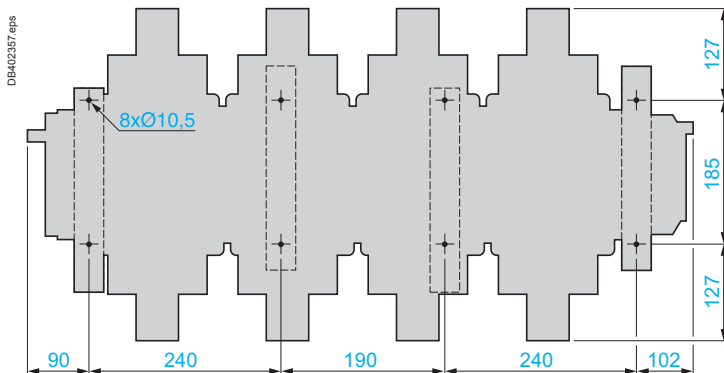
X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

(1) Minimum distance required for coil removal.

LC1 F780	200...500 V	690...1000 V
X1 (mm)	30	35

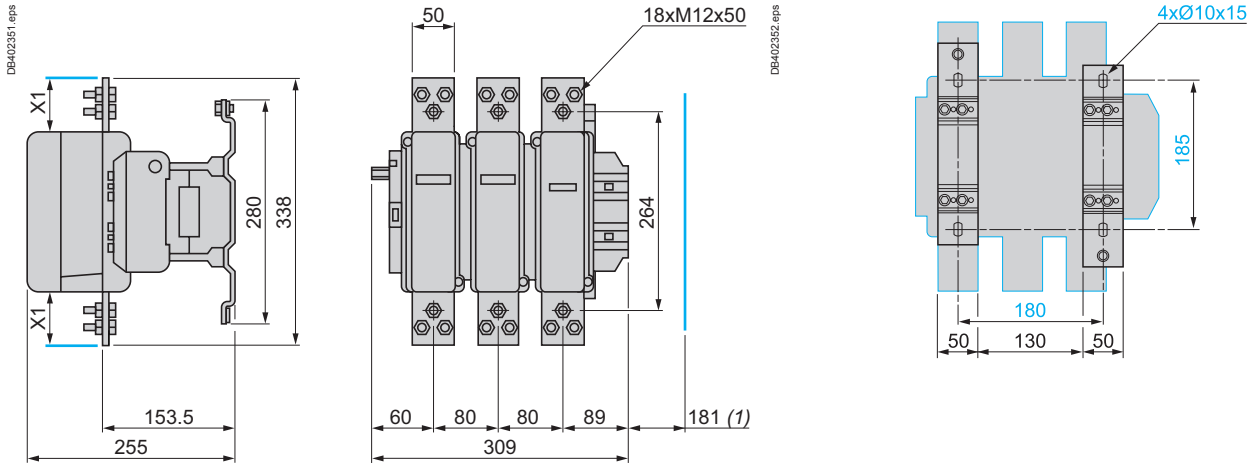
Fixing centres of LC1 F7804

Fixing centres of LC1 F780



TeSys F

LC1 F1250

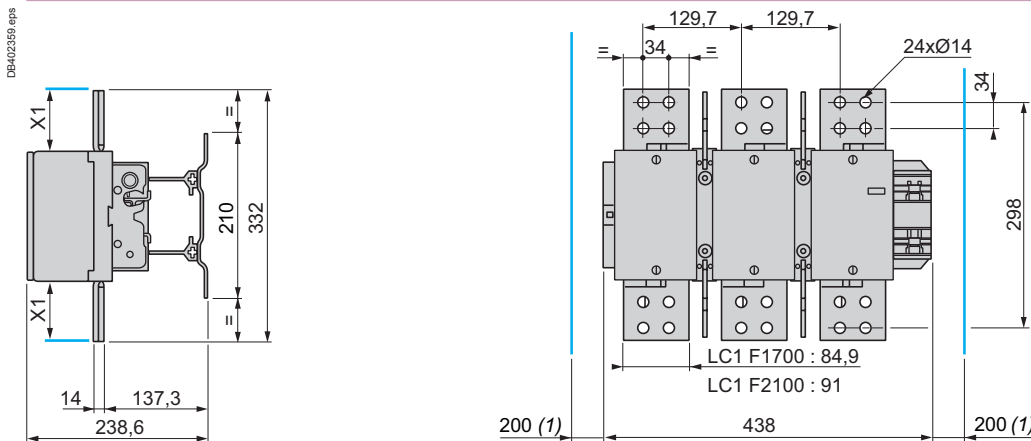


(1) Minimum distance required for coil removal.

X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

Voltage	200...500 V	690...1000 V
X1 (mm)	20	30

LC1 F1400, LC1 F1700 and LC1 F2100

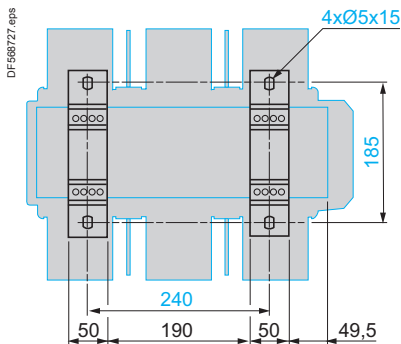


(1) Minimum distance required for coil removal.

X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

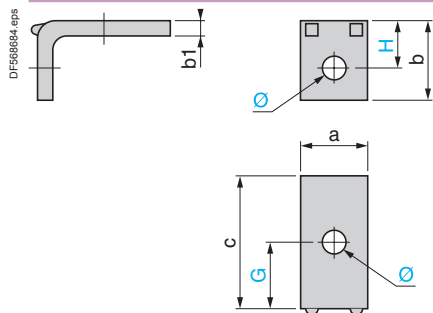
Voltage	200...500 V	690...1000 V
X1 (mm)	90	100

Fixing centres of LC1 F1400, F1700 and 2100



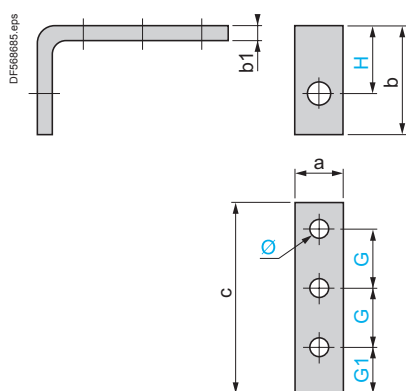
TeSys F

Right-angled connectors LA9 F●981 (set of 3) for rear connection



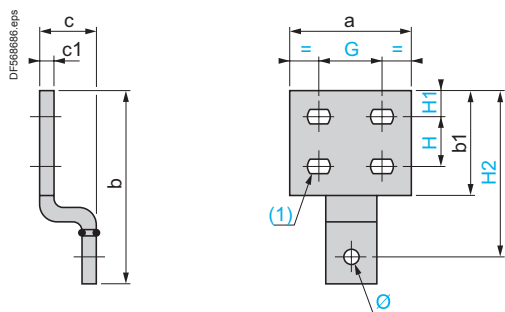
LA9	FF981	FG981	FJ981	FK981	FL981
a	15	20	25	30	40
b	18	23	29	35	48
b1	3	3	4	5	8
c	42	45	55	52	86
G	24	26	32.5	26	45
H	10.5	13	16.5	20	28
Ø	6.5	9	11	11	13

Right-angled connectors LA9 F●979 (set of 3) for side connection



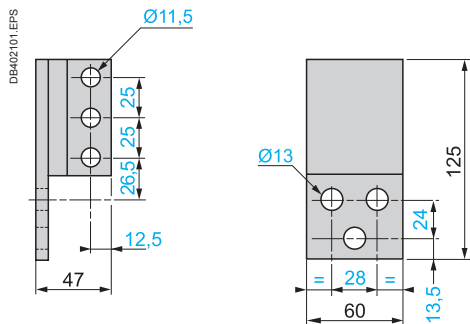
LA9	FF979	FG979	FJ979	FK979	FL979
a	15	20	25	30	40
b	54	58	63.5	68	117
b1	5	5	6	6	10
c	80	92	120	120	130
G	24	28	37	37	37.5
G1	20	22	29	29	35
H	36	39	41	42	76
Ø	6.5	9	11	11	13

Right-angled connectors LA9 F●980 with large surface area (set of 3)

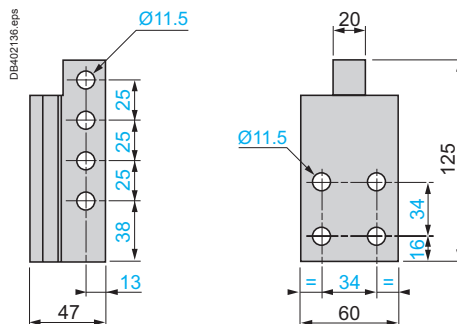


LA9	FF980	FG980	FJ980	FK980	FL980
a	35	40	50	60	100
b	70.5	82.5	98.5	114	154
b1	40	45	55	65	85
c	29	29	33	33	43
c1	3	3	5	5	10
G	18	20	25	29	53
H	18	20	22	26	40
H1	10	12	14	17	20
H2	60.5	72.5	84.5	97	132
Ø	6.5	9	11	11	13
(1)	Ø7 x 10	Ø9 x 12	Ø11 x 14	Ø12.5 x 15	Ø12.5 x 15

Right-angled connectors LA9 F1250 (set of 6)



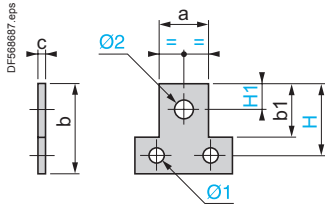
Right-angled connectors LA9 F2100 (set of 6) for rear connection



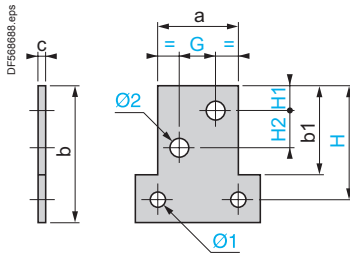
TeSys F

Paralleling links (set of 4)

LA9 FF602, FG602, FH602



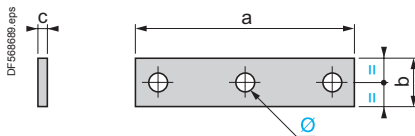
LA9 FK602, FL602



	LA9	FF602	FG602	FH602	FK602	FL602
a	25	30	40	50	60	
b	45	55	60	85	100	
b1	30	35	40	55	65	
c	4	5	8	10	10	
G	–	–	–	22	26	
H	37.5	45	52.5	70	85	
H1	12.5	15	15	14	17	
H2	–	–	–	22	26	
Ø1	6.5	9	11	11	13	
Ø2	11	11	13	11	14	

Links for "star" connection of 3 poles

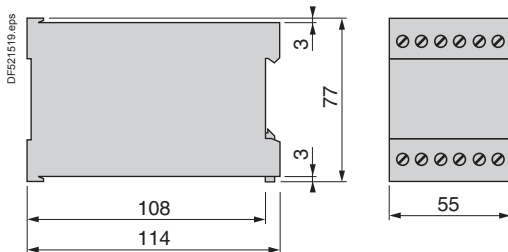
LA9 F●601



	LA9	FF601	FG601	FH601	FK601	FL601
a	69	100	121	140	200	
b	15	20	20	30	40	
c	3	3	5	5	8	
Ø	6.5 x 8.5	8.5 x 10.5	10.5 x 13	11	13	

Capacitive delayed opening devices for TeSys F contactors

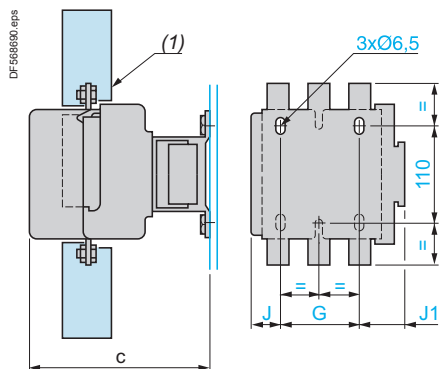
LAZ R9●●



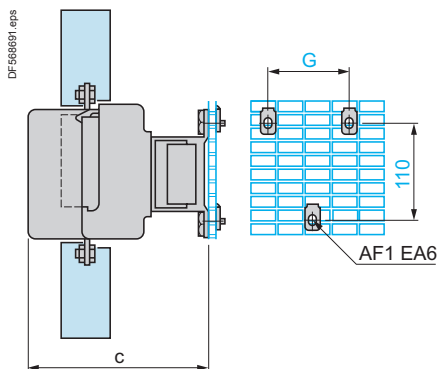
TeSys F

LC1 F115 to F330

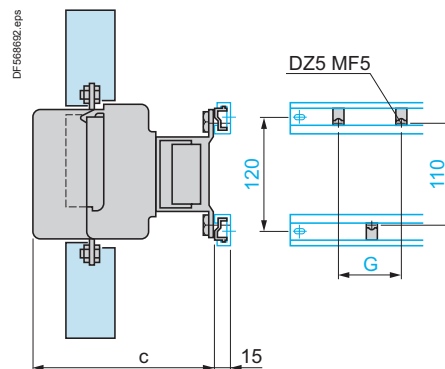
On panel



On pre-slotted mounting plate AM1 PA, PB, PC



On rails DZ5 MB on 120 mm centres



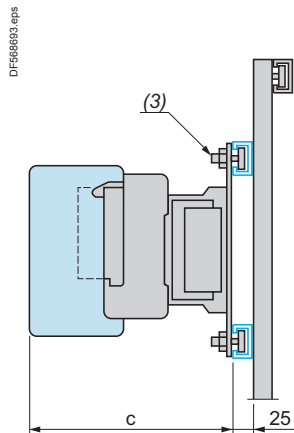
LC1	F115 F150	F185 F225	F265	F330
c ⁽²⁾	3P 171	181	213	219
	4P 171	181	213	219
G	3P 80	80	96	96
	4P 80	80	96	96
J	3P 26.5	29	44.5	44.5
	4P 45	49	68.5	68.5
J1	3P 57	59.5	61.5	61.5
	4P 75.5	79.5	85.5	85.5

LC1	F115 F150	F185 F225	F265	F330
c ⁽²⁾	3P 171	181	213	219
	4P 171	181	213	219
G	3P 80	80	96	96
	4P 80	80	96	96

LC1	F115 F150	F185 F225	F265	F330
c ⁽²⁾	3P 171	181	213	219
	4P 171	181	213	219
G	3P 80	80	96	96
	4P 80	80	96	96

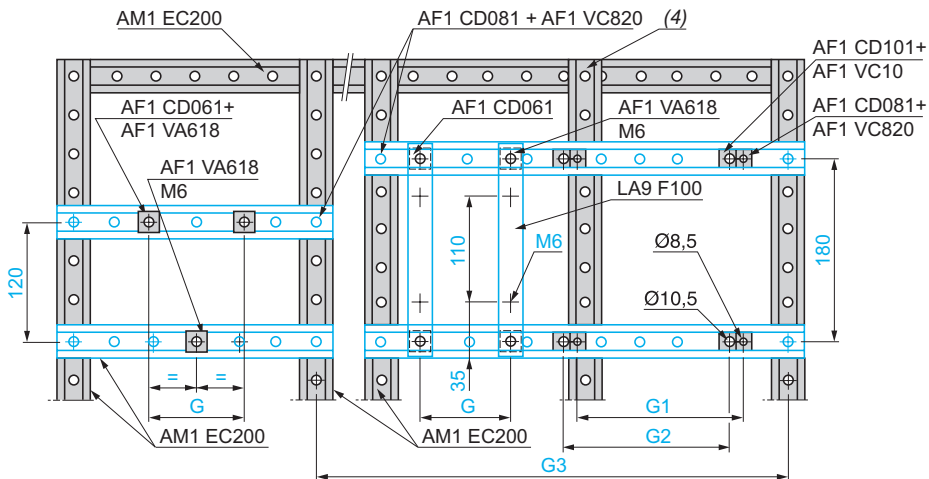
LC1 F

On 2 notched rails AM1 EC●●●



LC1 F115 to F330

LC1 F400 to F800



LC1	F115, F150	F185, F225	F265	F330	F400	F500	F630	F780	F800
c	3P 165 ⁽⁵⁾	176	207	213	219	232	255	255	255
	4P 165 ⁽⁵⁾	176	207	213	219	232	255	255	-
G (M6)	3P 80	80	96	96	-	-	-	-	-
	4P 80	80	96	96	-	-	-	-	-
G1 (Ø 8.5)	3P -	-	-	-	80	80	-	-	-
	4P -	-	-	-	80	140	-	-	-
G2 (Ø 10.5)	3P -	-	-	-	-	-	180	See page B9/55	180
	4P -	-	-	-	-	-	240	See page B9/55	-

- (1) Power terminal protection shroud (see page B9/14).
- (2) See X1 (minimum electrical clearance) pages B9/54 and B9/55.
- (3) AF1 CD●●● and AF1 VA●●●.
- (4) This AM1 EC200 upright is required when G2 or G3 is greater than 700 mm (please consult your Regional Sales Office).
- (5) + 6 mm with time-delay block on LC1 F.

TeSys F

Contactors

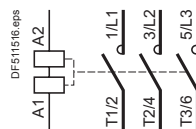
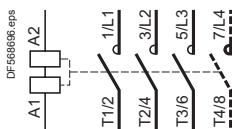
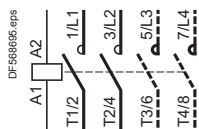
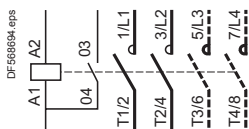
2, 3 and 4-pole contactors

LC1 F115 to F630 , F1250
(coil LX1 F ~)

LC1 F115 to F630 , F1250 (coil LX4 F ~:~)
LC1 F115 to F265 (coil LX9 F ~)
LC1 F800 (coil LX8 F ~ / ~:~)

LC1 F780 ~ or ~:~

LC1 F1400 ~ or ~:~
LC1 F1700 ~ or ~:~
LC1 F2100 ~ or ~:~



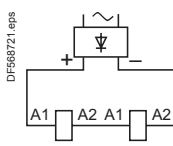
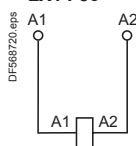
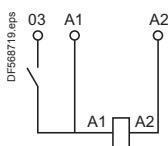
Coils

Standard ~ coils

LX1 FF, FG, FJ...FL
LX1 FH0422...FH3802

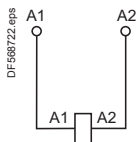
LX1 FH0202...FH0362
LX1 FH4402...FH10002
LX1 F8●

LX1 FX
Rectifier supplied and fixed on the contactor



Standard ~:~ coils

LX4 FF, FG, FH, FJ, FK, FL, FX ⁽¹⁾, LX4 F8●



(1) 2 coils in series.

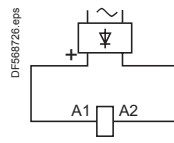
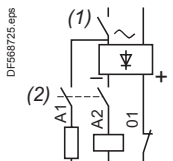
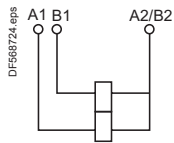
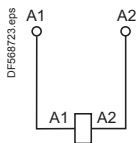
Special ~ coils

LX9 FF, FG

LX9 FH●●●2

LX9 FJ, FK, FL

LX4 F8●

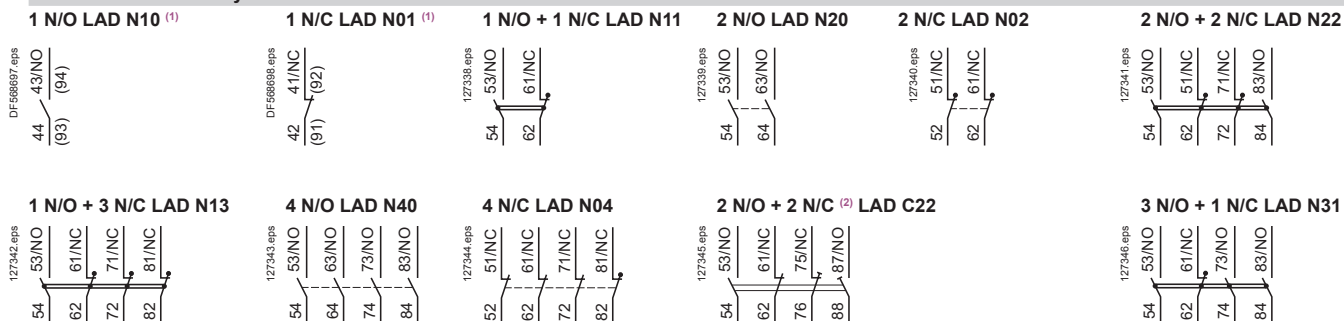


(1) Breaking on ~ side.
Drop-out time 50 ms.
(2) Breaking on ~:~ side.
Drop-out time 20 ms.

TeSys F

Add-on blocks

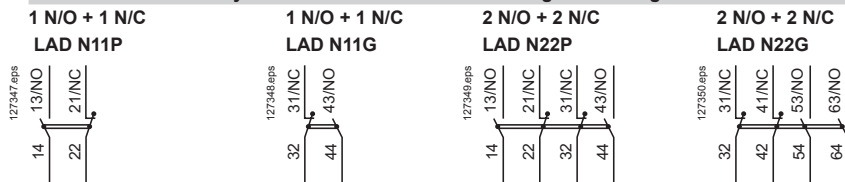
Instantaneous auxiliary contacts



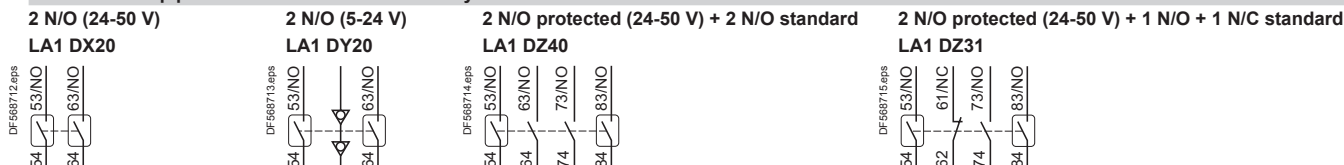
⁽¹⁾ Items in brackets: See "TeSys D contactors".

⁽²⁾ 1 N/O + 1 N/C make before break.

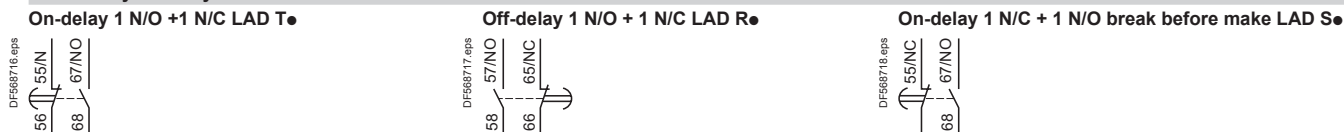
Instantaneous auxiliary contacts with terminal referencing conforming to standard EN 50012 (References: pages B9/10 and B9/11)



Dust and damp protected instantaneous auxiliary contacts

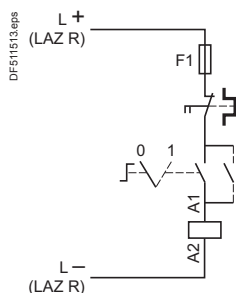


Time delay auxiliary contacts



Capacitive delayed opening devices for TeSys F contactors

LAZ R9●● + LC1 F



TeSys contactors

3-pole vacuum contactors and reversing contactors

TeSys V

Selection

Contactor size		LC1 V160	LC1 V320	LC1 V610
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For utilisation category AC-3

	A	160	320	610
Maximum operational current in AC-3				
Rated operational power P (standard power ratings of motors)	230 V kW	45	90	160
	400 V kW	75	160	300
	525 V kW	110	220	400
	690 V kW	150	280	560
	1000 V kW	200	400	800
	1500 V kW	280	600	930

For 3-phase motors conforming to CSA standards

Rated operational power P (standard power ratings of 3-phase CSA motors)	200 V hp	50	100	150
	240 V hp	60	125	200
	380 V hp	100	200	300
	480 V hp	125	250	400
	600 V hp	150	300	500
	800 V hp	200	400	700
	1000 V hp	250	500	1000
	1500 V hp	400	800	1300

For switching 3-phase capacitors

Rated operational power P	240 V kVAR	47	94	176
	480 V kVAR	95	190	356
	600 V kVAR	100	200	400
	1500 V kVAR	250	500	1000

For switching the primaries of 3-phase transformers (LV/LV)

Rated operational power P	208 V kVA	20	41	81
	240 V kVA	23	47	94
	480 V kVA	47	94	188
	600 V kVA	59	117	234

Environment characteristics

Contactor type			LC1 V160	LC1 V320	LC1 V610
Shock resistance (1/2 sine wave = 11 ms)	Contacts closed		10 gn	10 gn	10 gn
	Contacts open		10 gn	10 gn	10 gn
Vibration resistance	10...500 Hz		2 gn	2 gn	2 gn
Operating altitude	Above sea level	Maximum	m 3600	3600	3600
	Below sea level	Minimum	m 2500	4500	4500
Ambient air temperature around the device	Storage	°C	-40...+80	-40...+80	-40...+80
	Operation 0.8... 1.1 Uc	°C	-5...+55	-5...+55	-5...+55
	Permissible for operation at Uc	°C	-10...+75	-10...+75	-10...+75
Degree of protection	Conforming to IEC 60529		IP 00	IP 00	IP 00
Operating position			Any	Any	Any
Cabling	Cable c.s.a.	mm²	70	185	2 x 185
	Key for hex. screws	mm	Allen 4	20	20
	Tightening torque	N.m	14	39	39

Control circuit characteristics

Rated insulation voltage (Ui)	To earth	V	2000	2000	2000
Consumption	Inrush	VA	300	600	1700
	Sealed	VA	30	20	28
Permissible control circuit voltage			0.8...1.1 Uc	0.8...1.1 Uc	0.8...1.1 Uc
Closing time ⁽¹⁾		ms	18...22	24...32	24...32
Opening time ⁽¹⁾		ms	95...115	95...115	95...115

⁽¹⁾ The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

Main pole characteristics

Contactor type		LC1 V160	LC1 V320	LC1 V610	
Rated insulation voltage (Ui)	V	1500	1500	1500	
Rated impulse withstand voltage (Uimp)	kV	8	8	8	
Conforming to standards		EN 60947-4-1 - IEC 60947-4-1			
Approvals		CSA			
Conventional rated thermal current (Ith)	A	160	320	630	
Rated operational current (Ie)	$\theta \leq 40^\circ\text{C}$ AC-1	A	160	320	630
	$\theta \leq 55^\circ\text{C}$ AC-3	A	160	320	610
	$\theta \leq 55^\circ\text{C}$ AC-4	A	130	270	540
Electrical durability in millions of operating cycles (400 V at I max)	AC-1		1.2	1	1
	AC-3		1.6	1.5	1.5
	AC-4		0.18	0.15	0.12
Mechanical durability	In millions of operating cycles		5	2.5	2
Maximum operating rate in operating cycles per hour	Mechanical		1200	1200	1200
	AC-1		900	900	900
	AC-3		900	900	900
	AC-4		450	450	450
Maximum making capacity (I _{rms})	U _e = 1500 V To IEC 60947	A	1900	3800	7300
Maximum breaking capacity (I _{rms})	U _e = 1500 V To IEC 60947	A	1600	3200	6100
Maximum permissible current	For 1 s	A	2400	4500	9000
	For 2 s	A	2000	3750	7580
	For 10 s	A	1600	3200	6100
	For 30 s	A	960	1920	3600
Short-circuit protection at I _e in cat. AC-3 max.	aM fuse	A	160	400	630

Auxiliary contact characteristics

Rated insulation voltage (Ui)	V	690	
Conventional rated thermal current (Ith)	A	10	
Rated operational current (Ie)	AC-15, 230 V	A	0.78
	AC-15, 400 V	A	0.45
	AC-15, 500 V	A	0.35
	DC-13, 24 V	A	1.1
	DC-13, 110 V	A	0.24
	DC-13, 220 V	A	0.12
Cabling	Cable c.s.a.	mm ²	2.5
Short-circuit protection	gG fuse	A	10
Operating time ⁽¹⁾ (at 100 % of U _c)	"C"	ms	±5
	"O"	ms	±5

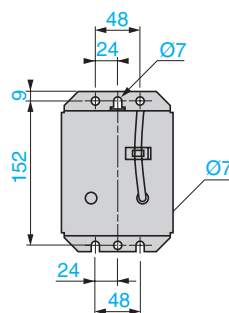
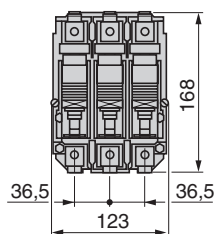
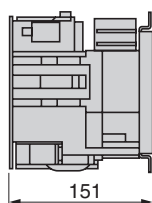
(1) Operating time in relation to the main contacts.

TeSys V

Dimensions, mounting

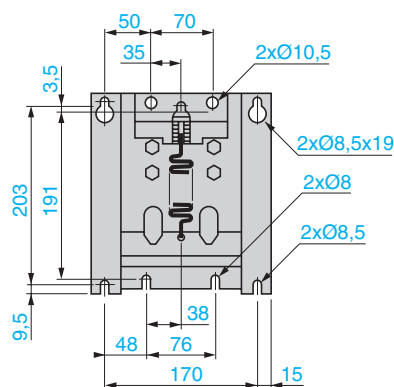
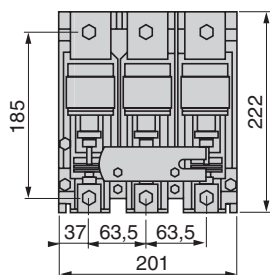
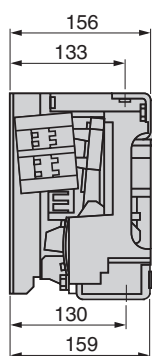
LC1 V160

500311.eps



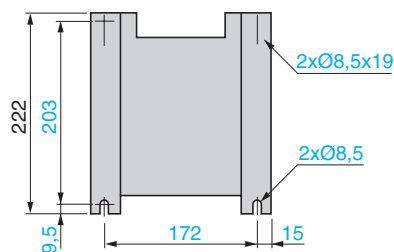
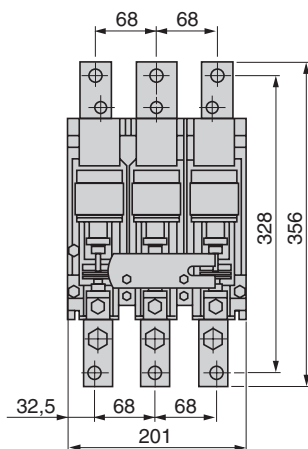
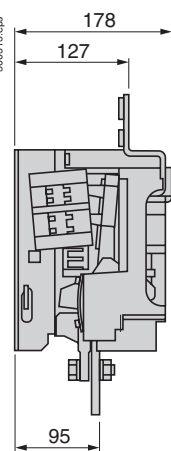
LC1 V320

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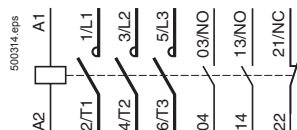
LC1 V610

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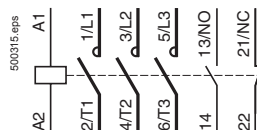


Schemes

LC1 V160

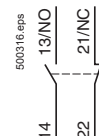


LC1 V320, V610

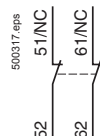


Auxiliary contact blocks

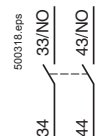
LA1 VN11 1 N/O & 1 N/C



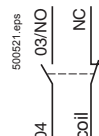
LA1 VN02 2 N/C



LA1 VN20 2 N/O



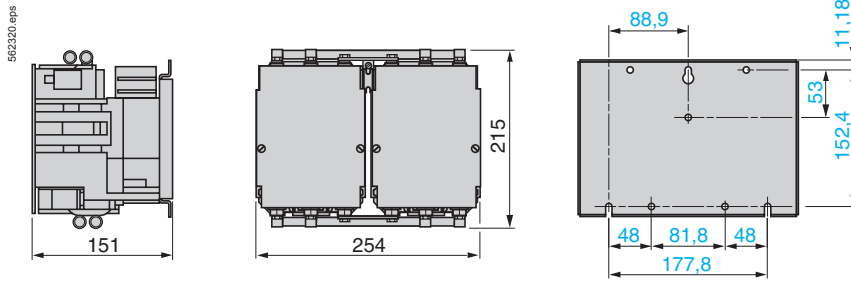
LA1 VN11X 1 N/O



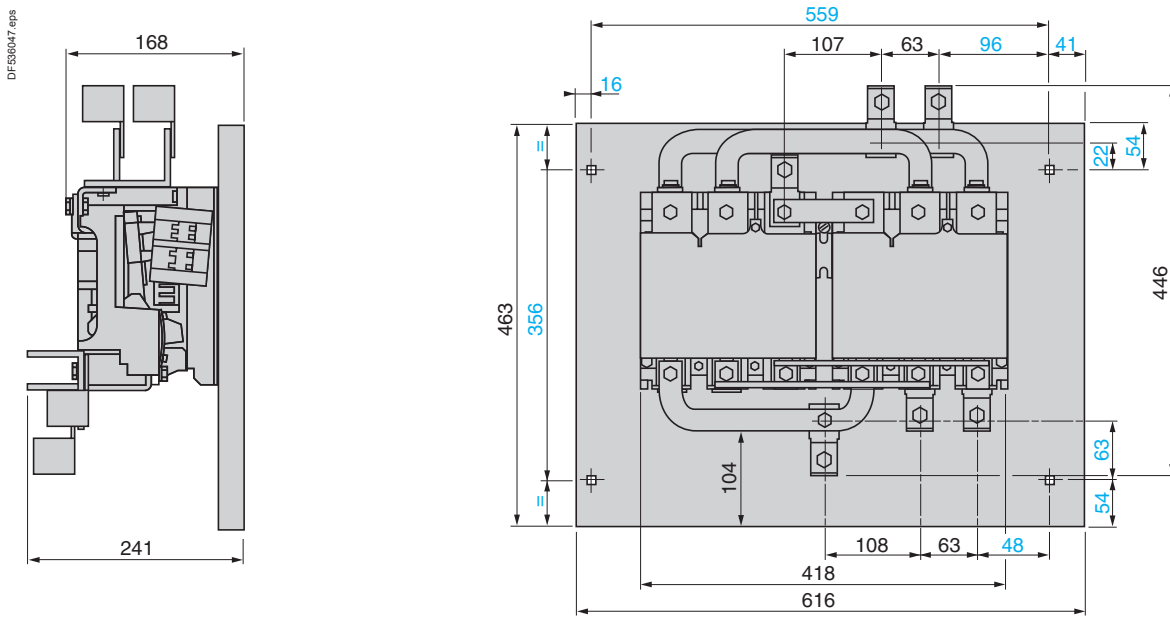
TeSys V

Dimensions, mounting

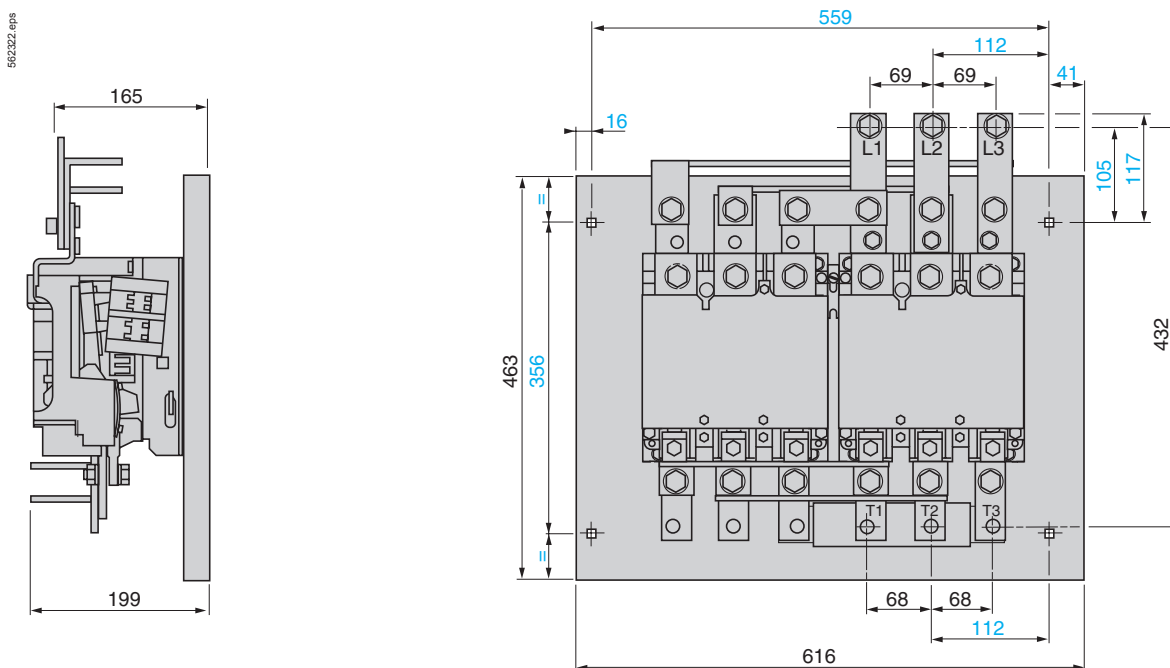
LA9 V974 + 2 x LC1V160



LC2 V320



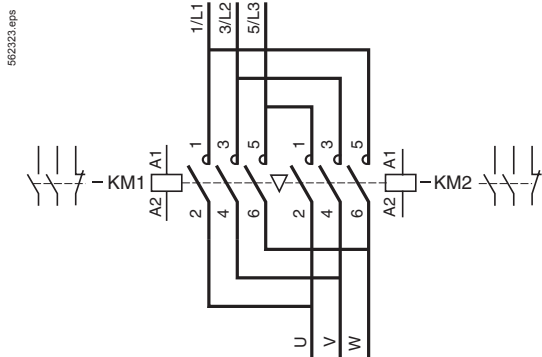
LC2 V610



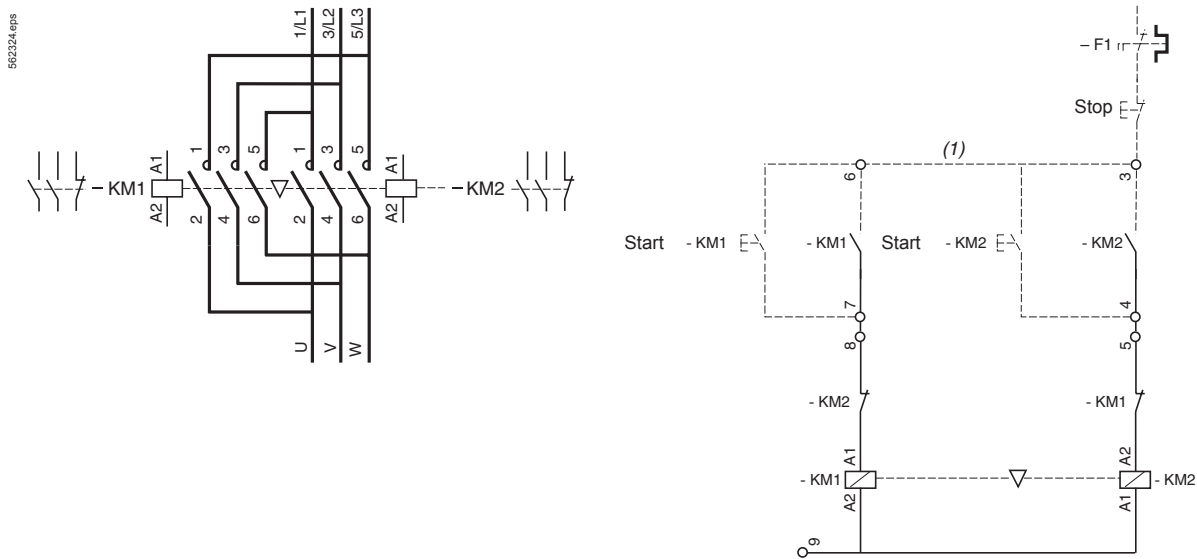
TeSys V

Schemes

LA9 V974 + 2 x LC1V160



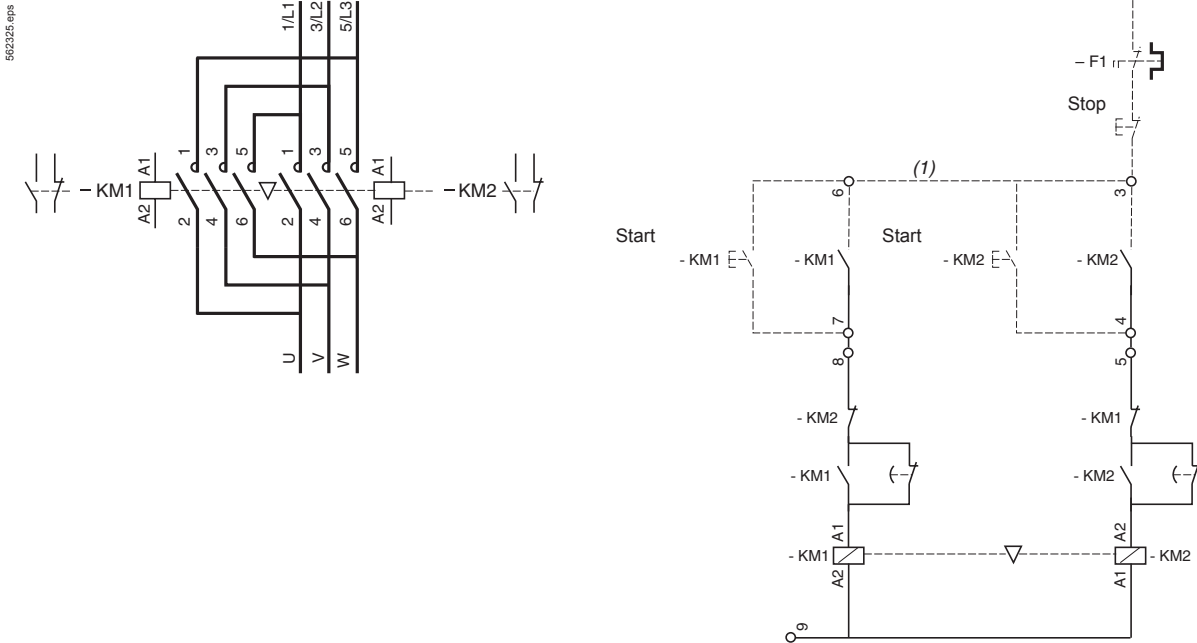
LC2 V320



(1) Dotted line indicates wiring to be installed by the customer.

TeSys V

Schemes
LC2 V610



(1) Dotted line indicates wiring to be installed by the customer.

TeSys F



LC1 FG150



LC1 FG265

Presentation

In an environment subject to severe mechanical shocks, unwanted closing of a contactor's poles and the serious consequences of this, is not permissible.

Shockproof contactors **LC1 FG150** to **FG630** are equipped with an auxiliary electromechanical device which ensures that the contactor is mechanically locked in the "open" position when it's main electromagnet is not energised.

If the contactor is subjected to mechanical impact, from back to front or from front to back, accidental closing of the poles is then impossible.

In addition, accidental opening of the poles (when the contactor is in the "on" position), is virtually impossible due to the significant pull-in force characteristic of these contactors.

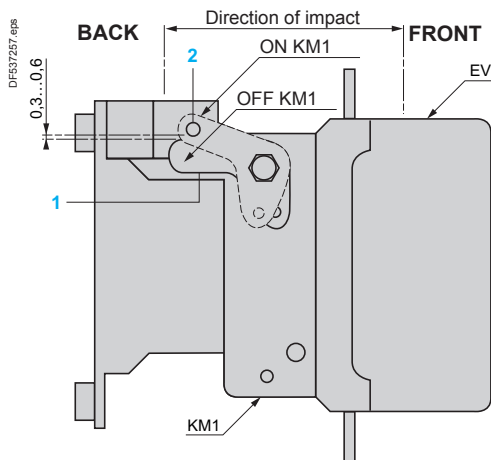
Applications

- **Marine:** on-board equipment, windlasses, capstans, winches, etc...
- **Military equipment :** land, sea, launching silos.
- **Heavy mechanical handling systems:** travelling cranes, cranes, gantries.
- **Conveying and handling:** lifts, hoists, conveyors.
- **Equipment for power stations.**
- **Distribution boards.**

Description of shockproof device

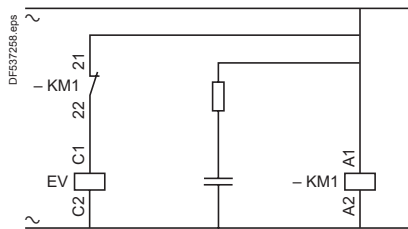
Shockproof contactors **LC1 FG●●●** are equipped with:

- a lever **1** that is rotated by the core of the contactor's electromagnet.
- an auxiliary electromagnet (EV) for the locking function.
- an RC circuit (Resistor-Capacitor) to limit overvoltage.



Operation

- In the 'off' position (contactor open and not energised) the core **2** of the electromagnet (EV) locks the lever **1** and therefore the contactor.
- The coils (KM1) and (EV) are energised simultaneously, the core **2** releases the lever **1** and allows the contactor to close.
- De-energisation of the locking electromagnet (EV) is achieved by an auxiliary contact within the contactor. The core **2** rests freely in lever **1**.
- On de-energisation of coil KM1, the moving contact drops out. Core **2**, under spring pressure, once again locks lever **1**.



TeSys contactors

3-pole shockproof contactors LC1 FG a.c. supply

According to the utilisation category and required electrical durability

TeSys F

Use in category AC-3 ($U_e \leq 440$ V)

Operational current and power ($\theta \leq 55$ °C)

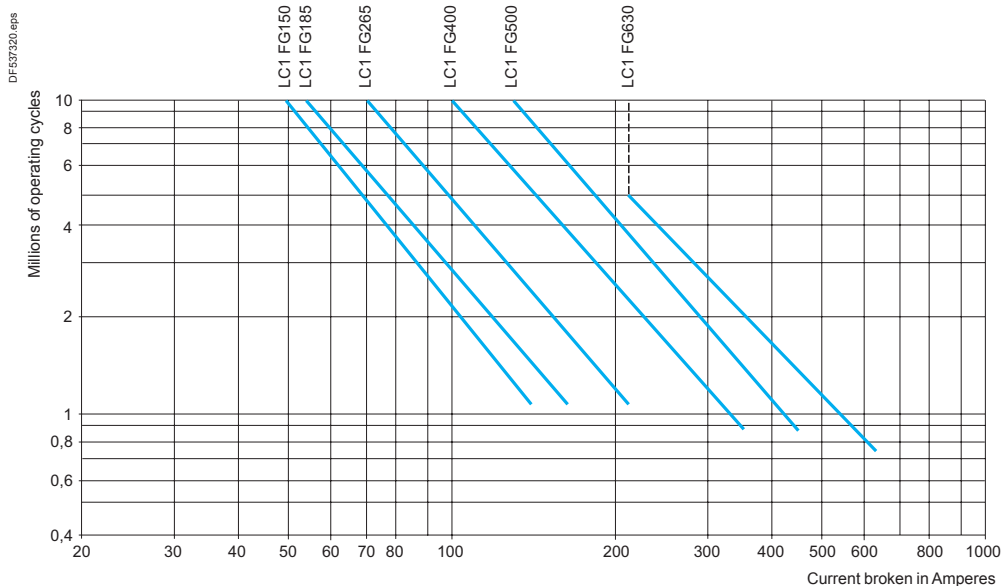
Contactors		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630	
Operational current	A	150	185	265	400	500	630	
Operational power Standard power ratings of motors)	220/230 V	kW	40	55	75	110	147	200
		hp	54	75	100	150	200	270
	380/400 V	kW	75	90	132	200	250	335
		hp	100	185	180	270	340	450
	415 V	kW	80	100	140	220	280	375
		hp	110	136	180	300	380	500
	440 V	kW	80	100	140	250	295	400
		hp	110	136	190	340	400	545
	500 V	kW	90	110	160	257	355	400
		hp	125	150	220	350	480	545
	660/690 V	kW	100	110	160	280	335	450
		hp	136	150	220	380	450	600
	1000 V	kW	65	100	147	185	335	450
		hp	85	136	200	250	450	610

Maximum operating rate (operating cycles/hour) ⁽¹⁾

On-load factor	Operational power	LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
≤ 85 %	P	750	750	750	500	500	500
≤ 85 %	0.5 P	2000	2000	2000	1200	1200	1200
≤ 25 %	P	1200	1200	1200	1200	1200	1200

(1) Depending on the operational power and the on-load factor ($\theta \leq 55$ °C).

Electrical durability in utilisation category AC-3 ($U_e \leq 440$ V)



Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.
The current broken (I_e) in category AC-3 is equal to the rated operational current of the motor.

Example:
Asynchronous motor with $P = 55$ kW - $U_e = 380$ V - $I_e = 105$ A
4 million operating cycles required.

The above selection curves show the contactor rating needed: **LC1 FG265**.

TeSys contactors

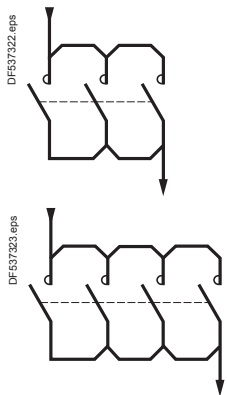
3-pole shockproof contactors LC1 FG a.c. supply

According to the utilisation category and required electrical durability

Use in category AC-1 ($U_e \leq 440$ V)									
Contactors				LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
Connection	Cable	C.s.a.	mm ²	120	150	240	–	–	–
	Bar	Number		–	–	–	2	2	2
		C.s.a.	mm		–	–	–	30 x 5	40 x 5
Maximum operating rate in operating cycles/hour				600	600	600	600	600	600
Operational current AC-1		≤ 40 °C	A	250	270	350	500	700	1000
		≤ 55 °C	A	220	240	300	430	580	850
		≤ 70 °C ⁽¹⁾	A	170	180	250	340	500	700

(1) Only for operation with coil supplied at U_c .

Increase in operational current by parallel connection of poles



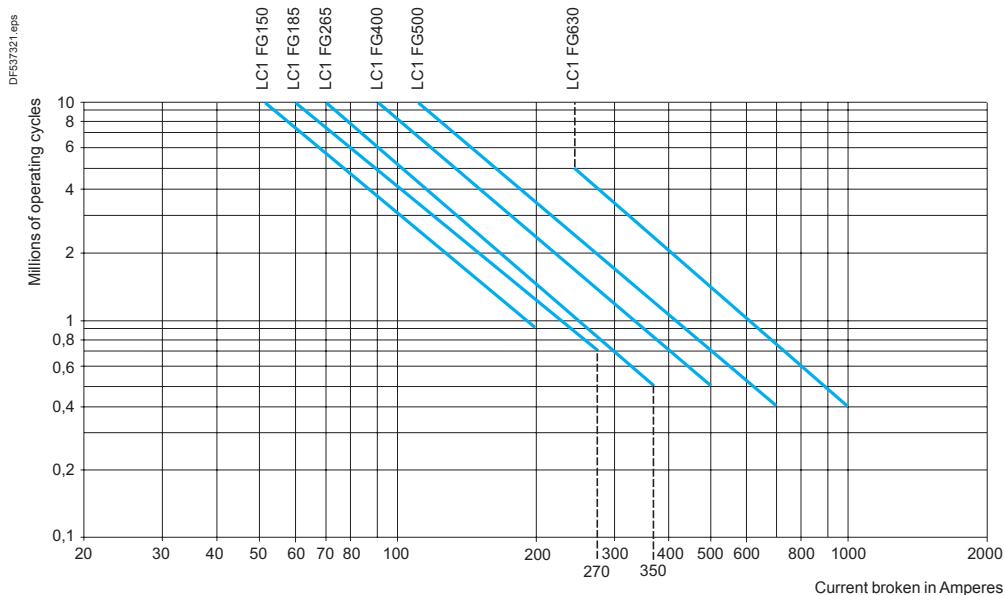
Apply the following multiplying factors to the current values given above.

The factors take into account the often unbalanced current distribution between the 2 poles:

- 2 poles in parallel: $K = 1.6$
- 3 poles in parallel: $K = 2.25$
- 4 poles in parallel: $K = 2.8$.

Recommended connection scheme to equalise the currents in each pole (see opposite).

Electrical durability in utilisation category AC-1 ($U_e \leq 440$ V)



Example:

Control of resistive circuits ($\cos \varphi \geq 0.95$).

The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.

$U_e = 220$ V - $I_c = I_e = 300$ A - $\theta = 40$ °C.

1 million operating cycles required.

The above selection curves show the contactor rating needed: **LC1 FG400**.

TeSys contactors

3-pole shockproof contactors LC1 FG a.c. supply

According to the utilisation category and required electrical durability

Thermal limits in utilisation categories AC-2/AC-4

Contactors		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
Thermal limit zone	Operating cycles/hour ⁽¹⁾ and on-load factor	Maximum current broken according to the duty requirements (thermal limit, ambient temperature ≤ 55 °C)					
A	From 150 and 15 % to 300 and 10 %	310	380	560	780	1100	1400
B	From 150 and 20 % to 600 and 10 %	280	350	500	700	950	1250
C	From 150 and 30 % to 1200 and 10 %	240	300	400	600	750	950
D	From 150 and 55 % to 2400 and 10 %	190	240	320	450	600	720
E	From 150 and 85 % to 3600 and 10 %	145	170	230	350	500	660

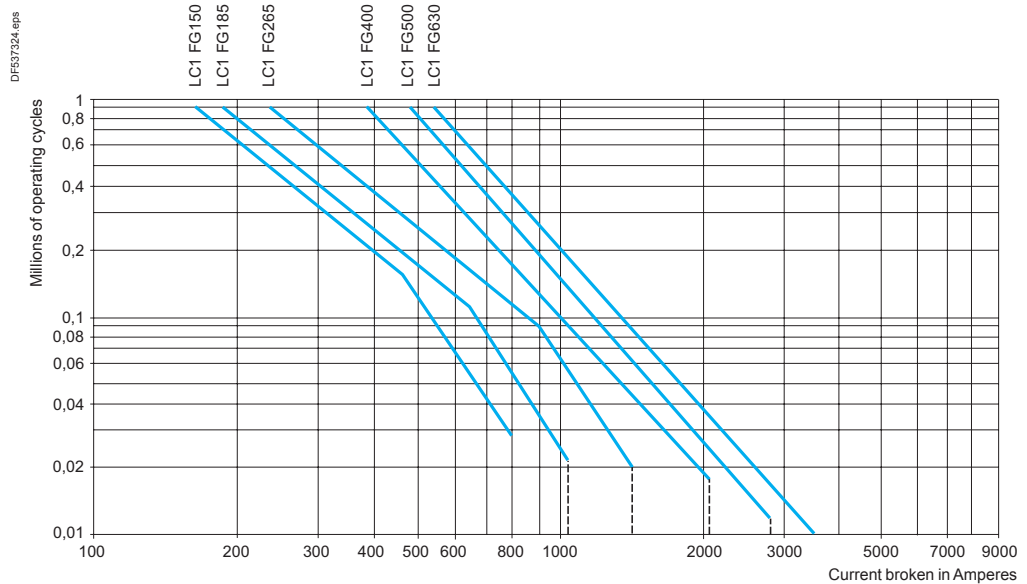
(1) Do not exceed the maximum limit for the mechanical operating cycles.

Counter current braking (plugging)

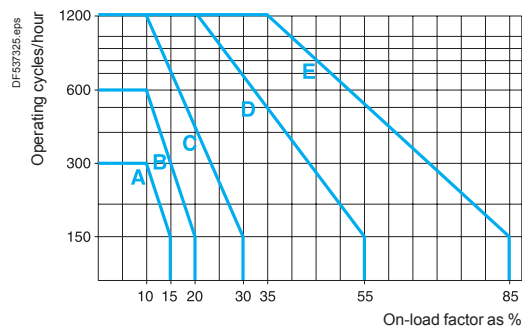
The current varies from the maximum plug-braking current to the rated motor current. The current made must be compatible with the making and breaking capacities of the contactor.

In most cases, breaking occurs at a current value close to the locked rotor current and contactor selection can therefore be made using the criteria for utilisation categories AC-2 and AC-4.

Electrical durability in utilisation categories AC-2/AC-4 (U_e ≤ 440 V)



Example: Contactor selection



For an on-load factor of 10 % at 400 operating cycles per hour, the curve on the left indicates zone B. If the current broken is 600 A, the above table leads to selection of an **LC1 FG400** contactor. Referring to the electrical durability curves, it can be seen that the contactor will be able to perform 350 000 operating cycles. Where a higher value of electrical durability is required, 1 million operating cycles for example, an **LC1 FG630** contactor would be recommended.

TeSys contactors

For switching 3-phase capacitor banks, used for power factor correction
Switching the primaries of 3-phase transformers (LV/LV)

TeSys F

Switching 3-phase capacitors

Capacitors, together with the circuits to which they are connected, form oscillatory circuits which can, at the moment of switch-on, give rise to high transient currents (> 180 I_n) at high frequencies (1 to 15 kHz).
The contactors are used for direct switching. The values of peak current at switch-on must not exceed the values indicated below.

An inductor or an early break resistor may be inserted in each of the three phases supplying the capacitors to reduce the peak current, if necessary. This must be done when switching multiple step capacitor banks.

Inductance values are determined according to the selected operating temperature: please refer to our "Motor starter solutions - Control and protection components" catalogue.

In addition, in accordance with standards IEC 60070, NF C 54 100, VDE 0560, the switching contactor must be able to withstand a continuous current of 1.43 times the rated current of the capacitor bank step being switched. The rated operational powers given in table the below take this overload into account.

Short-circuit protection is normally provided by g1 fuses rated at 1.3 to 1.6 I_n.

Maximum operational power of contactors

Maximum operating rate: 120 operating cycles/hour.
Electrical durability at maximum load: 100 000 operations.
With choke inductors connected, where necessary.

Operational power at 50/60 Hz						Maximum peak current	Contactor to be used
θ ≤ 40 °C			θ ≤ 55 °C				
220 V	400 V	600 V	220 V	400 V	600 V	A	
240 V	440 V	660 V	240 V	440 V	660 V		
kvar	kvar	kvar	kvar	kvar	kvar		
60	100	135	40	85	90	3200	LC1FG150
70	125	160	50	100	100	3500	LC1FG185
90	160	225	75	125	125	5000	LC1FG265
125	220	300	100	160	200	8000	LC1FG400
180	300	400	125	220	300	10 000	LC1FG500
250	400	600	190	350	500	12 000	LC1FG630

Switching the primaries of 3-phase transformers (LV/LV)

When a transformer is switched on, there is generally an initial current surge which can reach 20 to 40 times the rated current for the power ratings shown below. This current reaches its peak value almost instantaneously and then decreases in a largely exponential manner, quickly dropping back down to its steady state value.

Contactor selection

Operating rate less than 120 operating cycles/hour.
Maximum operational voltages: 1000 V 50/60 Hz.
The value of the peak magnetising current must be lower than the values indicated below.
Maximum ambient temperature: 55 °C.

Contactor		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630	
Maximum permissible current peak at switch-on	A	1700	2800	3500	5500	6800	9000	
Maximum operational power ⁽¹⁾	220 V	kVA	25	40	50	75	100	140
	380 V	kVA	50	75	90	130	170	225
	415/440 V	kVA	55	80	100	140	190	250
	500 V	kVA	65	95	110	170	225	280
	660 V	kVA	80	120	140	200	270	315
	1000 V	kVA	100	150	200	250	375	470

(1) Maximum operational power corresponding to a current peak at switch-on of 30 I_n.

High power contactors

TeSys contactors

3-pole shockproof contactors LC1 FG

d.c. supply

Selection guide for utilisation categories DC-1 to DC-5

TeSys F

Use in category DC-1 (resistive loads; time constant L/R ≤ 1 ms)

Rated operational current I _e							
Operational voltage (U _e)	Number of poles to be wired in series	Contactors					
		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
V		A	A	A	A	A	A
24	1	160	220	300	400	600	850
	2	160	220	300	400	600	850
	3	160	220	300	400	600	850
	4	160	220	300	400	600	850
48/75	1	160	220	300	400	600	850
	2	160	220	300	400	600	850
	3	160	220	300	400	600	850
	4	160	220	300	400	600	850
125	1	–	–	–	–	–	–
	2	130	170	300	400	550	850
	3	130	170	300	400	600	850
	4	130	170	300	400	600	850
225	1	–	–	–	–	–	–
	2	100	150	250	350	450	700
	3	130	170	300	400	600	850
	4	130	170	300	400	600	850
300	3	100	150	250	350	450	700
	4	130	170	300	400	600	850
460	4	100	150	250	350	450	700

Use in category DC-2 to DC-5 (inductive loads; time constant L/R ≤ 15 ms)

Rated operational current I _e							
Operational voltage (U _e)	Number of poles to be wired in series	Contactors					
		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
V		A	A	A	A	A	A
24	1	140	180	280	350	550	850
	2	140	180	280	350	550	850
	3	140	180	280	350	550	850
	4	140	180	280	350	550	850
48/75	1	140	180	280	350	550	850
	2	140	180	280	350	550	850
	3	140	180	280	350	550	850
	4	140	180	280	350	550	850
125	1	–	–	–	–	–	–
	2	100	140	250	350	550	850
	3	120	160	280	350	550	850
	4	120	160	280	350	550	850
225	1	–	–	–	–	–	–
	2	80	100	200	280	450	700
	3	100	140	250	350	550	850
	4	120	160	280	350	550	850
300	3	80	100	200	280	450	700
	4	120	160	280	350	550	850
460	4	80	100	200	280	450	700

TeSys contactors

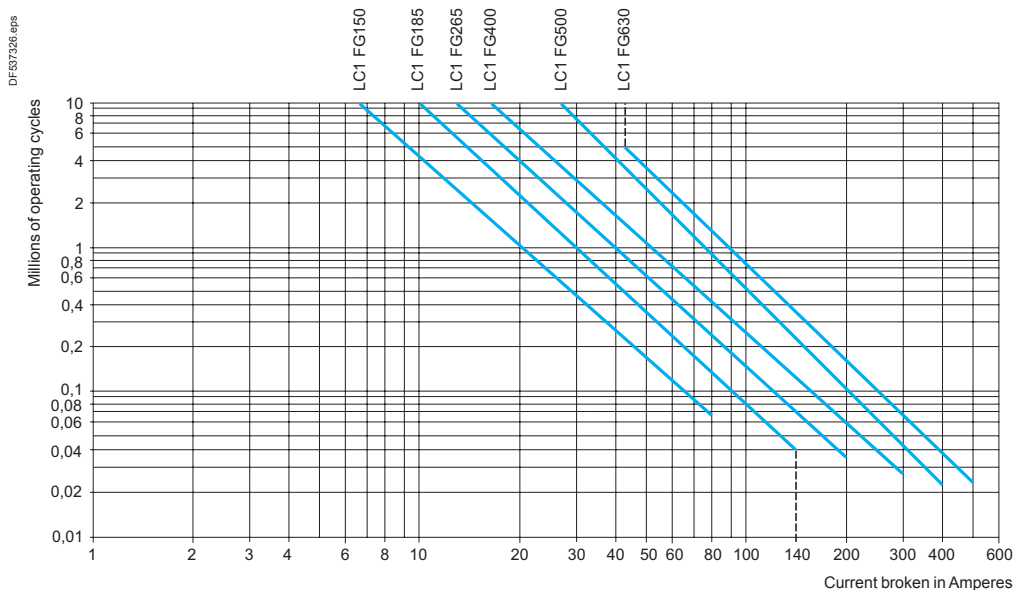
3-pole shockproof contactors LC1 FG

d.c. supply

Selection guide for utilisation categories DC-1 to DC-5

Electrical durability

Utilisation categories DC-1 to DC-5



Determining the electrical durability

The electrical durability can be read directly from the curve above, having previously calculated the power broken P_c . The following table gives, for each utilisation category, the value of P_c according to the operational current I_e and the operational voltage U_e .

Utilisation categories	P_c (Power broken)
DC-1 Non-inductive loads	$P_c = U_e \times I_e$
DC-2 Shunt motors, breaking whilst running	$P_c = 0.1 U_e \times I_e$
DC-3 Shunt motors, reversing	$P_c = U_e \times 2.5 I_e$
DC-4 Series wound motors, breaking whilst running	$P_c = 0.3 U_e \times I_e$
DC-5 Series wound motors, reversing	$P_c = U_e \times 2.5 I_e$
Counter current braking (plugging)	$P_c = 1.5 U_e \times 1.5 I_e$

Example:

Series wound motor, breaking whilst motor running, category DC-4.

$P = 50 \text{ kW}$, $U_e = 200 \text{ V}$, $I_e = 250 \text{ A}$.

Select contactor **LC1 FG265** with 3 poles in series.

The power broken is: $P_c = 0.3 U_e \times I_e = 0.3 \times 200 \times 250 = 15 \text{ kW}$.

The electrical durability read from the curve is 8 million operating cycles.

Maximum operating rate

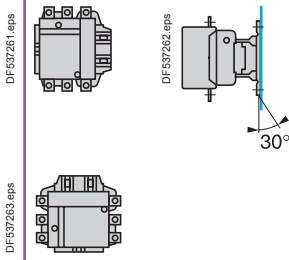
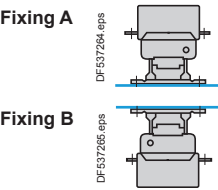
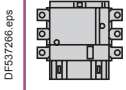
The following operating rate used at I_e must not be exceeded: 120 operating cycles/hour.

Use of poles in parallel

The electrical durability is equal to the number of operating cycles performed by a pole, multiplied by the number of poles in parallel, multiplied by a coefficient of 0.70.

High power contactors

TeSys F

Environment			LC1 FG150	LC1 FG185
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	1000	
	Conforming to VDE 0110 gr C	V	1500	
Rated impulse withstand voltage (Uimp)	Coil not connected to the power circuit	kV	8	
Conforming to standards			EN 60947-1, EN 60947-4-1, IEC 60947-1, IEC 60947-4-1	
Product certifications			N.A.T.O.	
Degree of protection	Conforming to IEC 60529		IP 20 front face with shrouds LA9 F	
	Conforming to VDE 0106		Front face protected against direct finger contact with shrouds LA9 F	
Protective treatment	Standard version		"TH"	
Ambient air temperature around the device	Storage	°C	-60...+80	
	Operation	°C	-5...+55	
	Permissible at Uc ⁽¹⁾	°C	-40...+70	
Maximum operating altitude	Without derating	m	3000	
Operating positions	Without derating			
				
	With derating ⁽³⁾			
Shock resistance ⁽²⁾			12 g, 50 ms on the three axes: X, Y, Z	
			15 g, 11 ms on the three axes: X, Y, Z	

(1) In these conditions, it is recommended that coils LX9F be used for contactor sizes FG150 to FG265.

(2) In the least favourable direction, without change of contact state (coil at Uc).

(3) Horizontal fixing:

- the operational current AC-1 is equivalent to 80 % of the value indicated in the catalogue
- breaking and making capacities not guaranteed
- mechanical and electrical durabilities not guaranteed.

Derating of pull-in and drop-out voltage

Contactors LC1		FG150	FG185	FG265	FG400	FG500	FG630
Fixing A	Pull-in	75 %	75 %	75 %	80 %	80 %	80 %
	Drop-out	105 %	105 %	105 %	110 %	110 %	110 %
Fixing B	Pull-in	115 %	115 %	115 %	120 %	120 %	120 %
	Drop-out	90 %	90 %	90 %	95 %	95 %	95 %

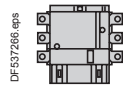
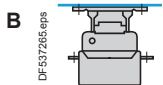
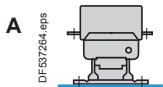
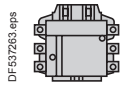
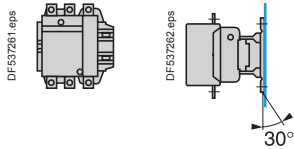
TeSys contactors

3-pole shockproof contactors LC1 FG

Control circuit: a.c.

TeSys F

LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
1000			
1500			
8			
EN 60947-1, EN 60947-4-1, IEC 60947-1, IEC 60947-4-1			
N.A.T.O.			
IP 20 front face with shrouds LA9 F			
Front face protected against direct finger contact with shrouds LA9 F			
"TH"			
-60...+80			
-5...+55			
-40...+70			
3000			



12 g, 50 ms on the three axes: X, Y, Z

15 g, 11 ms on the three axes: X, Y, Z

High power contactors

TeSys F

Pole characteristics				
Contactor type			LC1 FG150	LC1 FG185
Number of poles			3	3
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, θ ≤ 70 °C	A	150/150	185/180
	In AC-1, θ ≤ 55 °C	A	220/170	240/180
Rated operational voltage (Ue)	Up to	V	1000	1000
Frequency limits	Of the operational current ⁽¹⁾	Hz	25 to 200	25 to 200
Conventional thermal current	θ ≤ 40	°C	250	275
Rated making capacity	I rms conforming to IEC 60947-4-1	A	Making current: 10 x I in AC-3	
Rated breaking capacity	I rms conforming to IEC 60947-4-1	A	Making and breaking current: 8 x I in cat. AC-3	
Permissible short time rating No current flowing for preceding 60 minutes with θ ≤ 40 °C	For 1.5 or 10 s	A	1200	1500
	For 30 s	A	700	920
	For 1 mn	A	600	740
	For 3 mn	A	450	500
	For 10 mn	A	350	400
Fuse protection against short-circuits (U ≤ 440 V)	Motor circuit (type aM)	A	160	200
	With thermal overload relay (type gG)	A	200	315
	gG fuses	A	250	315
Average impedance per pole	At Ith and 50 Hz	mΩ	0.35	0.33
Power dissipation per pole for the above operational currents	AC-3	W	8	12
	AC-1	W	22	25
Cabling Minimum c.s.a.	Bar	No. of bars	2	2
		Bar	mm	25 x 3
		Cable with lug	mm²	120
		Cable with connector	mm²	120
		Bolt diameter	mm	Ø8
Tightening torque	Power circuit connections	N.m	18	18

(1) Sine wave without interference. Above these values, please consult your Regional Sales Office.

TeSys contactors

3-pole shockproof contactors LC1 FG

Control circuit: a.c.

TeSys F

LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
3	3	3	3
265/250	400/340	500/500	630/630
300/250	430/340	580/500	850/700
1000	1000	1000	1000
25 to 200	25 to 200	25 to 200	25 to 200
350	500	700	1000
Making current: 10 x I in AC-3			
Making and breaking current: 8 x I in AC-3			
2200	3600	4200	5050
1230	2400	3200	4400
950	1700	2400	3400
620	1200	1500	2200
480	1000	1200	1600
315	400	500	630
500	630	800	800
400	500	800	1000
0.3	0.26	0.18	0.12
21	42	45	48
37	65	88	120
2	2	2	2
32 x 4	30 x 5	40 x 5	60 x 5
240	2 x 150	2 x 240	–
240	–	–	–
Ø10	Ø10	Ø10	Ø12
35	35	35	58

Control circuit characteristics with LX1 coil					LC1 FG150	LC1 FG185
Contactor type					V	
Rated control circuit voltage (Uc)	50 or 60 Hz				V	48...440
Control voltage limits (θ ≤ 55 °C)	50 or 60 Hz coils	Operation				0.85...1.1 Uc
		Drop-out				0.35...0.55 Uc
	40...400 Hz coils	Operation				–
		Drop-out				–
Average consumption at 20 °C and at Uc	~ 50 Hz	Inrush	50 Hz coil	VA	550	805
			40...400 Hz coil	VA	–	–
			Cos φ		0.3	0.3
		Sealed	50 Hz coil	VA	45	55
			40...400 Hz coil	VA	–	–
			Cos φ		0.3	0.3
	~ 60 Hz	Inrush	60 Hz coil	VA	660	970
			40...400 Hz coil	VA	–	–
			Cos φ		0.3	0.3
		Sealed	60 Hz coil	VA	55	66
			40...400 Hz coil	VA	–	–
			Cos φ		0.3	0.3
Heat dissipation				W	12...16	18...24
Operating time ⁽¹⁾	Closing "C"		ms	23...35	20...35	
	Opening "O"		ms	5...15	7...15	
Mechanical durability at Uc	In millions of operating cycles			10	10	
Maximum operating rate at ambient temperature ≤ 55 °C	In operating cycles per hour			2400	2400	
Cabling Min/max c.s.a.	Flexible cable without cable end	1 or 2 conductors	mm ²	1/4	1/4	
		1 conductor	mm ²	1/4	1/4	
	Flexible cable with cable end	1 conductor	mm ²	1/2.5	1/2.5	
		2 conductors	mm ²	1/2.5	1/2.5	
Solid cable without cable end	1 or 2 conductors	mm ²	1/4	1/4		
	1 or 2 conductors	mm ²	1/4	1/4		
Tightening torque				N.m	1.2	1.2

Characteristics of the locking electromagnet (shockproof device)					LC1 FG150	LC1 FG185	
Contactor type					V		
Control circuit voltage 50/60 Hz					V	48...440	48...440
Inrush consumption					VA	100	100
Maximum energisation time at Uc					ms	20	20
Maximum operating rate		In operating cycles per hour			2400	2400	
Mechanical durability at Uc		In millions of operating cycles			1 x 10 ⁶	1 x 10 ⁶	

⁽¹⁾ The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles.
The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

TeSys contactors

3-pole shockproof contactors LC1 FG

Control circuit: a.c.

TeSys F

LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
48...440	110...440	110...440	110...440
-	-	-	-
-	-	-	-
0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc
0.35...0.55 Uc	0.3...0.5 Uc	0.3...0.5 Uc	0.25...0.5 Uc
-	-	-	-
650	1075	1100	1650
0.9	0.9	0.9	0.9
-	-	-	-
10	15	18	22
0.9	0.9	0.9	0.9
-	-	-	-
650	1075	1100	1650
0.9	0.9	0.9	0.9
-	-	-	-
10	15	18	22
0.9	0.9	0.9	0.9
8	14	18	20
40...65	40...75	40...75	40...80
100...170	100...170	100...170	100...200
10	10	10	10
2400	2400	2400	1200
1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4
1/2.5	1/2.5	1/2.5	1/2.5
1/4	1/4	1/4	1/4
1.2	1.2	1.2	1.2

LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
48...440	110...440	110...440	110...440
100	100	100	100
20	20	20	20
2400	2400	2400	1200
1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶

TeSys contactors

Auxiliary contact blocks

for 3-pole shockproof contactors LC1 FG

TeSys F

Environment				
Contact block type		LAD N	LAD T and LAD S	LAD R
Conforming to standards		IEC 60947-5-1, NF C 63-140, VDE 0660, BS 4794, EN 60947-5-1		
Product certifications		UL, CSA		
Protective treatment	Conforming to IEC 60068	"TH"		
Degree of protection	Conforming to VDE 0106	Protection against direct finger contact IP2X		
Ambient air temperature around the device	Storage	°C	-60...+80	
	Operation	°C	-5...+60	
	Permissible for operation at U _c	°C	-40...+70	
Maximum operating altitude	Without derating	m	3000	
Cabling	Phillips n° 2 and Ø6 mm. Flexible or solid cable with or without cable end	mm ²	Min: 1 x 1; max: 2 x 2.5	

Instantaneous and time delay contact characteristics									
Contact block type		LAD N	LAD T and LAD S	LAD R					
Number of contacts		1 or 4	2	2					
Rated operational voltage (U _e)	Up to	V	660						
Rated insulation voltage (U _i)	Conforming to IEC 60947-5-1	V	690						
	Conforming to UL, CSA	V	600						
Conventional thermal current (I _{th})	For ambient temperature ≤ 60 °C	A	10						
Frequency of the operational current		Hz	25...400						
Minimum switching capacity	U min	V	17						
	I min	mA	5						
Short-circuit protection	Conforming to IEC 60947-5-1 and VDE 0660. gG fuse	A	10						
Rated making capacity	Conforming to IEC 60947-5-1, I rms	A	~ 140; ∞ 250						
Short-time rating	Permissible for	1 s	A	100					
		500 ms	A	120					
		100 ms	A	140					
Insulation resistance		MΩ	> 10						
Non-overlap time	Guaranteed between N/C and N/O contacts	ms	1.5 (on energisation and on de-energisation)						
Time delay (LAD T, R and S contact blocks) Accuracy only valid for setting range indicated on the front face	Ambient air temperature for operation	°C	-	-40...+70	-40...+70				
	Repeat accuracy		-	±2 %	±2 %				
	Drift up to 0.5 million operating cycles		-	+15 %	+15 %				
	Drift depending on ambient air temperature		-	0.25 % per °C	0.25 % per °C				
Mechanical durability	In millions of operating cycles		30	5	5				
Rated operational power of contacts Conforming to IEC 60947-5-1		V	24	48	110/127	220/230	380/400	440	600
		VA	150	300	400	480	500	500	500
		VA	80	170	250	290	320	320	320
		VA	30	65	90	120	130	130	130
		VA	1200	2600	7000	13 000	15 000	13 000	9000

TeSys F

Environment

Module type		LAD T (On-delay)	LAD R (Off-delay)
Conforming to standards		IEC 60255-5	
Product certifications		UL, CSA	
Protective treatment	Conforming to IEC 60068	"TH"	
Degree of protection	Conforming to VDE 0106	Protection against direct finger contact IP2X	
Ambient air temperature around the device	Storage	°C	-40...+80
	Operation	°C	-25...+55
	For operation at U _c	°C	-25...+70
Rated insulation voltage (U _i)	Conforming to IEC 60947-1	V	250
Cabling	Phillips n° 2 and Ø6 mm. Flexible or solid cable with or without cable end	mm ²	Min: 1 x 1; max: 2 x 2.5

Control circuit characteristics

Module type		LAD T (On-delay)	LAD R (Off-delay)
Built-in protection	Of the input	By varistor	By varistor
	Contactor coil suppression	By varistor	By bidirectional peak limiting diode
Rated control circuit voltage (U _c)		V	~ or ~ 24...250
Permissible variation			0.8...1.1 U _c
Control type		By mechanical contact only	By mechanical contact only connecting cable < 10 m

Time delay characteristics

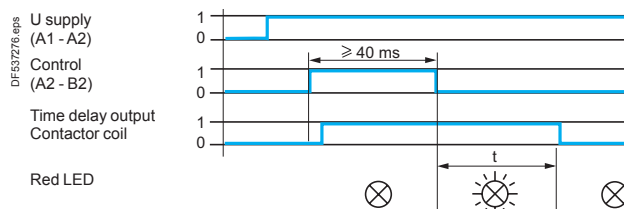
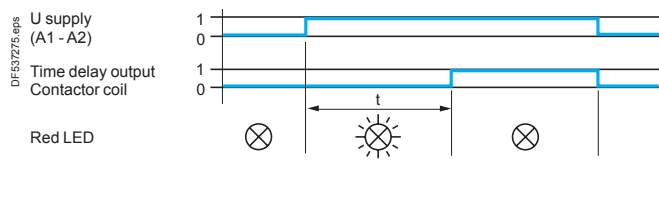
Module type		LAD T (On-delay)	LAD R (Off-delay)
Timing ranges		s	0.1...2 ; 1.5...30 ; 25...500
Repeat accuracy	0...40 °C		±3 % (10 ms minimum)
Reset time	During time delay period	ms	150
	After time delay period	ms	50
Immunity to microbreaks	During time delay period	ms	10
	After time delay period	ms	2
Minimum impulse duration		ms	–
Time delay signalling	By LED		Illuminates during time delay period
			Illuminates during time delay period

Switching characteristics (solid state type)

Module type		LAD T (On-delay)	LAD R (Off-delay)
Maximum power dissipated		W	2
Leakage current		mA	< 5
Residual voltage		V	3.3
Overvoltage protection			3 kV; 0.5 joule
Electrical durability	In millions of operating cycles		30

Operating diagrams

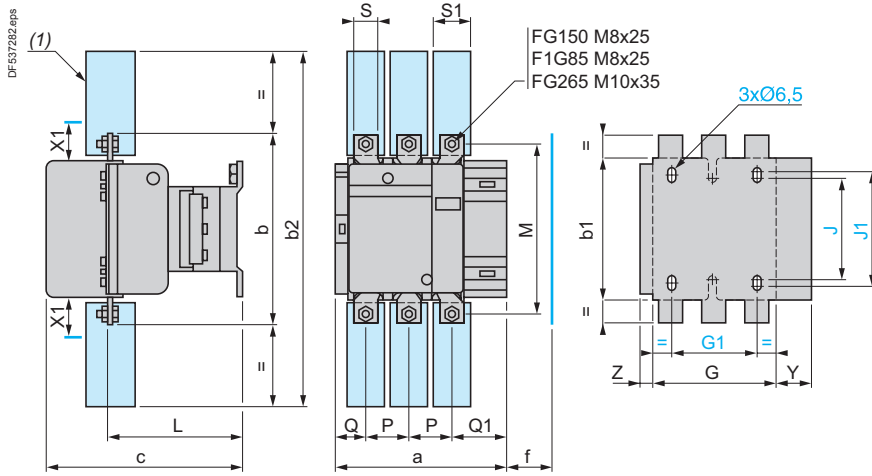
Electronic On-delay timer LAD T Electronic Off-delay timer LAD R



TeSys F

Dimensions

LC1 FG150, FG185 and FG265



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

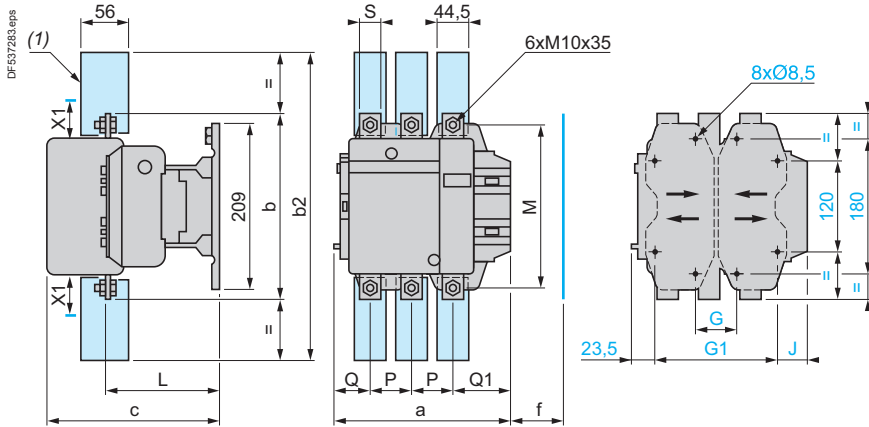
LC1	200...500 V	600...1000 V
FG150	10	15
FG185	10	15
FG265	10	15

(1) Power terminal protection shroud (see page B9/14).

LC1	a	b	b1	b2	c	f	G	G1	J	J1	L	M	P	Q	Q1	S	S1	Y	Z
FG150	181	170	137	301	180	131	106	80	106	120	116	150	40	26	57.5	20	34	44	13.5
FG185	183.5	174	137	305	190	130	111	80	106	120	122.5	154	40	29	59.5	20	34	44	13.5
FG265	217.5	203	145	375	222	147	142	96	106	120	150	178	48	39	66.5	25	44.5	38	21.5

f = minimum distance required for coil removal.

LC1 FG400 and FG500



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	600...1000 V
FG400	15	20
FG500	15	20

(1) Power terminal protection shroud (see page B9/14).

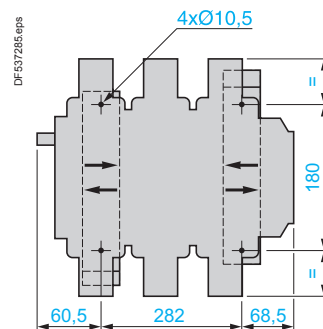
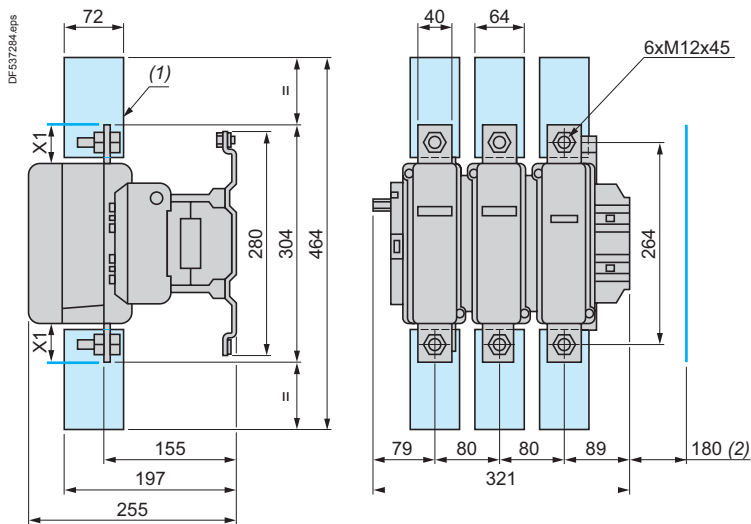
LC1	a	b	b2	c	f	G	G min.	G max.	G1 supplied	G1 min.	G1 max.	J	L	M	P	Q	Q1	S
FG400	237	206	375	234	146	80	66	102	223	156	192	19.5	160	181	48	75	74	25
FG500	257	238	400	247	150	80	66	120	223	156	210	39.5	181	208	55	78	77	30

f = minimum distance required for coil removal.

TeSys F

Dimensions

LC1 FG630



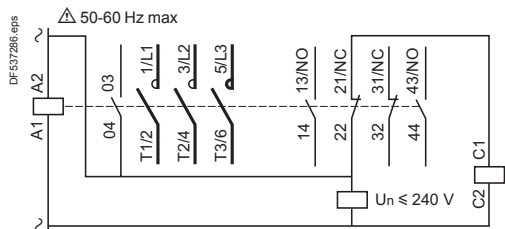
X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

	200...500 V	690...1000 V
LC1		
FG630	20	30

- (1) Power terminal protection shroud (see page B9/14).
- (2) Minimum distance required for coil removal.

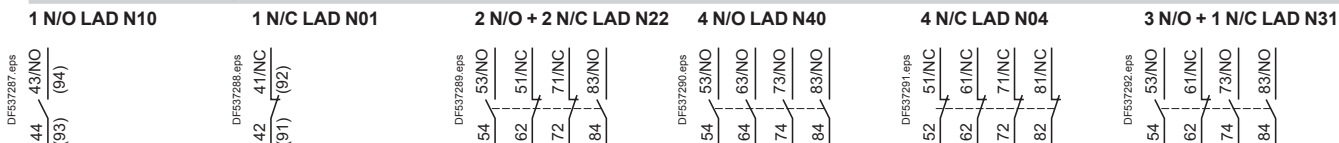
Schemes

Contactors LC1-FG150 to FG630



Add-on blocks

Instantaneous auxiliary contacts

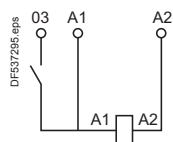


Time delay auxiliary contacts



Coils ~

LX1 FF, FG, FH, FJ, FK and FL



TeSys contactors

Magnetic latching contactors

TeSys F

Magnetic latching contactors of both block and bar mounted types are fitted with a special electromagnet which enables them to remain in the "On" position when the coil is no longer energised.

Applications

The special properties of magnetic latching contactors make them suitable for a large number of applications.

Properties

- Retention of the sequence memory in automatic control equipment in the event of loss of control voltage.
- Energy saving, since the source of supply to the coil does not need to supply current when the contactor is latched in the closed state.
- Change of state from "Closed" to "Open" by current signal through the coil.
- Unaffected by mains interference.
- Utilisation of contactors beyond their breaking capacity, as operations are performed off-load.
- Contactors are silent in the latched position.

Applications

- Refineries, power stations, excitation circuits.
 - Contactors remaining in the closed state for long periods.
- Examples: refineries, power supplies, low voltage distribution.
- Selective opening control.
 - No unwanted opening and closing of the main power poles.
 - Current carrying at voltages up to 1000 Volts.

Operation of the electromagnet

CR1 F block contactors

CR1 F magnetic latching contactors are fitted with a double coil with 3 terminals comprising a latching winding and an unlatching winding. The 2 windings have a common point which can necessitate special wiring precautions when the latching supply is separate from the unlatching supply.

The power supplies may be a.c. or d.c. For d.c. operation, the polarities indicated must be complied with.

Operating precautions:

- the 2 windings must not be supplied simultaneously
- a winding must not be supplied continuously
- supply to the coils must be via pulsed contacts.

Manual opening:

if the control voltage is not present, the contactor can be unlatched manually.

CR1 B bar mounted contactors

CR1 B magnetic latching contactors are fitted with a single coil, supplied with d.c. or with a.c. through a rectifier.

Latching is obtained by direct supply of the coil in one direction of current flow.

Unlatching is obtained by a reverse current, adjusted by resistors.

Mechanical latching contactors

LC1 D block contactors

For applications using smaller contactor sizes than those described on page B9/78, it is possible to obtain the same function by the addition of a mechanical latch block type LA6 DK, which can be mounted on LC1 D contactors (see page B9/78).

TeSys contactors

Magnetic latching contactors

Selection guide for direct on-line starting of squirrel cage motors

TeSys F

Continuous or intermittent duty up to 30 operating cycles/hour																	
Motor ⁽¹⁾												3-pole contactor	3-pole differential thermal overload relay		3 fuses Type		
220 V 230 V			380 V 400 V			415 V			440 V				Reference	Setting range	aM	BS-88	
P	In		P	In		P	In		P	In		Reference					A
kW	HP	A	kW	HP	A	kW	HP	A	kW	HP	A						
25	35	85	-	-	-	-	-	-	-	-	-	CR1F150	LR9F5367	60...100	100	125	
30	40	103	51	70	98	55	75	100	59	80	97	CR1F150	LR9F5369	90...150	100	160	
33	45	113	55	75	105	-	-	-	-	-	-	CR1F150	LR9F5369	90...150	125	160	
-	-	-	59	80	112	59	80	105	63	85	109	CR1F150	LR9F5369	90...150	125	160	
-	-	-	63	85	117	63	85	115	-	-	-	-	-	-	-	-	
37	50	126	75	100	138	75	100	135	75	100	125	CR1F150	LR9F5369	90...150	160	200	
40	54	134	-	-	-	-	-	-	80	110	131	-	-	-	-	-	
45	60	150	80	110	147	80	110	138	90	125	146	CR1F185	LR9F5369	90...150	160	200	
51	70	170	90	125	170	90	125	165	100	136	162	CR1F185	LR9F5371	132...220	200	250	
55	75	182	-	-	-	100	136	182	-	-	-	-	-	-	-	-	
59	80	195	100	138	188	110	150	200	110	150	178	CR1F265	LR9F5371	132...220	250	315	
63	85	203	110	150	205	-	-	-	129	175	209	-	-	-	-	-	
75	100	240	129	175	242	129	175	230	132	180	215	CR1F265	LR9F7375	200...330	250	315	
-	-	-	132	180	245	132	180	240	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	140	190	250	140	190	227	CR1F265	LR9F7375	200...330	315	400	
80	110	260	140	190	260	147	200	260	147	200	236	CR1F400	LR9F7375	200...330	315	400	
-	-	-	147	200	273	150	205	270	150	205	246	-	-	-	-	-	
-	-	-	150	205	280	160	220	280	160	220	256	-	-	-	-	-	
90	125	295	160	220	300	-	-	-	180	245	289	CR1F400	LR9F7375	200...330	315	400	
-	-	-	-	-	-	-	-	-	185	250	295	-	-	-	-	-	
100	136	325	180	245	333	180	245	320	200	270	321	CR1F400	LR9F7379	300...500	400	500	
110	150	356	185	250	342	185	250	325	220	300	353	-	-	-	-	-	
-	-	-	200	270	370	200	270	340	250	340	401	CR1F400	LR9F7379	300...500	400	500	
-	-	-	-	-	-	220	300	385	-	-	-	-	-	-	-	-	
129	175	420	220	300	408	-	-	-	257	350	412	CR1F500	LR9F7379	300...500	500	630	
132	180	425	250	340	460	250	340	425	280	380	450	CR1F500	LR9F7381	380...630	500	630	
140	190	450	-	-	-	257	350	450	-	-	-	-	-	-	-	-	
147	200	472	-	-	-	-	-	-	295	400	473	CR1F500	LR9F7381	380...630	500	630	
-	-	-	257	350	475	280	380	475	300	410	481	CR1F630	LR9F7381	380...630	500	630	
-	-	-	-	-	-	295	400	500	-	-	-	-	-	-	-	-	
150	205	483	280	380	510	300	410	510	315	430	505	CR1F630	LR9F7381	380...630	630	800	
160	220	520	295	400	546	315	430	535	335	450	518	-	-	-	-	-	
180	245	578	300	410	565	335	450	550	355	480	549	CR1F630	LR9F7381	380...630	630	800	
185	250	595	315	430	584	355	480	580	375	500	575	-	-	-	-	-	
200	270	626	335	450	620	375	500	610	400	454	611	CR1F630	LR9F7381	380...630	800	1000	
220	*	700	355	*	635	400	*	650	425	*	650	CR1BL33	-	500...800	800	1000	
-	-	-	375	*	670	425	*	690	445	*	680	-	-	-	-	-	
-	-	-	400	*	710	445	*	730	450	*	690	-	-	-	-	-	
-	-	-	-	-	-	450	*	740	475	*	730	-	-	-	-	-	
250	*	800	425	*	760	475	*	780	500	*	780	CR1BM33	-	500...800	800	1000	
257	*	826	445	*	790	500	*	820	530	*	825	CR1BM33	-	630...1000	1000	1250	
280	*	900	450	*	800	530	*	870	560	*	870	-	-	-	-	-	
295	*	948	475	*	850	560	*	920	600	*	920	-	-	-	-	-	
300	*	980	500	*	900	600	*	978	630	*	965	-	-	-	-	-	
315	*	990	530	*	950	-	-	-	-	-	-	-	-	-	-	-	

(1) The ratings are for standard 220/230 V, 380/400 V, 415 or 440 V motors. The overload relays should preferably be set to the motor full-load current shown on the motor rating plate. For other power ratings, select the overload relay with the appropriate range; the associated contactor and fuses must have ratings equal to or immediately greater than In.

(2) Reference to be completed, see page B9/79.

* There are no standard power ratings for these motors.

High power contactors

TeSys contactors

Magnetic latching contactors

Selection guide for utilisation category AC-3

TeSys F

Rated operational current in AC-3 ($\theta \leq 55^\circ\text{C}$)

Contactor size		CR1	CR1	CR1	CR1	CR1	CR1	CR1	CR1	CR1	CR1
		F150	F185	F265	F400	F500	F630	BL	BM	BP	BR
440 V	A	150	185	265	400	500	630	750	1000	1500	1800
500 V	A	135	175	245	385	500	540	750	900	1200	1500
660/690 V	A	130	140	230	365	435	470	700	800	900	1100
1000 V	A	47	73	95	135	270	330	400	400	500	600

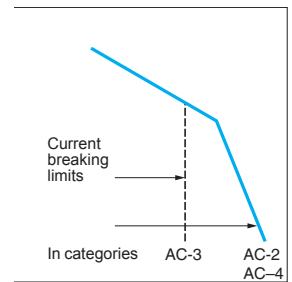
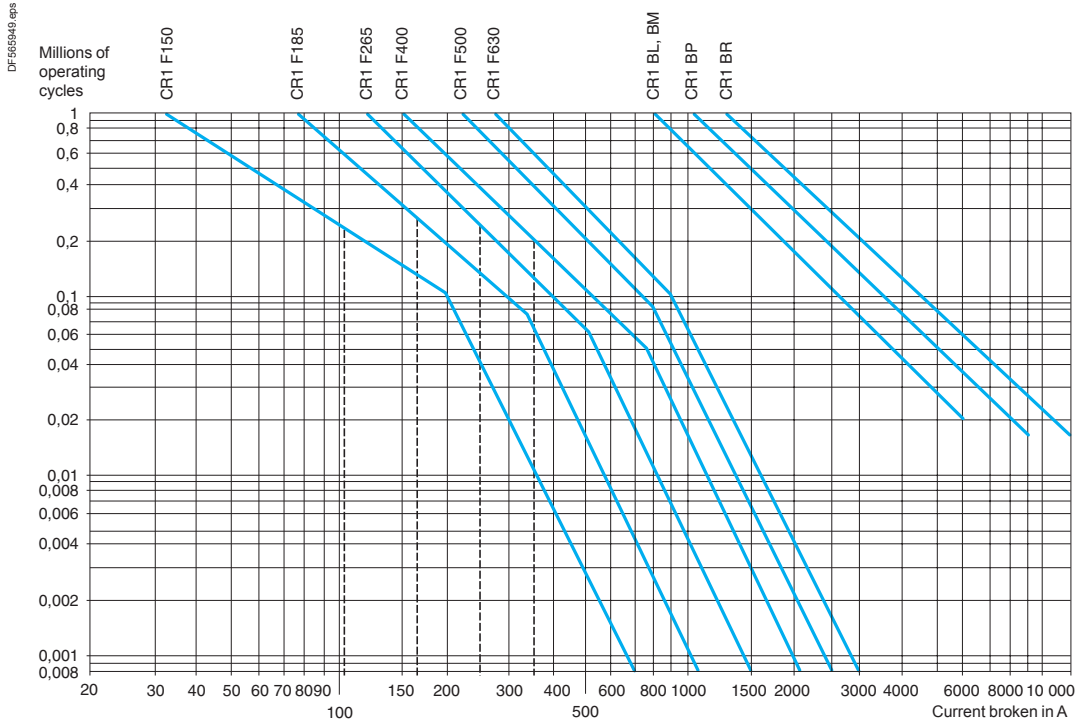
Rated operational power (standard motor power ratings)

220...240 V	kW	40	55	75	110	147	200	220	280	425	500
	HP	54	75	100	150	200	270	300	380	580	680
380...400 V	kW	75	90	132	200	250	335	400	500	750	900
	HP	100	185	180	270	340	450	545	680	1000	1220
415 V	kW	80	100	140	220	280	375	425	530	800	900
	HP	110	136	180	300	380	500	580	720	1100	1220
440 V	kW	80	100	140	250	295	400	450	560	800	900
	HP	110	136	190	340	400	545	610	760	1100	1220
500 V	kW	90	110	160	257	355	400	500	600	750	900
	HP	125	150	220	350	480	545	680	810	1000	1220
660/690 V	kW	100	110	160	280	335	450	560	670	750	900
	HP	—	—	—	—	—	610	760	910	1000	1220
1000 V	kW	65	100	147	185	335	450	530	530	670	750
	HP	—	136	200	250	—	610	720	720	910	1000

Maximum operating rate in operating cycles/hour, at rated operational power with an on-load factor = 85 %: 750 for CR1 F150 to F265, 500 for CR1 F400 to F630 and 120 for CR1 B.

Use in category AC-3 ($U_e \leq 440 \text{ V}$)⁽¹⁾ ($\theta \leq 55 \text{ °C}$)

The current (I_c) in AC-3 is equal to the rated operational current (I_e) drawn by the motor.



Example:

Asynchronous motor with $P = 50 \text{ kW}$, $U_e = 380 \text{ V}$, $I_e = 100 \text{ A}$, $I_c = I_e = 100 \text{ A}$, or asynchronous motor with $P = 55 \text{ kW}$, $U_e = 415 \text{ V}$, $I_e = 100 \text{ A}$, $I_c = I_e = 100 \text{ A}$. 600000 operating cycles required.

The above selection curves show the contactor rating needed, CR1 F185.

⁽¹⁾ For 660 V, multiply the number of operating cycles by 0.8.

TeSys contactors

Magnetic latching contactors

Selection guide for utilisation category AC-1 and according to required electrical durability

TeSys F

Maximum operational current (on-load factor ≥ 0.95)

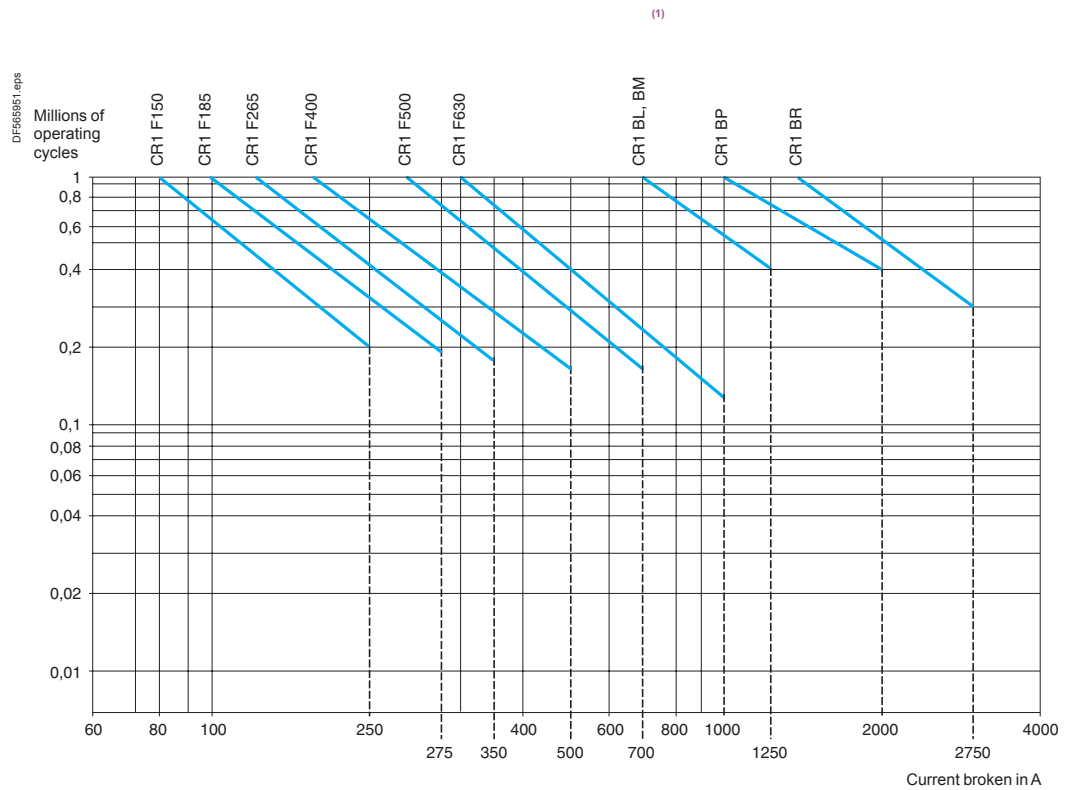
Maximum operating rate: 120 operating cycles/hour

Contactor size		CR1 F150	CR1 F185	CR1 F265	CR1 F400	CR1 F500	CR1 F630	CR1 BL	CR1 BM	CR1 BP	CR1 BR	
Cable c.s.a.	mm ²	120	150	185	-	-	-	-	-	-	-	
Number of bars		-	-	-	2	2	2	2	2	3	4	
Bar c.s.a.	mm	-	-	-	30 x 5	40 x 5	60 x 5	50 x 5	80 x 5	100 x 5	100 x 5	
Operational current in category AC-1 at ambient temperature	$\leq 40\text{ °C}$	A	250	275	350	500	700	1000	800	1250	2000	2750
	$\leq 55\text{ °C}$	A	250	275	300	430	580	850	700	1100	1750	2400
	$\leq 70\text{ °C}$	A	170	180	250	340	500	700	600	900	1500	2000

Increase in operational current by parallel connection of poles

Apply the following coefficients to the above currents; these coefficients take into account an often unbalanced distribution of current between the poles:

- 2 poles in parallel: K = 1.6
- 3 poles in parallel: K = 2.25
- 4 poles in parallel: K = 2.8.



Example:

U_e = 220 V - I_e = 200 A - θ = 40 °C - I_c = I_e = 200 A

600000 operating cycles required.

The above selection curves show the contactor rating needed, CR1 F400.

(1) For 660 V, multiply the number of operating cycles by 0.8.

TeSys contactors

Magnetic latching contactors

Selection guide for switching the primaries of 3-phase transformers

TeSys F

Operating conditions

Maximum ambient temperature: 55 °C.
Maximum operational voltage: 1000 V, 50...60 Hz.

When a transformer is switched on, there is generally an initial current surge which reaches its peak value almost instantaneously and then decreases in a largely exponential manner to quickly reach its steady state value.

The value of this current depends on:

- the characteristics of the magnetic circuit and of the windings (cross sectional area of the core, rated inductance, number of turns, size of the windings, ...)
- the performance of the magnetic laminations used (residual induction and saturation inductance),
- the magnetic state of the circuit and the instantaneous value of the a.c. mains voltage at the moment of switch-on.

The peak current at the moment of switch-on can reach 20 to 40 times the rated current for the various kVA power ratings in the tables below. This value is independent of the "no-load" or "on-load" state of the transformer.

The peak magnetising current of the transformer must be lower than the values given in the tables below.

Contactor selection												
Maximum operating rate: 120 operating cycles/hour												
Contactor size		CR1 F150	CR1 F185	CR1 F265	CR1 F400	CR1 F500	CR1 F630	CR1 BL	CR1 BM	CR1 BP	CR1 BR	
Maximum permissible current peak at switch-on	A	1700	2800	3500	5500	6800	9000	18 000	18 000	24 000	30 000	
Maximum operational power ⁽¹⁾	220...230 V	kVA	25	40	50	75	100	140	230	230	300	380
	380...400 V	kVA	50	75	90	130	170	225	400	400	530	660
	415...440 V	kVA	55	80	100	140	190	250	450	450	560	700
	500 V	kVA	65	95	110	170	225	280	480	480	600	750
	660 V	kVA	80	120	140	200	270	315	600	600	800	950
	1000 V	kVA	100	150	200	250	375	470	700	700	1000	1200

(1) Maximum operational power corresponding to a current peak at switch-on of 30 In.

TeSys F

Environment						
Contactor type			CR1 F150	CR1 F185	CR1 F265	
Rated insulation voltage (Ui)	Conforming to IEC 60158-1, BS 775, 60947-4	V	1000	1000	1000	
	Conforming to VDE 0110 grC	V	1500	1500	1500	
Protective treatment	Standard version		"TH"			
	Special version		-			
Ambient air temperature around the device	Storage	°C	-60...+80			
	For operation at U _c	°C	-15...+70			
Maximum operating altitude	Without derating	m	3000			
Operating positions	Without derating		±5 °			
Pole characteristics						
Number of poles			3 or 4	3 or 4	3 or 4	
Rated operational current (I _e) (U _e ≤ 440 V)	In AC-3, θ ≤ 40 °C	A	150	185	265	
	In AC-1, θ ≤ 40 °C	A	250	275	350	
	In AC-4, θ ≤ 40 °C	A	138	170	245	
Rated operational voltage (U _e)	Up to	V	1000	1000	1000	
Frequency limits (sine wave)	Of the operational current	Hz	25...200	25...200	25...200	
Rated making capacity	I _{rms}	A	1700	2100	2940	
Rated breaking capacity	I _{rms}	220...440 V	A	1500	1800	2450
		500 V	A	1200	1600	2200
		660/690 V	A	1100	1200	1700
		1000 V	A	450	600	800
Permissible short time rating from cold state, with no current flowing for previous 60 minutes at θ ≤ 40 °C	For 1 s	A	1200	1500	2200	
	For 5 s	A	1200	1500	2200	
	For 10 s	A	1200	1500	2200	
	For 30 s	A	700	920	1230	
	For 1 min	A	600	740	950	
	For 3 min	A	450	500	620	
	For 10 min	A	350	400	480	
Short-circuit protection by fuses θ ≤ 440 V	Motor circuit AC-3 (type aM)	A	160	200	315	
	AC-1 circuit (type gG, BS 88)	A	250	315	400	
Average impedance per pole	At I _{th} and 50 Hz	mΩ	0.45	0.36	0.32	
Power dissipated per pole for the above operational currents	AC-3	W	6	12	22	
	AC-1	W	18	26	39	
Connection	Number of conductors		1	1	1	
	Cable with lugs	mm ²	120	150	240	
	Cable with connector	mm ²	120	150	240	
	Number of bars		2	2	2	
	Bar c.s.a.	mm	25 x 3	25 x 3	32 x 4	
	Bolt diameter		Ø8	Ø8	Ø10	
	Tightening torque	N.m	18	18	35	

TeSys contactors

Magnetic latching contactors

TeSys F

CR1 F400	CR1 F500	CR1 F630	CR1 BL	CR1 BM	CR1 BP	CR1 BR
1000	1000	1000	1000	1000	1000	1000
1500	1500	1500	1500	1500	1500	1500
"TH"			"TC"			
-			"TH"			
-60...+80			-60...+80			
-15...+70			-15...+60			
3000			3000			
±5 ° in relation to normal vertical mounting plane			±5 ° in relation to normal vertical mounting plane			

3 or 4	3 or 4	3 or 4	1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4
400	500	630	750	1000	1500	1800
500	700	1000	800	1250	2000	2750
370	460	560	700	800	1250	1500
1000	1000	1000	1000	1000	1000	1000
25...200	25...200	25...200	50...60	50...60	50...60	50...60
4500	5000	6740	10 000	10 000	15 000	18 000
4000	5000	6300	10 000	10 000	15 000	18 000
3500	4500	5400	9000	9000	12 000	15 000
3000	3560	4600	8000	8000	9000	11 000
1200	2500	3200	4000	4000	5000	6000
3600	4200	5050	9600	9600	12 000	15 000
3600	4200	5050	9600	9600	12 000	15 000
3600	4200	5050	7000	8000	9600	12 000
2400	3200	4400	4800	5200	6400	8000
1700	2400	3400	3500	3800	5200	6300
1200	1500	2200	2100	2400	3600	4400
1000	1200	1600	1200	1800	2800	3600
400	500	630	800	1200	800 x 2 ⁽¹⁾	1000 x 2 ⁽¹⁾
500	800	1000	800	1200	1000 x 2 ⁽¹⁾	1200 x 2 ⁽¹⁾
0.28	0.18	0.12	0.18	0.18	0.13	0.09
45	45	48	88	180	290	360
70	88	120	115	280	520	680
2	2	-	-	-	-	-
150	240	-	-	-	-	-
-	-	-	-	-	-	-
2	2	2	2	2	3	4
30 x 5	40 x 5	60 x 5	50 x 5	80 x 5	100 x 5	100 x 10
Ø10	Ø10	Ø12	4 x Ø8	4 x Ø10	4 x Ø10	4 x Ø10
35	35	58	21	35	35	35

(1) Paralleling of poles must be carried out only in accordance with the fuse manufacturer's recommendations.

High power contactors

TeSys F

Control circuit characteristics				CR1 F150	CR1 F185	CR1 F265	
Contactor type	Rated control circuit voltage (Uc)	~ 50 or 60 Hz	V	48...415			
		~ 400 Hz	V	48...220			
		---	V	48...220			
		--- low consumption	V	48...220			
Control voltage limits ~ and ---	Latching			0.85...1.1 Uc			
	Unlatching			0.85...1.1 Uc			
Maximum operating rate at ambient temperature ≤ 40 °C	In operating cycles per hour			120			
Mechanical durability	In millions of operating cycles			1			
Average consumption 50/60 Hz	Latching	1-pole	VA	–	–	–	
		2-pole	VA	–	–	–	
		3-pole	VA	1100	1600	1650	
		4-pole	VA	100	1600	1650	
		Unlatching	1-pole	VA	–	–	–
			2-pole	VA	–	–	–
			3-pole	VA	7.3	8	9
			4-pole	VA	7.3	8	9
	400 Hz and ---	Latching	1-pole	VA	–	–	–
			2-pole	VA	–	–	–
			3-pole	VA	1260	1750	1800
			4-pole	VA	1260	1750	1800
		Unlatching	1-pole	VA	–	–	–
			2-pole	VA	–	–	–
			3-pole	VA	10	11	12
			4-pole	VA	10	11	12
	--- low consumption	Latching	3/4-pole	W	500	500	500
			Unlatching	3/4-pole	W	15	20
		Unlatching	3/4-pole	W	15	20	40
			3/4-pole	W	15	20	40
Average operating time at Uc ⁽¹⁾	Latching		ms	35...40	35...40	45...50	
	Unlatching		ms	50...100	50...100	50...100	

(1) The closing time is measured from the moment the closing coil is energised to initial contact of the main poles. The opening time is measured from the moment the opening coil is energised to the moment the main poles separate.

Note: the arcing time depends on the circuit switched by the main poles. For 3-phase applications the arcing time is usually less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.

Auxiliary contact characteristics											
Type of contacts		LAD N for contactors CR1 F									
Conventional thermal current	A	10									
Rated insulation voltage (Ui)	Conforming to IEC 60947-5-1	V	690								
Connection	Flexible or solid conductor with or without cable end	mm ²	1 x 1 min; 2 x 2.5 max								
Operational power of contacts LAD N for contactors CR1 F	a.c. supply			d.c. supply							
	Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current (cos φ 0.7) = 10 times the power broken (cos φ 0.4).			Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.							
	V	48	115	230	400	600	V	48	125	250	440
1 million operating cycles	VA	120	280	560	960	1440	W	90	75	68	61
Occasional making capacity	VA	2600	7000	13 000	15 000	9000	W	700	400	260	220

TeSys contactors

Magnetic latching contactors

TeSys F

CR1 F400	CR1 F500	CR1 F630	CR1 BL	CR1 BM	CR1 BP	CR1 BR
48...415			110...500			
48...220			110...500			
48...220			110...500			
48...220			–			
0.85...1.1 Uc			0.85...1.1 Uc			
0.85...1.1 Uc			0.85...1.1 Uc			
120			120			
1			1			
–	–	–	650	650	650	650
–	–	–	1100	1100	1100	1100
1450	1650	2100	1650	1650	1650	1650
1450	1650	2100	1850	1850	1850	1850
–	–	–	110	110	110	110
–	–	–	125	125	125	125
12	9.5	8	165	165	165	165
12	9.5	8	175	175	175	175
–	–	–	600	600	600	600
–	–	–	1000	1000	1000	1000
1600	1800	2300	1500	1500	1500	1500
1600	1800	2300	1700	1700	1700	1700
–	–	–	100	100	100	100
–	–	–	115	115	115	115
16	13	11	150	150	150	150
16	13	11	160	160	160	160
500	550	620	–	–	–	–
70	60	45	–	–	–	–
40...75	40...80	40...80	100...150	100...150	100...150	100...150
50...100	50...100	50...100	20...40	20...40	20...40	20...40

(1) The closing time is measured from the moment the closing coil is energised to initial contact of the main poles. The opening time is measured from the moment the opening coil is energised to the moment the main poles separate.

Note: the arcing time depends on the circuit switched by the main poles. For 3-phase applications the arcing time is usually less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.

LAD N for contactors CR1 F	ZC4 GM for contactors CR1 B																								
10	20																								
690	660																								
1 x 1 min; 2 x 2.5 max	2 min; 4 max																								
Operational power of contacts ZC4 GM for contactors CR1 B	a.c. supply Electrical durability (valid for up to 2400 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current (cos φ 0.7) = 10 times the power broken (cos φ 0.4).																								
	d.c. supply Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.																								
1 million operating cycles	<table border="1"> <thead> <tr> <th>V</th> <th>110</th> <th>220</th> <th>380</th> <th>415</th> <th>500</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td>440</td> <td></td> </tr> <tr> <td>VA</td> <td>2000</td> <td>4000</td> <td>4000</td> <td>4000</td> <td>3500</td> </tr> <tr> <td>VA</td> <td>14000</td> <td>23000</td> <td>35000</td> <td>45000</td> <td>35000</td> </tr> </tbody> </table>	V	110	220	380	415	500					440		VA	2000	4000	4000	4000	3500	VA	14000	23000	35000	45000	35000
V	110	220	380	415	500																				
				440																					
VA	2000	4000	4000	4000	3500																				
VA	14000	23000	35000	45000	35000																				
Occasional making capacity	<table border="1"> <thead> <tr> <th>V</th> <th>110</th> <th>120</th> <th>440</th> <th>500</th> </tr> </thead> <tbody> <tr> <td>W</td> <td>250</td> <td>250</td> <td>230</td> <td>200</td> </tr> <tr> <td>W</td> <td>1600</td> <td>800</td> <td>400</td> <td>360</td> </tr> </tbody> </table>	V	110	120	440	500	W	250	250	230	200	W	1600	800	400	360									
V	110	120	440	500																					
W	250	250	230	200																					
W	1600	800	400	360																					

High power contactors

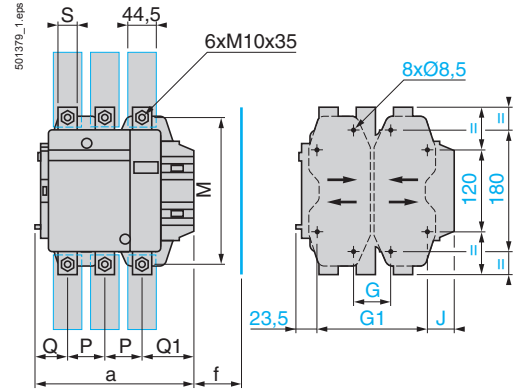
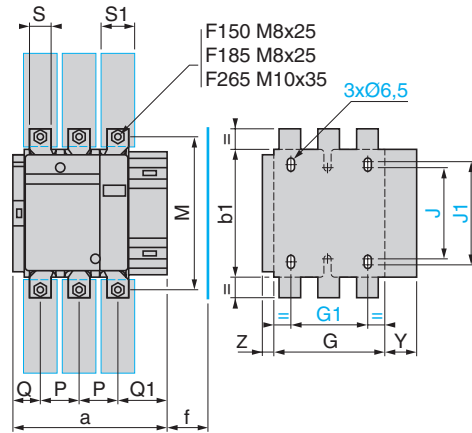
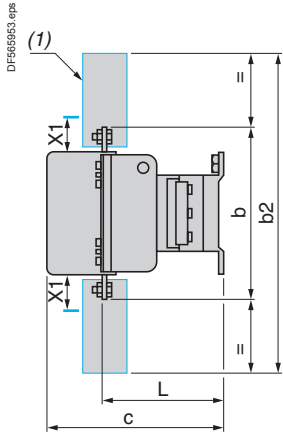
TeSys F

CR1 F150 to F500

Common side view

CR1 F150, F185, F265

CR1 F400, F500



CR1	F150		F185		F265	
	3P	4P	3P	4P	3P	4P
a	163.5	201.5	168.5	208.5	201.5	244.5
b	170	170	174	174	203	203
b1	137	137	137	137	145	145
b2	301	301	305	305	370	370
c	171	171	181	181	213	213
f	131	131	130	130	147	147
G	106	143	111	151	142	190
G1	80	80	80	80	96	96
J	106	106	106	106	106	106
J1	120	120	120	120	120	120
L	107	107	113.5	113.5	141	141
M	150	150	154	154	178	178
P	40	40	40	40	48	48
Q	26	26	29	29	39	34
Q1	57.5	55.5	59.5	59.5	66.5	66.5
S	20	20	20	20	25	25
S1	27	27	34	34	38	38
Y	44	44	38.5	30.5	30.5	21.5
Z	13.5	13.5	13.5	13.5	15.5	15.5

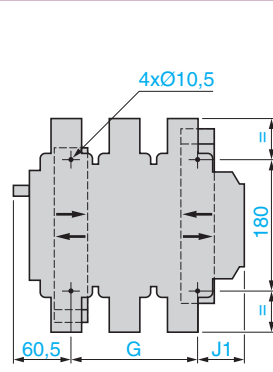
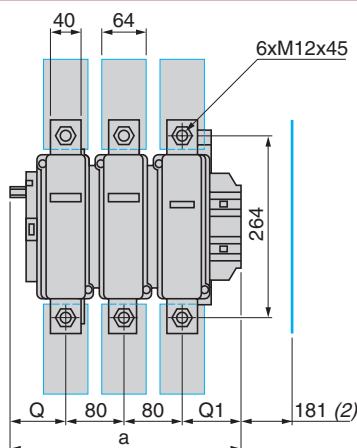
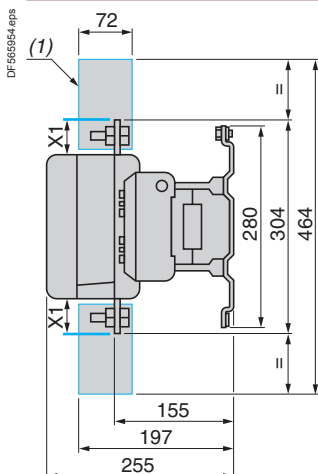
f = minimum distance required for coil removal.

X1: Minimum electrical clearance according to operational voltage and breaking capacity.

Voltage in V	200...500		660...1000	
	CR1 F150	CR1 F185	CR1 F265	
CR1 F150	10	15		
CR1 F185	10	15		
CR1 F265	10	15		

(1) Power terminal protection shroud (see page B9/14).

CR1 F630



CR1 F630	3P	4P
a	309	389
G supplied	180	240
G min.	100	150
G max.	195	275
J1	61	81
Q	60	60
Q1	89	89

X1: Min. electrical clearance according to operational voltage and breaking capacity.

Voltage in V	X1
200...500	20
690...1000	30

(1) Power terminal protection shroud.
(2) Minimum distance required for coil removal.

Selection: pages B9/87 to B9/91

Characteristics: pages B9/92 to B9/95

References: pages B9/7, B9/30 to B9/35

TeSys contactors

Magnetic latching contactors CR1 F

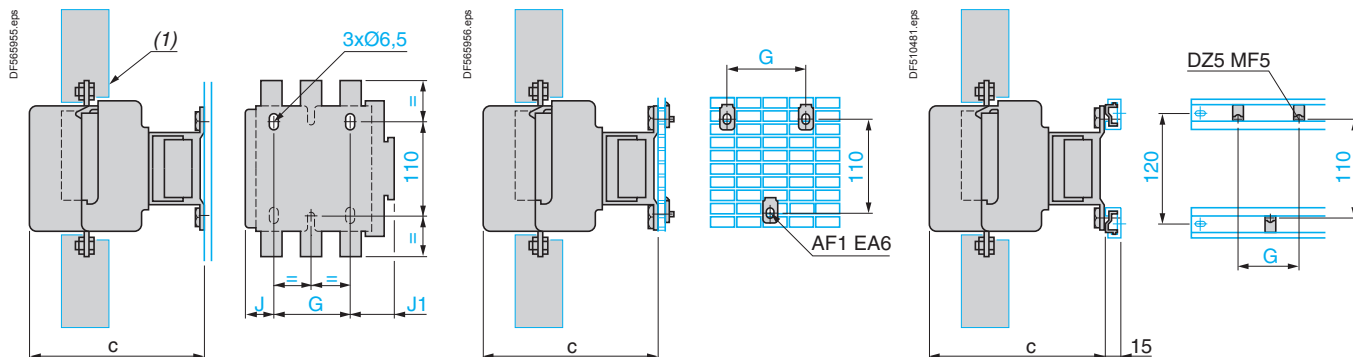
TeSys F

CR1 F150...F265

Panel mounted

On pre-slotted mounting plate AM1 PA, PB, PC

On rails DZ5 MB on 120 mm centres



CR1	F150	F185	F265	
c	3P	171	181	213
	4P	171	181	213
G	3P	80	80	96
	4P	80	80	96
J	3P	26.5	29	44.5
	4P	45	49	68.5
J1	3P	57	59.5	61.5
	4P	75.5	79.5	85.5

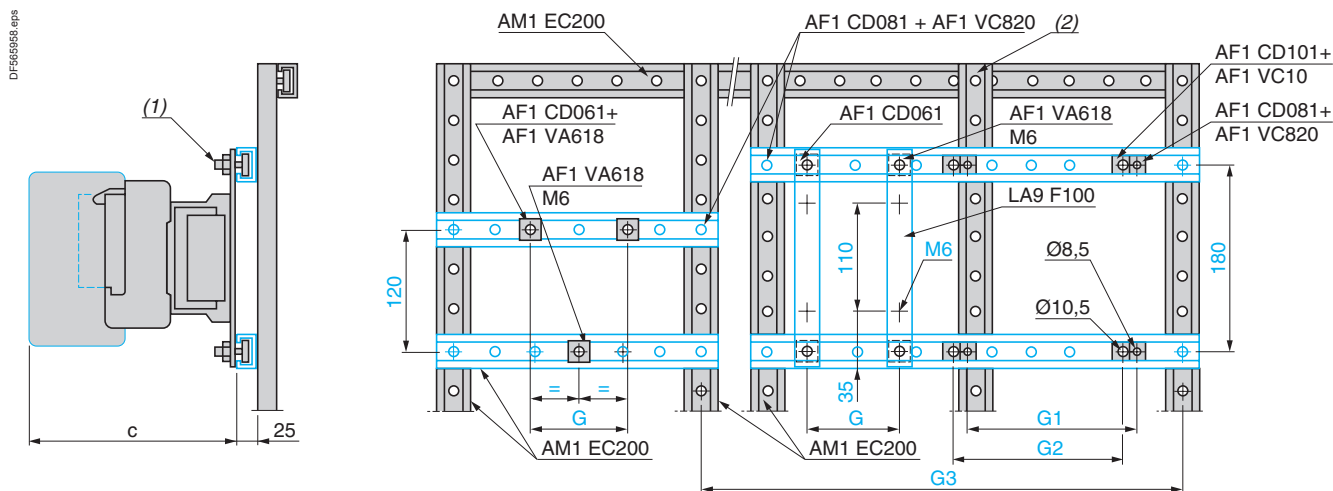
CR1	F150	F185	F265	
c	3P	171	181	213
	4P	171	181	213
G	3P	80	80	96
	4P	80	80	96
	4P	80	80	96

CR1	F150	F185	F265	
c	3P	171	181	213
	4P	171	181	213
G	3P	80	80	96
	4P	80	80	96
	4P	80	80	96

(1) Power terminal protection shroud (see page B9/14).

CR1 F150...F650

On 2 notched uprights AM1 EC●●●



CR1	F150	F185	F265	F400	F500	F630	
c	3P	171	181	213	213	226	250
	4P	171	181	213	213	226	250
G (M6)	3P	80	80	96	-	-	-
	4P	80	80	96	-	-	-
G1 (Ø 8.5)	3P	-	-	-	80	80	-
	4P	-	-	-	80	140	-
G2 (Ø 10.5)	3P	-	-	-	-	-	180
	4P	-	-	-	-	-	240

(1) AF1 CD●●● or AF1 VA●●●.

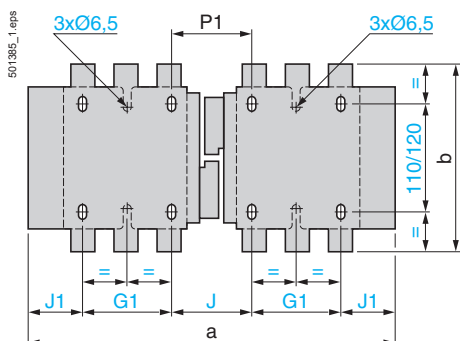
(2) This AM1 EC200 upright is required when G2 or G3 is greater than 700 mm (please consult your Regional Sales Office).

High power contactors

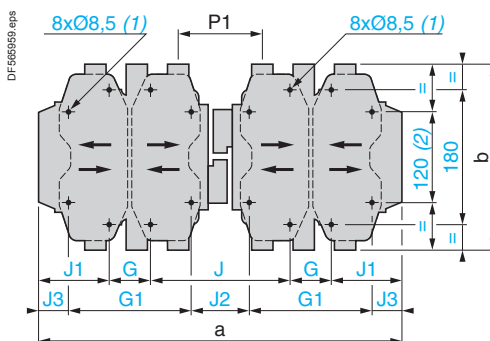
TeSys F

Reversing contactors 2 x CR1 F150...F265

Horizontally mounted



Reversing contactors 2 x CR1 F400...F630



2 x CR1		F150	F185	F265
a	3P	345	357	425
	4P	422	437	521
b	3P	170	174	203
	4P	170	174	203
G1	3P	80	80	96
	4P	80	80	96
J	3P	71	78	109
	4P	111	118	157
J1	3P	57	59.5	61.5
	4P	75.5	79.5	85.5
P1	3P	71	78	100
	4P	71	78	100

2 x CR1		F400	F500	F630
a	3P	446	485	636
	4P	542	595	796
b	3P	206	238	304
	4P	206	238	304
G	3P	80	80	180
	4P	80	140	240
G1	3P	170	170	—
	4P	170	230	—
J	3P	157	156	139
	4P	157	156	139
J1	3P	64.5	84.5	68.5
	4P	112.5	79.5	68.5
J2	3P	67	66	—
	4P	67	66	—
J3	3P	19.5	39.5	—
	4P	67.5	34.5	—
P1	3P	107	112	137
	4P	107	112	137

(1) Except F630: 4 x Ø 10.5.
 (2) Except F630: 180.

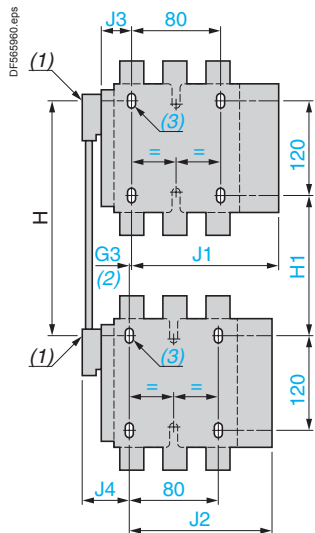
TeSys F

Reversing contactors

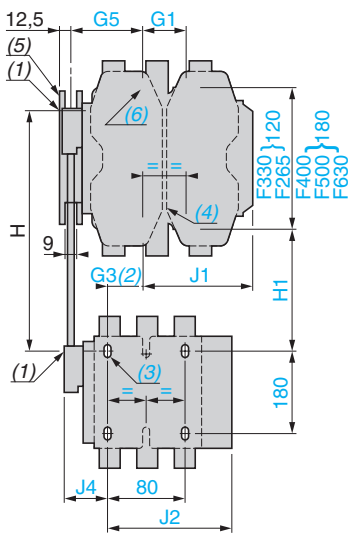
Vertically mounted with mechanical interlock LA9 F●●●.

2 contactors CR1 F of identical or different ratings (CR1 F150...F630), see pages B9/81 and B9/81.

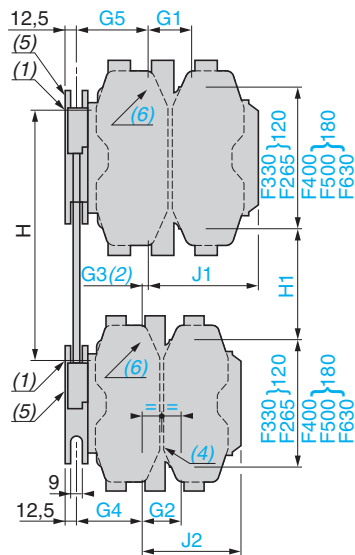
Assembly A



Assembly B



Assembly C



- (1) Mechanical interlock shaft.
- (2) For assembly of contactors of different ratings only.
- (3) 3 x Ø6.5 mm for CR1 F150...F265.
- (4) 3 x Ø6.5 mm for CR1 F265.
- (5) Mechanical interlock guide bracket.
- (6) 4 x Ø8.5 mm for CR1 F400, F500 or 4 x Ø10.5 mm.

Assembly type	A			B								C										
	LA9 F	F4F	G4F	G4G	H4F	J4F	K4F	L4F	H4G	J4G	K4G	L4G	H4H	J4H	K4H	L4H	J4J	K4J	L4J	K4K	L4K	L4L
G1	3P	-	-	-	96	80	80	180	96	80	80	180	96	80	80	180	80	80	180	80	180	180
	4P	-	-	-	96	80	140	240	96	80	140	240	96	80	140	240	80	140	240	140	240	240
G2	3P	-	-	-	-	-	-	-	-	-	-	-	96	96	96	96	80	80	80	80	80	180
	4P	-	-	-	-	-	-	-	-	-	-	-	96	96	96	96	80	80	80	140	140	240
G3	3P	0	3	0	21	45	45	35	19	42	42	33	0	23	23	14	0	0	9 ⁽⁷⁾	0	9 ⁽⁷⁾	0
	4P	0	4	0	27	26	26	17	23	22	22	13	0	0	0	9 ⁽⁷⁾	0	0	9 ⁽⁷⁾	0	9 ⁽⁷⁾	0
G4	3P	-	-	-	-	-	-	-	-	-	-	-	60	60	60	60	83	83	83	83	83	74
	4P	-	-	-	-	-	-	-	-	-	-	-	83	83	83	83	83	83	83	83	83	74
G5	3P	-	-	-	60	83	83	74	60	83	83	74	60	83	83	74	83	83	74	83	74	74
	4P	-	-	-	83	83	83	74	83	83	83	74	83	83	83	74	83	83	74	83	74	74
H	min.	200	210	220	240	250	270	310	250	250	270	310	250	260	280	330	260	280	325	300	345	380
	max.	310	300	310	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380
H1	min.	80	90	100	110	80	100	140	120	90	110	150	130	110	130	170	60	100	140	120	160	200
	max.	190	180	190	250	210	210	210	250	220	220	220	260	230	230	220	200	200	195	200	195	200
J1	3P	133	134	134	149.5	137	157	241	149.5	137	157	241	149.5	137	157	24	137	157	241	157	244	241
	4P	145	146	146	164.5	185	212	321	164.5	185	212	321	164.5	185	212	321	185	212	321	212	321	321
J2	3P	133	133	134	183	133	183	133	134	134	134	134	142.5	149.5	149.5	149.5	137	137	137	157	157	241
	4P	145	145	146	145	145	145	145	146	146	146	146	164.5	164.5	164.5	164.5	185	185	185	212	212	312
J3	3P	48.5	53	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4P	67	73	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J4	3P	48.5	54	53	48.5	48.5	48.5	48.5	53	53	53	53	-	-	-	-	-	-	-	-	-	-
	4P	67	69	73	67	67	67	67	73	73	73	73	-	-	-	-	-	-	-	-	-	-

(7) In this case, G4 is greater than G5.

High power contactors

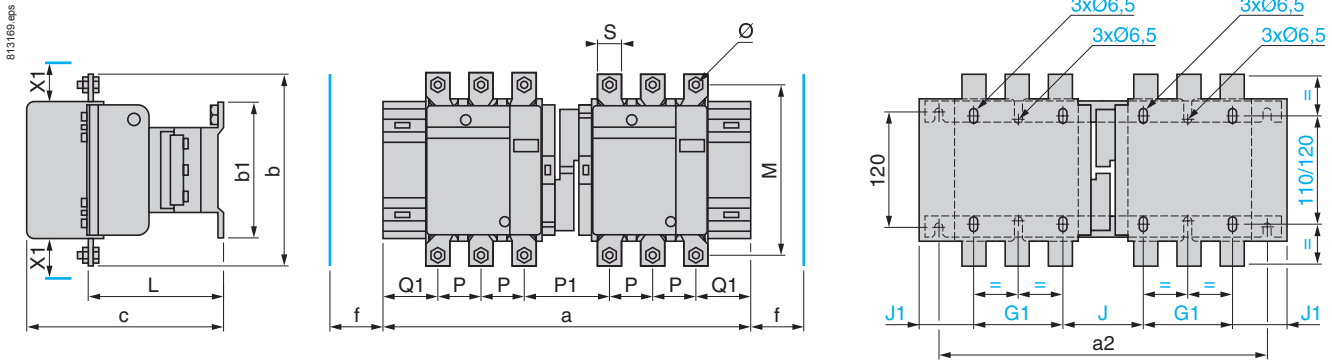
TeSys contactors

TeSys F reversing contactors and changeover contactor pairs Horizontally mounted

TeSys F

Pre-assembled

LC2 F115 to F265 (reverser supplied on 2 bars which can be used for fixing the device)



f - Minimum distance required for coil removal.

Bar fixing centres
Vertical: 120 mm
Horizontal: a2 see table

X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	660...1000 V
F115, F150	10	15
F185	10	15
F225, F265	10	15

LC2		a	a2	b	b1	c	G1	J	J1	L	M	P	P1	Q1	S	f	\emptyset
F115	3P	345	317	162	137	171	80	71	57	107	147	37	77	60	20	131	M6
	4P	419	378	162	137	171	80	108	75.5	107	147	37	77	60	20	131	M6
F150	3P	345	317	170	137	171	80	71	57	107	150	40	71	57	20	131	M8
	4P	422	381	170	137	171	80	111	75.5	107	150	40	71	55.5	20	131	M8
F185	3P	357	326	174	137	181	80	78	59.5	113.5	154	40	78	59.5	20	130	M8
	4P	437	390	174	137	181	80	118	79.5	113.5	154	40	78	59.5	20	130	M8
F225	3P	357	326	197	137	181	80	78	59.5	113.5	172	48	62	51.5	25	130	M10
	4P	437	390	197	137	181	80	118	79.5	113.5	172	48	54	47.5	25	130	M10
F265	3P	425	386	203	145	213	96	109	61.5	141	178	48	100	66.5	25	147	M10
	4P	521	464	203	145	213	96	157	85.5	141	178	48	100	66.5	25	147	M10

TeSys contactors

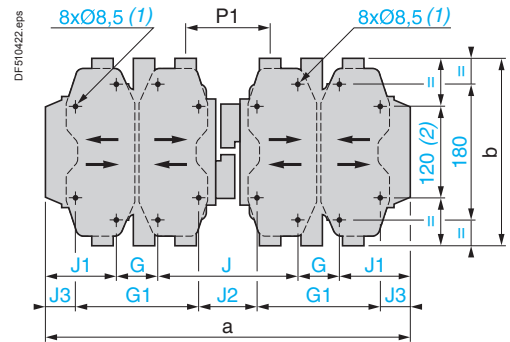
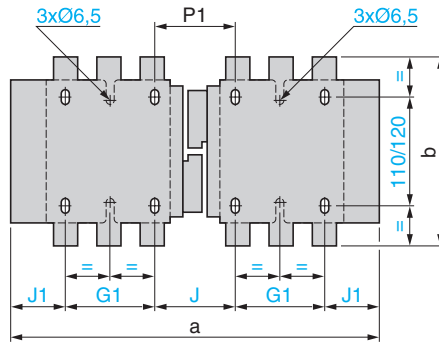
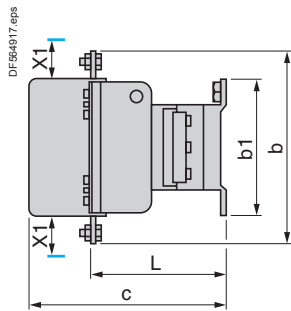
TeSys F reversing contactors and changeover contactor pairs Horizontally mounted

TeSys F

For customer assembly, fixing recommended on AM1 EC uprights, please consult your Regional Sales Office.

2 x LC1 F115 to F330

2 x LC1 F400, F500, F630, F800



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	660...1000 V	200...690 V	1000 V
F115, F150	10	15	-	-
F185	10	15	-	-
F225, F265	10	15	-	-
F330	10	15	-	-
F400	15	20	-	-
F500	15	20	-	-
F630	20	30	-	-
F800	-	-	10	20

2 x LC1		a	b	b1	c	G	G1	J	J1	J2	J3	L	P1
F115	3P	345	162	137	171	-	80	71	57	-	-	107	77
	4P	419	162	137	171	-	80	108	75.5	-	-	107	77
F150	3P	345	170	137	171	-	80	71	57	-	-	107	71
	4P	422	170	137	171	-	80	111	75.5	-	-	107	71
F185	3P	357	174	137	181	-	80	78	59.5	-	-	113.5	78
	4P	437	174	137	181	-	80	118	79.5	-	-	113.5	78
F225	3P	357	197	137	181	-	80	78	59.5	-	-	113.5	62
	4P	437	197	137	181	-	80	118	79.5	-	-	113.5	54
F265	3P	425	203	145	213	-	96	109	61.5	-	-	141	100
	4P	521	203	145	213	-	96	157	85.5	-	-	141	100
F330	3P	447	206	145	219	-	96	124	65.5	-	-	145	107
	4P	543	206	145	219	-	96	172	89.5	-	-	145	107
F400	3P	446	206	209	219	80	170	157	64.5	67	19.5	145	107
	4P	542	206	209	219	80	170	157	112.5	67	67.5	145	107
F500	3P	485	238	209	232	80	170	156	84.5	66	39.5	146	112
	4P	595	238	209	232	140	230	156	79.5	66	34.5	146	112
F630	3P	636	304	280	255	180	-	139	68.5	-	-	155	137
	4P	796	304	280	255	240	-	139	88.5	-	-	155	137
F800	3P	636	304	280	255	180	-	139	68.5	-	-	155	137

(1) Except LC1 F630 and F800: 4 x Ø10.5.

(2) Except LC1 F630 and F800.

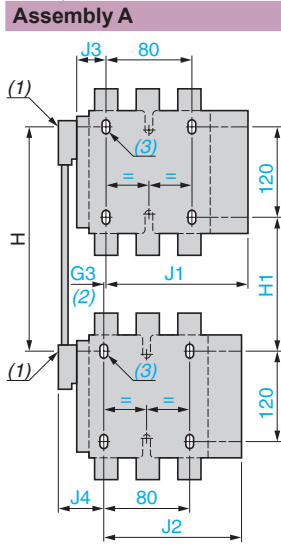
For other dimensions: see pages B9/54 and B9/55.

TeSys contactors

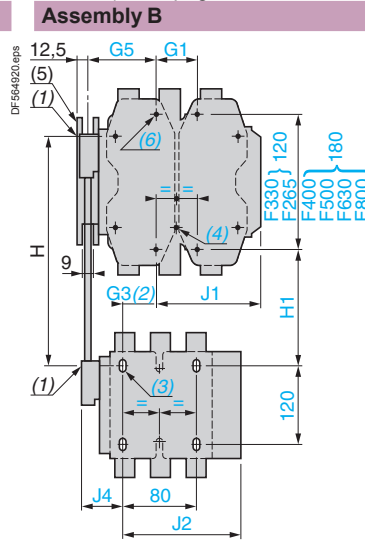
TeSys F reversing contactors and changeover contactor pairs Vertically mounted

TeSys F

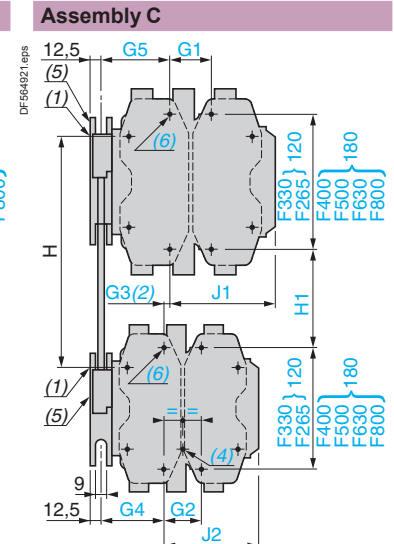
For customer assembly, with mechanical interlock (MI) **LA9 F**, fixing recommended on AM1 EC uprights (please consult your Regional Sales Office). 2 x **LC1** identical or different ratings (**LC1 F115 to F630 and F800**). See pages B9/36 to B9/39.



- (1) Mechanical interlock shaft.
- (2) For assembly of contactors of different ratings only.
- (3) 4 x Ø6.5 for LC1 F115 to F225.



- (4) 4 x Ø6.5 for LC1 F265.
- (5) Mechanical interlock guide bracket.



- (6) 4 x Ø8.5 for LC1 F400, F500 or 4 x Ø10.5 for LC1 F630 and F800.

Assembly A (7) - Mechanical interlock reference

	G3 3P	G3 4P	H min.	H max.	H1 min.	H1 max.	J1 3P	J1 4P
LA9 FF4F	0	0	200	310	80	190	137	155.5
LA9 FG4F	3	4	210	300	90	180	139.5	159.5
LA9 FG4G	0	0	220	310	100	190	139.5	159.5

	J2 3P	J2 4P	J3 3P	J3 4P	J4 3P	J4 4P
LA9 FF4F	137	155.5	48.5	67	48.5	67
LA9 FG4F	137	155.5	53	73	54	69
LA9 FG4G	139.5	159.5	53	73	53	73

For customer assembly, fixing recommended on AM1 EC uprights, please consult your Regional Sales Office.
2 x LC1 F780

Assembly B (7) - Mechanical interlock reference

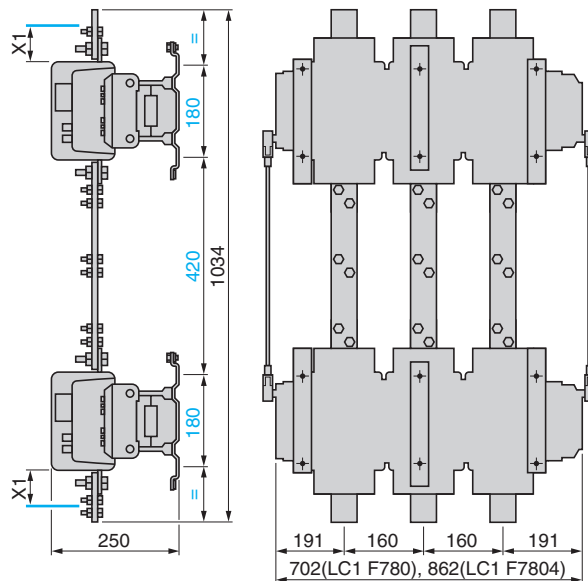
	G1 3P	G1 4P	G3 3P	G3 4P	G5 3P	G5 4P	H min.	H max.
LA9 FH4F	96	96	21	27	60	83	240	380
LA9 FJ4F	80	80	45	26	83	83	250	380
LA9 FK4F	80	140	45	26	83	83	270	380
LA9 FL4F	180	240	35	17	74	74	310	380
LA9 FH4G	96	96	19	23	60	83	250	380
LA9 FJ4G	80	80	42	22	83	83	250	380
LA9 FK4G	80	140	42	22	83	83	270	380
LA9 FL4G	180	240	33	13	74	74	310	380

	H1 min.	H1 max.	J1 3P	J1 4P	J2 3P	J2 4P	J4 3P	J4 4P
LA9 FH4F	110	250	157.5	181.5	137	155.5	48.5	67
LA9 FJ4F	80	210	144.5	192.5	137	155.5	48.5	67
LA9 FK4F	100	210	164.5	219.5	137	155.5	48.5	67
LA9 FL4F	140	210	248.5	328.5	137	155.5	48.5	67
LA9 FH4G	120	250	157.5	181.5	139.5	159.5	53	73
LA9 FJ4G	90	220	144.5	192.5	139.5	159.5	53	73
LA9 FK4G	110	220	164.5	219.5	139.5	159.5	53	73
LA9 FL4G	150	220	248.5	328.5	139.5	159.5	53	73

Assembly C (7)

	G1 3P	G1 4P	G2 3P	G2 4P	G3 3P	G3 4P	G4 3P	G4 4P	G5 3P	G5 4P
LA9 FH4H	96	96	96	96	0	0	60	83	60	83
LA9 FJ4H	80	80	96	96	23	0	60	83	83	83
LA9 FK4H	80	140	96	96	23	0	60	83	83	83
LA9 FL4H	180	240	96	96	14	9 ⁽⁸⁾	60	83	74	74
LA9 FJ4J	80	80	80	80	0	0	83	83	83	83
LA9 FK4J	80	140	80	80	0	0	83	83	83	83
LA9 FL4J	180	240	80	80	9 ⁽⁸⁾	9 ⁽⁸⁾	83	83	74	74
LA9 FK4K	80	140	80	140	0	0	83	83	83	83
LA9 FL4K	180	240	80	140	9 ⁽⁸⁾	9 ⁽⁸⁾	83	83	74	74
LA9 FL4L	180	240	180	240	0	0	74	74	74	74

	H min.	H max.	H1 min.	H1 max.	J1 3P	J1 4P	J2 3P	J2 4P
LA9 FH4H	250	380	130	260	157.5	181.5	157.5	181.5
LA9 FJ4H	260	380	110	230	144.5	192.5	157.5	181.5
LA9 FK4H	280	380	130	230	164.5	219.5	157.5	181.5
LA9 FL4H	330	380	170	220	248.5	328.5	157.5	181.5
LA9 FJ4J	260	380	60	200	144.5	192.5	144.5	192.5
LA9 FK4J	280	380	100	200	164.5	219.5	144.5	192.5
LA9 FL4J	325	380	140	195	248.5	329.5	144.5	192.5
LA9 FK4K	300	380	120	200	164.5	329.5	164.5	219.5
LA9 FL4K	345	380	160	195	248.5	328.5	164.5	219.5
LA9 FL4L	380	380	200	200	248.5	328.5	248.5	328.5



X1 and fixings, see page B9/84.

(7) Only 3P for F800.

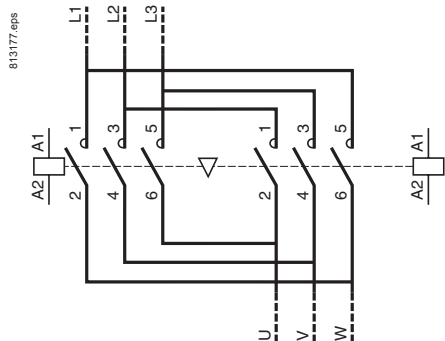
(8) In this case, G4 is greater than G5.

TeSys F

Reversing contactors for motor control LC2 F

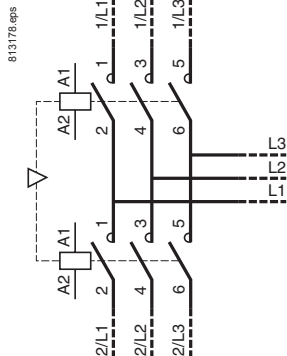
2 x LC1 F

Horizontally mounted



2 x LC1 F

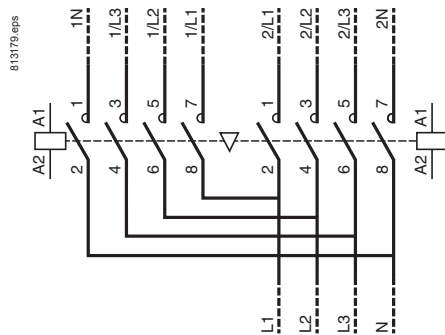
Vertically mounted



Changeover contactor pairs for distribution LC2 F

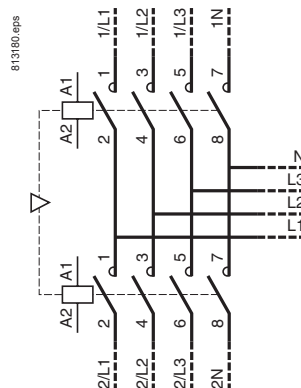
2 x LC1 F

Horizontally mounted



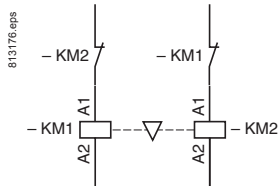
2 x LC1 F

Vertically mounted



Electrical interlocking of reversers fitted with mechanical interlock without integral electrical contacts

LA9 F



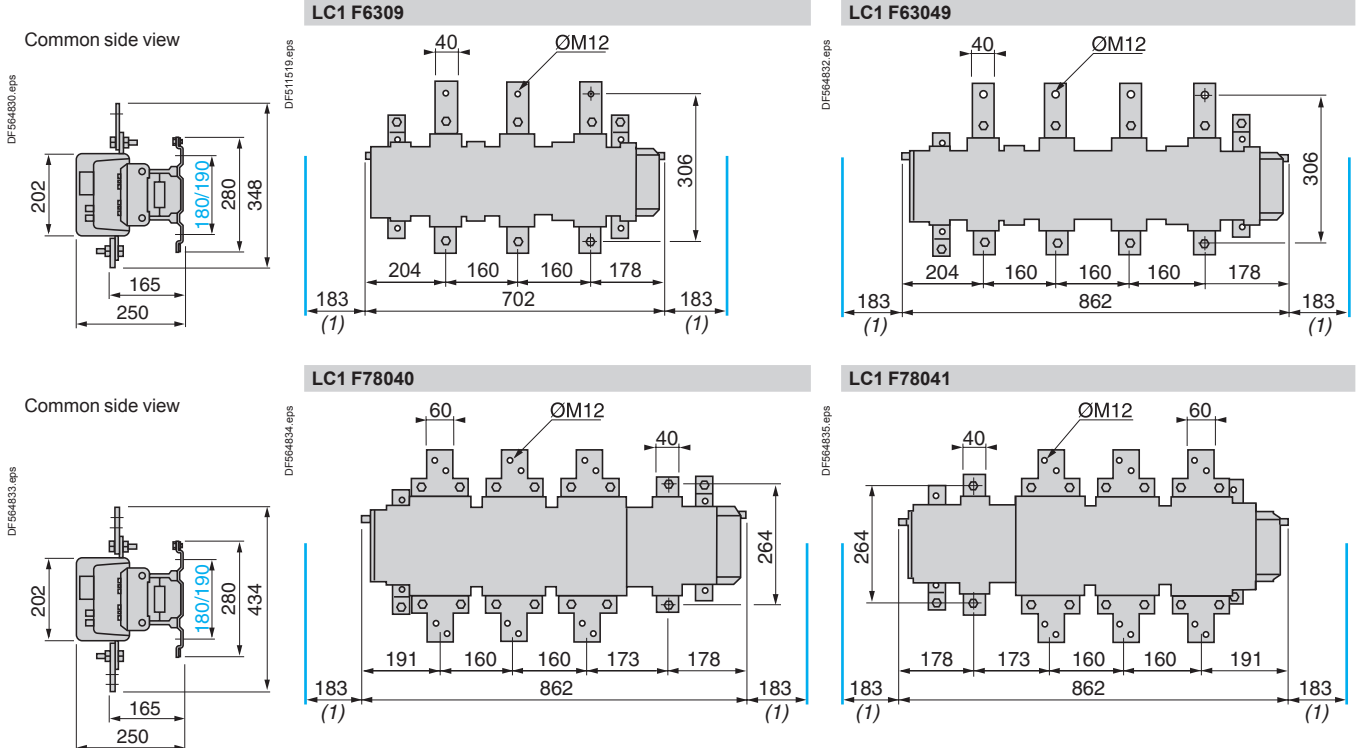
TeSys contactors

High power changeover contactor pairs for distribution

TeSys F

Dimensions

Contactors used to assemble high power changeover contactor pairs LC1 F780: see page B9/43

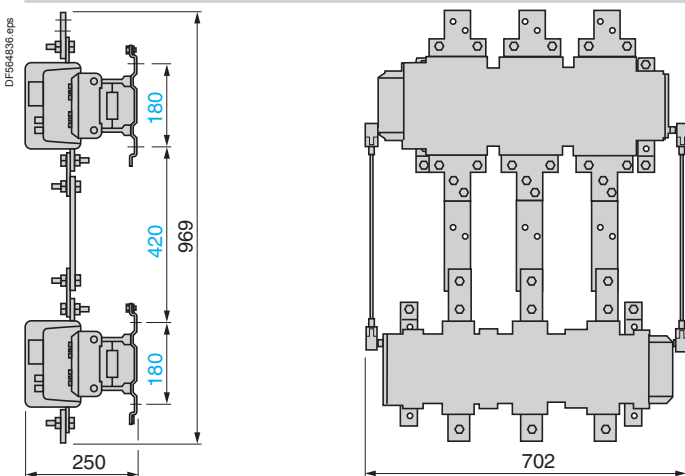


(1) Minimum distance required for removal of each coil.

3-phase changeover contactor pairs

LC1 F780 + LC1 F780 + LA9 FX970: see page B9/43

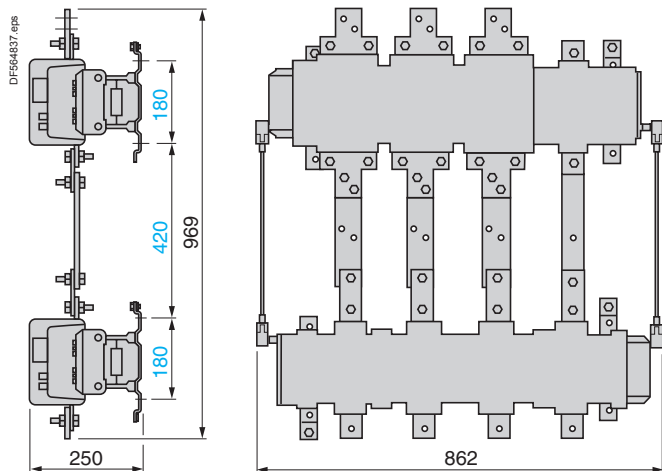
LC1 F780 + LC1 F6309 + LA9 FX970



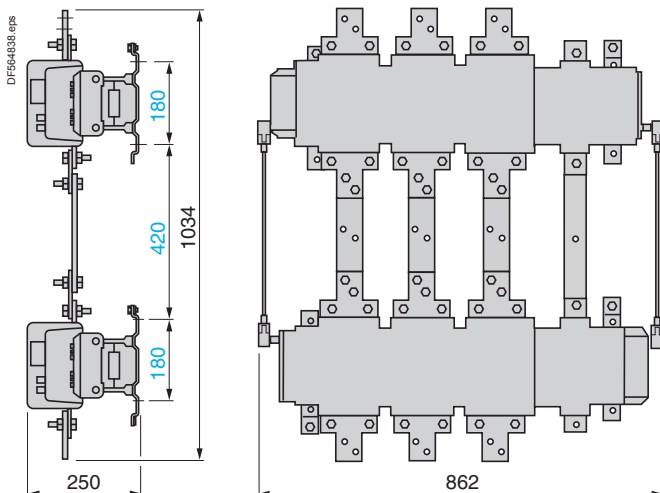
Dimensions

3-phase + neutral changeover contactor pairs

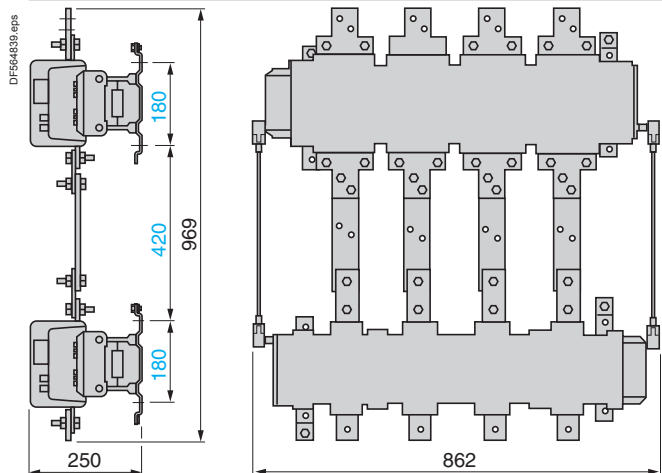
LC1 F78041 + LC1 F63049 + LA9 FX970



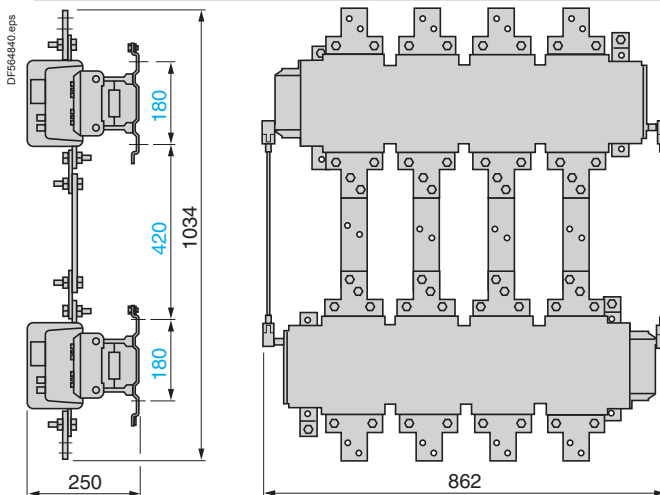
LC1 F78041 + LC1 F78040 + LA9 FX970



LC1 F7804 + LC1 F63049 + LA9 FX971

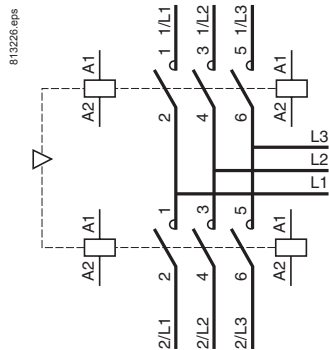


LC1 F7804 + LC1 F7804 + LA9 FX971

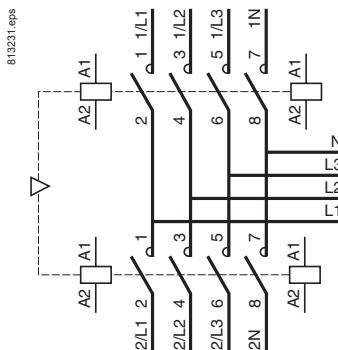


Schemes

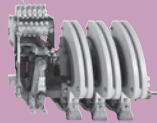
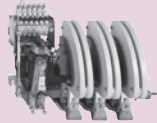
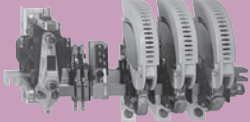
3-phase changeover contactor pairs



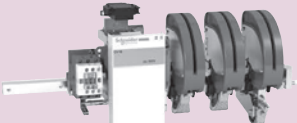

3-phase + neutral changeover contactor pairs



Pre defined composition contactors – TeSys B

Type of product	Range		Pages
High performance & power - 1000 V TeSys LC1B	From 750 to 1800 A - AC-3 From 800 to 2750 A - AC-1		B10/2
Magnetic latching - 1000 V TeSys CR1B	From 750 to 1800 A - AC-3 From 800 to 2750 A - AC-1		B10/10
For control of DC excitation circuit of synchronous motors - 1200 V DC TeSys CRXB, CVXB, CWXB	From 80 to 2750 A - DC		B10/13

Variable composition contactors – TeSys B

Standard - 690 V TeSys CV1B Composition to be defined by customer	From 80 to 700 A - AC-3 From 80 to 1000 A - AC-1		B10/16
High performance - 1000 V TeSys CV3B Composition to be defined by customer	From 80 to 1800 A - AC-3 From 80 to 2750 A - AC-1		B10/17
Variable composition contactors - ordering process			B10/18

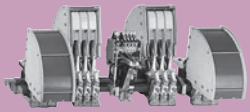
All details and composition list in the TeSys B dedicated catalogue



Catalogue ref:
DIAED2070702EN

Free
download
on the web

On request – TeSys B

For induction heating applications - 3000 V TeSys B	From 80 to 16300 A - AC-1		On request
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Technical Data for Designers

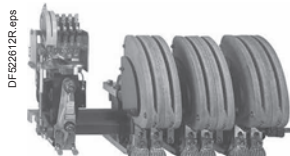
B10/23

TeSys B

Contactors for motor control in category AC-3, from 750 to 1800 A (\sim or \dots)

3-pole contactors

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3								Rated operational current in AC-3 440V up to	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the voltage code ⁽¹⁾	Weight
220 V	380 V	660 V			690 V	1000 V	A				
kW	kW	kW	kW	kW	kW	kW	A				kg
220	400	425	450	500	560	530	750	2	2	LC1BL33●22	58.000
								3	1	LC1BL33●31	58.000
								1	3	LC1BL33●13	58.000
								4	–	LC1BL33●40	58.000
280	500	530	560	600	670	530	1000	2	2	LC1BM33●22	57.000
								3	1	LC1BM33●31	57.000
								1	3	LC1BM33●13	57.000
								4	–	LC1BM33●40	57.000
425	750	800	800	700	750	670	1500	2	2	LC1BP33●22	94.000
								3	1	LC1BP33●31	94.000
								1	3	LC1BP33●13	94.000
								4	–	LC1BP33●40	94.000
500	900	900	900	900	900	750	1800	2	2	LC1BR33●22	129.000
								3	1	LC1BR33●31	129.000
								1	3	LC1BR33●13	129.000
								4	–	LC1BR33●40	129.000



LC1BP33

Contactors for control in category AC-1, from 800 to 2750 A (\sim or \dots)

Single, 2, 3 or 4-pole contactors

Maximum operational current in AC-1 ($\theta \leq 40^\circ\text{C}$)	Number of poles	Instantaneous auxiliary contacts		Basic reference, to be completed by adding the voltage code ⁽¹⁾	Weight
A					kg
800	1	2	2	LC1BL31●22	32.000
		3	1	LC1BL31●31	32.000
		1	3	LC1BL31●13	32.000
		4	–	LC1BL31●40	32.000
	2	2	2	LC1BL32●22	45.000
		3	1	LC1BL32●31	45.000
		1	3	LC1BL32●13	45.000
		4	–	LC1BL32●40	45.000
	3	2	2	LC1BL33●22	58.000
		3	1	LC1BL33●31	58.000
		1	3	LC1BL33●13	58.000
		4	–	LC1BL33●40	58.000
4	2	2	LC1BL34●22	72.000	
	3	1	LC1BL34●31	72.000	
	1	3	LC1BL34●13	72.000	
	4	–	LC1BL34●40	72.000	

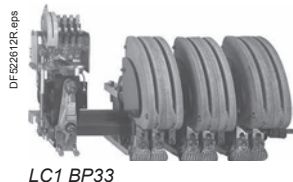
(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	48	110	120	125	127	220	230	240	380	400	415	440	500
\sim 50...400 Hz	–	F	K	–	G	M	P	U	Q	V	N	R	S
\dots	ED	FD	–	GD	–	MD	–	UD	–	–	–	RD	SD

For voltages other than those indicated above, replace the p in the reference with the the operational voltage (3 figures) and the type of current (2 letters: AC for a.c. supply and DC for d.c. supply). Example: 82 V d.c., the reference becomes LC1BP33082DC22.




For coil characteristics, see pages B10/6 to B10/9.

TeSys B



Contactors for control in category AC-1, from 800 to 2750 A (~ or ---)

Single, 2, 3 or 4-pole contactors

Maximum operational current in AC-1 ($\theta \leq 40^\circ\text{C}$)	Number of poles 	Instantaneous auxiliary contacts  		Basic reference, to be completed by adding the voltage code ⁽¹⁾	Weight kg
1250	1	2	2	LC1BM31●22	31.000
		3	1	LC1BM31●31	31.000
		1	3	LC1BM31●13	31.000
		4	–	LC1BM31●40	31.000
	2	2	2	LC1BM32●22	44.000
		3	1	LC1BM32●31	44.000
		1	3	LC1BM32●13	44.000
		4	–	LC1BM32●40	44.000
	3	2	2	LC1BM33●22	57.000
		3	1	LC1BM33●31	57.000
		1	3	LC1BM33●13	57.000
		4	–	LC1BM33●40	57.000
	4	2	2	LC1BM34●22	71.000
		3	1	LC1BM34●31	71.000
		1	3	LC1BM34●13	71.000
		4	–	LC1BM34●40	71.000
2000	1	2	2	LC1BP31●22	41.000
		3	1	LC1BP31●31	41.000
		1	3	LC1BP31●13	41.000
		4	–	LC1BP31●40	41.000
	2	2	2	LC1BP32●22	65.000
		3	1	LC1BP32●31	65.000
		1	3	LC1BP32●13	65.000
		4	–	LC1BP32●40	65.000
	3	2	2	LC1BP33●22	94.000
		3	1	LC1BP33●31	94.000
		1	3	LC1BP33●13	94.000
		4	–	LC1BP33●40	94.000
	4	2	2	LC1BP34●22	120.000
		3	1	LC1BP34●31	120.000
		1	3	LC1BP34●13	120.000
		4	–	LC1BP34●40	120.000
2750	1	2	2	LC1BR31●22	52.000
		3	1	LC1BR31●31	52.000
		1	3	LC1BR31●13	52.000
		4	–	LC1BR31●40	52.000
	2	2	2	LC1BR32●22	85.000
		3	1	LC1BR32●31	85.000
		1	3	LC1BR32●13	85.000
		4	–	LC1BR32●40	85.000
	3	2	2	LC1BR33●22	129.000
		3	1	LC1BR33●31	129.000
		1	3	LC1BR33●13	129.000
		4	–	LC1BR33●40	129.000
	4	2	2	LC1BR34●22	160.000
		3	1	LC1BR34●31	160.000
		1	3	LC1BR34●13	160.000
		4	–	LC1BR34●40	160.000

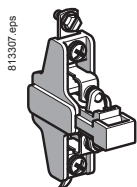
(1) See previous page.

TeSys contactors

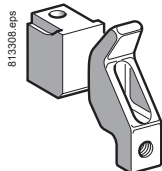
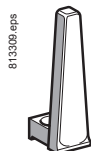
TeSys LC1 B contactors

Accessories and spare parts

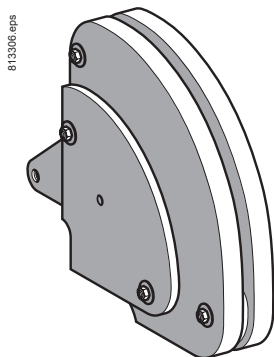
TeSys B



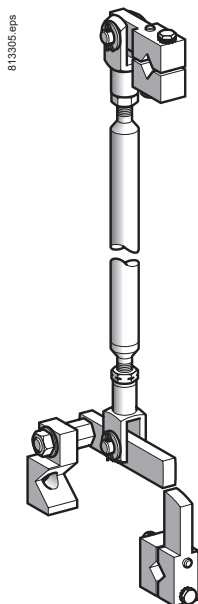
ZC4 GM1

PA1 LB80
(PA1 LB76 + PA1 LB75)

PA1 LB89



PA1 LB50



EZ2 LB0601

Spare parts

Description	For contactor	Composition	Reference	Weight kg
Instantaneous auxiliary contact blocks	LC1 B	1 N/O	ZC4GM1	0.030
		1 N/C	ZC4GM2	0.030

Description	For contactor	Number of sets required per contactor pole	Set reference	Weight kg
Set of contacts (1 moving contact, 1 fixed contact)	LC1 BL	1	PA1LB80	0.420
	LC1 BM	1	PA1LB80	0.420
	LC1 BP	2	PA1LB80	0.420
	LC1 BR	3	PA1LB80	0.420

Description	For contactor	Reference	Weight kg
Moving contact only (for 1 finger)	LC1 B	PA1LB75	0.220
Fixed contact only (for 1 finger)	LC1 B	PA1LB76	0.200
Blow-out horn only (for 1 finger)	LC1 B	PA1LB89	0.120
Arc chamber (for 1 contactor pole)	LC1 BL	PA1LB50	3.700
	LC1 BM	PA1LB50	3.700
	LC1 BP	PA1PB50	6.200
	LC1 BR	PA1RB50	8.500

Mounting accessories

Description	For contactor	Sold in lots of	Unit reference	Weight kg
Bar support bracket for mounting on 120 or 150 mm centres	LC1 BL to BR	2	LA9B103	1.620

Assembly of two vertically mounted contactors by the customer

Description	For contactor	Reference	Weight kg
Mechanical interlock LC1 B and locking device components		EZ2LB0601	1.280

Specifications

- Positive mechanical interlock between two vertically mounted contactors of the same or different ratings.
- Connecting rod with cranks mounted on the right-hand, pole side.
- Vertical fixing centres of the two contactors: 600 mm.

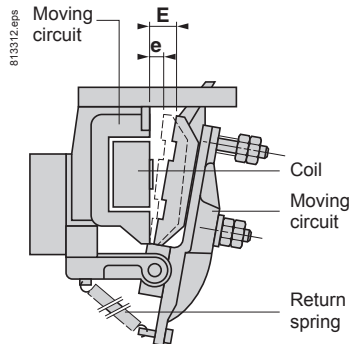
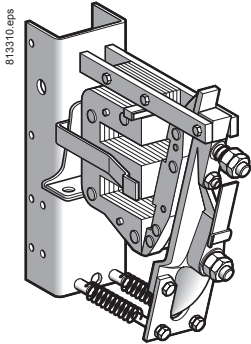
Description	Specification	Height mm	Sold in lots of	Unit reference	Weight kg
Notched mounting rails used as uprights and as equipment support	2 mm steel, with zinc chromate treatment	1650	4	AM1EC165	2.460
		1850	4	AM1EC185	2.760
		2000	4	AM1EC200	2.980
1/4 turn sliding clip nut and corresponding screw for assembly of rails AM1 EC	M8	–	10	AF1CD081	0.020
	M8 x 18	–	10	AF1VC820	0.024

TeSys B

Electromagnet

Electromagnet EB5 KB50

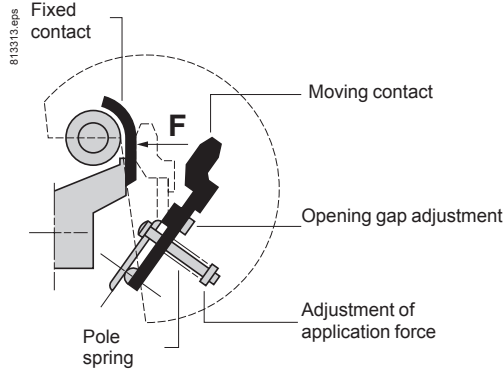
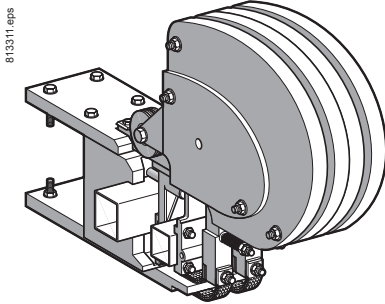
Adjustment of pick-up travel and pull-in travel



Poles

Complete pole

N/O pole



⋮ or ~ supply adjustment characteristics with economy resistor (and rectifier on ~)

Contactor type			LC1 BL	LC1 BM	LC1 BP	LC1 BR
Electromagnet	Pick-up travel (E)	mm	30	30	30	30
		Pull-in travel (e)	mm	10	10	10
	Coil	Pull-in voltage	V	0.75 Uc	0.75 Uc	0.75 Uc
Drop-out voltage		V	0.3...0.5 Uc	0.3...0.5 Uc	0.3...0.5 Uc	0.3...0.5 Uc
N/O pole Adjustment of application force (F) on the contact per pole according to contactor composition	1-pole	daN	30	30	30 ⁽¹⁾	30 ⁽²⁾
	2-pole	daN	30	30	30 ⁽¹⁾	30 ⁽²⁾
	3-pole	daN	30	30	30 ⁽¹⁾	30 ⁽²⁾
	4-pole	daN	30	30	30 ⁽¹⁾	30 ⁽²⁾

(1) Each pole has 2 contacts; the force must be applied evenly to each of these contacts.
 (2) Each pole has 3 contacts; the force must be applied evenly to each of these contacts.

Bar mounted contactors

TeSys contactors

TeSys LC1 B contactors

Replacement coils and accessories for single-pole contactors

TeSys B

References

The same coils are used for --- or \sim contactor control supply.

■ For d.c. operation, the following must be associated with the coil:

□ 1 economy resistor arrangement (resistors + 1 or 2 auxiliary contact(s) or 1 contactor).

■ For 50 to 400 Hz a.c. operation, the following must be associated with the coil:

□ 1 individual rectifier (to be wired)

□ 1 economy resistor arrangement (resistors + auxiliary contact(s) or 1 contactor) wired into the rectified current side.

Operating range min-max ⁽¹⁾		Coil		Economy resistor			Rectifier (for \sim only)		Coil	Weight
d.c.	a.c.	Resistance at 20 °C $\pm 10\%$	I inrush $\pm 10\%$ at U_n max	Resistor Unit reference	Total resistance	Contact Qty	Reference	Reference	Reference	kg
V	V	Ω	A		Ω					
47-51	–	5.1	10.3	DR2SC0270	270	1	ZC4GM2	–	WB1KB155	1.120
52-56	–	5.9	9.5	DR2SC0330	330	1	ZC4GM2	–	WB1KB132	1.120
57-64	–	7.3	8.9	DR2SC0390	390	1	ZC4GM2	–	WB1KB123	1.120
65-68	–	9.5	7.1	DR2SC0560	560	1	ZC4GM2	–	WB1KB133	1.120
69-79	–	11.6	6.9	DR2SC0680	680	1	ZC4GM2	–	WB1KB121	1.120
80-87	–	16.2	5.3	DR2SC0820	820	1	ZC4GM2	–	WB1KB130	1.120
88-94	–	19.9	4.7	DR2SC1000	1000	1	ZC4GM2	–	WB1KB140	1.120
95-108	110-125	25.5	4.3	DR2SC1200	1200	1	ZC4GM2	DR5TE1U	WB1KB134	1.120
109-136	126-155	33.1	4.2	DR2SC1800	1800	1	ZC4GM2	DR5TE1U	WB1KB124	1.120
137-151	156-173	50.9	3	DR2SC2700	2700	2	ZC4GM2	DR5TE1U	WB1KB122	1.120
152-166	174-191	61.36	2.7	DR2SC3300	3300	2	ZC4GM2	DR5TE1U	WB1KB135	1.120
167-189	192-216	78.4	2.4	DR2SC3900	3900	2	ZC4GM2	DR5TE1U	WB1KB136	1.120
190-221	217-256	94.8	2.3	DR2SC4700	4700	2	ZC4GM2	DR5TE1U	WB1KB139	1.120
222-243	257-280	123.9	1.9	DR2SC6800	6800	1	LC1DT20LDS135	DR5TE1U	WB1KB125	1.120
244-267	281-307	159.9	1.7	DR2SC8200	4700 + 3300	1	LC1DT20LDS135	DR5TE1S	WB1KB137	1.120
268-318	308-365	199.6	1.6	DR2SC1001	5600 + 4700	1	LC1DT20UDS135	DR5TE1S	WB1KB126	1.120
319-405	366-463	247.4	1.6	DR2SC1201	6800 + 5600	1	LC1DT20TDS135	DR5TE1S	WB1KB138	1.120
406-446	464-500	382	1.1 ⁽²⁾	DR2SC1001	20 000	1	LC1DT20VDS135	DR5TE1S	WB1KB127	1.120
447-500	–	506.7	1 ⁽³⁾	DR2SC1201	24 000	1	LC1DT20RDS135	–	WB1KB128	1.120

Specifications

■ Average coil consumption (low sealed consumption):

□ d.c.: inrush 380...520 W, sealed 0.15...0.20 W

□ a.c. (with rectifier): inrush 450...620 VA, sealed 0.15...0.20 VA

■ Time constant when sealed 25 ms

■ Economy resistor consumption: 7...10 W

■ Operating cycles/hour at $\theta \leq 55$ °C: ≤ 120

■ Mechanical durability at U_c : 1.2 million operating cycles

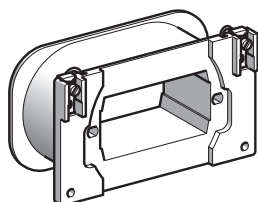
■ With a.c. operation: good resistance to voltage drop on inrush, non susceptibility to micro-breaks, mains harmonics: level ≤ 7 .

⁽¹⁾ For supply voltages of less than 110 V, beware of voltage drops caused by the inrush current.

⁽²⁾ 2 resistors in series: 2 x 10000 Ω .

⁽³⁾ 2 resistors in series: 2 x 12000 Ω .

DF522E04_eps



WB1 KB●●●

TeSys contactors

TeSys LC1 B contactors

Replacement coils and accessories for 2-pole contactors

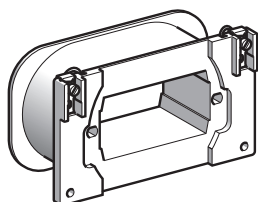
TeSys B

References

The same coils are used for \square or \sim contactor control supply.

- For d.c. operation, the following must be associated with the coil:
 - 1 economy resistor arrangement (resistors + 1 or 2 auxiliary contact(s) or 1 contactor).
- For 50 to 400 Hz a.c. operation, the following must be associated with the coil:
 - 1 individual rectifier (to be wired)
 - 1 economy resistor arrangement (resistors + auxiliary contact(s) or 1 contactor) wired into the rectified current side.

DF52634.eps



WB1 KB●●●

Operating range min-max ⁽¹⁾		Coil		Economy resistor			Rectifier (for \sim only)		Coil	Weight
d.c.	a.c.	Resis- tance at 20 °C ± 10 %	I inrush ± 10 % at U _n max	Resistors (2 in series) Unit reference	Total resis- tance	Contact Qty Reference	Reference	Reference		
V	V	Ω	A		Ω				kg	
48-51	–	3.22	15.8	DR2SC0068	2 x 68	1 ZC4GM2	–	WB1KB141	1.120	
52-56	–	4.04	13.8	DR2SC0082 DR2SC0100	82 + 100	1 ZC4GM2	–	WB1KB142	1.120	
57-62	–	4.96	12.5	DR2SC0100 DR2SC0120	100 + 120	1 ZC4GM2	–	WB1KB155	1.120	
63-68	–	5.86	11.6	DR2SC0120	2 x 120	1 ZC4GM2	–	WB1KB132	1.120	
69-79	–	7.2	11	DR2SC0150	2 x 150	1 ZC4GM2	–	WB1KB123	1.120	
80-85	–	9.6	8.8	DR2SC0180 DR2SC0220	180 + 220	1 ZC4GM2	–	WB1KB133	1.120	
86-98	99-113	11.4	8.6	DR2SC0220 DR2SC0270	220 + 270	1 ZC4GM2	–	WB1KB121	1.120	
99-108	114-125	16.3	6.6	DR2SC0330	2 x 330	1 ZC4GM2	DR5TE1U	WB1KB130	1.120	
109-119	126-136	19.7	6	DR2SC0390	2 x 390	1 ZC4GM2	DR5TE1U	WB1KB140	1.120	
120-136	137-156	25.2	5.4	DR2SC0470	2 x 470	2 ZC4GM2	DR5TE1U	WB1KB134	1.120	
137-173	157-196	32.5	5.3	DR2SC0680	2 x 680	2 ZC4GM2	DR5TE1U	WB1KB124	1.120	
174-191	197-216	49.7	3.8	DR2SC1000	2 x 1000	2 ZC4GM2	DR5TE1U	WB1KB122	1.120	
192-210	217-238	61	3.4	DR2SC1200	2 x 1200	2 ZC4GM2	DR5TE1U	WB1KB135	1.120	
211-238	239-272	77.2	3	DR2SC1500 DR2SC1800	1500 + 1800	2 ZC4GM2	DR5TE1U	WB1KB136	1.120	
239-279	273-318	94	3	DR2SC1800 DR2SC2200	1800 + 2200	1 LP1DT20LDS135	DR5TE1S	WB1KB139	1.120	
280-310	319-359	128	2.4	DR2SC2700	2 x 2700	1 LP1DT20UDS135	DR5TE1S	WB1KB125	1.120	
311-341	360-387	160	2.1	DR2SC3300	2 x 3300	1 LP1DT20TDS135	DR5TE1S	WB1KB137	1.120	
342-399	388-452	197	2	DR2SC3900	2 x 3900	1 LP1DT20TDS135	DR5TE1S	WB1KB126	1.120	
400-500	453-500	257	1.9	DR2SC4700 DR2SC5600	4700 + 5600	1 LP1DT20VDS135	DR5TE1S	WB1KB138	1.120	

Specifications

- Average coil consumption (low sealed consumption):
 - d.c.: inrush 600...800 W, sealed 0.35...0.5 W
 - a.c. (with rectifier): inrush 720...1000 VA, sealed 0.35...0.5 VA.
- Time constant when sealed 25 ms.
- Economy resistor consumption: 15...20 W.
- Operating cycles/hour at $\theta \leq 55$ °C: ≤ 120 .
- Mechanical durability at U_c: 1.2 million operating cycles.
- With a.c. operation: good resistance to voltage drop on inrush, non susceptibility to micro-breaks, mains harmonics: level ≤ 7 .

(1) For supply voltages of less than 110 V, beware of voltage drops caused by the inrush current.

TeSys contactors

TeSys LC1 B contactors

Replacement coils and accessories for 3-pole contactors

TeSys B

References

The same coils are used for --- or \sim contactor control supply.

■ For d.c. operation, the following must be associated with the coil:

□ 1 economy resistor arrangement (resistors + 1 or 2 auxiliary contact(s) or 1 contactor).

■ For 50 to 400 Hz a.c. operation, the following must be associated with the coil:

□ 1 individual rectifier (to be wired),

□ 1 economy resistor arrangement (resistors + auxiliary contact(s) or 1 contactor) wired into the rectified current side.

Operating range min-max ⁽¹⁾		Coil		Economy resistor		Rectifier (for \sim only)		Coil	Weight	
d.c.	a.c.	Resistance at 20 °C $\pm 10\%$	I inrush $\pm 10\%$ at U _n max	Resistors (2 in parallel or in series)	Contact	Reference	Reference			
V	V	Ω	A	Unit reference	Qty	Reference			kg	
47-50	–	1.85	27	DR2SC0150	2x150//	1	ZC4GM2	–	WB1KB154	1.120
51-55	–	2.35	23.5	DR2SC0180	2x180//	1	ZC4GM2	–	WB1KB153	1.120
56-60	–	3.22	18.5	DR2SC0220	2x220//	1	ZC4GM2	–	WB1KB141	1.120
61-66	–	4.04	16	DR2SC0270	2x270//	1	ZC4GM2	–	WB1KB142	1.120
67-72	–	4.96	14.5	DR2SC0330	2x330//	1	ZC4GM2	–	WB1KB155	1.120
73-79	–	5.86	13.5	DR2SC0100	2x100	1	ZC4GM2	–	WB1KB132	1.120
80-92	–	7.2	12.8	DR2SC0120	2x120	1	ZC4GM2	–	WB1KB123	1.120
93-98	108-113	9.6	10.2	DR2SC0150	150	1	ZC4GM2	DR5TE1U	WB1KB133	1.120
				DR2SC0180	+ 180					
99-114	114-132	11.4	10	DR2SC0180	180	1	ZC4GM2	DR5TE1U	WB1KB121	1.120
				DR2SC0220	+ 220					
115-126	133-145	16.3	7.7	DR2SC0270	2x270	2	ZC4GM2	DR5TE1U	WB1KB130	1.120
127-139	146-160	11.7	7	DR2SC0330	2x330	2	ZC4GM2	DR5TE1U	WB1KB140	1.120
140-159	161-181	25.2	6.3	DR2SC0390	390	2	ZC4GM2	DR5TE1U	WB1KB134	1.120
				DR2SC0470	+ 470					
160-201	182-228	32.2	6.2	DR2SC0560	2x560	2	ZC4GM2	DR5TE1U	WB1KB124	1.120
202-222	229-255	49.7	4.5	DR2SC0820	2x820	2	ZC4GM2	DR5TE1U	WB1KB122	1.120
223-246	256-282	61	4	DR2SC1000	2x1000	1	LC1DT20LDS135	DR5TE1S	WB1KB135	1.120
247-277	283-316	77.2	3.6	DR2SC1200	2x1200	1	LC1DT20LDS135	DR5TE1S	WB1KB136	1.120
278-327	317-372	94	3.5	DR2SC1500	2x1500	1	LC1DT20UDS135	DR5TE1S	WB1KB139	1.120
328-360	373-408	128	2.8	DR2SC1500	3x1500	1	LC1DT20TDS135	DR5TE1S	WB1KB125	1.120
361-399	409-452	160	2.5	DR2SC1800	3x1800	1	LC1DT20VDS135	DR5TE1S	WB1KB137	1.120
400-469	453-500	197	2.4	DR2SC2200	3x2200	1	LC1DT20VDS135	DR5TE1S	WB1KB126	1.120
470-500	–	257	1.9	DR2SC2700	3x2700	1	LC1DT20RDS135	–	WB1KB138	1.120

Specifications

■ Average coil consumption (low sealed consumption):

□ d.c.: inrush 900...1100 W, sealed 0.7...1 W

□ a.c. (with rectifier): inrush 1100...1300 VA, sealed 0.7...1 VA.

■ Time constant when sealed 25 ms.

■ Economy resistor consumption: 24...30 W.

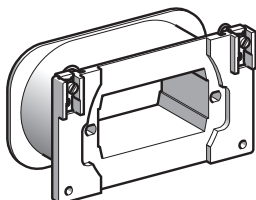
■ Operating cycles/hour at $\theta \leq 55\text{ °C}$: ≤ 120 .

■ Mechanical durability at U_c: 1.2 million operating cycles.

■ With a.c. operation: good resistance to voltage drop on inrush, non susceptibility to micro-breaks, mains harmonics: level ≤ 7 .

⁽¹⁾ For supply voltages of less than 110 V, beware of voltage drops caused by the inrush current.

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WB1 KB●●●

TeSys contactors

TeSys LC1 B contactors

Replacement coils and accessories for 4-pole contactors

TeSys B

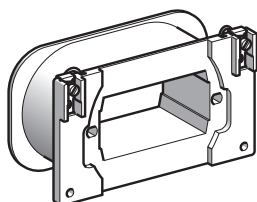
References

The same coils are used for $\overline{\text{---}}$ or \sim contactor control supply.

■ For d.c. operation, the following must be associated with the coil:
□ 1 economy resistor arrangement (resistors + 1 or 2 auxiliary contact(s) or 1 contactor).

■ For 50 to 400 Hz a.c. operation, the following must be associated with the coil:
□ 1 individual rectifier (to be wired),
□ 1 economy resistor arrangement (resistors + auxiliary contact(s) or 1 contactor) wired into the rectified current side.

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WB1 KB●●●

Operating range min-max ⁽¹⁾		Coil		Economy resistor			Rectifier (for \sim only)		Coil	Weight
d.c.	a.c.	Resistance at 20 °C $\pm 10\%$	I inrush $\pm 10\%$ at U_n max	Resistors (3 in series) Reference unit	Total resistance Ω	Contact Qty Reference	Reference	Reference		kg
V	V	Ω	A							
57-61	–	2.35	26	DR2SC0027	3x27	1	ZC4GM2	–	WB1KB153	1.120
62-67	–	3.22	21	DR2SC0033	3x33	1	ZC4GM2	–	WB1KB141	1.120
68-73	–	4.04	18	DR2SC0039	3x39	1	ZC4GM2	–	WB1KB142	1.120
74-81	–	4.96	16.3	DR2SC0047	3x47	1	ZC4GM2	–	WB1KB155	1.120
82-89	–	5.86	15	DR2SC0056	3x56	1	ZC4GM2	–	WB1KB132	1.120
90-102	105-119	7.2	14	DR2SC0068	3x68	1	ZC4GM2	DR5TE1U	WB1KB123	1.120
103-111	120-128	9.6	11.5	DR2SC0100	3x100	2	ZC4GM2	DR5TE1U	WB1KB133	1.120
112-129	129-148	11.4	11.3	DR2SC0100	3x100	2	ZC4GM2	DR5TE1U	WB1KB121	1.120
130-143	149-163	16.3	8.7	DR2SC0150	3x150	2	ZC4GM2	DR5TE1U	WB1KB130	1.120
144-157	164-179	19.7	8	DR2SC0180	3x180	2	ZC4GM2	DR5TE1U	WB1KB140	1.120
158-180	180-204	25.2	7.1	DR2SC0220	3x220	2	ZC4GM2	DR5TE1U	WB1KB134	1.120
181-226	205-259	32.5	6.9	DR2SC0330	3x330	2	ZC4GM2	DR5TE1U	WB1KB124	1.120
227-251	260-288	49.7	5	DR2SC0470	3x470	1	LC1DT20LDS135	DR5TE1S	WB1KB122	1.120
252-278	289-317	61	4.5	DR2SC0560	3x560	1	LC1DT20UDS135	DR5TE1S	WB1KB135	1.120
279-313	318-356	77.2	4	DR2SC0680	3x680	1	LC1DT20UDS135	DR5TE1S	WB1KB136	1.120
314-368	357-418	94	3.9	DR2SC0820	3x820	1	LC1DT20TDS135	DR5TE1S	WB1KB139	1.120
369-408	419-462	128	3.2	DR2SC1200	3x1200	1	LC1DT20VDS135	DR5TE1S	WB1KB125	1.120
409-448	463-500	160	2.8	DR2SC1500	3x1500	1	LC1DT20VDS135	DR5TE1S	WB1KB137	1.120
449-500	–	197	2.5	DR2SC1800	3x1800	1	LC1DT20RDS135	–	WB1KB126	1.120

Specifications

- Average coil consumption (low sealed consumption):
 - d.c.: inrush 1100...1400 W, sealed 1.2...1.6 W
 - a.c. (with rectifier): inrush 1300...1600 VA, sealed 1.2...1.6 VA
- Time constant when sealed 25 ms
- Economy resistor consumption: 35...45 W
- Operating cycles/hour at $\theta \leq 55\text{ °C}$: ≤ 120
- Mechanical durability at U_c : 1.2 million operating cycles
- With a.c. operation: good resistance to voltage drop on inrush, non susceptibility to micro-breaks, mains harmonics: level ≤ 7 .

⁽¹⁾ For supply voltages of less than 110 V, beware of voltage drops caused by the inrush current.

CR1 B

Magnetic latching contactors

TeSys B

Accessories for contactors CR1 B

Control circuit: a.c. or d.c. supply

Maximum thermal current in category AC-1	Rated operational current in category AC-3	Composition	Number of instantaneous auxiliary contacts		Basic reference, to be completed by adding the voltage code ⁽¹⁾	Weight
			N/C	N/O		
800	750	1 pole	2	1	CR1BL31●21 ⁽²⁾	32.000
		2 poles	2	1	CR1BL32●21 ⁽²⁾	45.000
		3 poles	2	1	CR1BL33●21 ⁽²⁾	58.000
		4 poles	2	1	CR1BL34●21 ⁽²⁾	72.000
1250	1000	1 pole	2	1	CR1BM31●21 ⁽²⁾	31.000
		2 poles	2	1	CR1BM32●21 ⁽²⁾	44.000
		3 poles	2	1	CR1BM33●21 ⁽²⁾	57.000
		4 poles	2	1	CR1BM34●21 ⁽²⁾	71.000
2000	1500	1 pole	2	1	CR1BP31●21 ⁽²⁾	41.000
		2 poles	2	1	CR1BP32●21 ⁽²⁾	65.000
		3 poles	2	1	CR1BP33●21 ⁽²⁾	94.000
		4 poles	2	1	CR1BP34●21 ⁽²⁾	120.000
2750	1800	1 pole	2	1	CR1BR31●21 ⁽²⁾	52.000
		2 poles	2	1	CR1BR32●21 ⁽²⁾	85.000
		3 poles	2	1	CR1BR33●21 ⁽²⁾	129.000
		4 poles	2	1	CR1BR34●21 ⁽²⁾	160.000

⁽¹⁾ Standard control circuit voltages:

Volts	110	125	127	200	220	240	250	380	412	440	500
~ 50-400 Hz	F	-	G	L	M	U	-	Q	N	R	S
---	FD	GD	-	-	MD	UD	UCD	-	-	RD	SD

For other voltages, see tables of references coils page B10/11 or consult us.

⁽²⁾ Other configurations, see below.

Other configurations for CR1 B

For other configurations of auxiliary contacts, replace the number 21 (2 "N/O" + 1 "N/C") by the reference of the chosen configuration.
Example: LC1 BP33●30.

1 "N/O" + 2 "N/C"	→	12
3 "N/O"	→	30

Accessories for contactors CR1 B

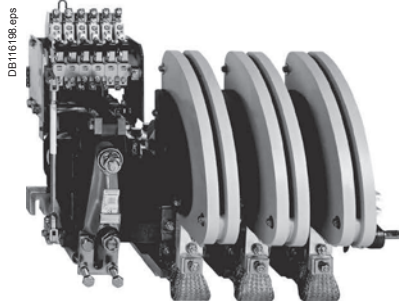
Description	Application	Reference	Weight
Mechanical interlock ⁽³⁾ with mounting accessories	For vertical assembly of reversing contactors and CR1 B changeover contactor pairs	EZ2LB0601	1.560
Kit containing 2 bar mounting brackets		LA9B103	1.620

Spare parts see page B10/12.

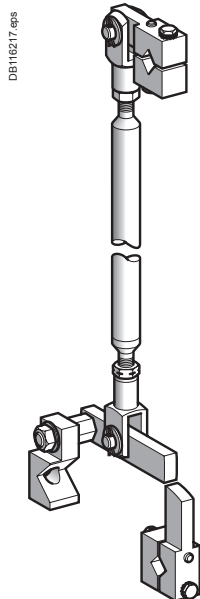
Note: the protection coil control circuit against short circuits must be performed by a fuse coordinated with the cable section used: 1.5 mm² for copper: 12 A fuse maximum (BS88 or g1).

⁽³⁾ Positive mechanical interlocking between 2 vertically mounted contactors of identical or different ratings. Connecting rods and cranks assembled on right-hand sides, crank pins on the pole side.

Vertical fixing centre distance between the two contactors: 600 mm.



CR1 BL33



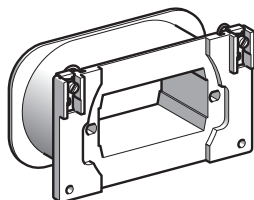
CR1 B

Magnetic latching contactors

TeSys B

Coils for CR1 B contactors

DF52634.eps



WB1 KB●●●

Usual voltage		Coils		Spare parts		Cut-out contact		Rectifier for ~
~	~	Resistance (θ = 20 °C)	Reference	Additional resistors ⁽¹⁾				
V	V	Ω		R1	R2	Number	Type	
		For CR1 B●31						
		1 pole						
-	110/120	19.7	WB1KB140	68	47	2	ZC4GM2 or ZC4GM8	DR5TE1U
110 / 125	-	25.2	WB1KB134	68	68	2	ZC4GM2 or ZC4GM8	-
-	220/240	77.2	WB1KB136	220	180	2	ZC4GM2 or ZC4GM8	DR5TE1U
220	-	94	WB1KB139	270	220	2	ZC4GM2 or ZC4GM8	-
250	-	128	WB1KB125	330	270	3	ZC4GM2 or ZC4GM8	-
-	380/400	197	WB1KB126	470	470	3	ZC4GM2 or ZC4GM8	DR5TE1S
-	415/440	257	WB1KB138	1000	470	3	ZC4GM2 or ZC4GM8	DR5TE1S
		For CR1 B●32						
		2 poles						
-	110	9.6	WB1KB133	10	33	1	PR4FB0011	DR5TE1U
110	120/127	11.4	WB1KB121	47	39	1	PR4FB0010	DR5TE1U
125	-	19.7	WB1KB140	100	47	1	PR4FB0009	-
-	220	32.5	WB1KB124	120	120	1	PR4FB0007	DR5TE1U
220	240	49.7	WB1KB122	220	150	1	PR4FB0007	DR5TE1U
250	-	77.2	WB1KB136	330	220	1	PR4FB0006	-
-	380/400	128	WB1KB125	470	470	1	PR4FB0005	DR5TE1S
-	415/440	160	WB1KB137	680	560	1	PR4FB0004	DR5TE1S
		For CR1 B●33						
		3 poles						
-	110	7.2	WB1KB123	39	27	1	PR4FB0012	DR5TE1U
110	120/127	9.6	WB1KB133	47	39	1	PR4FB0011	DR5TE1U
125	-	11.4	WB1KB121	56	47	1	PR4FB0010	-
220	240	32.5	WB1KB124	180	120	1	PR4FB0008	DR5TE1U
250	-	61	WB1KB135	270	270	1	PR4FB0006	-
-	380/400	94	WB1KB139	470	390	1	PR4FB0005	DR5TE1S
-	415/440	128	WB1KB125	680	470	1	PR4FB0004	DR5TE1S
		For CR1 B●34						
		4 poles						
-	110	5.8	WB1KB132	33	27	1	PR4FB0014	DR5TE1U
110	120/127	7.2	WB1KB123	47	33	1	PR4FB0012	DR5TE1U
125	-	11.4	WB1KB121	56	45	1	PR4FB0010	-
-	220	25.2	WB1KB134	150	120	1	PR4FB0008	DR5TE1U
-	240	32.5	WB1KB124	180	150	1	PR4FB0007	DR5TE1U
250	-	49.7	WB1KB122	270	220	1	PR4FB0007	-
-	380	77.2	WB1KB136	390	390	1	PR4FB0006	DR5TE1S
-	400/440	94	WB1KB139	560	470	1	PR4FB0005	DR5TE1S

(1) For hot and humid conditions "TH treatment", the references of the coils are supplemented by the letters "TH".

Example: **WB1 KB 135TH**.

Reference of resistance: **DR2 SC0010** for 10 ohms and **DR2 SC0470** for 470 ohms.

Weight of the various elements:

■ coil WB1 KB●●●	1.120 kg
■ contact ZC4 GM●	0.030 kg
■ switch PR4 FB00●●	0.600 kg
■ rectifier DRS TEI●	0.100 kg
■ resistance DR2 SC0●●●	0.030 kg

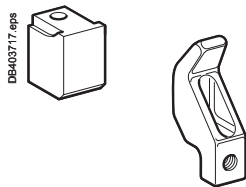
CR1 B Magnetic latching contactors

TeSys B

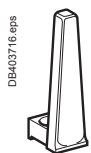
Separate components and spare

Description	For contactors	Number of sets required per pole	Reference	Weight kg
Sets of contacts (1 moving contact, 1 fixed contact)	CR1BL	1	PA1LB80	0.420
	CR1BM	1	PA1LB80	0.420
	CR1BP	2	PA1LB80	0.420
	CR1BR	3	PA1LB80	0.420
Description	For contactors	Composition	Reference	Weight kg
Moving contact only (for one finger)	CR1B		PA1LB75	0.220
Fixed contact only (for one finger)	CR1B		PA1LB76	0.200
Blow-out horn only (for 1 finger)	CR1B		PA1LB89	0.120
Arc chambers (for a single pole)	CR1BL		PA1LB50	3.700
	CR1BM		PA1LB50	3.700
	CR1BP		PA1PB50	6.200
	CR1BR		PA1RB50	8.500
Auxiliary contact blocks	CR1B	1 contact N/C	ZC4GM1	0.030
	CR1B	1 contact N/O	ZC4GM2	0.030
	CR1B	1 contact N/C	ZC4GM9	0.030
	CR1B	1 contact N/O	ZC4GM8	0.030
Switch pole for automatic cut-out coil	CR1B		PR4FB00●● ⁽¹⁾	0.600
Set of moving and fixed contacts for switch pole	CR1B		PV1FA80	0.035
Arc chamber for switch pole	CR1B		PN1FB50	0.220

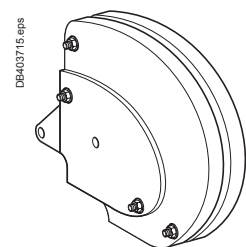
Mechanical interlock for the realization of reversing superposed contactors ref. E22-LB0601



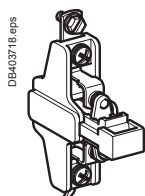
PA1 LB80
(PA1 LB76 + PA1 LB75)



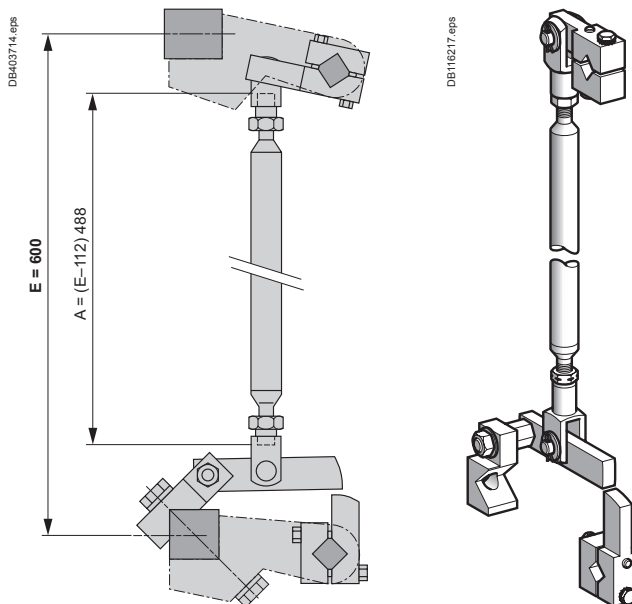
PA1 LB89



PA1 LB50








ZC4 GM1








⁽¹⁾ Reference to be completed, see page B10/10.

CRX B and CVX B for switching the excitation circuits of synchronous machines

TeSys B

Magnetic latching contactors							
Control circuit: dc							
Operational voltage	Number of pole N/O	Number of pole N/C	Instantaneous auxiliary contacts		Rated operational current	Basic reference to be completed by adding the voltage ⁽¹⁾	Weight
 V					A		kg
850	2	1	6	2	80	CRXBF21●●	6.280
					170	CRXBG21●●	10.890
					250	CRXBH21●●	15.000
					470	CRXBJ21●●	21.700
					630	CRXBK21●●	38.150
					800	CRXBL21●●	58.000
					1250	CRXBM21●●	58.000
					2000	CRXBP21●●	81.000
					2750	CRXBR21●●	114.000

Contactors with standard electromagnets							
Control circuit: dc with economy resistor							
Operational voltage	Number of pole N/O	Number of pole N/C	Instantaneous auxiliary contacts		Rated operational current	Basic reference to be completed by adding the voltage ⁽¹⁾	Weight
 V					A		kg
850	2	1	6	2	80	CVXBF21●●	6.280
					170	CVXBG21●●	10.890
					250	CVXBH21●●	15.000
					470	CVXBJ21●●	21.700
					630	CVXBK21●●	38.150
					800	CVXBL21●●	58.000
					1250	CVXBM21●●	58.000
					2000	CVXBP21●●	81.000
					2750	CVXBR21●●	114.000

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office).

Volts	110	125	250
	FD	GD	UD

Bar mounted contactors

CRX B and CVX B for switching the excitation circuits of synchronous machines

Contactors description

CRX and CVX B contactors comprise:

- 2 N/O poles with magnetic blow-out (80...2750 A at $\bar{\bar{~}}$ 850 V).
- 1 N/C pole without blow-out (80...630 A).
- 1 electromagnet with d.c. supply
 - either magnetic latching (CRX B●21●●)
 - or with economy resistor (CVX B●21●●).
- 2 instantaneous auxiliary contact heads (6 N/O contacts + 2 N/C contacts).
- 1 mounting bar, 1 rotary drive shaft.

The following can be added:

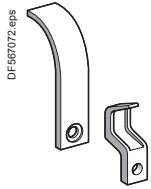
- 1 or 2 blocks of 4 instantaneous auxiliary contacts LAD N●●, without increasing the overall size of the contactor.
- or 1 time delay block LAD T● or LAD R●.

Note: it is not possible to fit a mechanical latch block LA6 DK●● on these contactors.

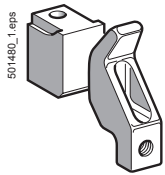
Characteristics											
Sizes of contactors CRX B and CVX B			F	G	H	J	K	L	M	P	R
N/O Pole											
Rated current	$\theta \leq 40 \text{ }^\circ\text{C}$	A	80	170	250	470	630	800	1250	2000	2750
Maximum operating voltage d.c.	2 pole series	V	850								
Rated insulation voltage According to IEC 60664-1	d.c.	V	1000								
Making capacity	d.c.	A	1400	2900	3500	5200	6500	14 000	14 000	21 000	25 000
Breaking capacity	d.c. L/R = 15 ms	A	500	1000	1200	1200	1500	3200	4400	7200	10 000
Overlap time with the N/C pole		ms	2								
N/C Pole											
Rated current	$\theta \leq 40 \text{ }^\circ\text{C}$	A	80	200	300	470	630	630	630	630	630
Making capacity	d.c.	A	1600	3200	4000	5200	6500	6500	6500	6500	6500
Breaking capacity	d.c. L/R = 15 ms	A	0								
Permissible current	For 10 seconds	A	480	960	1400	2700	3600	3600	3600	3600	3600

CRX B and CVX B for switching the excitation circuits of synchronous machines

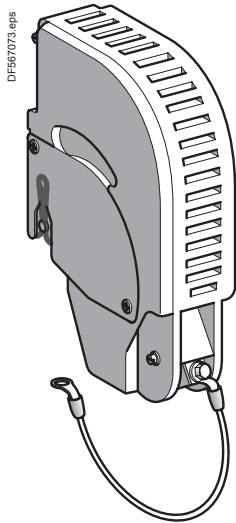
TeSys B



PN1 JB80



PN1 LB80



PN3 KB50

Spare parts

Sets of contacts for CRX contactors

Description	Number of sets required per contactor pole	CRX B and CVX B contactor sizes	Reference	Weight kg
1 fixed contact	1	F	PA2FB80	0.070
+ 1 moving contact	1	G	PA2GB80	0.160
	1	H	PA2HB80	0.220
	1	J	PN1JB80	0.320
	1	K	PN1KB80	0.440
	1	L	PA1LB80	0.420
	1	M	PA1LB80	0.420
	2	P	PA1LB80	0.420
	3	R	PA1LB80	0.420

Arc chamber only

Description	Number of sets required per contactor pole	CRX B and CVX B contactor sizes	Reference	Weight kg
Arc chamber	1	F	PA2FB50	0.070
		G	PA2GB50	0.160
		H	PA2HB50	0.220
		J	PN3JB50	0.320
		K	PN3KB50	0.440
		L	PA1LB50	0.420
		M	PA1LB50	0.420
		P	PA1PB52	0.840
		R	PA1RB52	1.260

Variable composition standard and high performance contactors

TeSys B

Applications

- Motor switching in categories AC-3.
- Resistive load switching: heating, etc.
- Distribution circuit switching: line contactor.
- Supply changeover switching: circuit coupling etc.
- Transformer, capacitor, lighting switching.

PE110889.eps



PE110893.eps



Contactors	Type
	Size

Rated operational current	AC-3
	AC-4/DC-5
	AC-1

Rated operational voltage

Available with configuration type command

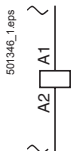
CV1 B					
F	G	H	J	K	L

80 A	170 A	250 A	350 A	460 A	700 A
72 A/-	145 A/-	205 A/-	290/470 A ⁽¹⁾	380/630 A ⁽¹⁾	584/1000 A ⁽¹⁾
80 A	200 A	300 A	470 A	630 A	1000 A
690 V ~	690 V ~	690 V ~	690 V ~	690 V ~	690 V ~

A - B - C - D

Available control circuit configuration

Type A
a.c. supply ~



Type B
d.c. supply ⎓

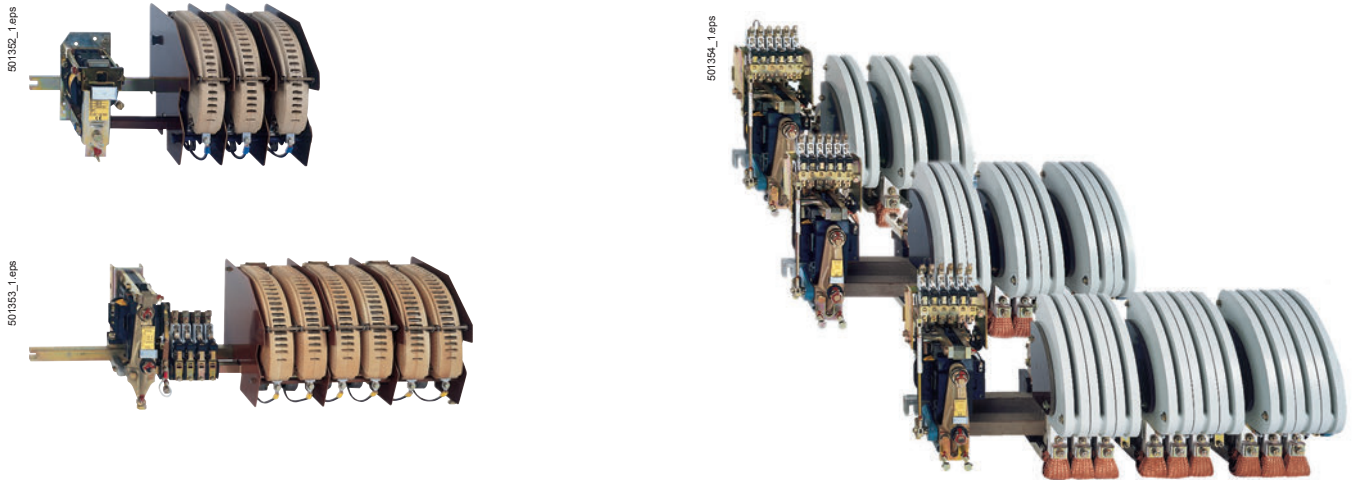


⁽¹⁾ With PN3 poles.

Variable composition standard and high performance contactors

TeSys B

- Motor switching in categories AC-4, DC-5.
- Inductive circuit switching.
- High voltage d.c. switching: crane electromagnets, railway locomotives.
- Load switching at high operating rates.



CV3 B

F	G	H	J	K
80 A	200 A	250 A	320 A	460 A
80/80 A	170/200 A	208/300 A	250/320 A	380/500 A
80A	200 A	300 A	320 A	500 A
1000 V ~	1000 V ~	1000 V ~	1000 V ~	1000 V ~

A - B - C - D

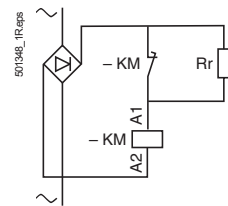
CV3 B and LC1 B

L	M	P	R
800 A	1000 A	1500 A	1800 A
720/800 A	830/1000 A	1200/1800 A	1500/2500 A
800 A	1250 A	2000 A	2750 A
1000 V ~	1000 V ~	1000 V ~	1000 V ~

C - D
(B: special conditions - contact us)

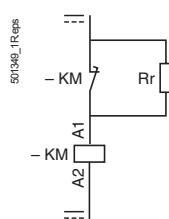
Type C

a.c. supply via economy resistor



Type D

d.c. supply via economy resistor



Selection

To define a contactor

The criteria required to define the composition of a contactor are:

- the number of N/O and N/C power poles
 - the current and power supply voltage
- (note: on a d.c. supply, the time constant $\frac{L}{R}$ of the load must be known in order to define the number of poles to be wired in series to break the arc)
- the control circuit voltage
 - the number of auxiliary contacts.

To order a contactor

Three possibilities are offered:

- contactor selectable by code combinations:
- use the configuration software "bar contactor soft-customer.xls" to download on: www.schneider-electric.com.
- use the symbol combination table, on the next page.
- Contactor not selectable by code combinations use the symbol combination table or the software, use the order form on catalogue DIA2070702EN.

To order a contactor manually

contactor selectable by code combinations

- Use the symbol combination table on the next page.
- Check the operational currents possible in the selection restrictions table, below.
- Check the maximum number of poles in the selection table, below.

Choice of operational current (I_e) for contactors selectable by code combinations

Contactor type		CV1 BF CV3 BF	CV1 BG CV3 BG	CV1 BH CV3 BH	CV1 BJ CV3 BJ	CV1 BK CV3 BK	CV1 BL
Rated operational current ⁽¹⁾	11 A	E	–	–	–	–	–
	13 A	M	–	–	–	–	–
	20 A	N	–	–	–	–	–
	40 A	P	–	–	–	–	–
	50 A	Q	Q	–	–	–	–
	80 A	F	–	–	–	–	–
	125 A	–	R	R	–	–	–
	200 A	–	G	G	–	–	–
	250 A	–	–	–	S	–	–
300 A	–	–	H	–	–	–	

(1) Other rating: contact us.

Guide to selection of poles for code combinations

Maximum potential of pole contactors, new design (size F to H)

Pole N/O	Pole N/C
0	1
1	0
1	1
2	0
2	1
3	0
4	0

For another combination, please contact us.

Contactors CV1 B or CV3 B:

number of standard auxiliary contacts: 3 N/O + 2 N/C + additive Tesys D.

Examples

- Switching of single-phase capacitor: 400 V - 80 A - 1 N/O main pole. 220 V / 50 Hz. control circuit voltage, 3 N/O and 2 N/C auxiliary contacts.

Reference: **CV1 BF1F0ZM5A**.

- Switching of d.c. heating circuits: 800 V - 150 A - 2 N/O main poles - 48 V ---. control circuit, instantaneous auxiliary contact 1 N/O + 1 on-delay.

Reference: **CV3 BG2G0ZEDA + LADT 0, 2 or 4**.

Other versions

To obtain a composition with more main poles or with more than 4 auxiliary contacts, please use **order form CF 452**, on catalogue DIA2070702EN..

Variable composition contactors CV1B / CV3B - 80 to 300 A

Symbol combination table

TeSys B

Reference to be constituted (see examples page B10/18)

Type of contactor related to application									
~ 690 V, --- 220 V/pole		CV1 B							
~ 1000 V, --- 440 V/pole		CV3 B							
Contactor size AC-1/AC-3									
CV1: 80/80 A	CV3: 80/80 A	F *							
CV1: 200/170 A	CV3: 200/200 A	G *							
CV1: 300/250 A	CV3: 300/285 A	H *							
Number of poles									
N/O poles	1 N/O		1						
	2 N/O		2						
	3 N/O		3						
	4 N/O		4						
N/C poles	1 N/C				1				
No main poles			0	Z	0	Z			
Operational current (determines the blow-out coil size)									
11 A				E		E			
13 A				M		M			
20 A				N		N			
40 A				P		P			
50 A				Q		Q			
80 A				F		F			
125 A				R		R			
200 A				G		G			
250 A				S		S			
300 A				H		H			
Without breaking				Z		Z			
Control circuit voltage									
24 V							B		
48 V							E		
110 V							F		
120 V							K		
127 V							G		
208 V							L		
220 V							M		
230 V							P		
240 V							U		
380 V							Q		
400 V							V		
Operating frequency									
50 Hz								5	
60 Hz								6	
50/60 Hz (rectifier + economy resistor)								7	
---								D	
--- + economy resistor								R	
Auxiliary contacts (LA1 BN32 + additives (fitted as standard))									
Instantanés	3 N/O + 2 N/C								A

To check whether the symbol combinations are possible, refer to the selection information and guide on pages B10/18 and B10/20.
If in doubt, fill out order form CF 452, see catalogue DIA2070702EN.

* New design, can use any additives in the range of contactors TeSys D except LA6DK, and LAD6K LAD8N.

Important information for use by Schneider Electric

To place an order in SAP GRC switch-LOGOS

Example: Order the contactor CRXBKZ1GD

- enter in the Reference product "CRXBK"
- in the field "Technical text", specify "CRXBKZ1GD".

Bar
mounted
contactors

Variable composition contactors

CV1 B - 80 to 1000 A

CV3 B - 80 to 500 A

TeSys B

Selection (see page B10/18)

To order a contactor manually contactor selectable by code combinations

- Use the symbol combination table on page B10/21.
- Check the operational currents possible in the selection restrictions table, below.
- Check the maximum number of poles in the selection table, below.

Choice of operational current (I_e) for contactors selectable by code combinations

Contactor type		CV1 BF CV3 BF	CV1 BG CV3 BG	CV1 BH CV3 BH	CV1 BJ CV3 BJ	CV1 BK CV3 BK	CV1 BL
Rated operational current ⁽¹⁾	11 A	E	–	–	–	–	–
	13 A	M	–	–	–	–	–
	20 A	N	–	–	–	–	–
	40 A	P	–	–	–	–	–
	50 A	Q	Q	–	–	–	–
	80 A	F	–	–	–	–	–
	125 A	–	R	R	–	–	–
	200 A	–	G	G	–	–	–
	250 A	–	–	–	S	–	–
	300 A	–	–	H	–	–	–
	320 A	–	–	–	T	–	–
	400 A	–	–	–	–	U	–
	470 A	–	–	–	J	–	–
	500 A	–	–	–	–	V	–
	630 A	–	–	–	–	K	K
1000 A	–	–	–	–	–	L	
0 Sans soufflage	Z	Z	Z	Z	Z	Z	

(1) Other rating: contact us.

Guide to selection of code combinations

CV1 B contactors: maximum number of power poles

Contactor type	CV1 BF		CV1 BG		CV1 BH		CV1 BJ		CV1 BK		CV1 BL	
	N/O	N/C	N/O	N/C	N/O	N/C	N/O	N/C	N/O	N/C	N/O	N/C
Number of poles	5	0	4	0	4	0	4	0	4	0	2 ⁽¹⁾	0
	0	2	0	2	0	2	0	2	0	2	0	1 ⁽²⁾
	2	1	2	1	2	1	2	1	2	1	–	–

CV3 B contactors: maximum number of power poles

Contactor type	CV3 BF		CV3 BG		CV3 BH		CV3 BJ		CV3 BK	
	N/O	N/C	N/O	N/C	N/O	N/C	N/O	N/C	N/O	N/C
Number of poles	5	0	4	0	4	0	2	0	2	0
	0	2	0	2	0	2	–	–	–	–
	1	2	1	2	–	–	–	–	–	–
	3	1	2	1	2	1	–	–	–	–

CV1 B or CV3 B contactors:

Maximum number of auxiliary contacts: 4 + 1 time delay if necessary

Selection restrictions, according to coil type:

(1) 4-pole with economy resistor.

(2) 2-pole with economy resistor.

Variable composition contactors

CV1 B - 80 to 1000 A

CV3 B - 80 to 500 A

Symbol combination table

TeSys B

Reference to be constituted (see examples page B10/20)

Type of contactor related to application											
~ 690 V, --- 220 V/pole		CV1 B									
~ 1000 V, --- 440 V/pole		CV3 B									
Contactor size AC-1/AC-3											
CV1: 80/80 A	CV3: 80/80 A	F									
CV1: 200/170 A	CV3: 200/200 A	G									
CV1: 300/250 A	CV3: 300/285 A	H									
CV1: 470/350 A	CV3: 320/320 A	J									
CV1: 630/460 A	CV3: 500/460 A	K									
CV1: 1000/700 A		L									
Number of poles											
N/O poles	1 N/O		1								
	2 N/O		2								
	3 N/O		3								
	4 N/O		4								
	5 N/O		5								
N/C poles	1 N/C				1						
	2 N/C				2						
	3 N/C				3						
No main poles		0	Z	0	Z						
Operational current (determines the blow-out coil size)											
11 A				E	E						
13 A				M	M						
20 A				N	N						
40 A				P	P						
50 A				Q	Q						
80 A				F	F						
125 A				R	R						
200 A				G	G						
250 A				S	S						
300 A				H	H						
320 A				T	T						
400 A				U	U						
470 A				J	J						
500 A				V	V						
630 A				K	K						
1000 A				L	L						
Without breaking				Z	Z						
Control circuit voltage											
24 V									B		
48 V									E		
110 V									F		
120 V									K		
127 V									G		
208 V									L		
220 V									M		
230 V									P		
240 V									U		
380 V									Q		
400 V									V		
415 V									N		
440 V									R		
480 V									T		
500 V									S		
600 V									X		
Operating frequency											
50 Hz										5	
60 Hz										6	
50/60 Hz (rectifier + economy resistor)										7	
---										D	
--- + economy resistor										R	
Auxiliary contacts (type ZC4 GM)											
N/O instantaneous	1 N/O										1
	2 N/O										2
	3 N/O										3
	4 N/O										4
N/C instantaneous	1 N/C										1
	2 N/C										2
	3 N/C										3
	4 N/C										4
No instantaneous auxiliary contacts										0	0
On-delay	1 N/O + 1 N/C on-delay										J
Off-delay	1 N/O + 1 N/C off-delay										N

To check whether the symbol combinations are possible, refer to the selection information and guide on pages B10/18 and B10/20.
If in doubt, fill out order form CF 452, on catalogue DIA2070702EN.

Bar mounted contactors

Technical Data for Designers

Contents

TeSys LC1B:

- > characteristics ... B10/24 and B10/25
- > dimensions B10/26
- > schemes..... B10/27

TeSys CR1B:

- > presentation..... B10/28
- > selection..... B10/29 and B10/30
- > characteristics ... B10/31 and B10/32
- > dimensions B10/33
- > schemes..... B10/34

TeSys CRXB, CVXB:

- > presentation..... B10/35
- > dimensions B10/36

TeSys CV1B, CV3B:

- > presentation..... B10/37 to B10/40

TeSys B

Environment							
Contactor type			LC1 BL	LC1 BM	LC1 BP	LC1 BR	
Rated insulation voltage (Ui)	Conforming to IEC 60158-1/IEC 60947-4	V	1000	1000	1000	1000	
	Conforming to VDE 0110 gr C	V	1500	1500	1500	1500	
Conforming to standards			IEC 60947-4, EN 60947-4				
Product certifications			CSA				
Ambient air temperature around the device (for operation at Uc)	Storage	°C	-60...+80				
	Operation	°C	-5...+55				
	Permissible	°C	-30...+70				
Maximum operating altitude	Without derating	m	2000				
Operating positions	Without derating		±23° occasional, in relation to normal vertical mounting plane				
Pole characteristics							
Number of poles			1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4	
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, θ ≤ 55 °C	A	750	1000	1500	1800	
	In AC-1, θ ≤ 40 °C	A	800	1250	2000	2750	
Rated operational voltage (Ue)	Up to	V	1000				
Frequency limits (sine wave)	Without derating	Hz	50/60				
	Derating coefficient		100 Hz: 0.9 - 150 Hz: 0.8 - 250 Hz: 0.7 - 400 Hz: 0.5				
Maximum thermal current (Ith)	θ ≤ 40 °C	A	800	1250	2000	2750	
Rated making capacity	I rms conforming to IEC 60158-1 and 60947-4	A	8000	9000	12000	15000	
Rated breaking capacity	I rms conforming to IEC 60158-1 and 60947-4	up to 440 V	A	8000	9000	12000	15000
		500 V	A	7000	8000	12000	14000
		660-690 V	A	6000	7000	9000	11000
		1000 V	A	4000	4000	5000	6000
Permissible short time rating From cold state, with no current flowing for previous 60 minutes at θ ≤ 40 °C	For 1 s	A	9600	9600	12000	15000	
	For 5 s	A	9600	9600	12000	15000	
	For 10 s	A	7000	8000	9600	12000	
	For 30 s	A	4800	5200	6400	8000	
	For 1 min.	A	3500	3800	5200	6300	
	For 3 min.	A	2100	2400	3600	4400	
	For 10 min.	A	1200	1800	2800	3600	
Short-circuit protection by fuses U ≤ 440 V	Motor circuit (type aM)	A	800	1200	2 x 800 ⁽¹⁾	2 x 1000 ⁽¹⁾	
	With thermal overload relay (type gl)	A	1000	1500	2 x 1000 ⁽¹⁾	2 x 1200 ⁽¹⁾	
	gl fuses	A	800	1200	2 x 1000 ⁽¹⁾	2 x 1200 ⁽¹⁾	
Average impedance per pole	At Ith and 50 Hz	mΩ	0.18	0.18	0.13	0.09	
Power dissipated per pole	AC-3	W	115	180	290	290	
	AC-1	W	115	280	520	680	
Connection	Number of bars		2	2	3	4	
	Bar	mm	50 x 5	80 x 5	100 x 5	100 x 5	
Bolt diameter		mm	4 x Ø8	4 x Ø10	4 x Ø10	4 x Ø10	
Tightening torque	Power circuit connections	N.m	18	35	35	35	

(1) Fuses must not be connected in parallel unless specified by the manufacturer.

TeSys B

Control circuit characteristics

Contactor type			LC1 BL	LC1 BM	LC1 BP	LC1 BR
Rated control voltage	50/60 Hz	V	110...500	110...500	110...500	110...500
	≡ 1,2 or 3-pole contactors	V	48...500	48...500	48...500	48...500
	≡ 4-pole contactors	V	48...500	48...500	48...500	60...500
Voltage limits	Operation	V	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Ucw
	Drop-out	V	0.30...0.50 Uc	0.30...0.50 Uc	0.35...0.50 Uc	0.40...0.50 Uc
Maximum consumption (coil + economy resistor)	~	Number of poles: 1	VA	Inrush: 620 - sealed: 10		
		Number of poles: 2	VA	Inrush: 1000 - sealed: 20		
		Number of poles: 3	VA	Inrush: 1300 - sealed: 31		
		Number of poles: 4	VA	Inrush: 1600 - sealed: 47		
	≡ (1)	Number of poles: 1	W	Inrush: 520 - sealed: 10		
		Number of poles: 2	W	Inrush: 800 - sealed: 20		
		Number of poles: 3	W	Inrush: 1100 - sealed: 31		
		Number of poles: 4	W	Inrush: 1400 - sealed: 47		
Operating time (2) average at Uc (in milliseconds)	"C"	ms	100...150	100...150	100...150	100...150
	"O" breaking on ~ side	ms	50...100	50...100	50...100	50...100
	"O" breaking on ≡ side	ms	20...40	20...40	20...40	20...40
Mechanical durability (at Uc)	In millions of operating cycles		1.2	1.2	1.2	1.2
Maximum operating rate in mechanical operating cycles	Ambient temperature ≤ 55 °C	Op. cycs/h	120	120	120	120

Characteristics of instantaneous auxiliary contacts ZC4 GM

Rated thermal current	A	20									
Rated insulation voltage	Conforming to IEC 60947-1	V	660								
	Conforming to VDE, group C	V	750								
Short-circuit protection gl type cartridge fuses	Conforming to IEC 60947-1 and VDE 0660	A	20								
Operational power	1 million operating cycles	~ supply				≡ supply					
		V	110/127	220	380	415/440	500	110	220	440	500
		VA/W	2000	4000	4000	4000	3500	250	250	230	200
Making and breaking capacity	VA/W	14000	23000	35000	45000	35000	1600	800	400	360	
Cabling	With cable end	mm ²	1 or 2 x 4 mm ² conductors								
	Without cable end	mm ²	1 or 2 x 6 mm ² conductors								

(1) The inrush and sealed power values of d.c. electromagnets often require the use of an intermediate relay for control.

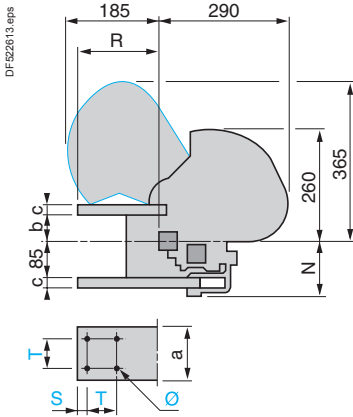
(2) The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

TeSys contactors

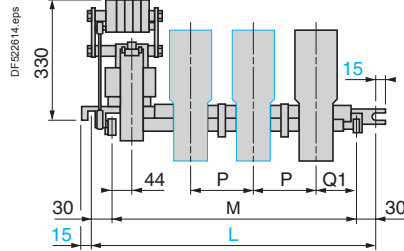
TeSys LC1 B contactors

TeSys B

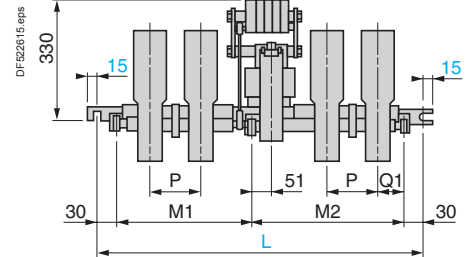
Single, 2, 3 or 4-pole contactors LC1 B Common side view



Single, 2 or 3-pole contactors LC1 B●31, B●32 or B●33



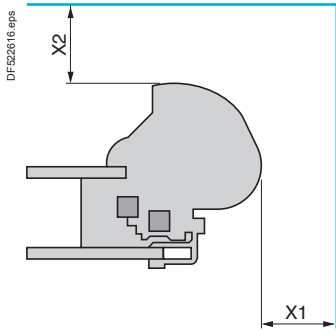
4-pole contactors LC1 B●34



Number of poles	LC1 BL				LC1 BM				LC1 BP				LC1 BR			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
a	50	50	50	50	63	63	63	63	100	100	100	100	125	125	125	125
b	59	59	59	59	55	55	55	55	55	55	55	55	50	50	50	50
c	16	16	16	16	20	20	20	20	20	20	20	20	25	25	25	25
L	345	445	540	760	345	445	540	760	385	540	760	1065	445	635	885	1065
M	285	385	480	—	285	385	480	—	325	480	700	—	385	575	825	—
M1	—	—	—	308	—	—	—	308	—	—	—	455	—	—	—	455
M2	—	—	—	392	—	—	—	392	—	—	—	550	—	—	—	550
N	121	121	121	121	125	125	125	125	125	125	125	125	130	130	130	130
P	100	100	100	100	100	100	100	100	150	150	150	150	195	195	195	195
Q1	100	100	100	100	100	100	100	100	110	110	110	110	130	130	130	130
R	122	122	122	122	157	157	157	157	173	173	173	173	173	173	173	173
S	10	10	10	10	17	17	17	17	20	20	20	20	20	20	20	20
T	30	30	30	30	30	30	30	30	60	60	60	60	60	60	60	60
Ø	9	9	9	9	11	11	11	11	11	11	11	11	11	11	11	11

Electrical safety clearance

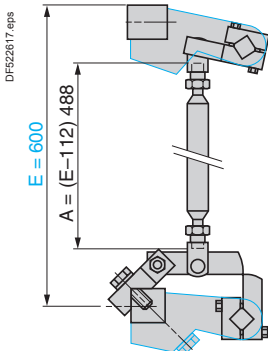
Values X1 and X2 are given for a breaking capacity of 10 In (~ 3-phase supply).



~ 3-phase voltage	LC1 BL				LC1 BM				LC1 BP				LC1 BR			
	X1	X2	X1	X2	X1	X2	X1	X2	X1	X2	X1	X2	X1	X2	X1	X2
380/440 V	100	150	100	150	150	200	150	250	150	200	150	200	200	250	200	250
500 V	100	150	100	150	150	220	150	250	150	200	150	200	200	250	200	250
660/690 V	150	200	150	200	200	250	200	250	200	250	200	250	250	300	250	300
1000 V	200	250	200	250	250	300	250	300	250	300	250	300	300	350	300	350

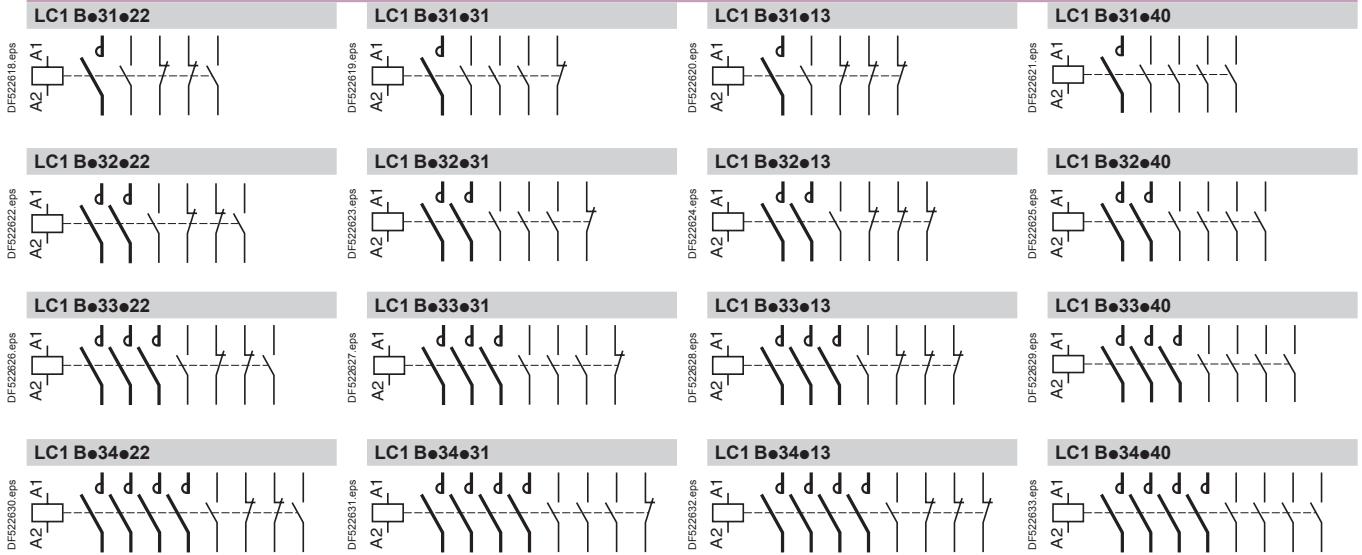
Mechanical interlock for assembling vertically mounted reversing contactors

EZ2 LB0601

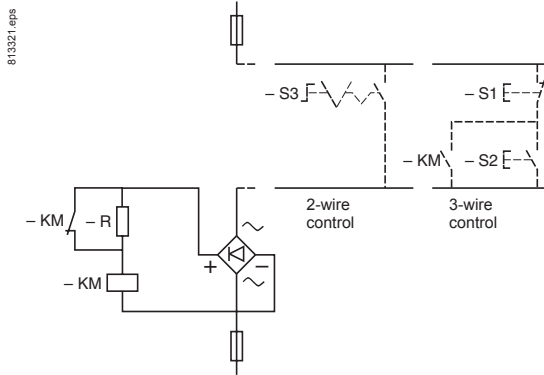


TeSys B

TeSys LC1 B contactors

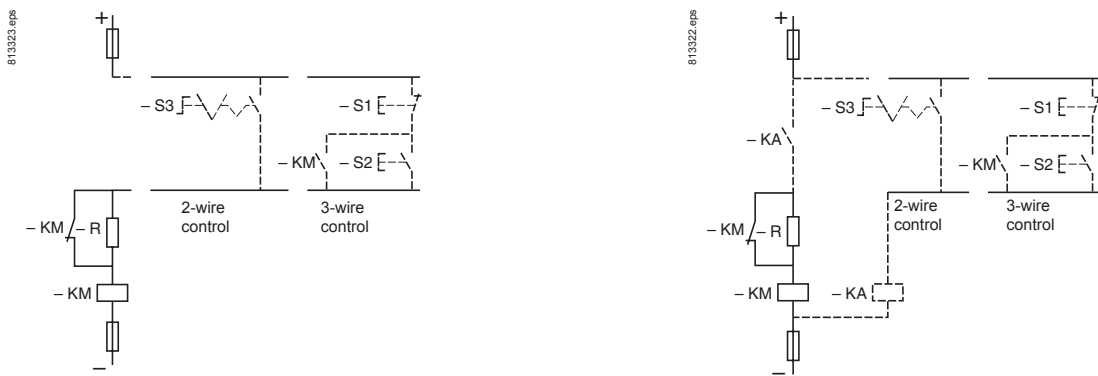


a.c. control circuit



Dotted lines show optional wiring and external items required.

d.c. control circuit



Note: it is essential to check that the control circuit contacts have ratings compatible with the voltage and power consumption of the operating coil of the contactor. If not, an intermediate "KA" relay must be fitted and wired as shown.

Dotted lines show optional wiring and external items required.

CR1 B

Magnetic latching contactors

TeSys B

Magnetic latching contactors

The magnetic latching contactors are equipped with a specific electromagnet allowing them to maintain position "ON" although the coil is fed by any current.

Use

The specific properties of magnetic latching contactors make them suitable for many uses:

Properties	Use
Memory retention of the sequence in automatic equipment, in the event of loss of the control voltage.	Refineries, power plants, excitation circuits.
Energy saving, as no current is drained when the contactor is activated.	Contactor staying activated for long periods. Examples: refineries, alimentation energy, ST distribution.
Change of state "Work" / "Rest" by current pulse sent to the coil.	Selective opening control.
Insensitivity to main perturbations.	No unexpected opening or closing of power poles
Use of contactors beyond breaking capacity as they are activated off-load.	Passer diverter, for use with 1000 V
Silent contactor when locked in ON position	

Electro-magnet operation of the CR1 B contactors

The CR1 B magnetic latching contactors are equipped with a single coil, supplied with direct current or alternating current through a rectifier.

The latching is obtained by direct feeding of the coil with a current in a given direction.

The unlatching is produced by a current of opposite direction, adjusted by resistors.

Range

- The magnetic latching contactors are available from 80 to 630 A (Size F to K).
- The characteristics of N/O and N/C poles are identical to those of CV1 and CV3 B (Size F to K).
- For other characteristics and mounting dimensions, please contact us.
- For ratings of 800 to 2750 A, see next page.

CR1 B Magnetic latching contactors

TeSys B

Direct starting of squirrel cage motors

In continuous or intermittent service up to 30 operating cycles per hour.

Motor ⁽¹⁾								3-poles contactor
220 / 230 V		380 / 400 V		415 V		440 V		Size ⁽²⁾
P	In	P	In	P	In	P	In	
kW	A	kW	A	kW	A	kW	A	
220	700	355	635	400	650	425	650	CR1-BL33
-	-	375	670	425	690	445	680	CR1-BL33
-	-	400	710	445	730	450	690	CR1-BL33
-	-	-	-	450	740	475	730	CR1-BL33
250	800	425	760	475	780	500	780	CR1-BM33
257	826	445	790	500	820	530	825	CR1-BM33
280	900	450	800	530	870	560	870	CR1-BM33
295	948	475	850	560	920	600	920	CR1-BM33
300	980	500	900	600	978	630	965	CR1-BM33
315	990	530	950	-	-	-	-	CR1-BM33

⁽¹⁾ The ratings are for standard 220/230 V, 380/400 V, 415 or 440 V motors. The overload relays should preferably be set to the motor full-load current shown on the motor rating plate. For other power ratings, select the overload relay with the appropriate range; the associated contactor and fuses must have ratings equal to or immediately greater than In.

⁽²⁾ Reference to be completed on page B10/10.

Selection guide for utilisation category and electrical durability

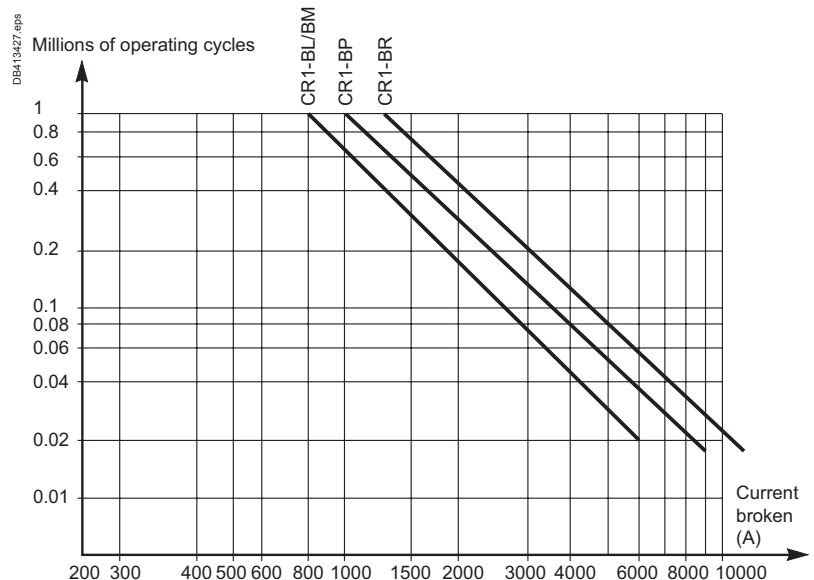
a.c.: category AC-3

CR1 B contactor rating		L	M	P	R
Rated operational current ($\theta \leq 55^\circ\text{C}$)					
440 V	A	750	1000	1500	1800
500 V	A	750	900	1200	1500
660 V	A	700	800	900	1100
1000 V	A	400	400	500	600
Operational power ($\theta \leq 55^\circ\text{C}$) (normalized motor power)					
220 / 230 V	kW	220	280	425	500
380 / 400 V	kW	400	500	750	900
415 V	kW	425	530	800	900
440 V	kW	450	560	800	900
500 V	kW	500	600	750	900
660 V	kW	560	670	750	900
1000 V	kW	530	530	670	750

Maximum operating rate of 120 operating cycles/hour, at rated operational power with an on-load factor $\leq 85\%$.

Electrical durability in category AC-3 ($U_e \leq 440\text{ V}$)

For 660 V, multiply the number of operating cycles by 0.8.



Bar mounted contactors

CR1 B

Magnetic latching contactors

TeSys B

Selection guide for utilisation category and electrical durability

Resistive circuits - power factor ≥ 0.95 .

a.c.: category AC-3

CR1 B contactor rating		L	M	P	R	
Maximum operational current ($\theta \leq 55^\circ\text{C}$)						
Number of bars		2	2	3	4	
Cabling c.s.a.	mm ²	50 x 5	80 x 5	100 x 5	100 x 5	
Rated operational current in category AC-1 at ambient air temperature	$\leq 40^\circ\text{C}$	A	800	1250	3000	2750
	$\leq 55^\circ\text{C}$	A	700	1100	1750	2400
	$\leq 70^\circ\text{C}$	A	600	900	1500	2000

Increase in rated operational current by paralleling of poles

Apply the following coefficients to the above currents:

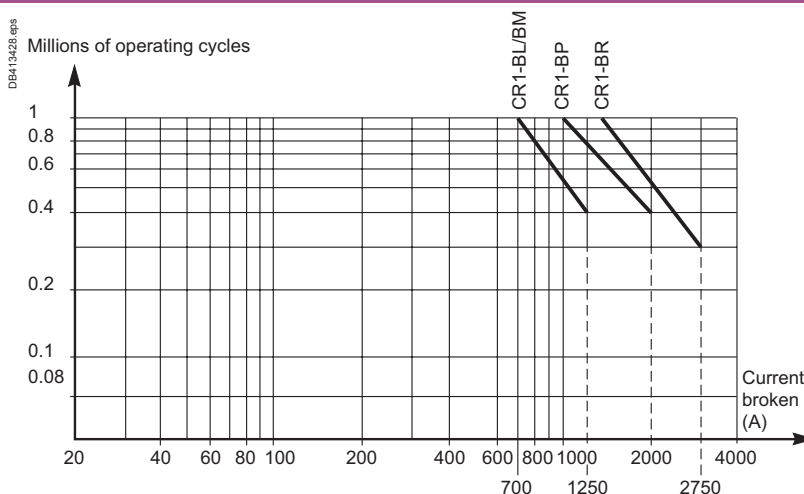
- 2 poles in parallel: K = 1.60
- 3 poles in parallel: K = 2.25
- 4 poles in parallel: K = 2.8.

These coefficients take into account an often unbalanced distribution of current between the poles.

Maximum operating rate in operating cycles 120/hour.

Electrical durability in category AC-1 ($U_e \leq 440\text{ V}$)

For 660 V, multiply the number of operating cycles by 0.8.



Switching the primaries of 3-phase transformers

Conditions of use

- Maximum operational voltage: 1000 V 50/60 Hz.
- Maximum ambient temperature: 55 °C.

At power up, there is usually a sudden inrush current. It reaches almost instantly its peak value and then decreases so approximately exponentially to its rapid steady state value.

The value depends on:

- characteristics of the magnetic circuit and the windings (section of kernel design field, number of turns, dimensions of the coils...)
- characteristics of magnetic metal sheets used (residual induction and saturation induction)
- of the magnetic state of the circuit and the instantaneous value of the alternating voltage of the network at the time of activation.

When a transformer is switched on, there is generally an initial current surge which can reach 20 to 40 times the rated current for the power ratings shown below.

This current reaches its peak value almost instantaneously and then decreases in a largely exponential manner, quickly dropping back down to its steady state value.

CR1 B contactor rating		L	M	P	R	
Prospective peak current at switch-on	A	18000	18000	24000	30000	
Maximum operational power ⁽¹⁾	220 / 230 V	kVA	230	230	300	380
	380 400 V	kVA	400	400	530	660
	415 / 440 V	kVA	450	450	560	700
	500 V	kVA	480	480	600	750
	660 V	kVA	600	600	800	950
	1000 V	kVA	700	700	1000	1200

⁽¹⁾ Maximum operational power corresponding to a current peak at switch-on of 30 I_n.

CR1 B

Magnetic latching contactors

a.c or d.c. control circuit

TeSys B

Characteristics								
CR1 B contactor rating			L	M	P	R		
Number of poles			1, 2, 3 or 4					
Rated operational voltage			V	1000				
Environment								
Terminal protection cover against accidental contact			Without					
Protective treatment			TC					
Ambient air temperature			storage	°C -60 ... +80				
			operation	°C -15 ... +60				
Maximum operating altitude			m	3000				
Maximum inclination			± 30° occasional, in relation to normal vertical mounting plane					
Pole characteristics								
Rated operational voltage conforming to			BS 775 and IEC 158-1	V	1000			
			VDE 0110 grC	V	1500			
Frequency limits by operational current			Hz	50-60				
Operational current		Distribution (θ ≤ 40 °C) AC-1	A	800	1250	2000	2750	
		Motor AC-3	A	750	1000	1500	1800	
		(θ ≤ 40 °C, U ≤ 440 V) AC-4	A	750	1000	1500	1800	
			A	10000	10000	15000	18000	
Rated making capacity I rms conforming to IEC 158-1			A	10000	10000	15000	18000	
Rated breaking capacity conforming to IEC 158-1			220 - 380 - 415 - 440 V	A	10000	10000	15000	18000
			500 V	A	9000	9000	12000	15000
			660 V	A	8000	8000	9000	11000
			1000 V	A	4000	4000	5000	6000
Permissible short time rating From cold state, with no current flowing for previous 60 minutes at θ ≤ 40 °C			for 1 s	A	9600	9600	12000	15000
			for 5 s	A	9600	9600	12000	15000
			for 10 s	A	7000	8000	9600	12000
			for 30 s	A	4800	5200	6400	8000
			for 1 min	A	3500	3800	5200	6300
			for 3 min	A	2100	2400	3600	4400
			for 10 min	A	1200	1800	2800	3600
Short-circuit protection by fuses (max. rating)		Distribution type g1 - BS 88	A	800	1200	1000 x 2 ⁽¹⁾	1200 x 2 ⁽¹⁾	
		Motor circuit type aM	A	800	1200	800 x 2 ⁽¹⁾	1000 x 2 ⁽¹⁾	
		With thermal overload relay type g1 - BS 88	A	1000	1500	1000 x 2 ⁽¹⁾	1200 x 2 ⁽¹⁾	
Average impedance per pole			mΩ	0.18	0.18	0.13	0.09	
Power dissipated per pole			AC-1	W	115	280	520	680
			AC-3	W	88	180	290	360
Number of bars				2	2	3	4	
Bar			mm	50 x 5	80 x 5	100 x 5	100 x 10	
Control circuit characteristics								
Rated control voltage			50/60 Hz	V	110 to 500			
			400 Hz and ---	V	110 to 500			
Voltage limits ~ and ---			latching	Un	0.85 to 1.1			
			unlatching	Un	0.85 to 1.1			
Maximum operating rate in mechanical operating cycles (at θ ≤ 40 °C)			man./h	120				
Mechanical durability			man.	1 million				
Average consumption at 50/60 Hz		Latching	1 pole	VA	650	650	650	650
			2 poles	VA	1100	1100	1100	1100
			3 poles	VA	1650	1650	1650	1650
			4 poles	VA	1850	1850	1850	1850
		Unlatching	1 pole	VA	110	110	110	110
			2 poles	VA	125	125	125	125
			3 poles	VA	165	165	165	165
			4 poles	VA	175	175	175	175
Average consumption at 400 Hz and ---		Latching	1 pole	VA	600	600	600	600
			2 poles	VA	1000	1000	1000	1000
			3 poles	VA	1500	1500	1500	1500
			4 poles	VA	1700	1700	1700	1700
		Unlatching	1 pole	VA	100	100	100	100
			2 poles	VA	115	115	115	115
			3 poles	VA	150	150	150	150
			4 poles	VA	160	160	160	160
Average operating time at nominal voltage			The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.					
Operating in a.c. or d.c.			Latching	ms	100 - 150	100 - 150	100 - 150	100 - 150
			Unlatching	ms	20 - 40	20 - 40	20 - 40	20 - 40
					<p>Note: the arcing time depends on the circuit switched by the main poles. For 3-phase applications the arcing time is usually less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.</p>			
Characteristics of instantaneous auxiliary contacts (type ZC4 GM for CR1 B contactors)								
Rated thermal current			A	20				
Rated insulation voltage conforming to			IEC 337-1	660				
			VDE 0110 grC	750				
Cabling			Number of bars	2				
			Bar c.s.a.	mm ²	4			

(1) Parallel cabling must be done only according the instructions of the fuses manufacturer.

Bar mounted contactors

CR1 B

Magnetic latching contactors

TeSys B

Characteristics

Characteristics of instantaneous auxiliary contacts (type ZC4 GM for CR1 B contactors)

Operational power	in a.c.	V	110/127	220	380	415/440	500
	1 million operating cycles	VA	2000	4000	4000	4000	3500
	occasional making capacity	VA	14000	23000	35000	45000	35000
Electrical durability (valid for up to 2400 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \varphi 0.7$) = 10 times the power broken ($\cos \varphi 0.4$).							
Operational power	in d.c.	V	110	220	440	500	
	1 million operating cycles	VA	250	250	230	200	
	occasional making capacity	VA	1600	800	400	360	
Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.							

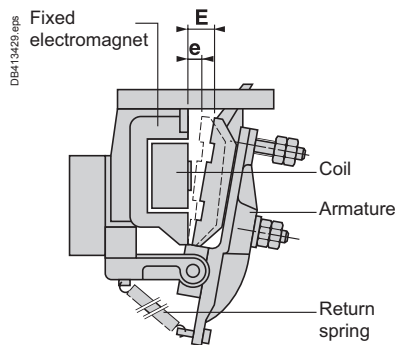
Adjustment characteristics for control circuit

CR1 B contactor rating			L	M	P	R
Electromagnet		Ref.	ET1-KB50			
Air gap of the magnetic circuit		mm	5/100			
Pick-up travel (E)		mm	30			
Pull-in travel (e)		mm	10			
N° of the return spring of the moving part			1 x 292 (1 pole contactors) 2 x 292 (2 poles, 3 poles, 4 poles contactors)			
Type of coil			WB1-KB			
Pull-in cold voltage ($\theta = 20^\circ\text{C}$)		Un	0.75			
Drop-out voltage		Un	0.30 to 0.50			
Adjustment of application force (F) on the contact per pole	according to contactor composition					
Number of springs	1 pole		201	201	201	155
	2 poles		201	201	201	155
	3 poles		201	201	201	155
	4 poles		201	201	201	155
Application force (F) to contact per pole	1 pole	daN	30	30	30 ⁽¹⁾	30 ⁽²⁾
	2 poles	daN	30	30	30 ⁽¹⁾	30 ⁽²⁾
	3 poles	daN	30	30	30 ⁽¹⁾	30 ⁽²⁾
	4 poles	daN	30	30	30 ⁽¹⁾	30 ⁽²⁾
Switch pole setting	Opening gap (b.), electro-magnet closed	mm	2 ±0.5			
	Beginning of opening, during closing action (F)	mm	12 to 14			
	Application force (F)	daN	0.900			

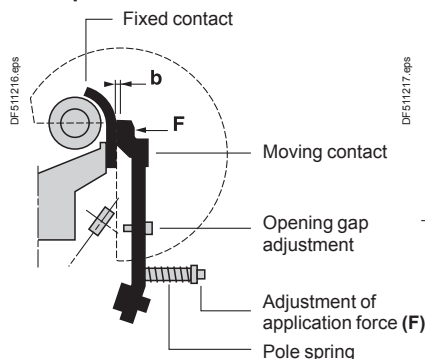
(1) Each pole has 2 contacts: the force must be applied evenly to each of these contacts.

(2) Each pole has 3 contacts: the force must be applied evenly to each of these contacts.

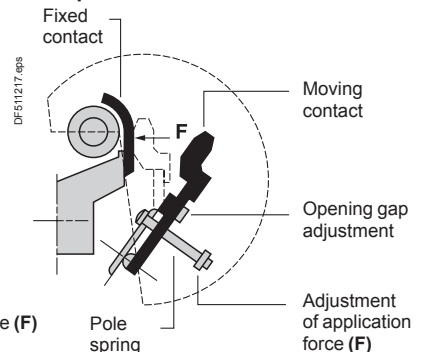
Electromagnet ET1-KB50



N/O pole



N/C pole

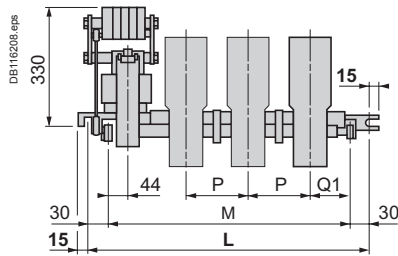


CR1 B Magnetic latching contactors

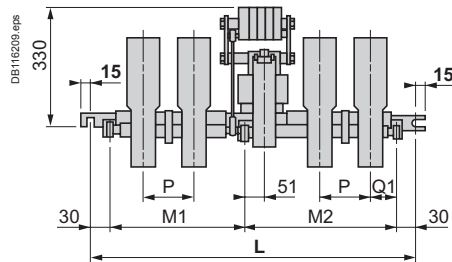
TeSys B

Front face view

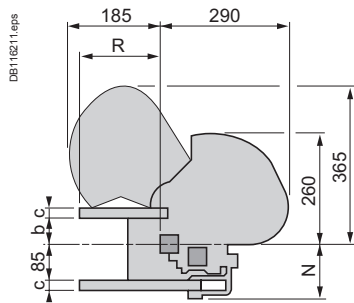
Single, 2 or 3-pole contactors



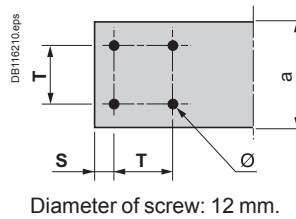
4-pole contactors



Common side view



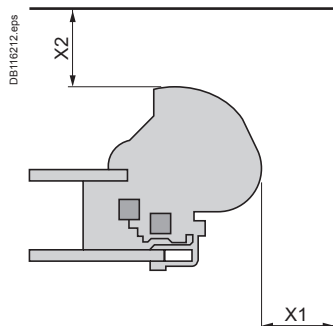
Drilling plan of busbars connections



Type	Rating (A)	Number of poles	L	M	M1	M2	b	c	ø	a	T	S	R	N	P	Q1
CR1 BL	800	1	345	285	-	-	59	16	9	50	30	10	122	121	100	100
		2	445	385	-	-	59	16	9	50	30	10	122	121	100	100
		3	540	480	-	-	59	16	9	50	30	10	122	121	100	100
		4	760	-	308	392	59	16	9	50	30	10	122	121	100	100
CR1 BM	1250	1	345	285	-	-	55	20	11	63	30	17	157	125	100	100
		2	445	385	-	-	55	20	11	63	30	17	157	125	100	100
		3	540	480	-	-	55	20	11	63	30	17	157	125	100	100
		4	760	-	308	392	55	20	11	63	30	17	157	125	100	100
CR1 BP	2000	1	385	325	-	-	55	20	11	100	60	20	173	125	150	110
		2	540	480	-	-	55	20	11	100	60	20	173	125	150	110
		3	760	700	-	-	55	20	11	100	60	20	173	125	150	110
		4	1065	-	455	550	55	20	11	100	60	20	173	125	150	110
CR1 BR	2750	1	445	385	-	-	55	20	11	125	60	20	173	130	195	123
		2	635	575	-	-	55	20	11	125	60	20	173	130	195	123
		3	885	825	-	-	55	20	11	125	60	20	173	130	195	123
		4	1065	-	455	550	55	20	11	125	60	20	173	130	195	123

Minimum electrical clearance

Values X1 and X2 are given for a breaking capacity of 10 In (a 3-phase supply).



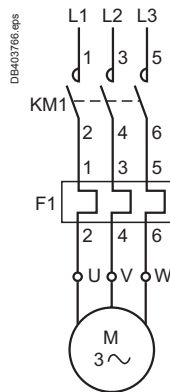
Rating of contactor CR1 B		L	M	P	R
~ 3-phase voltage					
380/440 V	X1	100	100	150	200
	X2	150	150	200	250
500 V	X1	100	100	150	200
	X2	150	150	220	250
660 V	X1	150	150	200	200
	X2	200	200	250	250
1000 V	X1	200	200	200	250
	X2	250	250	250	300

CR1 B

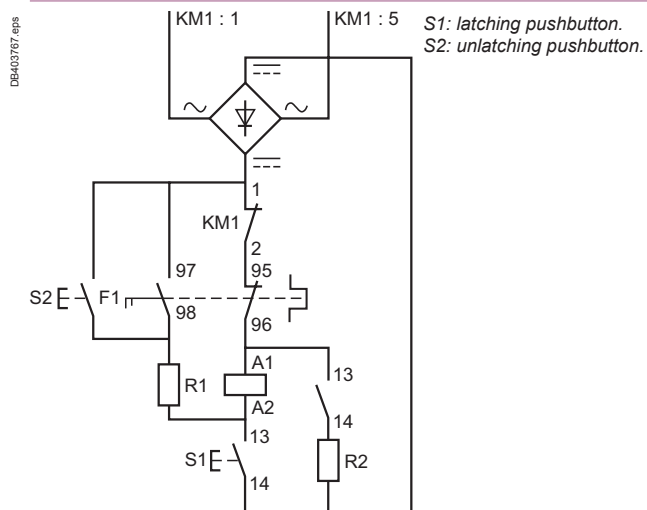
Magnetic latching contactors

TeSys B

Contactor CR1 B with overload relay



Contactor CR1 B



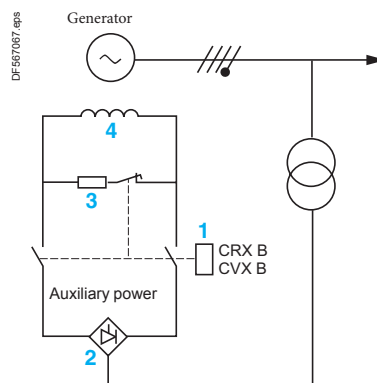
CRX B and CVX B for switching the excitation circuits of synchronous machines

Presentation

Variable composition contactors CRX B and CVX B are designed for switching the excitation circuits of synchronous machines, in particular electrical power station generators, for operational currents from 80 to 2750 A.

Example: Static excitation generator.

Basic scheme



- 1 Excitation contactor
- 2 Thyristor bridge
- 3 Discharge resistor R_d
- 4 Excitation winding

Operating principle

The voltage delivered by the generator is related to the current flowing through the excitation winding 4.

Start-up phase

- The contactor 1 closes, off load.
- An adjustable auxiliary power supply generates current in the excitation winding 4 to allow power-up of the generator.
- When the voltage delivered by the generator is sufficient to supply the excitation winding 4 via a thyristor bridge 2, the auxiliary supply is switched off.

Stop phase

When a stop instruction is received, the thyristor bridge 2 operates for a few seconds as an inverter, then the excitation contactor 1 opens. The function of the N/C pole is to discharge residual electromagnetic energy from the excitation winding 4 via the discharge resistor R_d 3.

Under normal operating conditions, breaking is therefore easy, especially as the N/O poles and the N/C pole are made before break.

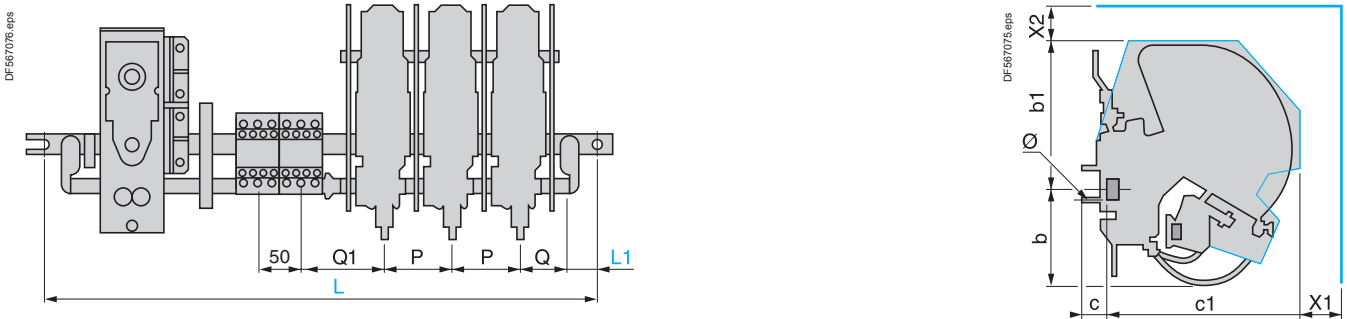
However, in the event of a problem, the contactor must be able to break.

Note: The N/C pole, which is used for machine de-excitation, has no arc chambers. Its breaking capacity is nil. Re-energisation of the contactor must therefore be avoided during the de-excitation phase. If there is any risk of this happening, it is advisable to add an off-delay function that prevents pick-up of the contactor for the 10 seconds following drop-out.

CRX B and CVX B for switching the excitation circuits of synchronous machines

TeSys B

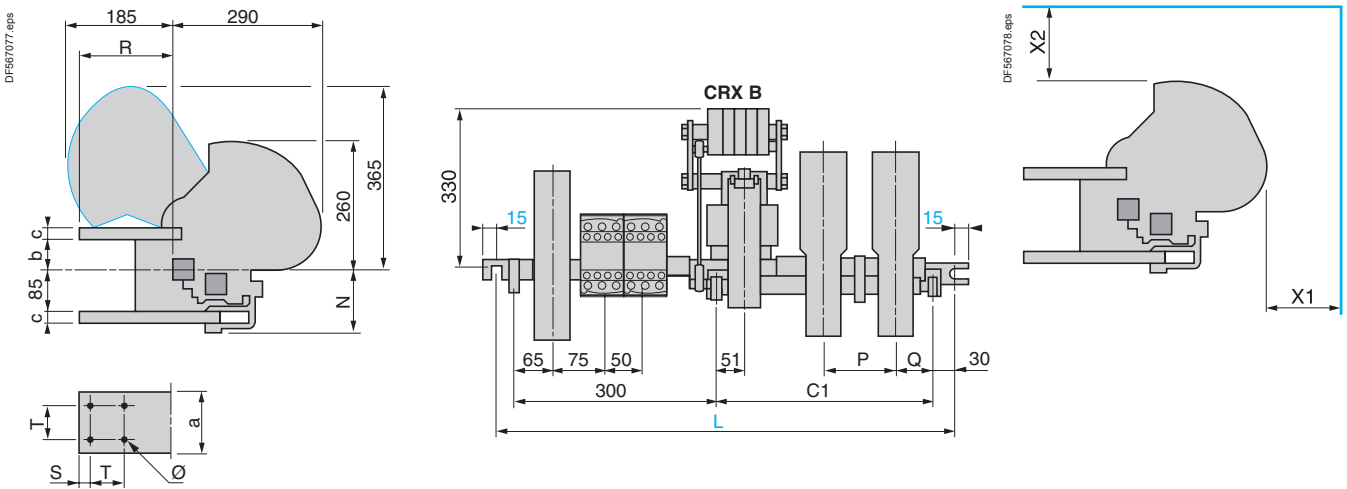
Contactors CRX B and CVX B, sizes F to K



Dimension L: fixing centres depending on the number of N/O or N/C main poles, with or without magnetic blow-out, and the number of ZC4 GM auxiliary contact blocks in addition to the maintaining contact.

C×X B contactor size	Ø	b	b1	c	c1	L	L1	P	Q	Q1	Minimum electrical clearance	
											X1	X2
F	M6	75	120	17	149	445	15	50	20	52	25	15
G	M8	60	164	43	134	540	15	50	45	52	20	15
H	M10	62	188	52	176	540	20	60	57	57	60	55
J	M10	114	117	40	173	635	34	85	64	70	50	100
K	M12	141	214	45	215	760	37	100	64	75	80	80

Contactors CRX B and CVX B, sizes L to R



Dimension L: fixing centres depending on the number of N/O or N/C main poles, with or without magnetic blow-out, and the number of ZC4 GM auxiliary contact blocks in addition to the maintaining contact.

C×X B contactor size	Ø	b	c	C1	L	N	P	Q	R	Minimum electrical clearance	
										X1	X2
L	M8	59	16	392	760	121	100	100	122	200	250
M	M10	55	20	392	760	125	100	100	157	200	250
P	M10	55	20	487	885	125	150	110	173	200	250
R	M10	50	25	582	950	130	195	130	173	250	300

Variable composition contactors

TeSys CV1 B, CV3 B

The variable composition contactor range is split into 3 groups:

■ **Low power switching contactors:**

- type CV1 B●, 80 to 1000 A
- type CV3 B●, 80 to 500 A.

For motor control, the references of the CV1 and CV3 contactors are given on catalogue DIA2070702EN.

For other applications, the composition of the commercial references is described on Symbol combination table, see pages B10/18 and B10/21 or use the configuration software "bar contactor soft-customer.xls" to download on: www.schneider-electric.com.

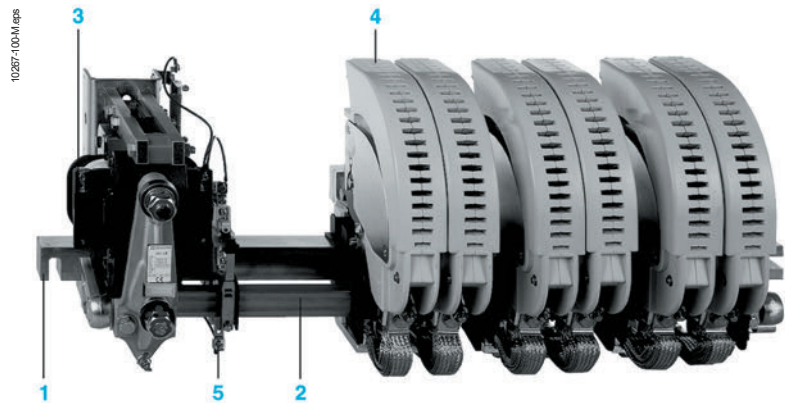
■ **Increased power switching contactors:**

- type LC1 B●, 800 to 2750 A. References shown on B10/2.

■ **Specific contactors** (large number of main poles, pole arrangement, customised fixing and dimensions, component referencing, etc.):

- type CV1●B, 80 to 1000 A
- type CV3●B, 80 to 2750 A.

To order these contactors, complete the Order form on catalogue DIA2070702EN.



- 1 Mounting bar
- 2 Rotating armature shaft
- 3 Electromagnet
- 4 Main pole
- 5 Instantaneous auxiliary contacts, type GM

Variable composition contactors are particularly suited for switching a.c. or d.c. motors and other circuits and are capable of providing a high number of operating cycles.

Their variable composition design allows them to be built to customer specification.

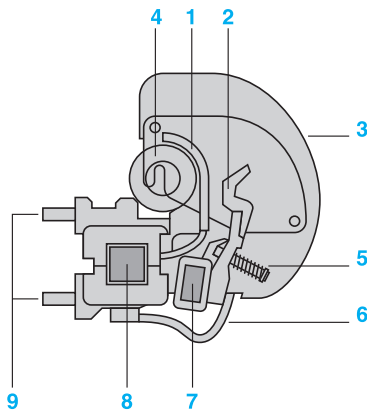
Applications

These variable composition contactors are ideally suited for the most frequently encountered applications:

- Switching a.c. squirrel cage and slip-ring motors in all utilisation categories (AC-2, AC-3, AC-4).
 - Switching d.c. motors in all utilisation categories (DC-2, DC-3, DC-4, DC-5).
 - Switching a.c. resistive loads (category AC-1) and d.c. resistive loads (category DC-1).
 - Switching distribution circuits (category AC-1).
 - Short-circuiting of rotor resistors.
 - Switching capacitors, power factor correction.
 - Switching transformer primaries.
 - Switching inductive circuits with high time constant ($L/R > 15$ ms)
- Example: alternator excitation circuit.
- Severe duty requirements and main pole arrangements comprising 1 to 6 N/O and/or N/C poles.

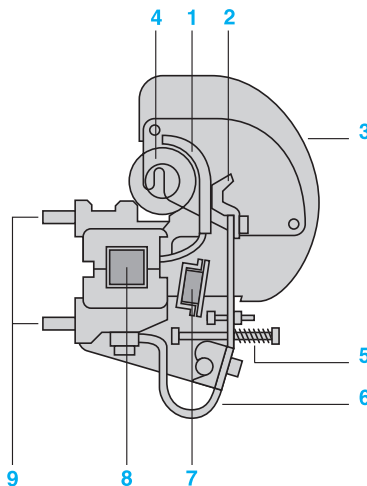
TeSys CV1 B, CV3 B

DF511200.eps



N/O pole 80...2750 A.

DF511201.eps



N/C pole 80...1000 A.

- 1 Fixed contact
- 2 Moving contact
- 3 Arc chamber
- 4 Blow-out coil
- 5 Pole pressure spring
- 6 Braided conductor
- 7 Rotating armature shaft (moving contact actuator)
- 8 Mounting bar
- 9 Terminal lugs

Power circuit

The principal function of a main pole is to make and break the supply current. It is designed to continuously carry its nominal operational current.

Making the current

On energisation of the electromagnet coil, the armature shaft rotates and the moving contact makes with the fixed contact. The contact pressure, maintained by the pole pressure spring, is sufficient to overcome the electrodynamic forces of transient current peaks (e.g.: switching a transformer, starting a motor, etc.).

Breaking the current

On de-energisation of the electromagnet coil, the contacts separate and electrical arcing is dissipated by the blow-out coil and arc chamber. To optimise the performance of the magnetic blow-out, the blow-out coil can be selected to suit the operational current, which is particularly important when switching d.c. The N/C pole operates in a reverse manner to the N/O pole, i.e. the contacts are closed whilst the electromagnet coil is de-energised and open during energisation.

CV1 contactors

- 690 V ~, 220 V ≡ / pole
- N/O poles 80...1000 A (PN1)
- N/C poles 80...1000 A (PR1).

■ Variants:

- no-load breaking poles
 - N/O poles 80...1000 A (PN5)
 - N/C poles 80...1000 A (PR5).
- arc chambers with splitters for dispersing the electric arc: 1000 V ~ / 440 V ≡ per pole
 - N/O poles 500...1000 A (PN3)
 - N/C poles 500...1000 A (PR3).

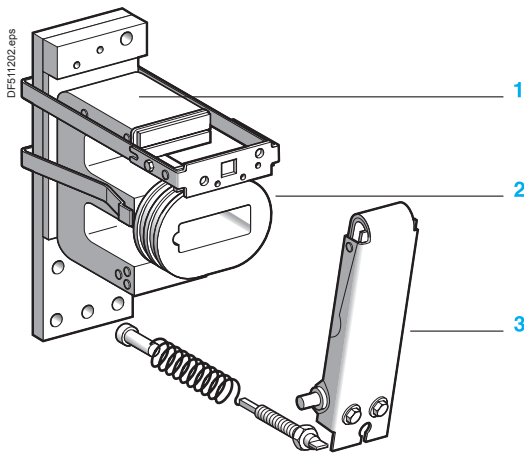
CV3 contactors

- 1000 V ~, 440 V ≡ / pole
- N/O poles 0...500 A (PA3)
- N/C poles 80...500 A (PR3)
- N/O poles 750...2750 A (PA1).

■ Variants:

- high making capacity poles 750...2750 A (PA2)
- high breaking capacity poles and poles with reduced safety clearances (arc chambers with closed splitters) 750...2750 A (PA1PX8)
- no-load breaking poles
 - N/O poles 750...2750 A (PA5).

TeSys CV1 B, CV3 B



Electromagnet EB1 or EC1

- 1 Electromagnet core
- 2 Coil
- 3 Electromagnet armature

Control circuit

- 2 types of electromagnet: E shaped core and U shaped core.
- 2 types of coil: type WB1 and type WB2.

Electromagnet with E shaped core and coil type WB1

- **Electromagnet with E shaped laminated iron core, type EB or EC ⁽¹⁾**
 - with central air gap machined in armature,
 - with single coil type **WB1** fitted on centre limb of core.
- The upper limb incorporates a shading ring, the armature rotates.

■ Coil - direct a.c. 50 or 60 Hz supply

- 20 to 600 V
- 1200 operations/hour.

At the moment of inrush, with the armature open, the coil impedance is low and power consumption is high.
 In the sealed state the armature is closed, the coil impedance increases and power consumption is low.
 The inrush current is 6 to 10 times higher than the sealed current.

■ **Electromagnet** directly DC powered or via individual rectifier (50-400 Hz):

- the electromagnet is mounted with the reduction in consumption
- 12 to 500 V
- 120 operations/hour.

■ **Electromagnet** powered via individual rectifier (50-400 Hz):

- the electromagnet is mounted with the reduction in consumption
- 12 to 500 V
- 120 operations/hour.

At the moment of inrush, the full actuating voltage is applied to the coil and the inrush current is determined by the coil resistance.
 In the sealed state an additional resistor is switched automatically in series with the coil, so as to reduce power consumption.
 This economy resistor is switched by a N/C auxiliary contact which is adjusted to open only when the armature is fully closed.
 The inrush current is 15 to 40 times higher than the sealed current.

Coils type WB1, used in conjunction with laminated iron cores, have a much higher inrush current than sealed current, whatever the nature of the supply current.

When establishing the current and selecting the supply voltage rating, it is important to take into account the line voltage drop due to the inrush current.

Electromagnet with U shaped core and coil type WB2 for d.c. supply

- **Electromagnet** with U shaped solid iron core, type **EK**:
 - 2 similar coils type **WB2** connected in series, one coil being fitted to each limb of the core
 - the armature rotates.

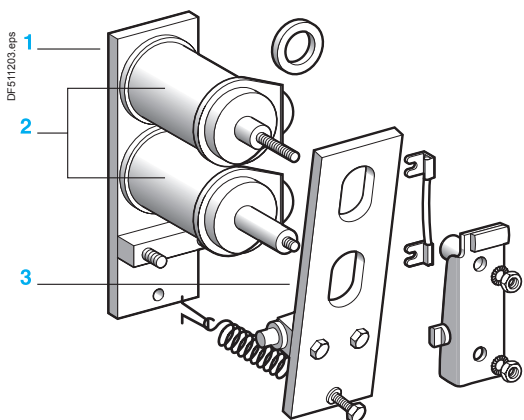
■ **Electromagnet** for d.c. supply

- 12 to 600 V
- 1200 operations/hour.

The coils for this type of electromagnet have a considerable number of turns so as to obtain sufficient magnetic flux to attract the armature.

Due to its simplicity and relatively slow movements the assembly is very robust and, therefore, has increased mechanical durability.

⁽¹⁾ For contactor compositions requiring an increased number of poles, use EC electromagnets.



Electromagnet EK

- 1 Electromagnet core
- 2 Coil
- 3 Electromagnet armature

Variable composition contactors

TeSys CV1 B, CV3 B

Instantaneous and time delay auxiliary contacts

Signalling, electrical interlocking and slave functions can be achieved by using auxiliary contacts.

Instantaneous auxiliary contacts suitable for use with all contactor types are available in 2 versions:

- 1 N/O instantaneous contact, reference ZC4 GM1.
- 1 N/C instantaneous contact, reference ZC4 GM2.
- 1 block of 3 instantaneous N/O contacts and 2 N/C instantaneous contacts, reference LA1BN32A.

Delayed auxiliary contacts can be mounted onto contactors CV1 and CV3:

- 1 N/O contact + 1 N/C contact, ON-delay, reference ZC2 GG1 (delay from 0.2 to 180 s)
- 1 N/O contact + 1 N/C contact, OFF-delay, reference ZC2 GG5 (delay from 0.2 to 180 s)
- On the block LA1 BN32A, 1 block of N/O ON-delayed contact + 1 N/C ON-delayed contact, references LADT0 (delay from 0.1 to 3 s), LADT2 (0.1 to 30 s), LADT4 (10 to 180 s)
- On the block ref. LA1 BN32A: 1 block of N/O OFF-delayed contact + 1 N/C OFF-delayed contact, references LADR0 (delay from 0.1 to 3 s), LADR4 (10 to 180 s).

The delayed contacts are established or separate some time after the closing or opening of the contactor which operates them. This time is adjustable.


On the block LA1 BN32A all TeSys D contactors additives can be mounted, with the exception of LA6DK, LAD6K and LAD8N

Assembling reversing/changeover contactor pairs

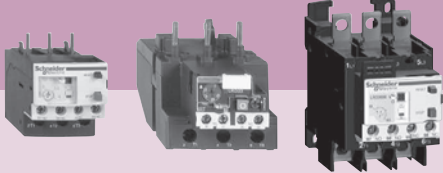
Mounting accessories

For applications involving the switching of reversing motors or changeover circuits, contactors of different ratings can easily be mounted vertically and interlocked. Mechanical interlock kits are available and auxiliary contacts can be used for electrical interlocking.

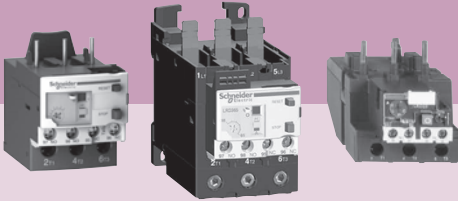
Thermal overload relays - For use with TeSys K contactors

Type of product	Range		Pages
Adjustable thermal overload relays For motors TeSys LRK	From 0.16 to 16 A		B11/2
Adjustable thermal overload relays For unbalanced loads TeSys LRK	From 0.8 to 16 A		B11/3


Thermal overload relays Class 10 - For use with TeSys D contactors

Adjustable thermal overload relays For motors TeSys LRD	From 0.16 to 140 A		B11/4
Adjustable thermal overload relays For unbalanced loads TeSys LRD	From 0.16 to 140 A		B11/4


Thermal overload relays Class 20 - For use with TeSys D contactors

Adjustable thermal overload relays For motors TeSys LRD	From 0.63 to 80 A		B11/6
Adjustable thermal overload relays For unbalanced loads TeSys LRD	From 0.63 to 32 A		B11/6


Electronic thermal overload relays - For use with TeSys F contactors

Compensated and differential overload relays, with or without alarm TeSys LR9F	From 50 to 630 A		B11/10
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Single pole magnetic over current relays

Latching or non latching overload relays TeSys RM1	From 1.15 to 630 A		B11/14
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Thermistor-type protection units - For use detection of motor overheating

Protection units and PTC probes, with or without fault memory TeSys LT3	From 90 to 170 °C		B11/16
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Electronic over current relays - For machine protection

Predefined or adjustable starting times, Manual reset	From 1.5 to 34 A		B11/18
Automatic, electric or manual reset	From 0.5 to 50 A		B11/18

Technical Data for Designers

B11/19

Protection components

TeSys LRK thermal overload relays, adjustable from 0.11 to 16 A

Overload relays

3-pole relays with screw clamp terminals

These overload relays are designed for the protection of motors. They are compensated and phase failure sensitive. Resetting can either be manual or automatic.

Direct mounting: under the contactor for versions with screw clamp terminals only; pre-wired terminals, see pages B11/26 and B11/28.

Separate mounting: using terminal block LA7 K0064 (see below).

On the front face of the overload relay:

- selection of reset mode: Manual (marked H) or Automatic (marked A),
- red pushbutton: Trip Test function,
- blue pushbutton: Stop and manual Reset,
- yellow trip flag indicator: overload relay tripped.

Protection by magnetic circuit breaker GV2 LE, see pages A5/11 and A5/20.

Class 10 A (the standard specifies a tripping time of between 2 and 10 seconds at 7.2 In)

Relay setting range	Fuses to be used with selected relay			Reference
	Maximum rating			
	Type			
A	aM	gG	BS88	
A	A	A	A	
0.11...0.16	0.25	0.5	–	LR2K0301
0.16...0.23	0.25	0.5	–	LR2K0302
0.23...0.36	0.5	1	–	LR2K0303
0.36...0.54	1	1.6	–	LR2K0304
0.54...0.8	1	2	–	LR2K0305
0.8...1.2	2	4	6	LR2K0306
1.2...1.8	2	6	6	LR2K0307
1.8...2.6	4	8	10	LR2K0308
2.6...3.7	4	10	16	LR2K0310
3.7...5.5	6	16	16	LR2K0312
5.5...8	8	20	20	LR2K0314
8...11.5	10	25	20	LR2K0316
10...14	16	32	25	LR2K0321
12...16	20	40	32	LR2K0322

PF52022611f

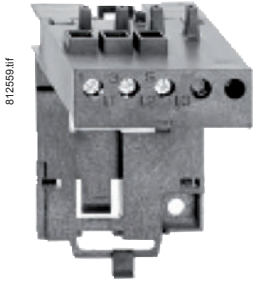


LR2 K0307

Protection components

TeSys LRK thermal overload relays,
adjustable from 0.11 to 16 A

Overload relays



8125595.tif

LA7 K0064

Overload relays for unbalanced loads

Class 10 A: to order, replace the prefix **LR2** by **LR7** in the references selected from above (only applicable to overload relays **LR2 K0305** to **LR2 K0322**).
Example: **LR7 K0308**.

Accessory

Description	Type of connection	Reference
Terminal block for separate clip-on mounting of the overload relay on 35 mm rail	Screw clamp	LA7K0064

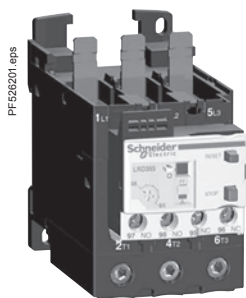
TeSys protection components

TeSys LRD, 3-pole thermal overload relays

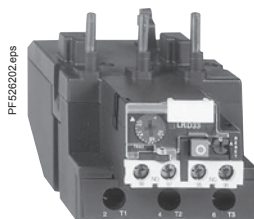
Overload relays



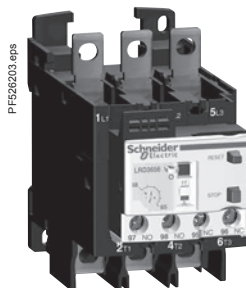
LRD 01



LRD 30



LRD 33



LRD 336

Differential thermal overload relays for screw clamp connectors and lugs for use with fuses or magnetic circuit breakers GV2 L and GV3 L

- Compensated relays with manual or automatic reset
- with relay trip indicator
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay			For use with contactor LC1	Reference	Weight kg
	aM (A)	gG (A)	BS88 (A)			
Class 10 A ⁽¹⁾ for connection by screw clamp terminals or connectors						
0.10...0.16	0.25	2	–	D09...D38	LRD01	0.124
0.16...0.25	0.5	2	–	D09...D38	LRD02	0.124
0.25...0.40	1	2	–	D09...D38	LRD03	0.124
0.40...0.63	1	2	–	D09...D38	LRD04	0.124
0.63...1	2	4	–	D09...D38	LRD05	0.124
1...1.6	2	4	6	D09...D38	LRD06	0.124
1.6...2.5	4	6	10	D09...D38	LRD07	0.124
2.5...4	6	10	16	D09...D38	LRD08	0.124
4...6	8	16	16	D09...D38	LRD10	0.124
5.5...8	12	20	20	D09...D38	LRD12	0.124
7...10	12	20	20	D09...D38	LRD14	0.124
9...13	16	25	25	D12...D38	LRD16	0.124
12...18	20	35	32	D18...D38	LRD21	0.124
16...24	25	50	50	D25...D38	LRD22	0.124
23...32	40	63	63	D25...D38	LRD32	0.124
30...38	40	80	80	D32 and D38	LRD35	0.124
Class 10 A ⁽¹⁾ for connection by EverLink[®] BTR screw connectors ⁽³⁾						
9...13	16	25	25	D40A...D65A	LRD313	0.375
12...18	20	32	35	D40A...D65A	LRD318	0.375
17...25	25	50	50	D40A...D65A	LRD325	0.375
23...32	40	63	63	D40A...D65A	LRD332	0.375
30...40	40	80	80	D40A...D65A	LRD340	0.375
37...50	63	100	100	D40A...D65A	LRD350	0.375
48...65	63	100	100	D50A and D65A	LRD365	0.375
Class 10 A ⁽¹⁾ for connection by screw clamp terminals or connectors						
17...25	25	50	50	D80 and D95	LRD3322	0.510
23...32	40	63	63	D80 and D95	LRD3353	0.510
30...40	40	100	80	D80 and D95	LRD3355	0.510
37...50	63	100	100	D80 and D95	LRD3357	0.510
48...65	63	100	100	D80 and D95	LRD3359	0.510
55...70	80	125	125	D80 and D95	LRD3361	0.510
63...80	80	125	125	D80 and D95	LRD3363	0.510
80...104	100	160	160	D80 and D95	LRD3365	0.510
80...104	125	200	160	D115 and D150	LRD4365	0.900
95...120	125	200	200	D115 and D150	LRD4367	0.900
110...140	160	250	200	D150	LRD4369	0.900
80...104	100	160	160	⁽²⁾	LRD33656	1.000
95...120	125	200	200	⁽²⁾	LRD33676	1.000
110...140	160	250	200	⁽²⁾	LRD33696	1.000

Class 10 A ⁽¹⁾ for connection by lugs

Select the appropriate overload relay with screw clamp terminals or connectors from the table above and add one of the following suffixes:

- figure 6 for relays LRD 01 to LRD 35 and relays LRD 313 to LRD 365.
- A66 for relays LRD 3322 to LRD 3363.

Relays LRD 4300 are suitable, as standard, for use with lug-clamps.

Thermal overload relays for use with unbalanced loads

Class 10 A ⁽¹⁾ for connection by screw clamp terminals or lugs

In the references selected above, change the prefix LRD (except LRD 4000) to LR3 D.

Example: LRD 01 becomes LR3 D01.

Example with EverLink[®] connectors: LRD 340 becomes LR3 D340.

Example with lugs: LRD 3406 becomes LR3 D3406.

⁽¹⁾ Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R : class 10 A: between 2 and 10 seconds.

⁽²⁾ Independent mounting of the contactor.

⁽³⁾ BTR screws: hexagon socket head. In accordance with local BTR electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page B8/21).

TeSys protection components

TeSys LRD, 3-pole thermal overload relays

Overload relays



LRD ●●3

Differential thermal overload relays for spring terminals for use with fuses or magnetic circuit breakers GV2 L and GV3 L

- Compensated relays with manual or automatic reset
- with relay trip indicator
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay			For use with contactor LC1	Reference
	aM (A)	gG (A)	BS88 (A)		
Classes 10 A ⁽¹⁾ for connection by spring terminals (only for direct mounting beneath the contactor)					
0.10...0.16	0.25	2	–	D09...D38	LRD013
0.16...0.25	0.5	2	–	D09...D38	LRD023
0.25...0.40	1	2	–	D09...D38	LRD033
0.40...0.63	1	2	–	D09...D38	LRD043
0.63...1	2	4	–	D09...D38	LRD053
1...1.6	2	4	6	D09...D38	LRD063
1.6...2.5	4	6	10	D09...D38	LRD073
2.5...4	6	10	16	D09...D38	LRD083
4...6	8	16	16	D09...D38	LRD103
5.5...8	12	20	20	D09...D38	LRD123
7...10	12	20	20	D09...D38	LRD143
9...13	16	25	25	D12...D38	LRD163
12...18	20	35	32	D18...D38	LRD213
16...24	25	50	50	D25...D38	LRD223

Class 10 A with connection by EverLink® BTR screw connectors ⁽²⁾ and control by spring terminals

9...13	16	25	25	D40A...D65A	LRD3133
12...18	20	32	35	D40A...D65A	LRD3183
17...25	25	50	50	D40A...D65A	LRD3253
23...32	40	63	63	D40A...D65A	LRD3323
30...40	40	80	80	D40A...D65A	LRD3403
37...50	63	100	100	D40A...D65A	LRD3503
48...65	63	100	100	D50A and D65A	LRD3653

Thermal overload relays for use with unbalanced loads

Classes 10 A ⁽¹⁾ for connection by BTR screw connectors ⁽²⁾ and control by spring terminals

In the references selected above, replace **LRD 3** with **LR3 D3**.

Example: **LRD 3653** becomes **LR3 D3653**.

Thermal overload relays for use on 1000 V supplies

Classes 10 A ⁽¹⁾ for connection by screw clamp terminals

For relays LRD 06 to LRD 35 only, for an operating voltage of 1000 V, and only for independent mounting, the reference becomes **LRD 33●●A66**.

Order an **LA7 D3064** terminal block separately, see page B11/9.

Standard relay	Relay for 1000 V network
LRD06	LRD3306A66
LRD07	LRD3307A66
LRD08	LRD3308A66
LRD10	LRD3310A66
LRD12	LRD3312A66
LRD14	LRD3314A66
LRD16	LRD3316A66
LRD21	LRD3321A66
LRD22	LRD3322A66
LRD32	LRD3353A66
LRD35	LRD3355A66

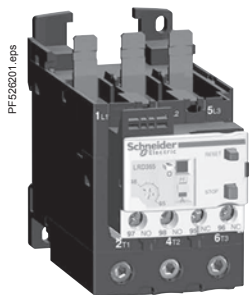
⁽¹⁾ Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_p ; class 10 A: between 2 and 10 seconds.

⁽²⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page B8/21).

Overload relays



LRD 04L...LRD 32L



LRD 3...L



LR2 D35...L

Differential thermal overload relays for screw clamp connectors and lugs for use with fuses or magnetic circuit breakers GV2 L and GV3 L

- Compensated relays with manual or automatic reset
- with relay trip indicator
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay			For use with contactor LC1	Reference
	aM (A)	gG (A)	BS88 (A)		
Classes 20 ⁽¹⁾ for connection by screw clamp terminals					
0.4...0.63	1	2	-	D09...D38	LRD04L
0.63...1	2	4	-	D09...D38	LRD05L
1...1.6	2	4	6	D09...D38	LRD06L
1.6...2.5	4	6	10	D09...D38	LRD07L
2.5...4	6	10	16	D09...D38	LRD08L
4...6	8	16	16	D09...D38	LRD10L
5.5...8	12	20	20	D09...D38	LRD12L
7...10	12	20	20	D09...D38	LRD14L
9...13	16	25	25	D12...D38	LRD16L
12...18	20	35	32	D18...D38	LRD21L
17...24	25	50	50	D25...D38	LRD22L
23...32	40	63	63	D25...D38	LRD32L
Class 20 ⁽¹⁾ for connection by EverLink[®] BTR screw connectors ⁽²⁾					
9...13	20	32	35	D40A...D65A	LRD313L
12...18	25	40	40	D40A...D65A	LRD318L
17...25	32	50	50	D40A...D65A	LRD325L
23...32	40	63	63	D40A...D65A	LRD332L
30...40	50	80	80	D40A...D65A	LRD340L
37...50	63	100	100	D40A...D65A	LRD350L
48...65	80	125	125	D50A and D65A	LRD365L
Classes 20 ⁽¹⁾ for connection by screw clamp terminals					
17...25	32	50	50	D80 and D95	LR2D3522
23...32	40	63	63	D80 and D95	LR2D3553
30...40	40	100	80	D80 and D95	LR2D3555
37...50	63	100	100	D80 and D95	LR2D3557
48...65	80	125	100	D80 and D95	LR2D3559
55...70	100	125	125	D80 and D95	LR2D3561
63...80	100	160	125	D80 and D95	LR2D3563

Class 20 ⁽¹⁾ for connection by lugs

For relays LRD 04L to LRD 32L and relays LRD 313L to LRD 365L, select the appropriate overload relay with screw clamp terminals or connectors from the table above and add the suffix 6.

Example: **LRD 04L** becomes **LRD 04L6**.

Thermal overload relays for use with unbalanced loads

Class 20 ⁽¹⁾ for connection by screw clamp terminals or lugs

For relays LRD 04L to LRD 32L and relays LR2 D3522 to LR2 D3563, select the appropriate overload relay with screw clamp terminals or connectors from the table above and change the prefix LRD or LR2 D to **LR3 D**. Example: **LRD 04L** becomes **LR3D 04L**.

⁽¹⁾ Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R :
class 20: between 6 and 20 seconds

⁽²⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page B8/21).

Overload relays

Differential thermal overload relays for screw clamp connectors and springs for use with fuses or magnetic circuit breakers GV2 L and GV3 L

- Compensated relays with manual or automatic reset
- with relay trip indicator
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay			For mounting beneath contactor LC1	Reference
	aM (A)	gG (A)	BS88 (A)		
Class 20 ⁽¹⁾ with connection by EverLink® BTR screw connectors ⁽²⁾ and control by spring terminals					
9...13	20	32	35	D40A...D65A	LRD313L3
12...18	25	40	40	D40A...D65A	LRD318L3
17...25	32	50	50	D40A...D65A	LRD325L3
23...32	40	63	63	D40A...D65A	LRD332L3
30...40	50	80	80	D40A...D65A	LRD340L3
37...50	63	100	100	D40A...D65A	LRD350L3
48...65	80	125	125	D50A and D65A	LRD365L3

Differential thermal overload relays for bars and connectors for use with fuses or magnetic circuit breakers NSX

- Compensated relays, with relay trip indicator
- for a.c.
- for direct mounting on contactor or independent mounting ⁽³⁾.

Relay setting range (A)	Fuses to be used with selected relay		For mounting beneath contactor LC1	Reference
	aM (A)	gG (A)		
Classes 10 or 10A ⁽¹⁾ for connection using bars or connectors				
60...100	100	160	D115 and D150	LR9D5367
90...150	160	250	D115 and D150	LR9D5369
Classes 20 ⁽¹⁾ for connection using bars or connectors				
60...100	125	160	D115 and D150	LR9D5567
90...150	200	250	D115 and D150	LR9D5569

Electronic thermal overload relays for use with balanced or unbalanced loads

- Compensated relays
- with separate outputs for alarm and tripping.

Relay setting range (A)	Fuses to be used with selected relay		For mounting beneath contactor LC1	Reference
	aM (A)	gG (A)		
Classes 10 or 20 ⁽¹⁾ selectable, for connection using bars or connectors				
60...100	100	160	D115 and D150	LR9D67
90...150	160	250	D115 and D150	LR9D69

⁽¹⁾ Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R :

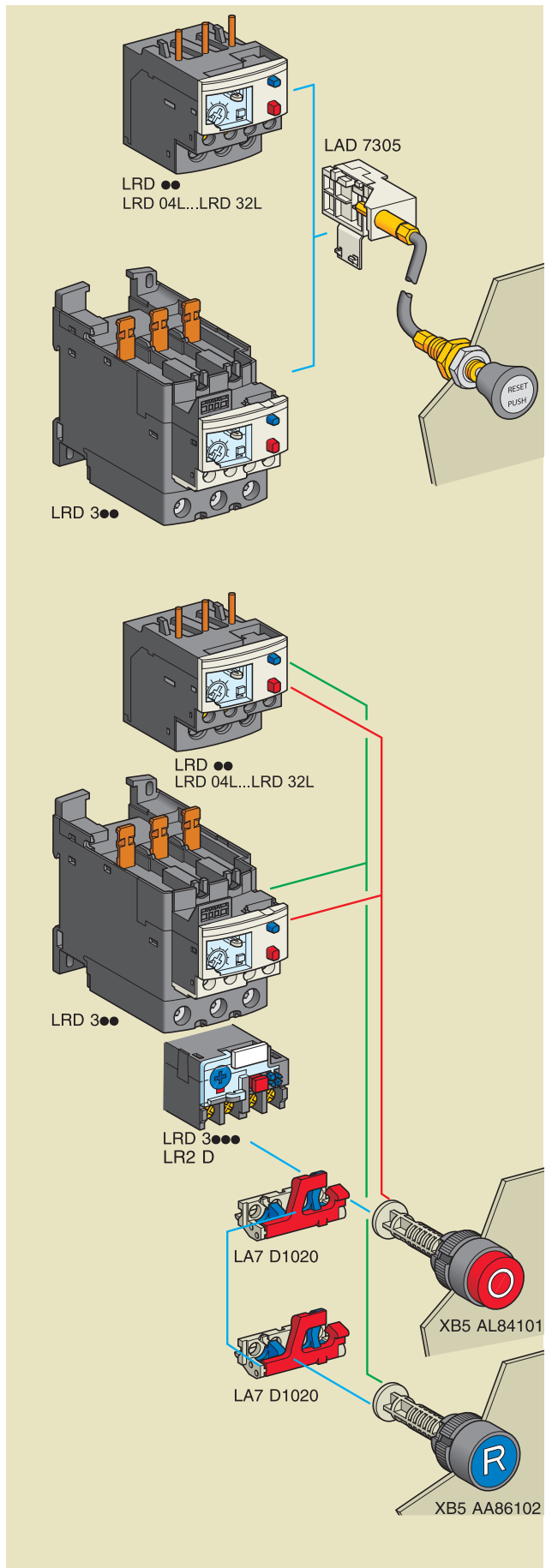
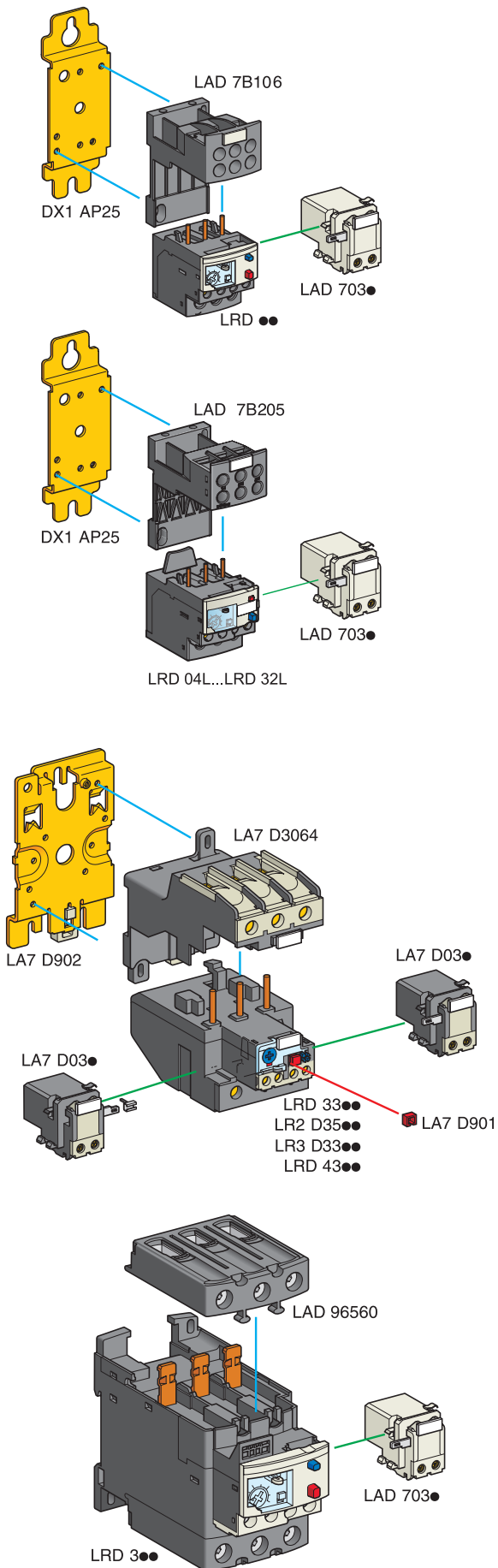
class 10: between 4 and 10 seconds,
class 10 A: between 2 and 10 seconds,
class 20: between 6 and 20 seconds

⁽²⁾ BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page B8/21).

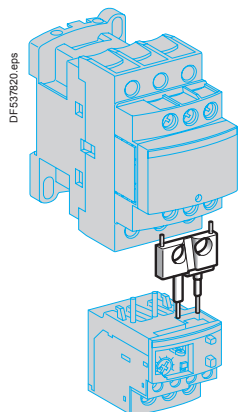
⁽³⁾ Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page B8/20).

Other versions

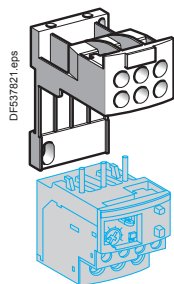
Thermal overload relays for resistive circuits in category AC-1.
Please consult your Regional Sales Office.



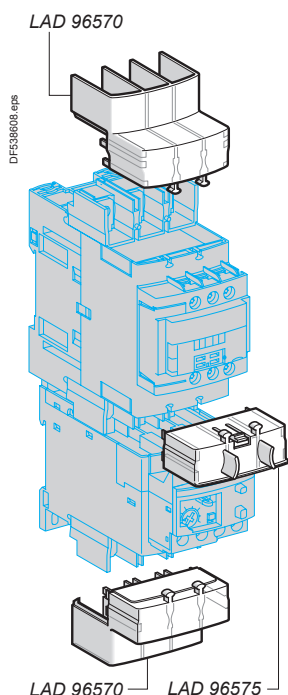
Overload relays



LAD 7C●



LAD 7B106



LAD 96570 — LAD 96575

Separate components for relays

Description	For use with	Sold in lots of	Unit reference
Pre-wiring kit allowing direct connection of the N/C contact of relay LRD 01...35 or LR3 D01...D35 to the contactor	LC1 D09...D18 LC1 D25...D38	10 10	LAD7C1 ⁽¹⁾ LAD7C2 ⁽¹⁾
Terminal block ⁽²⁾ for clip-on mounting on 35 mm rail (AM1 DP200) or screw fixing; for fixing centres, see pages B11/35 to B11/37	LRD 01...35 and LR3 D01...D35 LRD04L...LRD32L, LR3D04L...LR3D32L	1 1	LAD7B106 LAD7B205
EverLink® terminal block for independent mounting	LRD 43●●, LRD 33●●●, LR3 D33●●●, LR2 D35●●	1	LA7D3064 ⁽³⁾
Size 4 Allen key, insulated, 1000 V	LRD 3●●, LRD 3●●L and LR3 D3●●	5	LADALLEN4
Terminal block adapter for mounting a relay beneath an LC1 D115 or D150 contactor	LRD 3●●, LR3 D3●●●, LRD 35●●	1	LA7D3058 ⁽³⁾
Mounting plates ⁽⁴⁾ for screw fixing on 110 mm centres	LRD 01...35, LR3 D01...D35, LRD04L...LRD32L, LR3D04L...LR3D32L	10	DX1AP25
Marker holders, snap-in 8 x 18 mm	LRD 3●●	1 100	LA7D902 LAD90
	All relays except LRD 01...35, LRD 04L...32L, LR3D04L...D32L, LR3 D01...D35, LRD 3●●, LRD 3●●L and LR3 D3●●	100	LA7D903
Bag of 400 blank legends (self-adhesive, 7 x 16 mm)	All relays	1	LA9D91
Stop button locking device	All relays except LRD 01...35, LRD 04L...32L, LR3D04L...D32L, LR3 D01...D35, LR9 D and LRD 313...LRD 365	10	LA7D901
Remote Stop or electrical reset device ⁽⁵⁾	LRD 01...35, LR3 D01...D35, LRD 04L...32L, LR3D04L...D32L and LRD 313...LRD 365	1	LAD703● ^{(6) (7)}
Remote tripping or electrical reset device ⁽⁶⁾	All relays except LRD 01...35, LRD 04L...32L, LR3D04L...D32L, LR3 D01...D35, LRD 3●●, LRD 3●●L and LR3 D3●●	1	LA7D03● ⁽⁶⁾
Block of insulated terminals	LR9 D	2	LA9F103
IP 20 cover for lug type terminals for independent mounting	LRD 3136...3656	1	LAD96570
IP 20 cover for lug type terminals for mounting with contactor LC1 D40A6...D65A6	LRD 3136...3656	1	LAD96575
Terminal block for lug type terminals for independent mounting	LRD 3136...3656	1	LAD96566

Remote control

"Reset" function

Description	For use with	Sold in lots of	Unit reference
By flexible cable (length = 0.5 m)	LRD 01...35, LR3 D01...D35, LR3D04L...D32L and LRD 313...LRD 365, LRD 04L...LRD 32L	1	LAD7305 ⁽⁷⁾
	All relays except LRD 01...35, LR3 D01...D35, LRD 3●●, LRD 04L...32L, LR3D04L...D32L, LRD 3●●L and LR3 D3●●	1	LA7D305

"Stop" and/or "Reset" functions

The terminal protection shroud must be removed and the following 3 products must be ordered separately:

Adapter for door mounting	LRD 33●●, LR2 D	1	LA7D1020	
Operating heads for spring return pushbutton	Stop	All relays	1	XB5AL84101
	Reset	All relays	1	XB5AA86102

⁽¹⁾ These pre-wiring kits cannot be used with reversing contactors.

⁽²⁾ Terminal blocks are supplied with terminals protected against direct finger contact and screws in the open, "ready-to-tighten" position.

⁽³⁾ To order a terminal block for connection by lugs, the reference becomes LA7 D30646.

⁽⁴⁾ Remember to order the terminal block corresponding to the type of relay.

⁽⁵⁾ The time for which the coil of remote tripping or electrical resetting device LA7 D03 or LAD 703 can remain energised depends on its rest time: 1 s pulse duration with 9 s rest time; 5 s pulse duration with 30 s rest time; 10 s pulse duration with 90 s rest time; maximum pulse duration 20 s with a rest time of 300 s. Minimum pulse time: 200 ms.

⁽⁶⁾ Reference to be completed by adding the code indicating the control circuit voltage.

Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	12	24	48	96	110	220/230	380/400	415/440
50/60 Hz	—	B	E	—	F	M	Q	N
Consumption, inrush and sealed: < 100 VA								
---	J	B	E	DD	F	M	—	—
Consumption, inrush and sealed: < 100 W.								

⁽⁷⁾ Not compatible with 3-pole relays fitted with spring terminals.

Protection components

3-pole electronic thermal overload relays, TeSys LR9 F for motor protection

Compensated and differential overload relays

Thermal overload relays:

- compensated and differential,
- with relay trip indicator,
- for a.c.,
- for direct mounting on contactor or independent mounting ⁽¹⁾.

Relay setting range	Fuses to be used with selected relay		For direct mounting beneath contactor LC1	Reference	Weight
	aM	gG			
A	A	A			kg
Class 10 ⁽²⁾					
30...50	50	80	F115...F185	LR9F5357	0.885
48...80	80	125	F115...F185	LR9F5363	0.900
60...100	100	200	F115...F185	LR9F5367	0.900
90...150	160	250	F115...F185	LR9F5369	0.885
132...220	250	315	F185...F400	LR9F5371	0.950
200...330	400	500	F225...F500	LR9F7375	2.320
300...500	500	800	F225...F500	LR9F7379	2.320
380...630	630	800	F400...F630 and F800	LR9F7381	4.160
Class 20 ⁽²⁾					
30...50	50	80	F115...F185	LR9F5557	0.885
48...80	80	125	F115...F185	LR9F5563	0.900
60...100	100	200	F115...F185	LR9F5567	0.900
90...150	160	250	F115...F185	LR9F5569	0.885
132...220	250	315	F185...F400	LR9F5571	0.950
200...330	400	500	F225...F500	LR9F7575	2.320
300...500	500	800	F225...F500	LR9F7579	2.320
380...630	630	800	F400...F630 and F800	LR9F7581	4.160

⁽¹⁾ When mounting overload relays up to size **LR9 F5371** directly beneath the contactor, they may be additionally supported by a mounting plate (see page B11/13). Above this size it is always necessary to use the mounting plate.

Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page B11/13).

⁽²⁾ Standard IEC 60947-4 specifies a tripping time for 7.2 times the setting current I_n :

- class 10: between 4 and 10 seconds,
- class 20: between 6 and 20 seconds.



LR9 F53●●



LR9 F73●●

Protection components

3-pole electronic thermal overload relays, TeSys LR9 F for motor protection

Compensated overload relays, class 10 or 20 with alarm

Thermal overload relays:

- compensated,
- with relay trip indicator,
- for a.c.,
- for direct mounting on contactor or independent mounting ⁽¹⁾,
- class 10 or 20 by selector switch,
- protection of 3-phase or single-phase circuits by selector switch,
- with alarm function that enables tripping to be forestalled.



LR9 F57

Relay setting range	Fuses to be used with selected relay		For direct mounting beneath contactor LC1	Reference	Weight
	aM	gG			
A	A	A			kg
30...50	50	80	F115...F185	LR9F57	0.885
48...80	80	125	F115...F185	LR9F63	0.900
60...100	100	200	F115...F185	LR9F67	0.900
90...150	160	250	F115...F185	LR9F69	0.885
132...220	250	315	F185...F400	LR9F71	0.950
200...330	400	500	F225...F500	LR9F75	2.320
300...500	500	800	F225...F500	LR9F79	2.320
380...630	630	800	F400...F630 and F800	LR9F81	4.160

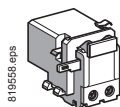
⁽¹⁾ When mounting overload relays up to size **LR9 F71** directly beneath the contactor, they may be additionally supported by a mounting plate (see page B11/13). Above this size it is always necessary to use the mounting plate.
Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page B11/13).

Protection components

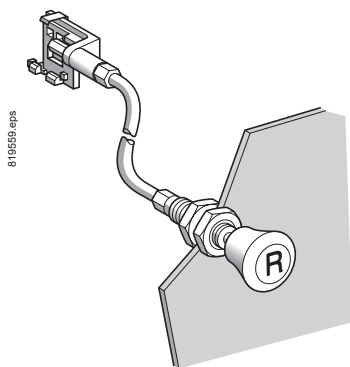
3-pole electronic thermal overload relays, TeSys LR9 F

Accessories (to be ordered separately)

Overload relays



LA7 D03●



LA7 D305

Control accessories

Description	Sold in lots of	Unit reference
Remote electrical reset device ⁽¹⁾	1	LA7D03● ⁽²⁾
Remote Reset function control by flexible cable (length = 0.5 m)	1	LA7D305
Remote Stop and/or Reset function control	1	LA7D1020
Adapter for door mounted operator		
Rod (snap-off end to obtain required length, between 17 and 120 mm)	10	ZA2BZ13
Operating head for spring return pushbutton	1	ZA2B●●●● ⁽³⁾

Connection accessories

For mounting an LR9 F5●71 thermal overload relay together with an LC1 F185 contactor

Description	Reference
Set of 3 busbars	LA7F407

For mounting a thermal overload relay beneath a reversing contactor or star-delta contactors

Application	For contactor	Width of terminal lug	Set of 3 busbars Reference
For relay		mm	
LR9 F5●57, F5●63, F5●67, LC1 F115 F5●69, F69, F71		15	LA7F401
LR9 F5●57, F5●63	LC1 F150, F185	20	LA7F402
LR9 F5●71, LR9 F71	LC1 F185	25	LA7F407
LR9 F5●71, LR9 F71	LC1 F225, F265	25	LA7F403
LR9 F7●75, F7●79, LR9 F75, F79	LC1 F225...F400	25	LA7F404
LR9 F7●81, LR9 F81	LC1 F400	25	LA7F404
LR9 F7●75, F7●79, F7●81, LC1 F500 LR9 F75, F79, F81		30	LA7F405
LR9 F7●81, LR9 F81	LC1 F630, F800	40	LA7F406

⁽¹⁾ The time for which the coil of remote electrical reset device LA7 D03 can remain energised depends on its rest time: 1 s pulse duration with 9 s rest time; 5 s pulse duration with 30 s rest time; 10 s pulse duration with 90 s rest time. Maximum pulse duration of 20 s with rest time of 300 s. Minimum pulse time: 200 ms.

⁽²⁾ Reference to be completed by adding the coil voltage code.
Standard control circuit voltages,
(for other voltages, please consult your Regional Sales Office):

Volts	12	24	48	96	110	220/ 230	380/ 400	415/ 440
~ 50/60 Hz	–	B	E	–	F	M	Q	N
Consumption, inrush and sealed: < 100 VA								
---	J	B	E	DD	F	M	–	–

Consumption, inrush and sealed: < 100 W.

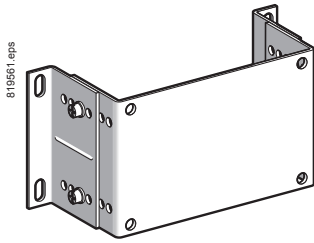
⁽³⁾ Stop: ZA2 BL432 and Reset: ZA2 BL639.

Protection components

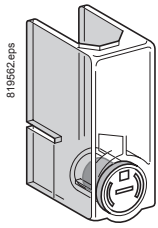
3-pole electronic thermal overload relays, TeSys LR9 F

Accessories (to be ordered separately)

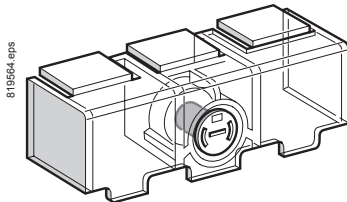
Overload relays



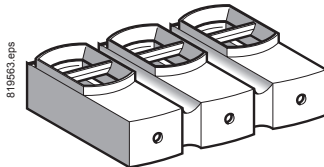
LA7 F90●



LA9 F70●



LA7 F70●



LA9 F103

Mounting plates for overload relay

For use with relays	Reference
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LR9 F5●57, F5●63, F5●67, F5●69, F5●71, LR9 F57, F63, F67, F69, F71	LA7F901
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LR9 F7●75, F7●79, F7●81, LR9 F75, F79, F81	LA7F902
---	---------

Sets of power terminal protection shrouds, single-pole

For use with relays	Number of shrouds per set	Set reference
---------------------	---------------------------	---------------

LR9 F5●57, LR9 F57	6	LA9F701
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LR9 F5●63, F5●67, F5●69, LR9 F63, F67, F69	6	LA9F702
---	---	---------

LR9 F5●71, LR9 F71	6	LA9F705
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LR9 F7●75, F7●79, F7●81, LR9 F75, F79, F81	6	LA9F703
---	---	---------

Power terminal protection shrouds, 3-pole

For use with relays	Reference
---------------------	-----------

LR9 F5●57, F5●63, F5●67, F5●69, LR9 F57, F63, F67, F69	LA7F701
---	---------

LR9 F5●71, LR9 F71	LA7F702
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LR9 F7●75, F7●79, F7●81, LR9 F75, F79, F81	LA7F703
---	---------

Insulated terminal blocks

For use with relays	Set of 2 blocks Reference
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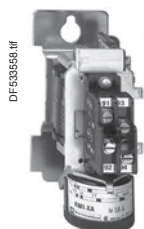
LR9 F5●57, F5●63, F5●67, F5●69, LR9 F57, F63, F67, F69	LA9F103
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Marking accessories

Description	Sold in lots of	Unit reference
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Clip-in marker holder	100	LA7D903
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Bag of 400 blank self-adhesive legends 7 x 16 mm	1	LA9D91
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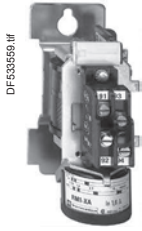
RM1 XA001

Non-latching				
With 1 C/O contact block, non-latching				
	Recommended operating range (motor In)	Setting range (trip current)	Maximum continuous current ~ or ≡	Reference
	A	A	A	
~ or ≡	0.7...1.15	1.25...4	1.6	RM1XA001
	1.16...1.8	2...6.3	2.5	RM1XA002
	1.9...2.9	3.2...10	4	RM1XA004
	3...4.6	5...16	6.3	RM1XA006
	4.7...7.2	8...25	10	RM1XA010
	7.3...11.5	12.5...40	16	RM1XA016
	11.6...18	20...63	25	RM1XA025
	18.1...29	32...100	40	RM1XA040
	29.1...46	50...160	63	RM1XA063
	46.1...72	80...250	100	RM1XA100
	73...115	125...400	160	RM1XA160
	116...145	160...500	200	RM1XA200
	146...230	250...800	315	RM1XA315
	231...360	400...1250	500	RM1XA500
~	361...630	630...2200	1000	RM1XA101
≡	361...570	630...2000	1000	RM1XA101
Accessory (to be ordered separately)				
	Description			Reference
	1 C/O contact block, non-latching			RM1ZG21

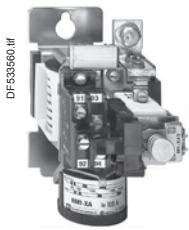
Protection components

Single-pole magnetic over current relays, TeSys RM1

Overload relays



RM1 XA0011



RM1 XA1001
+
ER1 XA2●



RM1 XA0011
+
RM1 ZH21

Latching with manual reset

With 1 C/O contact block, latching with manual reset				
Recommended operating range (motor In)	Setting range (trip current)	Maximum continuous current ~ or ---	Reference	
A	A	A		
~ or ---	0.7...1.15	1.25...4	1.6	RM1XA0011
	1.16...1.8	2...6.3	2.5	RM1XA0021
	1.9...2.9	3.2...10	4	RM1XA0041
	3...4.6	5...16	6.3	RM1XA0061
	4.7...7.2	8...25	10	RM1XA0101
	7.3...11.5	12.5...40	16	RM1XA0161
	11.6...18	20...63	25	RM1XA0251
	18.1...29	32...100	40	RM1XA0401
	29.1...46	50...160	63	RM1XA0631
	46.1...72	80...250	100	RM1XA1001
	73...115	125...400	160	RM1XA1601
	116...145	160...500	200	RM1XA2001
	146...230	250...800	315	RM1XA3151
	231...360	400...1250	500	RM1XA5001
~	361...630	630...2200	1000	RM1XA1011
---	361...570	630...2000	1000	RM1XA1011

Accessories (to be ordered separately)

Description	Reference
1 C/O contact block, latching	RM1ZH21
Electrical reset ⁽¹⁾ (consumption: inrush, sealed: 500 VA) (fitted to the relay together with a latching contact block) Basic reference. Complete with code indicating control circuit voltage ⁽²⁾	ER1XA2●

⁽¹⁾ The impulse duration must not exceed 2 seconds within 10 minute intervals.

⁽²⁾ Standard coil voltages for electrical reset:

Volts	24	48	110	220	380
50 Hz	B	E	F	M	Q

Protection components

Thermistor protection units for use with PTC thermistor probes ⁽¹⁾, TeSys LT3

PF52621-24-M.IF



LT3 SE00M

PF52622-24-M.IF



LT3 SA00M

PF52623-24-M.IF



LT3 SM00M

Protection units (without fault memory)

Units with automatic reset with thermistor short-circuit detection

Connection	Voltage		Output contact	Reference	
Cage connectors	~ 50/60 Hz	115 V	N/C	LT3SE00F	
		230 V	N/C	LT3SE00M	
		---	24 V	N/C	LT3SE00BD

Units with automatic reset with thermistor short-circuit detection

On front panel: fault and voltage signalling indicator.

Connection	Voltage		Output contact	Reference
Cage connectors	~ 50/60 Hz	115/230 V	N/C + N/O	LT3SA00M
		---	24/48 V	N/C + N/O
	~ 50/60 Hz or ---	24...230 V	2 C/O	LT3SA00MW

Protection units (with fault memory)

Units with manual reset with thermistor short-circuit detection

On front panel:

- fault and voltage signalling indicator,
- Test and Reset button.

Connection	Voltage		Output contact	Reference	
Cage connectors	~ 50/60 Hz	400 V	N/C + N/O	LT3SM00V	
		24/48 V	N/C + N/O	LT3SM00E	
		115/230 V	N/C + N/O	LT3SM00M	
		---	24/48 V	N/C + N/O	LT3SM00ED
	~ 50/60 Hz or ---	24...230 V	2 C/O	LT3SM00MW	

(1) PTC: Positive Temperature Coefficient.

Protection components

Thermistor protection units for use with PTC thermistor probes ⁽¹⁾, TeSys LT3

Overload relays



DA1 TT●●●



DA1 TS●●●

PTC thermistor probes ⁽¹⁾

Description	Nominal Operating Temperature (NOT) ° C	Colour	Sold in lots of	Unit reference
Integrated triple probes	90	Green/green	10	DA1TT090
	110	Brown/brown	10	DA1TT110
	120	Grey/grey	10	DA1TT120
	130	Blue/blue	10	DA1TT130
	140	White/blue	10	DA1TT140
	150	Black/black	10	DA1TT150
	160	Blue/red	10	DA1TT160
Surface probes	170	White/green	10	DA1TT170
	60	White/grey	10	DA1TS060
	70	White/brown	10	DA1TS070
	80	White/white	10	DA1TS080
	90	Green/green	10	DA1TS090
	100	Red/red	10	DA1TS100

Accessories (to be ordered separately)

Mounting accessories

Description	Application	Sold in lots of	Unit reference
Adapter	For fixing on C rail DZ5 MB	10	RHZ66

Marking accessories

Clip-in markers (maximum of 5 per unit)	Strips of 10 identical numbers (0 to 9)	25	AB1R● ⁽²⁾
	Strips of 10 identical capital letters (A to Z)	25	AB1G● ⁽²⁾

⁽¹⁾ PTC: Positive Temperature Coefficient.

⁽²⁾ When ordering, replace the ● in the reference with the number or letter required.

Overload relays

DF526329-40-M.tif



LR97 D07●●

DF526330-40-M.tif



LT47 30●●●

LR97 D electronic over current relays

Relay setting range	Usable range ⁽¹⁾	For use with contactor ⁽²⁾	Relay supply voltage	Reference ⁽³⁾
A				
0.3...1.5	0.3...1.3	LC1 D09...D38	~ 200...240 V	LR97D015M7
			~ 100...120 V	LR97D015F7
			~/~ 24 V	LR97D015B
			~/~ 48 V	LR97D015E
1.2...7	1.2...6	LC1 D09...D38	~ 200...240 V	LR97D07M7
			~ 100...120 V	LR97D07F7
			~/~ 24 V	LR97D07B
			~/~ 48 V	LR97D07E
5...25	5...21	LC1 D09...D38	~ 200...240 V	LR97D25M7
			~ 100...120 V	LR97D25F7
			~/~ 24 V	LR97D25B
			~/~ 48 V	LR97D25E
20...38	20...34	LC1 D25...D38	~ 200...240 V	LR97D38M7
			~ 100...120 V	LR97D38F7
			~/~ 24 V	LR97D38B
			~/~ 48 V	LR97D38E

LT47 electronic over current relays

Relay setting range	Usable range ⁽¹⁾	Relay supply voltage	Reference
A			
LT47 relay with manual/electric reset			
0.5...6	0.5...5	~ 200...240 V	LT4706M7S
		~ 100...120 V	LT4706F7S
		~/~ 24 V	LT4706BS
		~/~ 48 V	LT4706ES
3...30	3...25	~ 200...240 V	LT4730M7S
		~ 100...120 V	LT4730F7S
		~/~ 24 V	LT4730BS
		~/~ 48 V	LT4730ES
5...60	5...50	~ 200...240 V	LT4760M7S
		~ 100...120 V	LT4760F7S
		~/~ 24 V	LT4760BS
		~/~ 48 V	LT4760ES
LT47 relay with automatic reset			
0.5...6	0.5...5	~ 200...240 V	LT4706M7A
		~ 100...120 V	LT4706F7A
		~/~ 24 V	LT4706BA
		~/~ 48 V	LT4706EA
3...30	3...25	~ 200...240 V	LT4730M7A
		~ 100...120 V	LT4730F7A
		~/~ 24 V	LT4730BA
		~/~ 48 V	LT4730EA
5...60	5...50	~ 200...240 V	LT4760M7A
		~ 100...120 V	LT4760F7A
		~/~ 24 V	LT4760BA
		~/~ 48 V	LT4760EA

Accessories (to be ordered separately)

Description	For use with	Sold in lots of	Unit reference
Pre-wiring kits allowing connection of the LR97 D relay N/C contact directly to the contactor	LC1 D09...D18	10	LAD7C1
	LC1 D25...D38	10	LAD7C2
Terminal block for clip-on mounting on 35 mm rail (AM1 DP200)	LR97 D	1	LAD7B106

(1) To allow adjustment of the tripping sensitivity, see adjustment method (page B11/54).

(2) Please see chapter B8.

(3) If a pre-wiring kit is used, it is no longer possible to electrically wire signalling of tripped status.

Technical Data for Designers

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Introduction

Exceeding the operating limits of an electric motor will lead, eventually, not only to destruction of the motor itself but also of the mechanisms it drives.

This type of load can be the cause of electrical or mechanical faults.

■ **Electrical faults:**

- overvoltage, voltage drop, imbalance and phase failure which cause variations in the current drawn,
- short-circuits which can cause the current to reach levels capable of destroying the load.

■ **Mechanical faults:**

- locked rotor,
- brief or prolonged overload which leads to an increase in the current drawn by the motor, and therefore overheating.

The cost of these faults must take into account loss of production, loss of raw materials, repair of the production tool, poor quality of production and delays in delivery.

These faults can also have dramatic consequences on the safety of persons in direct or indirect contact with the motor.

To prevent these faults, protection measures are necessary. They make it possible to isolate the equipment to be protected from the mains supply by measuring variations in electrical values (voltage, current, etc.).

Each motor starter must therefore have:

■ **short-circuit protection**, to detect and break, as quickly as possible, abnormal currents generally greater than 10 times the rated current (I_n).

■ **overload protection**, to detect increases in current up to about $10 I_n$ and switch off the starter before overheating of the motor and conductors damages the insulation.

This protection is provided by specific devices such as fuses, circuit breakers and thermal overload relays, or by more integrated devices offering several types of protection.

Overload relays

Causes, effects and consequences of various faults

There are two types of fault:

- Internal faults within the motor
- External faults: these are located outside the electric motor but their consequences can lead to damage inside the motor.

Faults	Causes	Effects	Consequences on the motor and on the machine
Short-circuit	Contact between several phases, or between one phase and neutral or between several turns of the same phase.	<ul style="list-style-type: none"> ■ Current peak ■ Electrodynamical forces on the conductors 	Destruction of windings
Overvoltage	<ul style="list-style-type: none"> ■ Lightning ■ Electrostatic discharge ■ Operation 	Dielectric breakdown in the windings	Destruction of the windings due to loss of insulation
Phase imbalance and phase failure	<ul style="list-style-type: none"> ■ Opening of a phase ■ Single-phase load upstream of the motor ■ Short-circuit between the turns of the same winding 	<ul style="list-style-type: none"> ■ Reduction of usable torque, efficiency and speed ■ Increase in losses ■ Starting impossible if phase failure 	Overheating ⁽¹⁾
High starting frequency	<ul style="list-style-type: none"> ■ Failure of the automation system ■ Too many manual control operations ■ Numerous fault trips 	High stator and rotor temperature rise due to the frequent start current	Overheating ⁽¹⁾ Consequences on the process
Voltage variations	<ul style="list-style-type: none"> ■ Instability of the mains voltage ■ Connection of heavy loads 	<ul style="list-style-type: none"> ■ Reduction of usable torque ■ Increase in losses 	Overheating ⁽¹⁾
Harmonics	<ul style="list-style-type: none"> ■ Pollution of the mains supply by variable speed drives, inverters, etc... 	<ul style="list-style-type: none"> ■ Reduction of usable torque ■ Increase in losses 	Overheating ⁽¹⁾
Long starting time	<ul style="list-style-type: none"> ■ Resistive torque too high (load too heavy) ■ Voltage drop 	Increase in starting time	Overheating ⁽¹⁾
Jamming	<ul style="list-style-type: none"> ■ Mechanical problem (crusher) ■ Seizures 	Overcurrent	Overheating ⁽¹⁾ Consequences on the process
No-load running	<ul style="list-style-type: none"> ■ Pump running empty ■ Mechanical break in drive to the load 	Drop in current drawn	Consequences on the process
Frequency fluctuations	<ul style="list-style-type: none"> ■ Overload of a supply powered by limited independent sources ■ Faulty alternator speed regulator 	<ul style="list-style-type: none"> ■ Increase in losses ■ Interferes with synchronous devices (clock, recorder, ...) 	–
Overload	<ul style="list-style-type: none"> ■ Increase in resistive torque ■ Voltage drop ■ Drop in power factor 	Increase in current consumption	Overheating ⁽¹⁾
Loss of machine excitation	<ul style="list-style-type: none"> ■ Significant drop in excitation current ■ Break in rotor winding 	<ul style="list-style-type: none"> ■ Increase in active power ■ Drop in power factor 	Significant overheating of rotor and cage
Phase-Earth fault	<ul style="list-style-type: none"> ■ Accidental Phase-Earth contacts ■ Accidental Phase-machine casing contacts (casing connected to earth) 	<ul style="list-style-type: none"> ■ Overvoltage developed in the mains supply ■ Rise in earth potential (safety of persons) 	Consequences on safety of persons

⁽¹⁾ Then, in the longer or shorter term, depending on the seriousness of the fault and/or its frequency, short-circuit and destruction of the windings.

Overload relays

Protection functions

Short-circuit protection

General

A short-circuit results in a very rapid rise in current which can reach several hundred times the value of the operational current. The consequences of a short-circuit are dangerous to both equipment and persons. It is therefore imperative to use protection devices to detect the fault and very quickly break the circuit.

Two types of protection are commonly used:

- fuses (cutout) which break the circuit by melting, which then requires their replacement,
- magnetic trip circuit breakers, often more simply called "magnetic circuit breakers", which only require re-setting to put them back into service.

Short-circuit protection can also be built-into multifunction devices such as motor circuit breakers and contactor-breakers.

The main characteristics of short-circuit protection devices are:

- their breaking capacity: this is the highest prospective short-circuit current value that a protection device can break at a given voltage.
- their making capacity: this is the highest current value that the protection device can make at its rated voltage in specified conditions.

The making capacity is equal to k times the breaking capacity.

Fuses (cutouts)

Fuses provide individual phase protection (single-pole), with a high breaking capacity in a compact size:

- mounted either in fuse carriers,
- or in isolators, replacing the original links or shunt bars.

For motor protection, aM type fuses are used. Their design characteristics allow them to conduct the high magnetising currents that occur when motors are switched on. They are therefore unsuitable for overload protection (unlike gG type fuses). This is why an overload relay must be included in the motor power supply circuit.

Magnetic circuit breakers

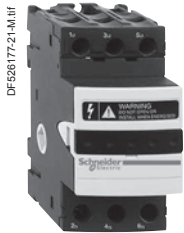
These circuit breakers protect installations against short-circuits, within the limit of their breaking capacity.

Magnetic circuit breakers provide omnipole breaking as standard.

For relatively low short-circuit currents, the operation of a circuit breaker is faster than that of fuses.

This protection conforms to standard IEC 60947-2.

The thermal and electrodynamic effects are also limited, therefore ensuring better protection of cables and equipment.



LS1 D32
fuse carrier



GS2 N3
switch disconnectors

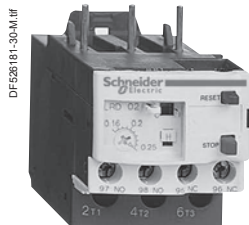


GV2 L
magnetic circuit-breaker

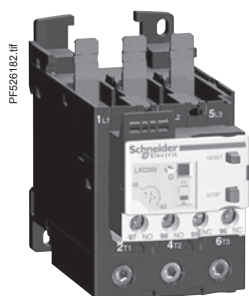


TeSys U LUB 12 starter with
LUCA control unit

Overload relays



DF526181-30-M.tif
LRD 02
thermal overload relay



PF526182.tif
LRD 365
thermal overload relay



DF526183-21-M.tif
RM4 JA current measurement relay



PF526184.tif
TeSys U starter with "thermal overload alarm" function module

Protection functions

Overload protection

General

An overload condition is the most frequently encountered fault. The symptoms are a rise in the current drawn by the motor and thermal effects. A rapid return to normal operating conditions is important. The actual operating conditions (ambient temperature, operating altitude and type of standard duty) are essential to determine the operating values of the motor (power, current) and to be able to select effective overload protection. These operational values are given by the motor manufacturer.

According to the level required, protection can be provided by:

- overload relays and thermal overload relays (bi-metallic or electronic type) which protect motors in the event of:
 - overload, by monitoring the current drawn by each phase,
 - phase imbalance or failure, by their differential mechanism.
- relays with PTC thermistor probes (Positive Temperature Coefficient).
- overtorque relays,
- multifunction relays.

Overload relays

These relays protect motors against overload. They must allow the temporary overload that occurs on starting and must only trip if the starting time is abnormally long.

The overload relay will be selected according to the length of the starting time (tripping class) and the motor rating.

These relays have a thermal memory (except for certain electronic overload relays, indicated by their manufacturers) and can be connected:

- either in series with the load,
- or to current transformers placed in series with the load.

Bi-metallic thermal overload relays

Combined with a contactor, these relays protect the line and the equipment against small and prolonged overloads. They must be protected against strong overcurrent by a circuit breaker or fuses.

These relays may be used on an a.c. or d.c. system and are generally:

- 3-pole,
- compensated, i.e. insensitive to ambient temperature variations,
- with manual or automatic reset,
- graduated with a "motor FLC" scale: allowing direct setting to the full load current as shown on the motor rating plate.

They can also be sensitive to phase failure: this is known as 'differential'. This function conforms to standards IEC 60947-4-1 and 60947-6-2

This type of relay is extremely reliable and is a relatively low cost device.

Electronic thermal overload relays

Electronic thermal overload relays have the advantage of electronics which allow a more complex thermal image of the motor to be created.

They can be combined with products having complementary functions, such as:

- temperature sensing via PTC probes,
- protection against jamming and overtorque,
- protection against phase reversal,
- earth fault protection,
- protection against no-load running,
- alarm function.

Overload relays



LT3 S relays for use with thermistor probes



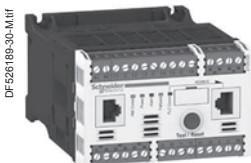
LR97 D07 instantaneous electronic overcurrent relays



TeSys U LUB 32 starter with multifunction control unit LUC M



TeSys U controller LUTM 20BL



TeSys T controller LTM R08MBD

Protection functions *(continued)*

Overload protection *(continued)*

Relays for use with PTC thermistor probes

With direct sensing of the stator windings, these relays can be used to protect motors against:

- overload,
- a rise in ambient temperature,
- a ventilation circuit fault,
- a high starting frequency,
- mechanical shocks, etc.

Overload (or overtorque) relays

These relays protect the drive line in the event of a locked rotor, seizure or mechanical shocks. This is an additional protection.

Unlike thermal overload relays, these relays do not have a thermal memory. They have definite time characteristics (adjustable current threshold and time delay).

The overtorque relay can be used as overload protection for motors with long starting times or very frequent starting (for example, lifting hoists).

Multifunction relays

Overcurrent relays are limited when it is necessary to take into account problems associated with voltage, temperature or special applications. New production or maintenance management needs have prompted manufacturers to offer products which provide not only adaptable protection, but also complete management of the motor and its load.

They incorporate:

- current and voltage sensors (TeSys T controllers),
- hybrid analog and digital electronic technology,
- the use of communication buses for data exchange and control,
- powerful motor modelling algorithms,
- integrated application programs whose parameters can be set.

These products make it possible to reduce installation and operating costs by reducing maintenance and downtime.

TeSys U starters:

The multifunction relay is incorporated in the motor starter.

This solution is very compact with reduced wiring. It is limited to 32 A.

TeSys U controllers:

The multifunction relay is separate from the power line and reuses the function blocks from the TeSys U solution. It can be used in conjunction with a contactor up to 810 A.

TeSys T controllers:

The multifunction relay is separate from the power line and incorporates inputs and outputs. It can be used in conjunction with a contactor up to 810 A.

Protection components

Motor and machine protection

Overload relays

Protection relay selection table					
Relay type	Motor protection		Machine protection	Motor and machine protection	
	Thermal overload relay	Relays for use with PTC probes	Overtorque relays	TeSys U controller	TeSys T controller
	LR2 K, LRD, LRD 3, LR9 F, LR9 D ⁽¹⁾	LT3 S	LR97 D, LT47	LUT M	LTM R
Causes of overheating	⁽²⁾		⁽²⁾	⁽²⁾	⁽³⁾
Slight overload	■	■	■	■	■
Locked rotor	■	■	■	■	■
No-load running	□	□	□	■	■
Supply phase failure	■	■	LR9 7D	■	■
Ventilation fault	□	■	□	□	With probes
Abnormal temperature rise	■	■	□	□	With probes
Shaft bearing seizure	■	■	■	■	With probes
Insulation fault	■	□	□	■	■
Protracted starting time	■	■	■	■	■
Severe duty	■	■	■	■	With probes
Voltage variation	■	■	■	■	■
Frequency fluctuations	■	□	□	□	■
Loss of machine excitation	□	□	□	□	■

- Ideally suited
- Possible solution
- Not suitable (no protection)

⁽¹⁾ For motor circuit breaker type GV2ME.
⁽²⁾ Protection based on current.
⁽³⁾ Protection based on current and voltage.

Protection components

TeSys LRK thermal overload relays, adjustable from 0.11 to 16 A

Overload relays

Environment					
Conforming to standards			IEC 60947, NF C 63-650, VDE 0660, BS 4941		
Product certifications			UL, CSA		
Protective treatment	Conforming to IEC 60068 (DIN 50016)		"TC" (Klimafest, Climateproof)		
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact		
Ambient air temperature around the device	Storage	°C	-40...+70		
	For normal operation (IEC 60947)	°C	-20...+55 (without derating)		
	Operating limit	°C	-30...+60 (with derating) ⁽¹⁾		
Maximum operating altitude	Without derating	m	2000		
Operating positions			<p>Vertical axis</p> <p>Without derating</p>	<p>Horizontal axis</p> <p>With derating⁽¹⁾</p>	
Flame resistance	Conforming to UL 94		Self-extinguishing material V1		
	Conforming to NF F 16-101 and 16-102		Conforming to requirement 2		
Shock resistance, hot state (1/2 sine wave, 11 ms)	Conforming to IEC 60068, N/C contact		10 gn		
	Conforming to IEC 60068, N/O contact		10 gn		
Vibration resistance, hot state 5 to 300 Hz	Conforming to IEC 60068, N/C contact		2 gn		
	Conforming to IEC 60068, N/O contact		2 gn		
Safe separation of circuits	Conforming to VDE 0106 and IEC 60536		VLSV (2), up to 400 V		
Cabling Screw clamp terminals	Solid cable Flexible cable without cable end Flexible cable with cable end	mm ²	Minimum	Maximum	Maximum to IEC 60947
			1 x 1.5	2 x 4	1 x 4 + 1 x 2.5
			1 x 0.75	2 x 4	2 x 2.5
		mm ²	1 x 0.34	1 x 1.5 + 1 x 2.5	1 x 1.5 + 1 x 2.5
Tightening torque	Philips head n° 2 - Ø6	N.m	0.8		
Mounting			Directly under the contactor or reversing contactor		
Connections			<p>Made automatically when mounted under the contactor, as follows:</p> <ul style="list-style-type: none"> ■ contactor terminal A2 connected to overload relay terminal 96 on all products, ■ contactor terminal 14 connected to overload relay terminal 95 on products with 3 P + N/O. <p>When using 3 P + N/C, or 4 P contactors, or the N/O auxiliary contact marked 13-14, at a voltage other than the coil voltage, break off the link marked 14.</p>		

Auxiliary contact characteristics									
Number of contacts			1 N/C + 1 N/O						
Conventional thermal current		A	6						
Short-circuit protection	Conforming to IEC 60947, VDE 0660. gG fuse or circuit breaker GB2 CB●●	A	6 max.						
Maximum power of the controlled contactor coils (sealed) (Occasional operating cycles of contact 95-96)	a.c.	V	24	48	110	220/230	400	415/440	600/690
		VA	100	200	400	600	600	600	600
	d.c.	V	24	48	110	220	250	—	—
		W	100	100	50	45	35	—	—
Maximum operational voltage	a.c., category AC-15	V	690						
	d.c., category DC-13	V	250						

(1) Please consult your Regional Sales Office.
 (2) Very low safety voltage.

Protection components

TeSys LRK thermal overload relays, adjustable from 0.11 to 16 A

Overload relays

Electrical characteristics of the power circuit

Rated operational voltage (Ue)	Up to	V	690
Rated insulation voltage (Ui)	Conforming to BS 4941	V	690
	Conforming to IEC 60947	V	690
	Conforming to VDE 0110 group C	V	750
	Conforming to CSA C 22-2 n° 14	V	600
Rated impulse withstand voltage (Uimp)		kV	6
Frequency limits of the operational current		Hz	Up to 400
Power dissipated per pole		W	2

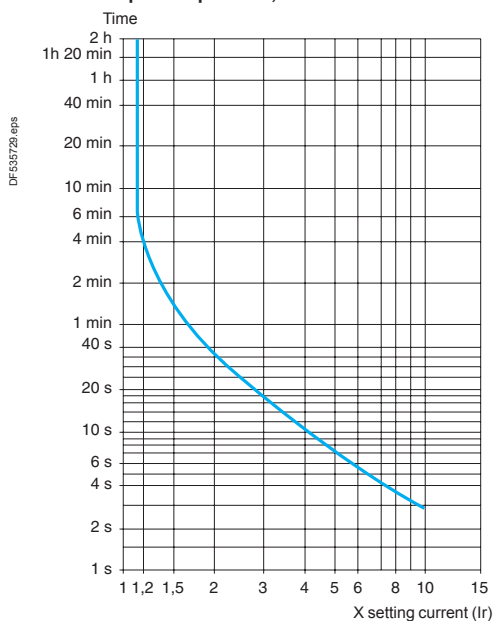
Operating characteristics

Sensitivity to phase failure	Conforming to IEC 60947		Yes
Reset	Manual or automatic		Selected by means of a lockable and sealable switch on the front of the relay
Signalling	On front of relay		Trip indicator
Reset-Stop function			Pressing the Reset-Stop button: - actuates the N/C contact - has no effect on the N/O contact
Test function	By pushbutton		Pressing the Test button enables: - checking of the control circuit wiring - simulation of overload tripping (actuation of both N/C and N/O contacts, and of the trip indicator)
Short-circuit protection and coordination			See pages A5/11 and A5/20

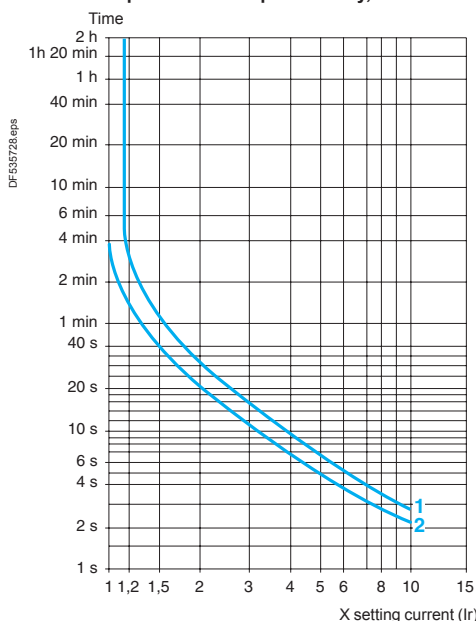
Tripping curves

Average operating time related to multiples of the current setting (Class 10 A)

Balanced 3-phase operation, from cold state



Balanced operation with 2 phases only, from cold state



Setting: at lower end of scale

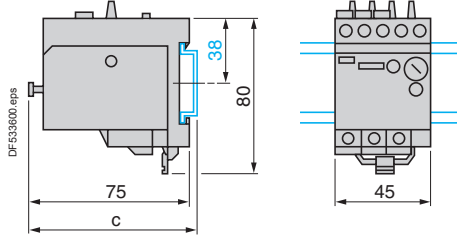
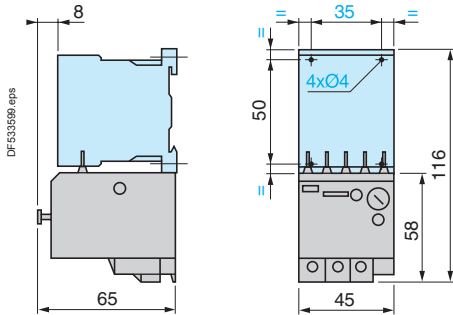
Setting: at upper end of scale

Dimensions, mounting

LR2 K

Direct mounting beneath the contactor

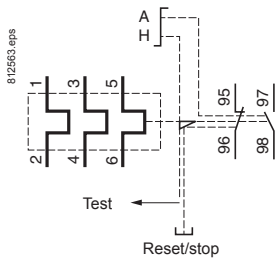
Separate mounting with terminal block LA7 K0064 on 35 mm rail
(AM1 DP200 or AM1 DE200)



AM1	c
DP200	78.5
DE200	86

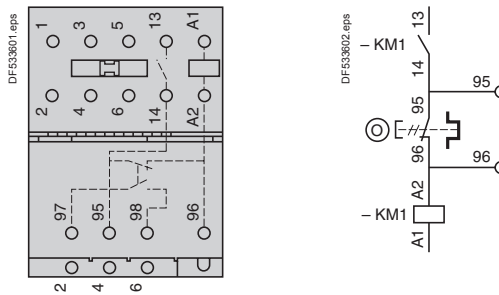
Schemes

LR2 K

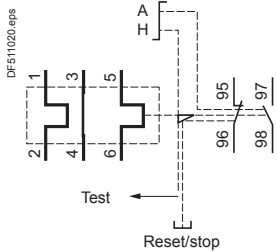


LR2 K + LC• K

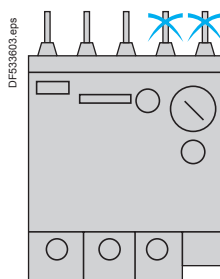
Pre-wiring scheme



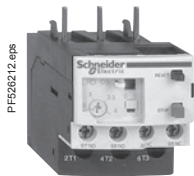
LR7 K



Note: If pre-wiring is not required, break off the 2 links located on the thermal overload relay.



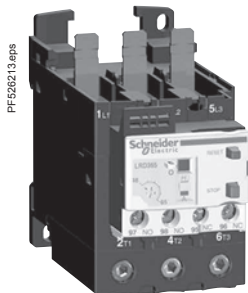
Overload relays



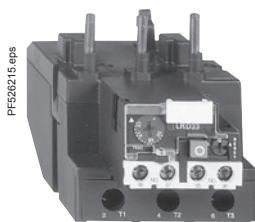
LRD 08



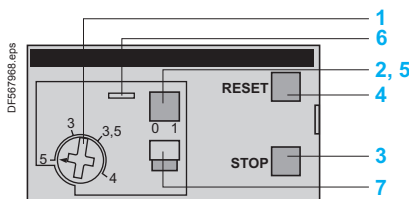
LRD 04L...32L



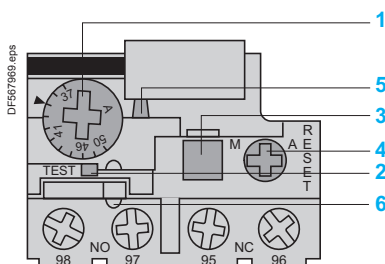
LRD 365



LRD 33●●



LRD 01...35, LRD 04L...32L
LRD 313...LRD 365



LRD 3361...4369, LR2 D3561...3563

Presentation

TeSys D thermal overload relays are designed to protect a.c. circuits and motors against:

- overloads
- phase failure
- excessively long starting times
- prolonged stalled rotor condition.

Power connection

LRD 01 à LRD 35

LRD 01 to 35 relays are designed for connection by screw clamp terminals. They can be supplied for connection by spring terminals or by lugs ⁽¹⁾.

LRD04 to LRD32L

These relays are designed for connection by screw clamp terminals. They can be supplied for connection by lugs ⁽¹⁾.

LRD 313 to LRD 365

These relays are for connection by BTR screw connectors (hexagon socket head). The screws are tightened by means of a size 4, insulated Allen key.

This type of connection uses the **EverLink®** system with creep compensation ⁽²⁾ (Schneider Electric patent).

This technique makes it possible to achieve accurate and durable tightening torque.

These relays are also available for connection by lugs ⁽¹⁾.

LRD 3361 to 4369, LR2 D3561 to D3563

LRD 3361 to 4369 and LR2 D3561 to D3563 relays are designed for connection by screw clamp terminals. They can be supplied for connection by lugs ⁽¹⁾.

Description

TeSys D 3-pole thermal overload relays are designed to protect a.c. circuits and motors against overloads, phase failure, long starting times and prolonged stalling of the motor.

- 1 Adjustment dial Ir.
- 2 Test button.
Operation of the Test button allows:
 - checking of control circuit wiring,
 - simulation of relay tripping (actuates both the N/O and N/C contacts).
- 3 Stop button. Actuates the N/C contact; does not affect the N/O contact.
- 4 Reset button.
- 5 Trip indicator.
- 6 Setting locked by sealing the cover.
- 7 Selector for manual or automatic reset.

LRD 01 to 35, LRD 04L to 32L and LRD 313 to LRD 365 relays are supplied with the selector in the manual position, protected by a cover. Deliberate action is required to move it to the automatic position.

⁽¹⁾ Connection by lugs meets the requirements of certain Asian markets and is suitable for applications subject to strong vibration, such as railway transport.

⁽²⁾ Creep: normal crushing phenomenon of copper conductors, that is accentuated over time.

Overload relays

Environment			
Conforming to standards			IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 508, CSA C22.2 n° 14. ATEX directive 94/9/EC ⁽¹⁾
Product certifications			UL ⁽⁴⁾ , CSA ⁽⁴⁾ CCC, GOST ATEX INERIS ⁽¹⁾ GL, DNV, RINA, BV, LROS
Degree of protection (front face)	Conforming to IEC 60529		Protection against direct finger contact IP20
Protective treatment	Conforming to IEC 60068		"TH"
Ambient air temperature around the device	Storage	°C	-60...+70
	Normal operation, without derating (IEC 60947-4-1)	°C	-20...+60
	Minimum /maximum operating temperatures (with derating)	°C	-40...+70
Operating positions without derating	In relation to normal vertical mounting plane		Any position. When mounting on a vertical rail, use a stop.
Flame resistance	Conforming to UL94		V1
	Conforming to IEC 60695-2-1	°C	850
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7		15 gn - 11 ms
Vibration resistance ⁽²⁾	Permissible acceleration conforming to IEC 60068-2-6		6 gn except LRD04L...LRD32L: 3 gn
Dielectric strength at 50 Hz	Conforming to IEC 60255-5	kV	6
Surge withstand	Conforming to IEC 60801-5	kV	6

Electrical characteristics of power circuit										
Relay type		LRD 01 ...16, LR3 D01 ...16	LRD 04L ...32L	LRD 21 ...35, LR3 D21 ...35	LRD 313 ...365 LR3 D313 ...365	LRD 313L ...365L	LRD 3322 ...33696 LR3 D3322 ... 33696	LR2 D3522 ... 3563	LRD 4365 ...4369	
Tripping class	Conforming to UL508, IEC 60947-4-1	10 A	20	10 A	10 A	20	10 A	20	10 A	
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V						690		1000 ⁽³⁾
	Conforming to UL, CSA	V						600		600 except LRD 4369
Rated impulse withstand voltage (Uimp)		kV								6
Rated operational voltage (Ue)		V								690
Frequency limits	Of the operating current	Hz								0...400
Setting range	Depending on model	A	0.1...13	0.63...32	12...38	9...65	9...65	17...140	17...80	80...140

Auxiliary contact characteristics									
Conventional thermal current		A	5						
Max. sealed consumption of the operating coils of controlled contactors (Occasional operating cycles of contact 95-96)	a.c. supply, AC-15	V	120	240	380	480	500	600	
		A	3	1.5	0.95	0.75	0.72	0.12	
	d.c. supply, DC-13	V	125	250	440				
		A	0.22	0.1	0.06				
Protection against short-circuits	By gG, BS fuses. Maximum rating or by GB2	A	5						

⁽¹⁾ For relays LRD 01 to LRD 365, LRD 3322 to LRD 3365, LRD 04L to LRD 32L, LRD 4365 to LRD 4369, LRD 33656 to LRD 33696.

⁽²⁾ For relays LRD 313 to LRD 365: 6 gn only with independent plate mounting and 4 gn when mounted beneath the contactor.

⁽³⁾ 750 V for LRD 33656, LRD 33676, LRD 33696.

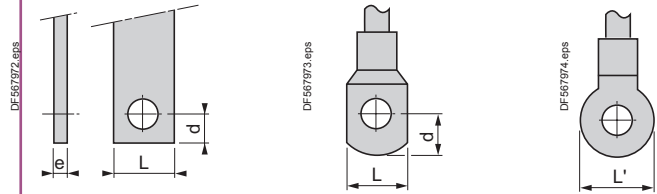
⁽⁴⁾ Except for relays LRD 4369.

Overload relays

Power circuit connection characteristics

Relay type		LRD 01 ...16, LR3 D01 ...16	LRD 04L ...21L	LRD 22L ...32L	LRD 21 ...35, LR3 D21 ...35	LRD 313 ...365 LR3 D313 ...365	LRD 313L ...365L	LRD 3322 ...33696 LR3 D3322 ... 33696	LR2 D3522 ...3563	LRD 4365 ...4369
Connection to screw clamp terminals										
Flexible cable without cable end	1 conductor	mm ² 1.5...10			1.5...10		1...35	1...35	4...35	
Flexible cable with cable end	1 conductor	mm ² 1...4		1...6	1...6 except LRD 21: 1...4		1...35	1...35	4...35	
Solid cable without cable end	1 conductor	mm ² 1...6		1.5...10	1.5/10 except LRD 21: 1/6		1...35	1...35	4...35	
Tightening torque		N.m 1.7		2.5	2.5	1...25: 5 35: 8	1...25: 5 35: 8	9	9	9
Connection to spring terminals (Min/max c.s.a.) (except LRD 04L...LRD 32L)										
Flexible cable without cable end	1 conductor	mm ² 1.5...4		-	1.5...4		-	-	-	
Flexible cable with cable end	1 conductor	mm ² 1.5...4		-	1.5...4		-	-	-	

Connection by bars or lugs

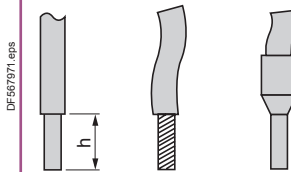


Relay type		LRD 016...166 LRD 04L6 ... 16L6	LRD 216...356 LRD 21L6 ... 32L6	LRD 3136 ... 3656	LRD 313L6 ... 365L6	LRD 3322A66 ... 3365A66
Pitch	Without spreaders	mm 14.5	17.5	17.5	17.5	21.5
Bars or cables with lugs	e	N.m ≤ 6	≤ 6	≤ 6	≤ 6	≤ 6
	L	mm ≤ 8	≤ 8	≤ 13.5	≤ 13.5	≤ 16
	L'	mm ≤ 9.5	≤ 10	≤ 16.5	≤ 16.5	≤ 16
	d	mm ≤ 7	≤ 7	≤ 10	≤ 10	≤ 12
Screws		M4	M4	M6	M6	M10
	Tightening torque	N.m 2.3	2.3	6	6	11.3

Control circuit connection characteristics

Connection to screw clamp terminals or spring terminals

Bare cables



Relay type		LRD 01 ...16, LR3 D01 ...16	LRD 04L ...21L	LRD 22L ...32L	LRD 21 ...35, LR3 D21 ...35	LRD 313 ...365 LR3 D313 ...365	LRD 313L ...365L	LRD 3322 ...33696 LR3 D3322 ... 33696	LR2 D3522 ... 3563	LRD 4365 ...4369
Connection to screw clamp terminals ⁽¹⁾										
	Solid cable without cable end	mm ² 2 x 1...2.5								
	Flexible cable without cable end	mm ² 2 x 1...2.5								
	Flexible cable with cable end	mm ² 2 x 1...2.5								
Tightening torque		N.m 1.7								
Connection to spring terminals (Min/max c.s.a.) (except LRD 04L...LRD 32L)										
	Solid cable	mm ² 1...2.5			1...2.5		-			
	Flexible cable without cable end	mm ² 1...2.5			1...2.5		-			

(1) For relays LRD 313 to 365: BTR hexagon socket head screws, EverLink® system. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page B8/21).

Overload relays

Operating characteristics

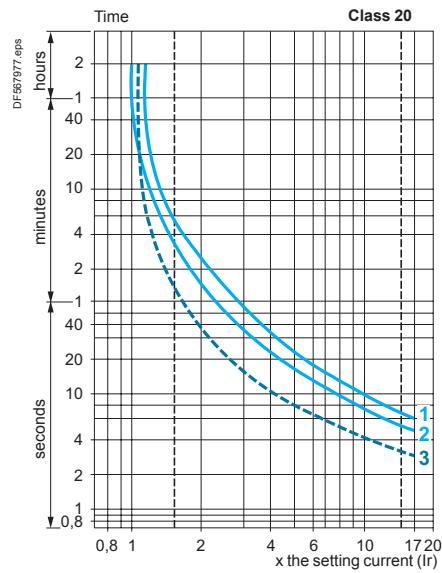
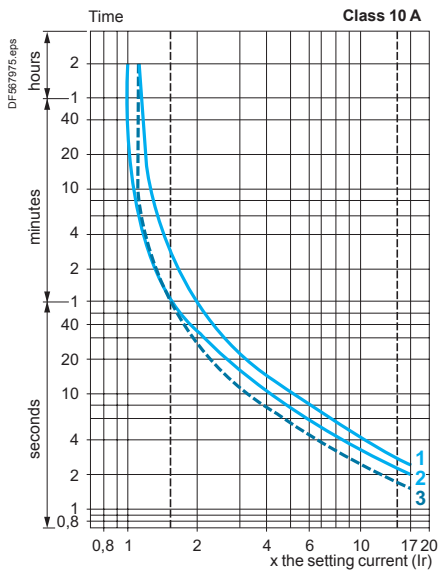
Relay type	LRD 01 ...16, LR3 D01 ...16	LRD 04L... LRD 32L	LRD 21 ...35, LR3 D21 ...35	LRD 313 ...365 LR3 D313 ...365	LRD 313L ...365L	LRD 3322 ...33696 LR3 D3322 ... 33696	LR2 D3522 ... 3563	LRD 4365 ...4369
Temperature compensation	°C		-20...+60					
Tripping threshold	Conforming to IEC 60947-4-1		A		1.14 ±0.06 I _r			
Sensitivity to phase failure	Tripping current 130 % of I _r on two phases, the third phase at 0.							

Tripping curves

Average operating time related to multiples of the setting current

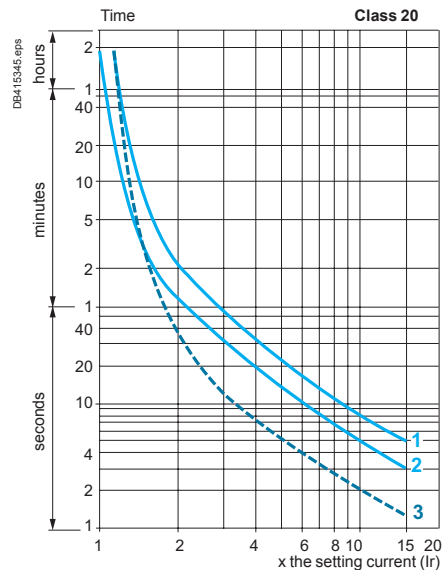
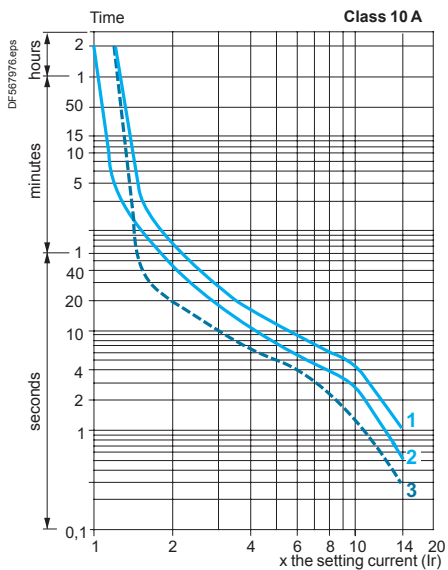
LRD 01 to LRD 35, LR2 D and LRD 3322 to LRD 4369

LRD 04L to LRD 32L and LR2 D3522 to LR2 D3563



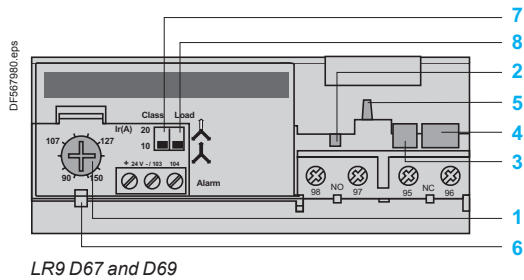
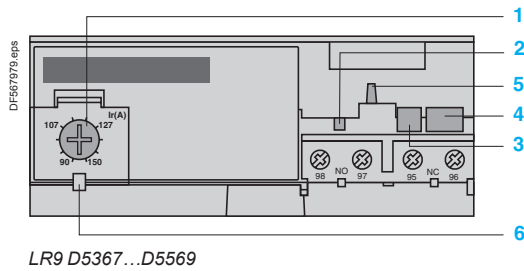
LRD 313 to LRD 365

LRD 313L to LRD 365L



- 1 Balanced operation, 3-phase, without prior current flow (cold state).
- 2 2-phase operation, without prior current flow (cold state).
- 3 Balanced operation, 3-phase, after a long period at the set current (hot state).

Overload relays



Description

LR9 D electronic thermal overload relays are designed for use with contactors LC1 D115 and D150.

In addition to the protection provided by TeSys D thermal overload relays (see page B11/29), they offer the following special features:

- protection against phase imbalance
- choice of starting class
- protection of unbalanced circuits
- protection of single-phase circuits
- alarm function to avoid tripping by load shedding.

- 1 Adjustment dial Ir.
- 2 Test button.
- 3 Stop button.
- 4 Reset button.
- 5 Trip indicator.
- 6 Setting locked by sealing the cover.
- 7 Class 10/class 20 selector switch.
- 8 Selector for balanced load /unbalanced load

Environment

Conforming to standards		IEC 60947-4-1, 255-8, 255-17, VDE 0660 and EN 60947-4-1
Product certifications		UL 508 , CSA 22-2
Degree of protection	Conforming to IEC 60529 and VDE 0106	IP 20 on front panel with protective covers LA9 D11570● or D11560●
Protective treatment	Standard version	"TH"
Ambient air temperature around the device (Conforming to IEC 60255-8)	Storage	°C - 40...+ 85
	Normal operation	°C - 20...+ 55 ⁽¹⁾
Maximum operating altitude	Without derating	m 2000
Operating positions without derating	In relation to normal vertical mounting plane	Any position
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7	13 gn - 11 ms
Vibration resistance	Permissible acceleration conforming to IEC 60068-2-6	2 gn - 5...300 Hz
Dielectric strength at 50 Hz	Conforming to IEC 60255-5	kV 6
Surge withstand	Conforming to IEC 61000-4-5	kV 6
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	kV 8
Immunity to radiated radio-frequency disturbances	Conforming to IEC 61000-4-3 and NF C 46-022	V/m 10
Immunity to fast transient currents	Conforming to IEC 61000-4-4	kV 2
Electromagnetic compatibility	Draft EN 50081-1 and 2, EN 50082-2	Meets requirements

Electrical characteristics of auxiliary contacts

Conventional thermal current		A	5					
Max. sealed consumption of the operating coils of controlled contactors (Occasional operating cycles of contact 95-96)	a.c. supply	V	24	48	110	220	380	600
		VA	100	200	400	600	600	600
	d.c. supply	V	24	48	110	220	440	–
		W	100	100	50	45	25	–
Protection against short-circuits	By gG or BS fuses or by circuit breaker GB2	A	5					
Cabling	1 or 2 conductors	mm²	Minimum c.s.a.: 1					
Flexible cable without cable end			Maximum c.s.a.: 2.5					
Tightening torque		Nm	1.2					

(1) For operating temperatures up to 70 °C, please consult your Regional Sales Office.

TeSys protection components

3-pole electronic thermal overload relays, TeSys LR9 D

Overload relays

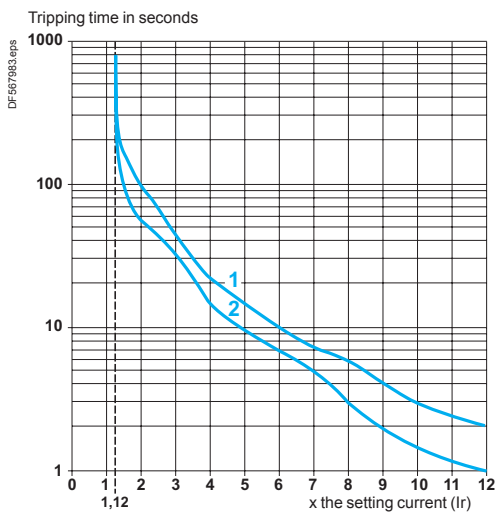
Relay type		LR9 D	
Electrical characteristics of power circuit			
Tripping class	Conforming to UL 508, IEC 60947-4-1	A	10 or 20
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	1000
	Conforming to UL, CSA	V	600
Rated impulse withstand voltage (Uimp)		Hz	8
Frequency limits	Of the operating current	Hz	50...60 ⁽¹⁾
Setting range	Depending on model	A	60...150
Power circuit connections	Width of terminal lug	mm	20
	Clamping screw		M8
	Tightening torque	N.m	18

Operating characteristics			
Temperature compensation		°C	- 20...+70
Tripping thresholds	Conforming to IEC 60947-4-1		
		Alarm	A 1.05 ±0.06 In
		Trip	A 1.12 ±0.06 In
Sensitivity to phase failure	Conforming to IEC 60947-4-1		Tripping in 4 s ±20 % in the event of phase failure

Alarm circuit characteristics			
Rated supply voltage	d.c. supply	V	24
Supply voltage limits		V	17...32
Current consumption	No-load	mA	≤ 5
Switching capacity		mA	0...150
Protection	Short-circuit and overload		Self protected
Voltage drop	Closed state	V	≤ 2.5
Cabling	Flexible cable without cable end	mm²	0.5...1.5
Tightening torque		N.m	0.45

⁽¹⁾ For other frequencies and for applications involving the use of these overload relays with soft starters or variable speed drives, please consult your Regional Sales Office.

LR9 D tripping curves



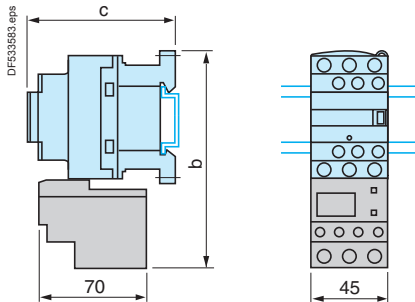
Average operating time related to multiples of the setting current

- 1 Cold state curve
- 2 Hot state curve

Overload relays

LRD 01...35

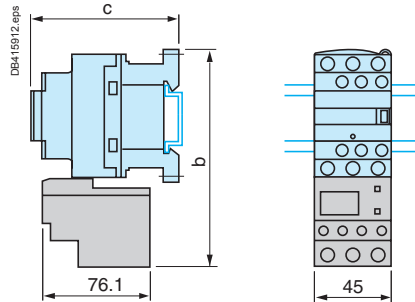
Direct mounting beneath contactors with screw clamp connections



LC1	D09...D18	D25...D38
b	123	137
c	See pages B8/65 and B8/66	

LRD 04...32L

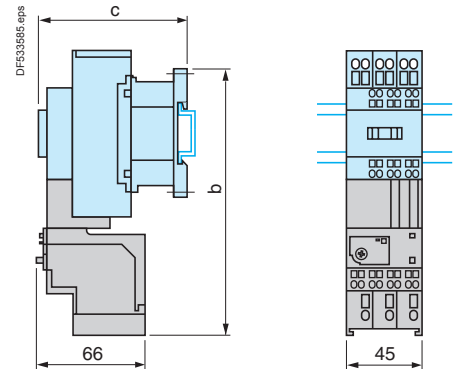
Direct mounting beneath contactors with screw clamp connections



LC1	D09...D18	D25...D38
b	123	137
c	See pages B8/65 and B8/66	

LRD 013...223

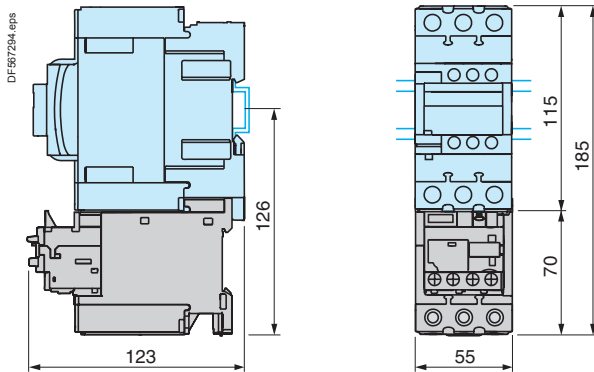
Direct mounting beneath contactors with spring terminal connections



LC1	D093...D253
b	168
c	See pages B8/65 and B8/66

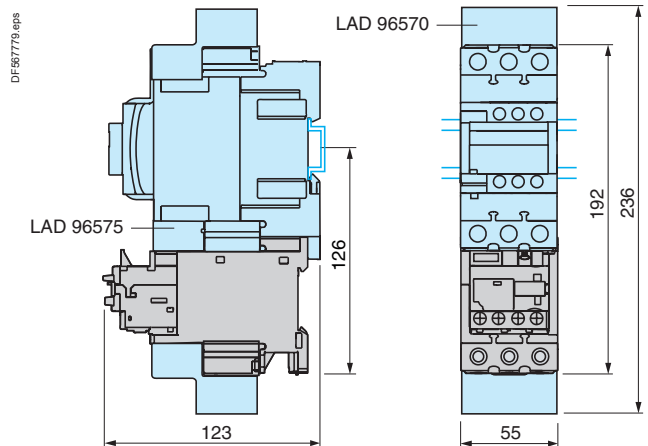
LRD 313 ...365

Direct mounting beneath contactors LC1 D40A...D65A with screw clamp connections or EverLink® connectors



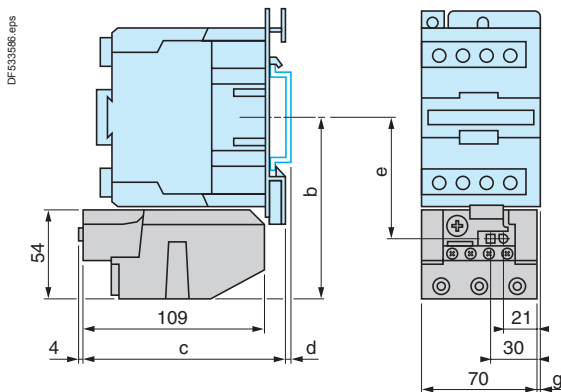
LRD 3136 ...3656

Direct mounting beneath contactors LC1 D40A6...D65A6 with lugs



LRD 33...3

Direct mounting beneath contactors LC1 D80...D95



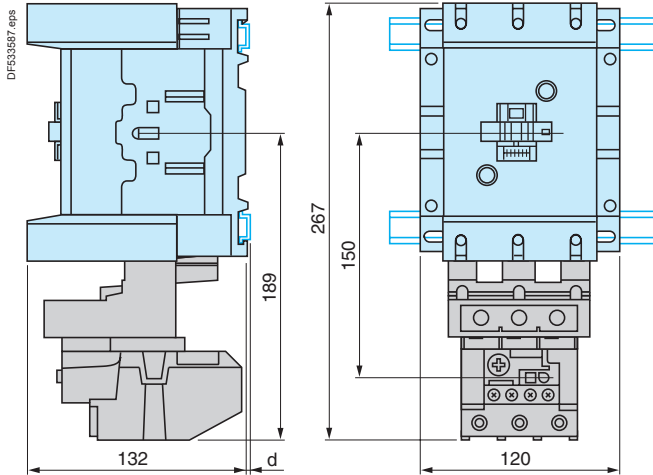
AM1	DL201	DL200
d	7	17

Control circuit AC					
	b	c	e	g (tri)	g (tetra)
LC1 D80	115.5	124	76.9	9.5	22
LC1 D95	115.5	124	76.9	9.5	-
Control circuit DC					
LC1 D80, D95	115.5	179.4	76.9	9.5	22

Overload relays

LRD 4●●●

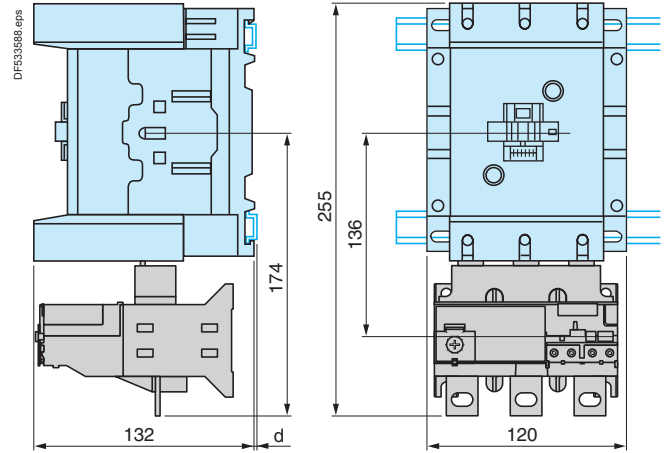
Direct mounting beneath contactors LC 1D115 and D150



AM1	DL200 and DR200	DE200 and ED●●●
d	2.5	10.5

LR9 D

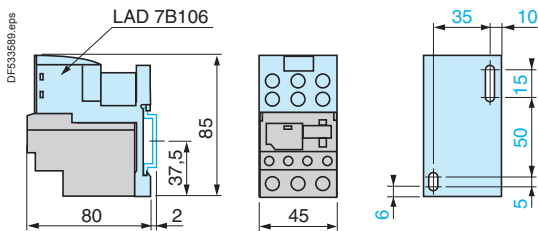
Direct mounting beneath contactors LC 1D115 and D150



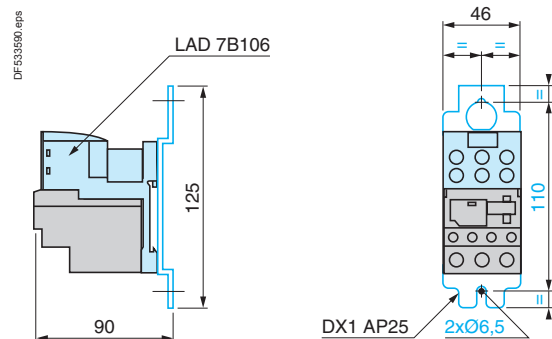
AM1	DP200 and DR200	DE200 and ED●●●
d	2.5	10.5

LRD 01...35

Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200



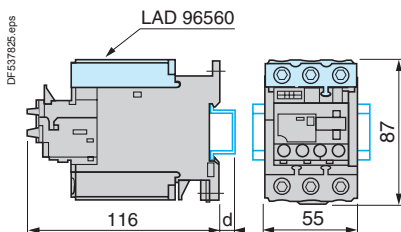
Independent mounting on 110 mm centres



LRD 313 ...365

Mounting on rail AM1 D●200 or ED200

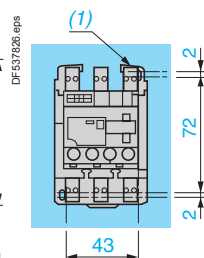
With terminal block LAD 96560



AM1	DP200	DE200	ED200
d	2	9.5	9.5

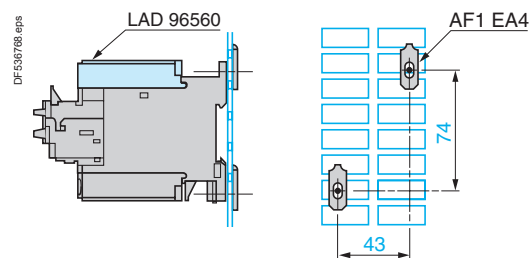
Panel mounting

Outgoing terminal block not shown



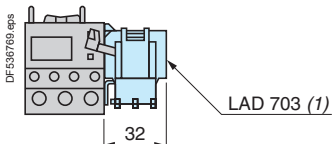
(1) 2 elongated holes $\varnothing 4.2 \times 6$.

Mounted on plate AM1 P



LRD 01...35 and LRD 313...365

Remote tripping or electrical reset

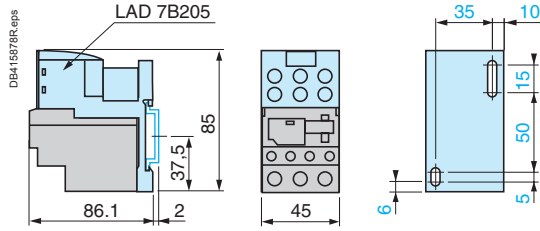


(1) Can only be mounted on RH side of relay LRD 01...35 and LRD 313...365.

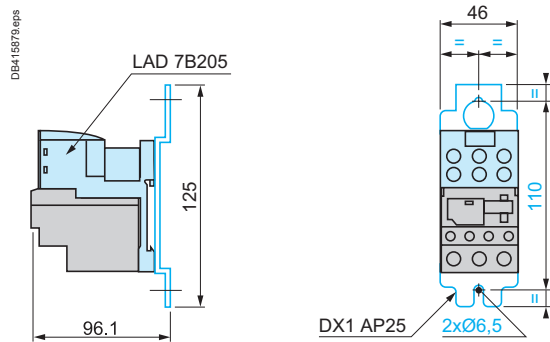
Overload relays

LRD 04L...32L

Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200

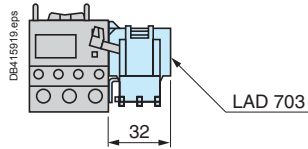


Independent mounting on 110 mm centres



AM1	DP200	DE200
d	2	9.5

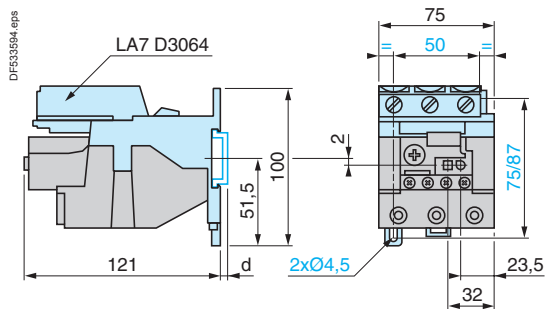
Remote tripping or electrical reset



(1) Can be mounted on RH or LH side of relay LR2 D15.

LRD 3... and LR2 D35...

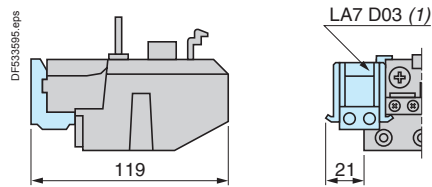
Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200



AM1	DP200	DE200
d	2	9.5

LRD 3... , LR2 D35... and LR9 D

Remote tripping or electrical reset

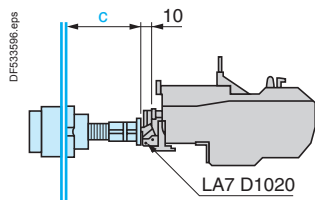


(1) Can be mounted on RH or LH side of relay LRD 3... , LR2 D35... or LR9 D.

LRD 3...

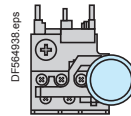
Adapter for door mounted operator

LA7 D1020

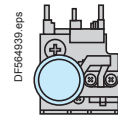


c: adjustable from 17 to 120 mm

Stop



Reset



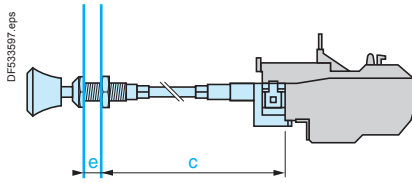
Overload relays

LRD, LRD 313...365, LRD04...32L and LR9 D

"Reset" by flexible cable

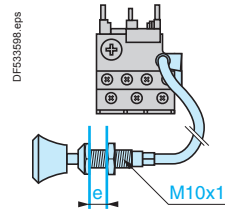
LA7 D305 and LAD 7305

Mounting with cable straight



e: up to 20 mm
c: up to 550 mm

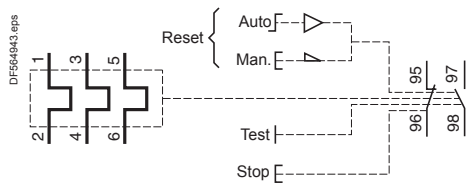
Mounting with cable bent



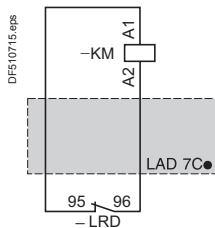
e: up to 20 mm

Overload relays

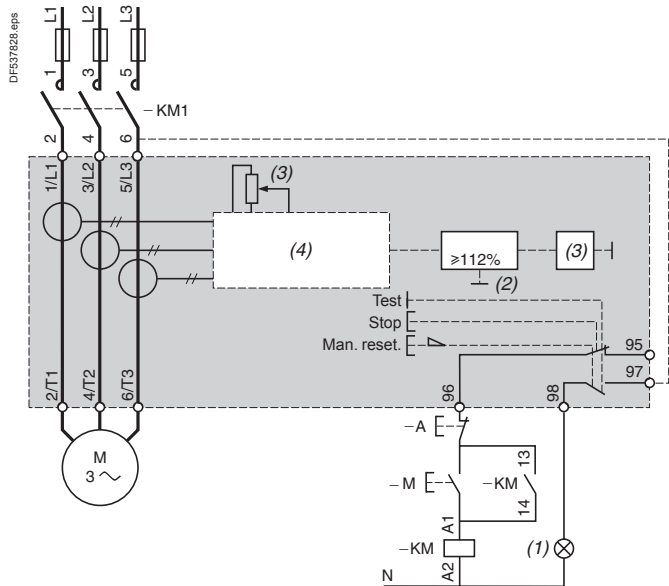
LRD ●●, LRD 3●● and LR2 D●●



Pre-wiring kit LAD 7C1, LAD 7C2

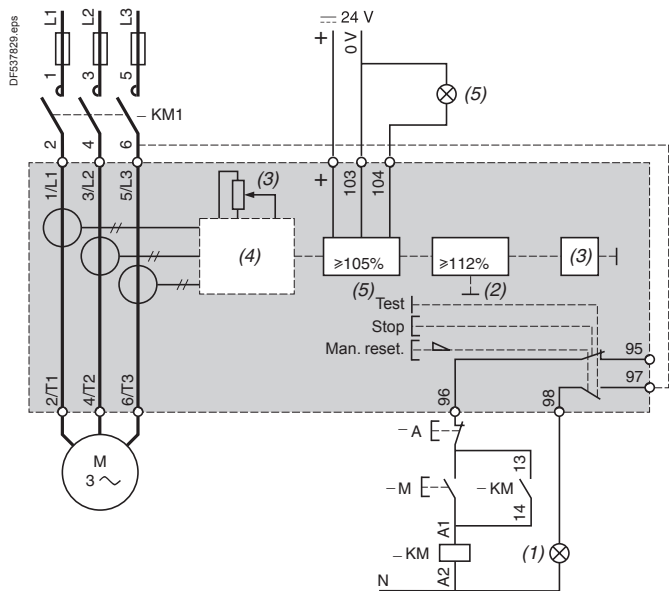


LR9 D5●●●



- (1) Tripped.
- (2) Overload.
- (3) Setting current.
- (4) Specialised circuit.

LR9 D67 and LR9 D69



- (1) Tripped.
- (2) Overload.
- (3) Setting current.
- (4) Specialised circuit.
- (5) Alarm.

Protection components

3-pole electronic thermal overload relays, TeSys LR9 F

Overload relays

Presentation

TeSys LR9 F electronic protection relays are especially suited to the operating conditions of motors.

They provide protection against:

- thermal overload of 3-phase or single-phase balanced or unbalanced circuits;
- phase failure and large phase unbalance,
- protracted starting times,
- prolonged stalled rotor condition.

LR9 F electronic protection relays are mounted directly below an LC1 F type contactor. They cover a range from 30 to 630 A, in eight ratings.

The settings can be locked by sealing the transparent protective cover.

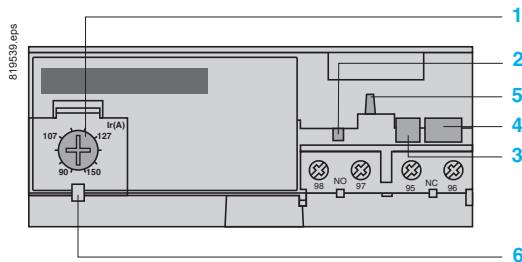
A reset button is mounted on the front of the relay.

Two versions are available:

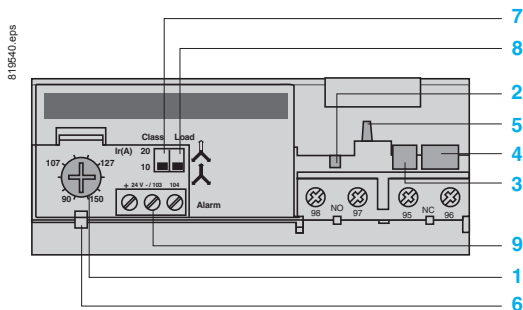
- simplified version: class 10: LR9 F●3●●, class 20: LR9 F●5●●,
- complete version: class 10, 10 A or class 20, selectable, conforming to EN 60947-4-1: LR9 F●●.



This latter version includes an alarm function which makes it possible to forestall tripping by load shedding.

Simplified version: class 10 or 20



Complete version: class 10, 10 A or class 20, selectable, and alarm circuit



- 1 Ir adjustment dial
- 2 Test button
- 3 Stop button
- 4 Reset button
- 5 Trip indicator
- 6 Setting locked by sealing the cover
- 7 Class 10/class 20 selector switch
- 8 Selector switch for balanced load  /unbalanced load 
- 9 Alarm circuit

Protection components

3-pole electronic thermal overload relays, TeSys LR9 F

Overload relays

Environment			
Conforming to standards			IEC 60947-4-1, IEC 60255-8, IEC 60255-17, EN 60947-4-1 and VDE 0660
Product certifications			UL 508, CSA 22-2
Degree of protection	Conforming to VDE 0106		IP 20
	Conforming to IEC 60529		IP 20 on front of relay with accessories LA9 F103 or LA7 F70 , see page B11/13
Protective treatment	Standard version		"TH"
Ambient air temperature around the device (conforming to IEC 60255-8)	Storage	°C	-40...+85
	Normal operation	°C	-20...+55 ⁽¹⁾
Maximum operating altitude	Without derating	m	2000
Operating positions without derating	In relation to normal vertical mounting plane		Any position
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7		13 gn - 11 ms
Vibration resistance	Permissible acceleration conforming to IEC 60068-2-6		2 gn - 5 to 300 Hz
Dielectric strength at 50 Hz	Conforming to IEC 255-5	kV	6
Surge withstand	Conforming to IEC 61000-4-5	kV	4
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	kV	8 (in air) 6 (in indirect mode)
Resistance to radiated radio-frequency disturbance	Conforming to IEC 61000-4-3	V/m	10
Resistance to fast transient currents	Conforming to IEC 61000-4-4	kV	2
Electromagnetic compatibility	EN 50081-1 and 2, EN 50082-2		Conforming

(1) For operating temperatures up to 70 °C, please consult your Regional Sales Office.

Protection components

3-pole electronic thermal overload relays, TeSys LR9 F

Overload relays

Electrical characteristics of power circuit								
Relay type		LR9	F5●57, F57	F5●63, F63 F5●67, F67 F5●69, F69	F5●71, F71	F7●75, F75 F7●79, F79	F7●81, F81	
Rated insulation voltage (Ui) Conforming to IEC 60947-4		V	1000					
Rated operational voltage (Ue) Conforming to VDE 0110 gr C		V	1000					
Rated impulse withstand voltage (Uimp) Conforming to IEC 60947-1		kV	8					
Rated operational current (Ie)		A	30 to 630					
Short-circuit protection and coordination			See pages: A5/11, A5/12, A5/15 and A5/16					
Frequency limits Of the operating current		Hz	50...60. For other frequencies, please consult your Regional Sales Office ⁽¹⁾					
Power circuit connections	Width of terminal lug	mm	20	25	25	30 LR9 F7●75 and LR9 F75 40 LR9 F7●79 and LR9 F79	40	
	Clamping screw		M6	M8	M10	M10	M12	
	Tightening torque	N.m	10	18	35	35	58	
Auxiliary contact electrical characteristics								
Conventional thermal current		A	5					
Short-circuit protection By gG or BS fuses or by circuit-breaker GB2 CD10		A	5					
Control circuit connections	Flexible cable with cable end	1 conductor	mm ²	Min. 1 x 0.75		Max. 1 x 2.5		
		2 conductors	mm ²	2 x 1		2 x 1.5		
	Flexible cable without cable end	1 conductor	mm ²	1 x 0.75		1 x 4		
		2 conductors	mm ²	2 x 1		2 x 2.5		
	Solid cable	1 conductor	mm ²	1 x 0.75		1 x 2.5		
		2 conductors	mm ²	2 x 1		-		
	Tightening torque		N.m	1.2				
Maximum sealed current consumption of the coils of associated contactors (occasional operating cycles of contact 95-96)	a.c. supply	V	24	48	110	220	380	600
		VA	100	200	400	600	600	600
	d.c. supply	V	24	48	110	220	440	-
		W	100	100	50	45	25	-

(1) For applications involving the use of these overload relays with soft starters or variable speed drives, please consult your Regional Sales Office.

Overload relays

Operating characteristics

Tripping class	Conforming to IEC 60947-4-1			10, 10 A and 20
Temperature compensation			°C	-20...+70
Reset				Manual on front of relay
Fault indication				On front of relay
Test function				On front of relay
Stop function				Actuation of N/C contact, without affecting N/O contact
Tripping thresholds	Conforming to IEC 60947-4-1	Alarm	A	$1.05 \pm 0.06 I_n$
		Tripping	A	$1.12 \pm 0.06 I_n$
Sensitivity to phase failure	Conforming to IEC 60947-4-1			Tripping in $4 s \pm 20 \%$ in the event of phase failure
Adjustment (nominal motor current)				Setting dial on front of relay
Security sealing				Yes

Alarm circuit characteristics

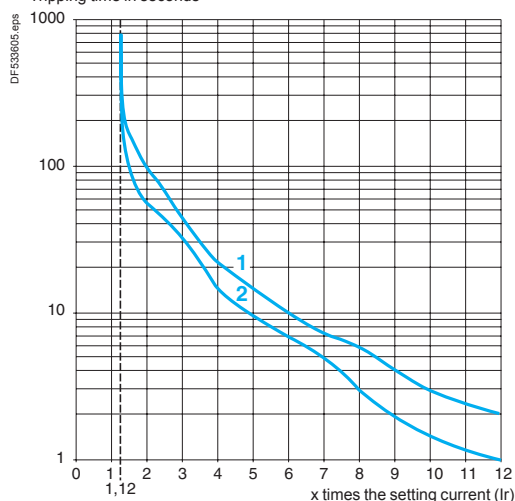
Rated supply voltage	d.c. supply	V	24
Supply voltage limits		V	17...32
Current consumption	No-load	mA	≤ 5
Switching current		mA	0...150
Protection	Short-circuit and overload		Auto-protected
Voltage drop	Closed state	V	≤ 2.5
Connection	Flexible cable without cable end	mm²	0.5...1.5
Tightening torque		N.m	0.45

LR9 F tripping curve

Average operating times depending on multiples of the setting current

Class 10

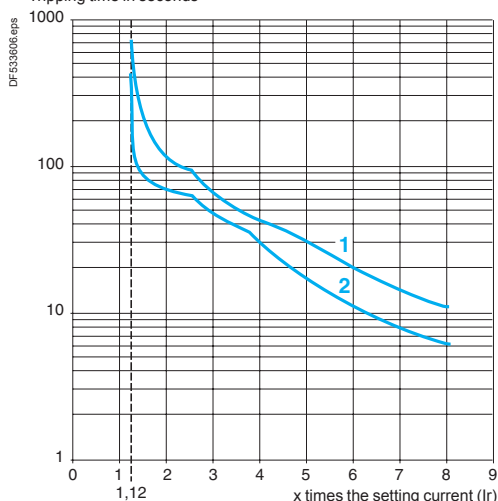
Tripping time in seconds



- 1 Cold state curve
- 2 Hot state curve

Class 20

Tripping time in seconds

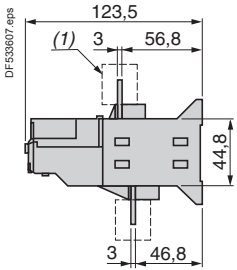


Protection components

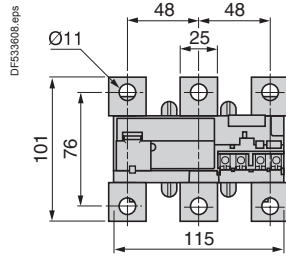
3-pole electronic thermal overload relays, TeSys LR9 F

Overload relays

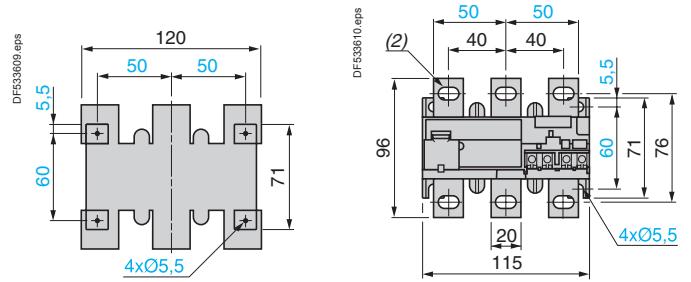
Common side view



LR9 F57, F71



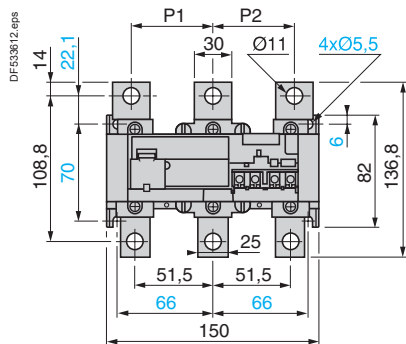
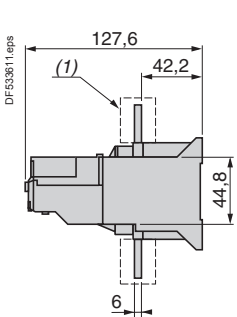
LR9 F57, F563, F567, LR9 F569, F57, F63, F67, F69



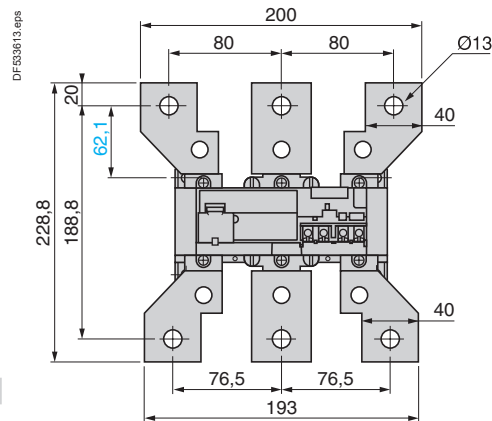
(1) Terminal shroud LA9 F70

(2) 6.5 x 13.5 for LR9 F57 and F57. 8.5 x 13.5 for LR9 F563, F567, F569, F63, F67, F69

Common side view



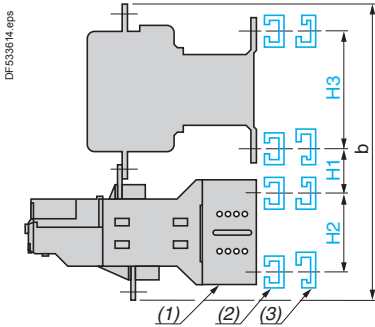
LR9 F781 (for mounting beneath LC1 F630 and F800), LR9 F81



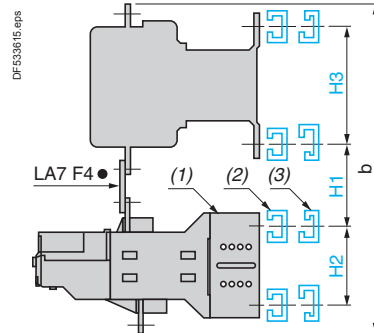
(1) Terminal shroud LA9 F70

	P1	P2
LR9 F775, F75	48	48
LR9 F779, F781, F79, F81	55	55

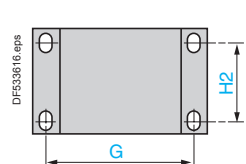
Direct mounting beneath contactor LC1 F



Mounting beneath contactors: reversing LC2 F or star-delta LC3 F



Mounting plate for LR9 F



LA7	G
F901	145
F902	190

Contactors LC1	With LR9 relays	b	H1	H2	H3
F115	F57, F563, F567, F569, F57, F63, F67, F69	240	30	50	120
F150	F57, F563, F567, F569, F57, F63, F67, F69	246	30	50	120
F185	F57, F563, F567, F569, F57, F63, F67, F69	250	30	50	120
F225	F571, F71	273	40	50	120
	F775, F779, F75, F79	308	50	58	120
F265	F571, F71	279	40	50	120
	F775, F779, F75, F79	314	60	58	120
F330	F775, F779, F75, F79	317	60	58	120
F400	F775, F779, F781, F75, F79, F81	317	60	58	180
F500	F775, F779, F781, F75, F79, F81	346	70	58	180
F630, F800	F781, F81	510	110	58	180

Contactors LC1	With LR9 relays	b	H1	H2	H3
F115	F57, F563, F567, F569, F57, F63, F67, F69	279	60	50	120
F150	F57, F563, F567, F569, F57, F63, F67, F69	283	60	50	120
F185	F57, F563, F567, F569, F57, F63, F67, F69	285	60	50	120
F225	F571, F71	360	100	58	120
	F775, F779, F75, F79	363	100	58	120
F265	F571, F71	332	90	50	120
	F775, F779, F75, F79	363	100	58	120
F330	F775, F779, F75, F79	364	100	58	120
F400	F775, F779, F781, F75, F79, F81	364	100	58	180
F500	F775, F779, F781, F75, F79, F81	390	110	58	180
F630, F800	F781, F81	509	120	58	180

(1) Relay mounting plate LA7 F90, see page B11/13

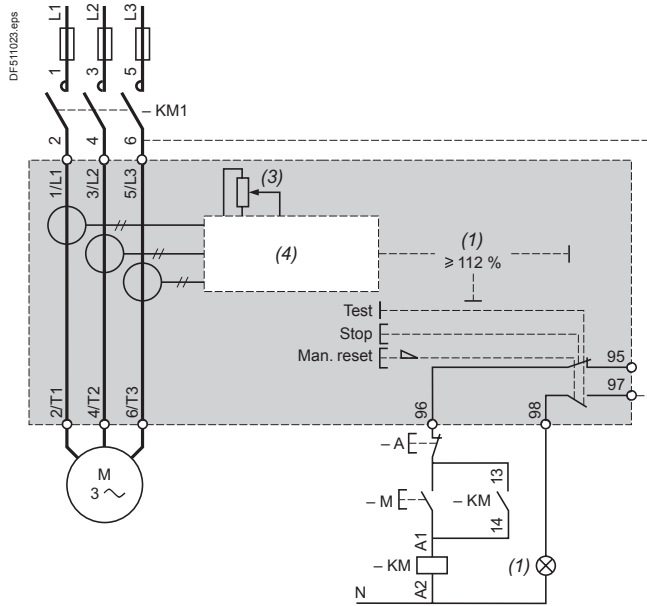
(3) DZ5 MB for LC1 F115 to F400

(2) AM1 EC or AM1 DF for LC1 F115 to F630 and LC1 F800

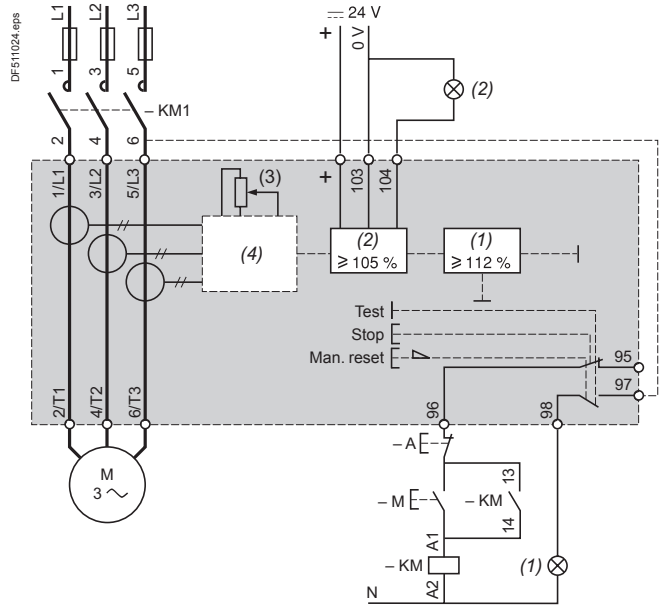
Overload relays

Schemes

LR9 F5●57...F7●81



LR9 F57...F81 (with alarm)

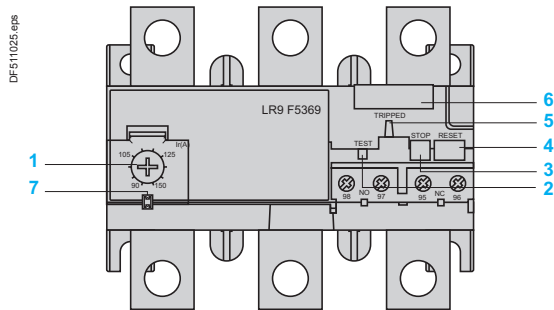


- (1) Tripped on thermal overload.
- (2) Overheating alarm.
- (3) Setting current.
- (4) Specialised circuit.

Setting-up the special functions of TeSys LR9 F thermal overload relays

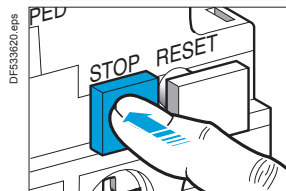
Setting the relay

- Lift the transparent cover 7 to gain access to the various settings.
- Adjustment is achieved by turning dial 1 which is graduated directly in Amperes.
- The setting can be locked by sealing the cover 7.



"Stop" function 3

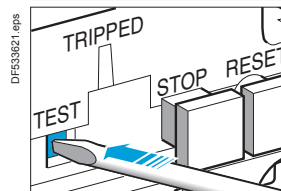
Stop



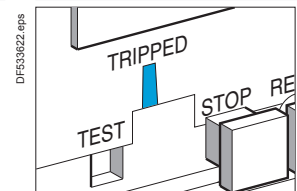
- The "Stop" function is obtained by pressing the red "STOP" button 3.
- Pressing the Test button:
 - actuates the N/C contact,
 - has no effect on the N/O contact.
- The "STOP" button can be locked by fitting a "U" clip (reference: LA7 D901).

"Test" function 2

Test



Trip indicator



- The "Test" function is obtained by pressing the red "TEST" button 2 with a screwdriver.
- Operation of the "TEST" button simulates tripping of the relay and:
 - actuates both the N/O and N/C contacts,
 - actuates the trip indicator 5.

Overload relays

Presentation

The RM1 XA electromagnetic relay detects over current peaks in excess of the maximum permissible current value. It is designed for the protection of circuits which are not subject to current peaks (starters, resistors) or for controlling starting peaks on slip ring motors.

It trips instantaneously and is not suitable for frequent operation (12 operating cycles per hour). It can withstand a continuous current equivalent to 1.25 times the minimum setting current.

Environment characteristics

Conforming to standards		Standard version NF C 63-650, VDE 0660
Approvals		CSA
Protective treatment		Standard version "TC", special version "TH"
Ambient air temperature around the device	°C	Storage: - 60...+ 70 Operation: - 40...+ 60
Maximum operating altitude	m	3000
Operating position		± 15° in relation to normal vertical mounting position

Electrical characteristics of power circuit

Maximum rated operational voltage	V	~ or --- 600
Frequency limits of the rated operational current	Hz	0...60

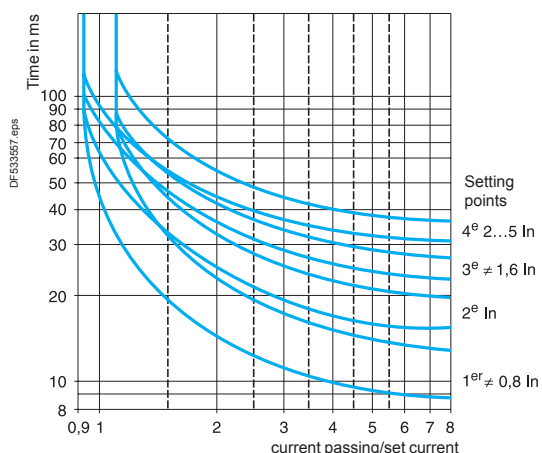
Electrical characteristics of auxiliary contacts

Conventional thermal current	A	10						
Occasional making and breaking capacities	a.c. supply	Voltage	V	48	110	220	380	600
		Power ⁽¹⁾	VA	4000	12 000	17 000	22 000	—
	d.c. supply	Voltage	V	48	110	220	440	600
		Power ⁽²⁾	W	240	200	190	180	180

(1) Circuit such as the electromagnet of a contactor - $\cos \varphi$ inrush: 0.7 and $\cos \varphi$ sealed: 0.4.

(2) Circuit such as an electromagnet without economy resistor ; time constant varying from 20 ms for 5 W to 200 ms for 100 W or more.

Operating times



Operating times: because of the numerous applications for RM1 XA over current relays, it is not possible to give precise operating times. The curves shown are therefore purely indicative.

Overload relays

Dimensions

RM1 XA●●●,
RM1 XA●●●1

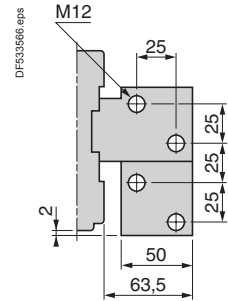
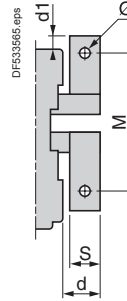
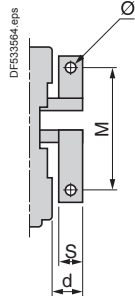
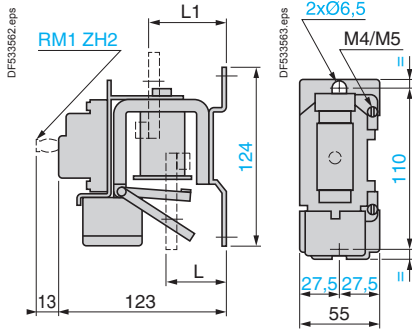
RM1 XA001...XA040
RM1 XA0011...XA0401

RM1 XA063, XA100
and XA315
RM1 XA0631, XA1001
and XA3151

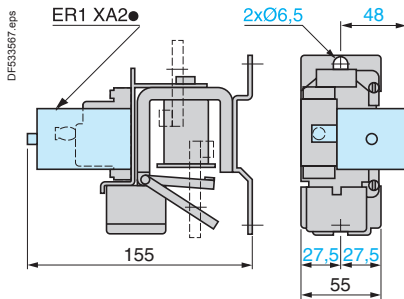
RM1 XA160, XA200,
and XA500
RM1 XA1601, XA2001,
and XA5001

RM1 XA101,
RM1 XA1011

Common side view



RM1 XA●●●1 with electrical reset ER1 XA2●



RM1	d	d1	M	L	L1	S	Ø
XA 063	20.5	-	83	25	40	15	M6
XA 100	20.5	-	87	25	40	20	M8
XA 160	27.5	5.5	94	25	40	25	M8
XA 200	27.5	5.5	94	25	40	25	M8
XA 315	35.5	-	74	44	55	30	M10
XA 500	40.5	7	84	44	55	40	M10
XA 101	-	-	-	37	64	-	-

Schemes

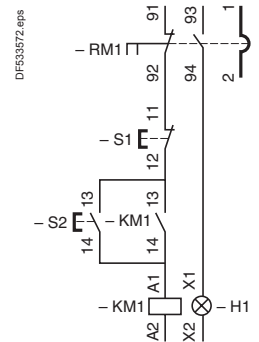
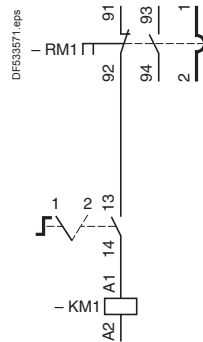
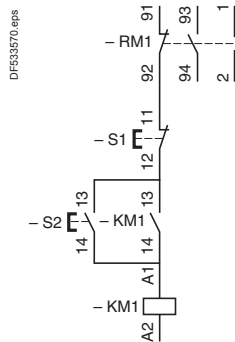
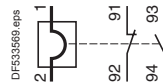
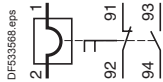
RM1 XA●●●1
Latching

RM1 XA●●●
Non-latching

RM1 XA
3-wire control (without
mechanical latching)

2-wire control (with
mechanical latching)

3-wire control
(with "trip" signal)



Protection components

Thermistor protection units

for use with PTC thermistor probes ⁽¹⁾

Overload relays

Application

LT3 S● thermistor protection units continuously monitor the temperature of the machines to be protected (motors, generators, etc.) by means of PTC thermistor probes embedded in the machine windings.

If the nominal operating temperature of the probes is reached, they convert the rapid increase in resistance into a switching function which can be used to switch off the machine or signal a fault (see paragraph relating to thermistor probes below).

Accidental breaks in the supply circuits of the thermistors are also detected.

Electromagnetic compatibility

Conforming to "Electromagnetic compatibility" directive.
Conforming to standard EN 61000-6-2.

Resistance to electrostatic discharge (conforming to IEC 61000-4-2)	Level 3
Resistance to fast transients (conforming to IEC 61000-4-4)	Level 3
Susceptibility to electromagnetic fields (conforming to IEC 61000-4-3)	Level 3
Surge resistance 1.2/50 - 8/20 (conforming to IEC 61000-4.5)	Level 4
Immunity to microbreaks and voltage drops (IEC 61000-4-11)	

Suitable for use with variable speed controllers

Thermistor probes

Range of most commonly used PTC thermistor probes:
from 90 to 160 °C, in steps of 10 °C.

Curve $R = f(\theta)$, characteristic of a PTC thermistor probe, is defined by standard IEC 60947-8.

The choice of PTC thermistor probe to be incorporated in the motor winding depends on the insulation class, the type of motor and the most suitable location for the probe. This choice is usually made by the motor manufacturer or the motor rewinder, who have all the necessary information.

Application example

Insulation class of rotating machines conforming to IEC 60034-11 (S1 duty)	NOT Nominal operating temperature	Temperature at which rapid increase in resistance occurs Probes used for Alarm	
	°C	°C	Fault °C
A	100	100	100
B	110	110	120
E	120	120	130
F	140	140	150
H	160	160	170

⁽¹⁾ PTC: Positive Temperature Coefficient.

Protection components

Thermistor protection units

for use with PTC thermistor probes ⁽¹⁾

Overload relays

Protection unit type		LT3 SE	LT3 SA	LT3 SM
Reset method		Automatic	Automatic	Manual/Automatic
Fault indication		–	On front panel of unit and remote	On front panel of unit and remote
Fault test		–	–	By pushbutton on front panel of unit
Probe interchangeability		Label "Mark A" to IEC 60034-11	Label "Mark A" to IEC 60034-11	Label "Mark A" to IEC 60034-11

Environment

Conforming to standards		IEC 60034-11 VDE 0660	IEC 60034-11 VDE 0660	IEC 60034-11 VDE 0660
Product certifications		–	LROS	
Degree of protection		IP 20 conforming to IEC 60529, VDE 0106		
CE marking		LT3 S● protection units have been designed to comply with the basic recommendations of European directives relating to low voltage and EMC. Therefore LT3 S● products bear the European Community CE mark.		
Ambient air temperature around the device	Storage Conforming to IEC 60068-2-1 and 2-2	°C	- 40...+ 85	
	Operation	°C	- 25...+ 60	
Maximum operating altitude	Without derating		1500 m	
	With derating		Up to 3000 m, the maximum permissible ambient air temperature for operation (60 °C) must be reduced by 5 °C per additional 500 m above 1500 m	
Vibration resistance	Conforming to IEC 60068-2-6		2.5 gn (2...25 Hz) 1 gn (25...150 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		5 gn (11 ms)	
Operating positions without derating	In relation to normal vertical mounting plane		Any position	

Power supply circuit characteristics

Rated control circuit voltage (Uc)	~ 50/60 Hz	Single voltage	V	115 or 230	–	400
		Dual voltage	V	–	115/230	115/230, 24/48
	~ 50/60 Hz	Multivoltage	V	–	24...230	24...230
		–	Single voltage	V	24	–
	0.8...1.25 Uc	Dual voltage	V	–	24/48	24/48
		Multivoltage	V	–	24...230	24...230
Average consumption	Sealed	~	VA	< 2.5	< 2.5	< 2.5 except (400 V: 2.7)
		–	W	< 1	< 1	< 1

(1) PTC: Positive Temperature Coefficient

Protection components

Thermistor protection units

for use with PTC thermistor probes ⁽¹⁾

Overload relays

Control circuit characteristics

Protection unit type		LT3 SE	LT3 SA	LT3 SM
Resistance	Tripping	Ω	2700...3100	2700...3100
	Reset	Ω	1500...1650	1500...1650
Maximum number of probes fitted in series ⁽²⁾	Probes ≤ 250 Ω at 25°		6	6
Voltage at terminals in the thermistor circuit	Normal operation (R = 1500 Ω)	V	< 2.5	< 2.5
	Conforming to IEC 60034-11 (R = 4000 Ω)	V	< 7.5	< 7.5
Thermistor probe short-circuit detection	Operating threshold	Ω	–	< 20
Connection of probes to the LT3	Distance	m	300	400
	Minimum c.s.a. of conductors	mm ²	0.75	1

Electrical characteristics of the output relay contacts

Contact type	Single voltage or dual voltage		1 N/C	1 N/C + 1 N/O	1 N/C + 1 N/O
	Multivoltage		–	2 C/O	2 C/O
Rated insulation voltage		V	~ 500		
Maximum operational voltage		V	~ 250 (~ 400 V for LT3 SM00V)		
Rated impulse withstand voltage	Uimp	kV	2.5		
Conventional thermal current		A	5		
Operational power	At 220 V	VA	100 for 0.5 million operating cycles		
Breaking capacity	In cat. AC-16	120 V	A	6	
		250 V	A	3	
	In DC-13	24 V	A	2	
Cabling (cage type connector) for flexible or solid cable	Without cable end	mm ²	2 x 1...1 x 2.5		
	With cable end	mm ²	1 x 0.75...2 x 2.5		
Tightening torque		N.m	0.8		

Thermistor probe characteristics

Probe type		DA1 TT●●●	DA1 TS●●●
Conforming to standards		IEC 60034-11. Mark A	
Resistance	At 25 °C	Ω	3 x 250 in series
Rated operational voltage (Ue)	Per probe	V	--- 2.5 V max
Rated insulation voltage (Ui)		kV	2.5
Insulation			Reinforced
Length of connecting cables	Between probes	mm	250
	Between probe and motor terminal plate	m	1

(1) PTC: Positive Temperature Coefficient.

(2) Provided that the total resistance of the probe circuit is less than 1500 Ω at 20 °C.

(3) For distances greater than 500 m take cabling precautions (twisted shielded pairs).

Protection components

Thermistor protection units

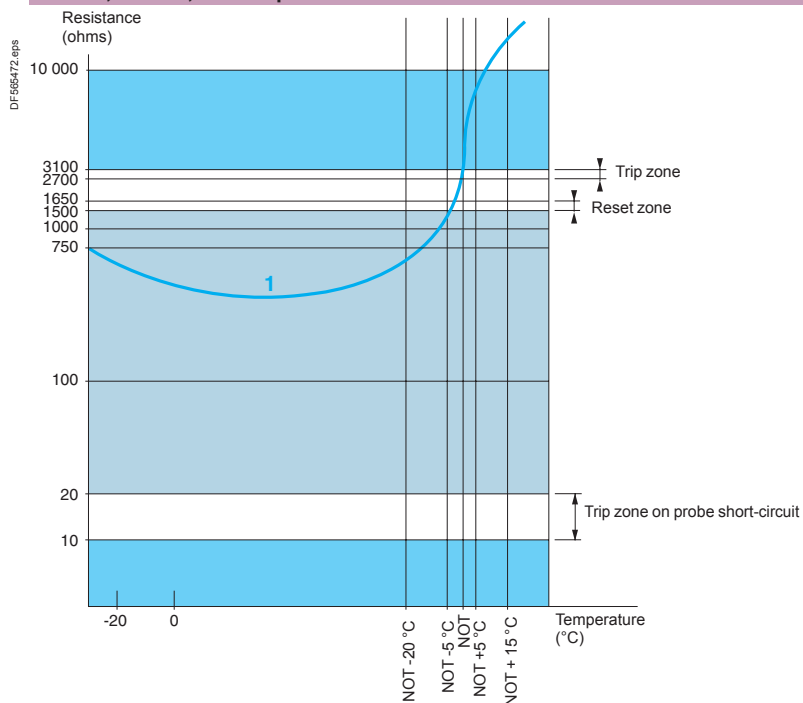
for use with PTC thermistor probes ⁽¹⁾

Overload relays

LT3 S protection unit/thermistor probe combination

Guaranteed operating zones: examples with 3 probes type DA1 TT●●● (250 Ω at 25 °C) in series, conforming to standard IEC 60034-11, Mark A.

LT3 SE, LT3 SA, LT3 SM protection units



1 3 probes type DA1 TT●●● (250 Ω at 25 °C) in series.

NOT: Nominal Operating Temperature

- Protection unit tripped.
- Protection unit reset.

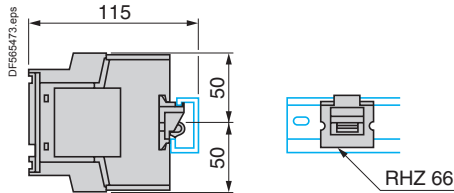
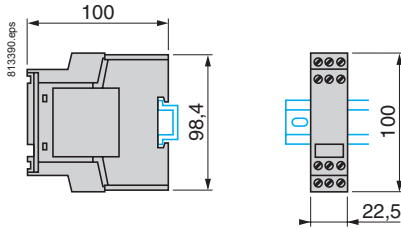
⁽¹⁾ PTC: Positive Temperature Coefficient.

Dimensions

LT3 SE, SA, SM

Mounting on \perp rail AM1 DP200

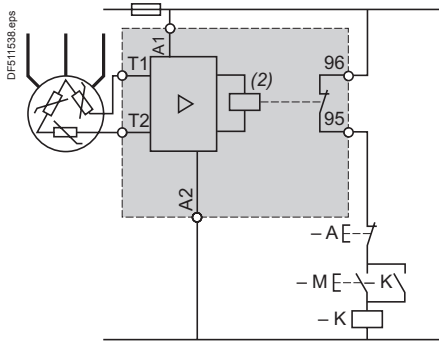
Mounting on 1 \perp rail
(with adapter RHZ 66)



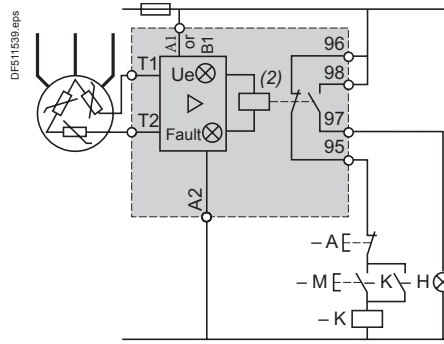
Schemes for "no fault" operation

LT3 SE

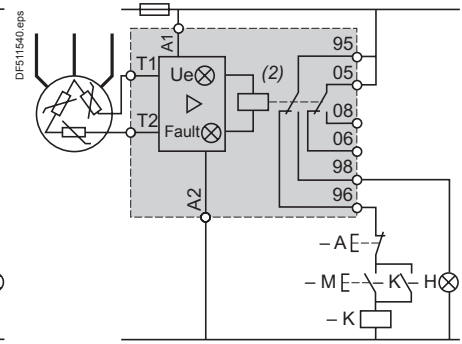
Without fault memory



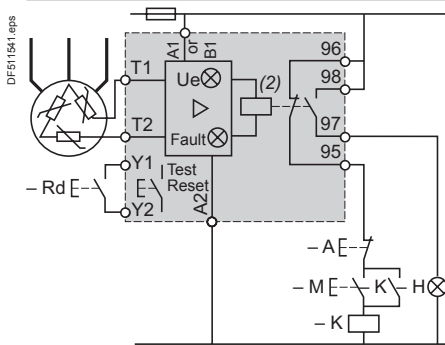
LT3 SA dual voltage



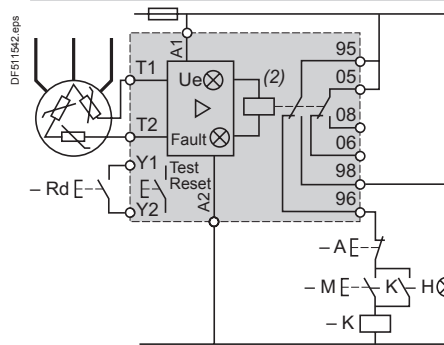
LT3 SA multivoltage



LT3 SM dual voltage and 400 V (without B1)



LT3 SM multivoltage



LT3 S dual voltage

Terminal	A1	B1
Voltage	48 V	24 V
	230 V	115 V

Setting-up

Cabling

It is inadvisable to use the same multi-core cable for the thermistor probe circuit and the power circuit. This is especially important for long cable runs. If it is impossible to comply with the above recommendation, a pair of twisted conductors must be used for the thermistor probe circuit.

Testing the insulation of the line connecting the thermistors to the LT3 S unit

Before carrying out this test, short-circuit all the terminals of the LT3 S protection unit.

Measure the insulation value between these terminals and earth using a megger or a flash tester, progressively increasing the voltage to the value defined by the standards.

Checking the PTC thermistor probes for correct operation

With the machine stopped, in the cold state and after having taken all the necessary safety precautions:

- disconnect the line linking the thermistors to the LT3 S protection unit, at the terminals of the machine being protected: motor, etc.,
- using an ohmmeter with a voltage rating less than or equal to 2.5 V, measure the resistance of the probe circuit at the machine terminals,
- depending on the number and type of thermistors connected in series, check that their resistance value at 25 °C is correct.

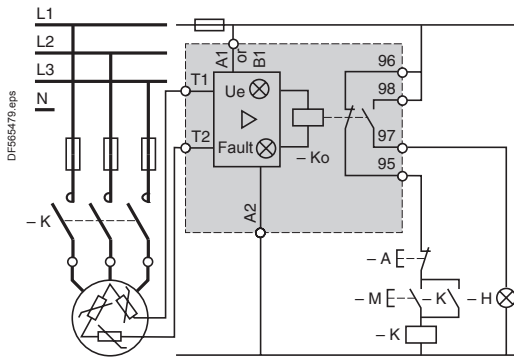
Example: motor fitted with 3 PTC thermistor probes with a resistance $\leq 250 \Omega$ at 25 °C.

Any value higher than $250 \times 3 = 750 \Omega$ indicates a problem.

(1) PTC: Positive Temperature Coefficient.

(2) Relay energised: the contacts are shown in the "operating" position.

Overload relays



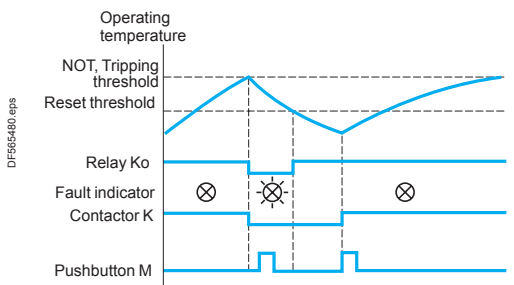
LT3 SA protection units

Starting

The LT3 SA is normally energised and its internal relay is in the pre-energised position. The motor is started by operating pushbutton M automatically held in by K (3-wire control circuit).

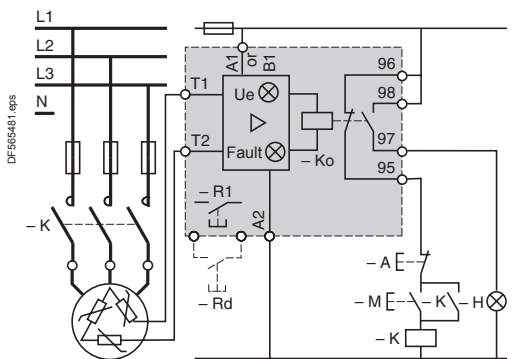
Thermal fault

The strong increase in resistance of the PTC probes at the moment their temperature reaches the nominal operating temperature (NOT) is detected by the LT3 SA unit and causes the relay to drop out; indicator H comes on, as does the built-in indicator on unit LT3 SA. Contactor K drops out and pressing button M has no effect.



Reset

As the motor cools, it reaches the reset threshold, 2 to 3 °C below the nominal operating temperature. The relay resets and the motor can be started by pressing button M.



LT3 SM protection units

Operation is very similar to that described above, except for the following:

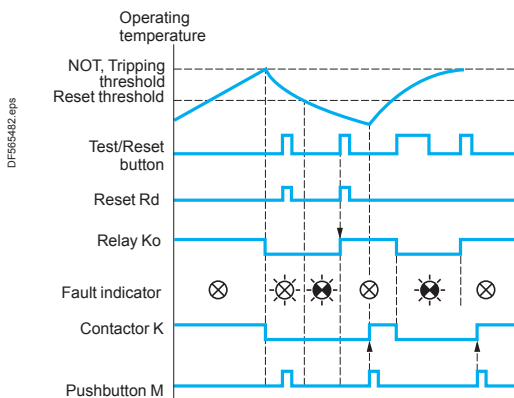
Reset

After tripping on thermal fault and cooling to the reset threshold, the Test/RESET button on the unit (R1) or a remote reset button (Rd) must be pressed to energise the relay.

The fault is therefore memorised, even though the temperature of the probes has dropped to well below the reset threshold.

Signalling circuit

As the relay is fitted with 2 separate contacts, the signalling voltage may be different from the contactor control voltage.



Test

Pressing the Test/RESET button simulates a fault and causes the relay to drop out: the FAULT indicator comes on, as does the remote signalling indicator. The unit is reset by pressing the Test/RESET button again.

(1) PTC: Positive Temperature Coefficient.

Overload relays

Presentation



LR97 D



LT47

LR97 D and LT47 electronic over current relays have been developed to satisfy machine protection requirements. These relays have definite time characteristics: current threshold and time based function. They are particularly recommended for providing mechanical protection on machines with high resistive torque, high inertia and with strong probability of jamming under steady state conditions. They can be used for motor protection in the case of long starting times or frequent starting. The LR97 D relay also incorporates two fixed time protection functions, one of 0.5 seconds against locked rotor and one of 3 seconds against phase failure. LR97 D and LT47 can be used to provide mechanical shock protection. In this case, setting the O-Time knob to minimum will ensure tripping in 0.3 seconds.

Applications

LR97 D and LT47 relays are particularly suitable for the following machines:

- Monitoring function for excessively long starting time on machines with a risk of difficult starting:
 - Machines with high resistive torque, high inertia machines.
 - Monitoring of machines during steady state operation: overtorque detection function
 - Machines with strong risk of jamming, machines with torque build-up over time,
 - Mechanical failure monitoring,
 - Faster detection of malfunctioning on machines where the motor is oversized in relation to its thermal protection I²t.
- Motor protection for specific applications:
 - Machines with long starting times,
 - Machines with high on-load factor: more than 30 to 50 starts/hour,
 - Machine with fluctuating load from a steady state, where the thermal image of a thermal overload relay (thermal memory) is unsuitable in relation to actual overheating of the motor.

Examples of machines:

- Conveyors, crushers and mixers,
- Fans, pumps and compressors,
- Centrifuges and spin-dryers,
- Presses, shearing machines, saws, broaching machines, sanders and lifting hoists.

Operation

Because of their two separate time settings, LR97 D and LT47 relays can be combined with the motor-starter function:

D-Time: starting time, O-Time: trip time during steady state.

The D-Time function is only available during the motor starting phase. During this phase the overload detection function is inhibited in order to allow starting. Under steady state conditions, when the motor current is greater than the setting current due to an overload or single-phasing, the red LED lights up and the internal relay switches its contact after a time preset by the O-Time knob.

The red LED stays on, indicating that the relay has tripped.

The relays are simple to set, in 5 easy steps:

- Adjust the 3 knobs to maximum (Load, D-Time and O-Time),
- Adjust the D-Time knob to the value corresponding to the motor starting time.
- When the motor reaches steady state, adjust the Load knob (turn the knob counter-clockwise until the red LED starts to flicker).
- Slowly turn the Load knob clockwise until the LED goes out.
- Set the required tripping time, using the O-Time knob.

Description

Description

LR97 D ●●●●●

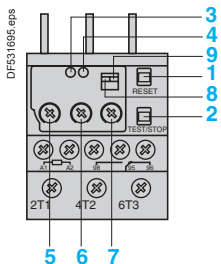
LT47 ●●●●●

Status signalling

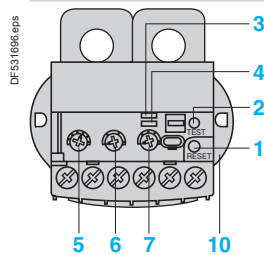
LR97 D ●●●●●

LT47 ●●●●●

To assist fast diagnostics, two LEDs (one green and one red) allow signalling of the operating status:



- 1 RESET knob
- 2 TEST/STOP knob
- 3 Ready/Run Indicator
- 4 Relay tripped indicator
- 5 Current setting
- 6 Adjustment of starting time



- 7 Adjustment of tripping time
- 8 Manual/Auto adjustment
- 9 Single-phase/3-phase adjustment
- 10 Retractable fixing lugs

Status	LED signal	
	Green LED	Red LED
Voltage	On	Off
Starting		
Steady state	On	Off
Overload	On	
Trip	Over-current	Off
	Rotor locked	On
Phase failure	L1	Off
	L2	Off
	L3	Off

Condition	LED signal	
	Green LED	Red LED
Voltage	On	Off
Starting		
Steady state	On	Off
Overload	On	
Trip	Off	On

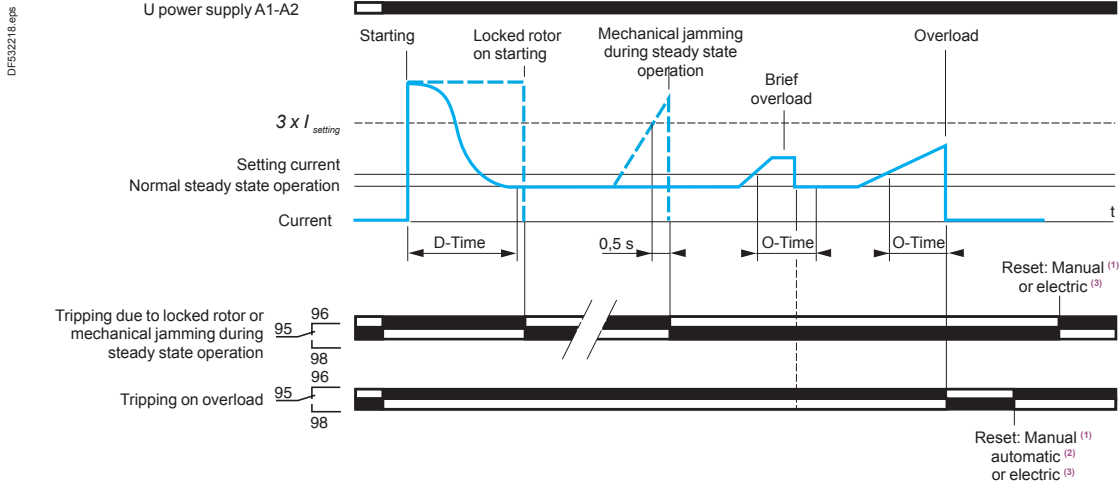
Overload relays

Curves

LR97 D

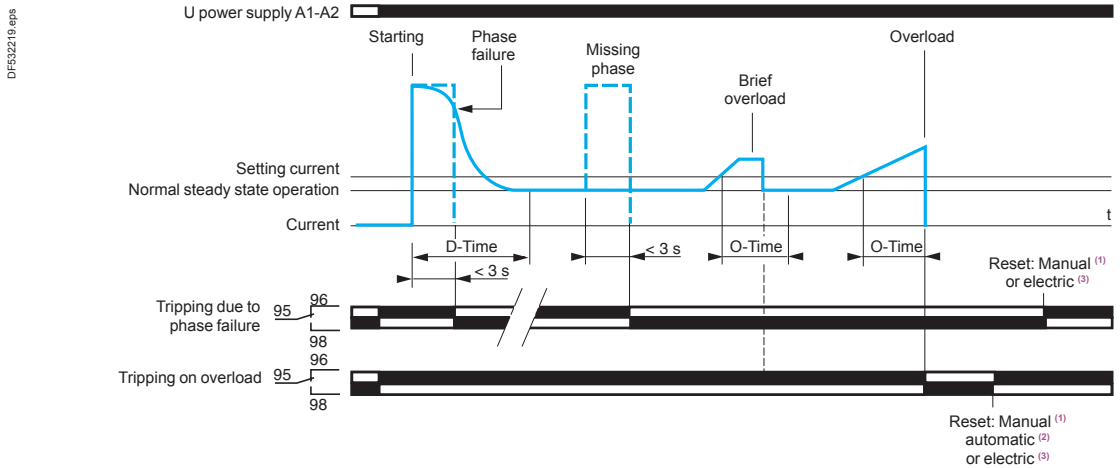
Overload protection

Protection against locked rotor and mechanical jamming under steady state conditions

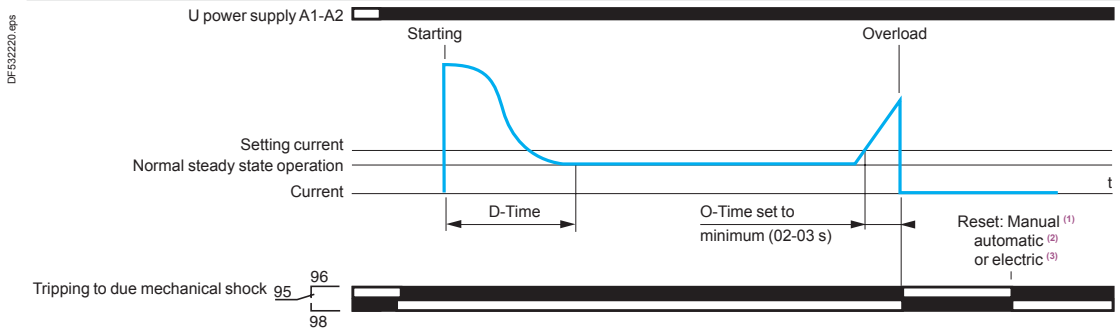


Overload protection

Protection against phase failure during starting and during steady state operation



Mechanical shock protection



(1) By Reset button.

(2) Fixed time of 120 s. Selectable by dip switch. Function not available in the event of tripping due to locked rotor/mechanical jamming ($I > 3 \times I_{setting}$) or phase failure.

(3) By brief interruption of power supply, minimum 0.1 s.

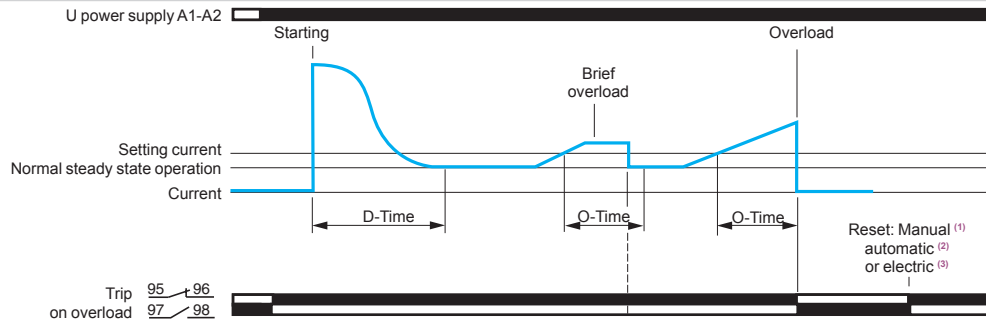
Overload relays

Curves

LT47

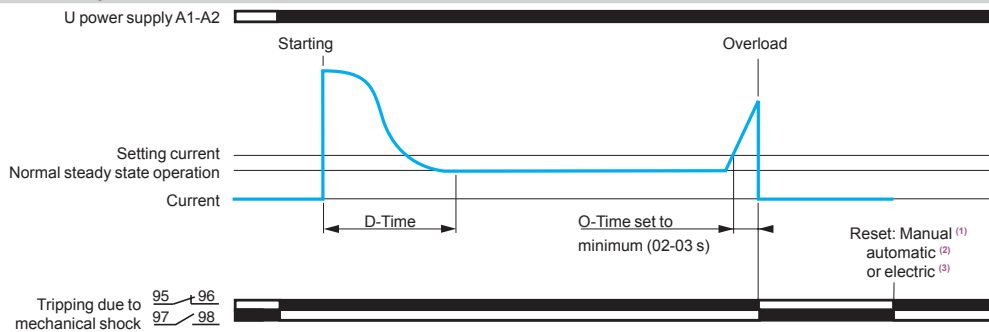
Overload protection

DF53221.eps



Mechanical shock protection

DF53222.eps



- (1) By Reset button.
- (2) Only available on version with automatic reset (LT47 ●●●●A). Time adjustable from 1 to 120 s with the R-Time knob.
- (3) By brief interruption of power supply, minimum 0.1 s.

Characteristics

Environment

Relay type		LR97 D●●●●●	LT47 ●●●●●
Conforming to standards		IEC 60255-6, IEC 60947	IEC 60255-6, IEC 60947
Product certifications		UL, CSA	UL, CSA
Degree of protection	Conforming to IEC 60529 and VDE 0106	IP 20 (front face)	IP 20 (front face)
Protective treatment		“TH”	“TH”
Ambient air temperature around the device	Storage	°C - 30...+ 80	- 30...+ 80
	Normal operation without derating (IEC 60947-4-1)	°C - 25...+ 60	- 25...+ 60
Maximum operating altitude		m 2000	2000
Operating positions without derating		In relation to normal vertical mounting plane	Any position
Shock resistance		Permissible acceleration conforming to IEC 60068-2-7	15 gn - 11 ms
Vibration resistance		Permissible acceleration conforming to IEC 60068-2-6	4 gn
Dielectric strength at 50 Hz		Conforming to IEC 60255-5	kV 2
Surge withstand		Conforming to IEC 61000-4-5	kV 6
Resistance to electrostatic discharge	In open air	kV 8 (level 3)	8 (level 3)
	In direct mode	kV 6 (level 3)	6 (level 3)
Immunity to radiated radio-frequency disturbance		V/m 10 (level 3)	10 (level 3)
Immunity to fast transient currents		kV 2	2
Conducted emissions		Conforming to EN 55011	Class A
Conducted HF disturbance		Conforming to EN 61000-4-6	V 10

Overload relays

Characteristics

Auxiliary contact characteristics

Relay type			LR97 D●●●●●				LT47 ●●●●●				
Contact type			1 NO/NC				1 N/O + 1N/C				
Conventional thermal current			3				3				
Maximum hold consumption of controlled contactor coils (occasional operating cycles of contact 95-96)	Conforming to IEC 60947	V	~ 24	~ 48	~ 110	~ 220	~ 24	~ 48	~ 110	~ 220	
		VA	70	140	360	360	70	140	360	360	
		V	~ 24	~ 48	~ 110	~ 220	~ 24	~ 48	~ 110	~ 220	
		W	55	55	28	28	55	55	28	28	
Short-circuit protection			3				3				
Connection by cable or lug-clamps											
Flexible cable without cable end	1 or 2 conductors	Min.	mm ²	1 x 0.75				1 x 1			
		Max.	mm ²	2 x 2.5				2 x 2.5			
Flexible cable with cable end	1 or 2 conductors	Min.	mm ²	1 x 0.34				1 x 1			
		Max.	mm ²	1 x 1.5 + 1 x 2.5				2 x 2.5			
External Ø of lugs			mm				7				
Ø of screw			mm				M3				
Tightening torque			N.m				0.6...1.2				

Electrical characteristics of power circuit

Relay type			LR97 D015●● to LR97 D25●●		LR97 D38●●	LT47 ●●●●●
Setting range			Depending on model		A	0.3...38
Tripping class			Adjustable			Adjustable
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1		V		690	690
	Conforming to UL, CSA		V		600	600
Rated impulse withstand voltage (Uimp)			kV		6	6
Frequency limits			Of the operating current		Hz	50...60
Connection by cable or lug-clamps						
Flexible cable without cable end	1 conductor	Min.	mm ²	1.5	2.5	–
		Max.	mm ²	10	10	–
Flexible cable with cable end	1 conductor	Min.	mm ²	1	1	–
		Max.	mm ²	4	6	–
External Ø of lugs			mm		10	12
Ø of screw			mm		M4	M4
Tightening torque			N.m		2	2

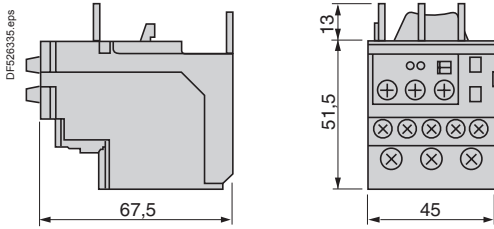
Operating characteristics

Relay type			LR97 D●●●●●		LT47 ●●●●S		LT47 ●●●●A
Adjustment	Current		A		"Load" knob		"Load" knob
	Time	D-time knob	s		0.5...30		0.5...30
		O-time knob	s		0.2/0.3...10		0.2/0.3...10
		R-time knob	s		–		–
Reset	Manual				Reset button		Reset button
	Automatic				120 s fixed		–
	Electrical				By interruption of power supply (minimum 0.1 s)		By interruption of power supply (minimum 0.1 s)
Protection functions					On starting		Steady state
Overload $I_{max} > I_{setting}$	Tripping				Inhibited during D-time		After O-time
	Locked rotor, mechanical jamming $I > 3 \times I_{setting}$				After D-time		< 0.5 s
	Sensitivity to phase failure				< 3 s		< 3 s
Status and fault signalling (see table page 24517/2)					2 LEDs		2 LEDs
TEST/STOP function	Test				No load		No load
	Stop				Under load		Under load
Sealing					Yes		Yes

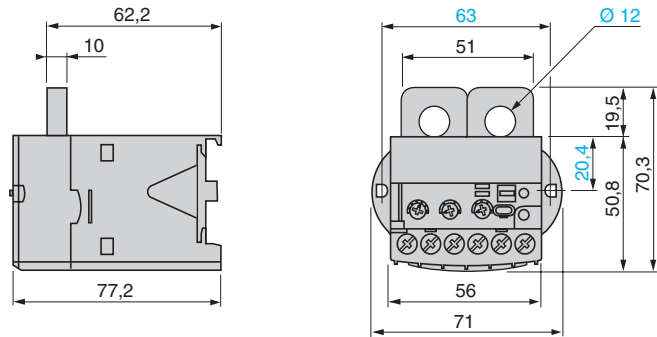
Overload relays

Dimensions

LR97 D●●●●



LT47 ●●●●

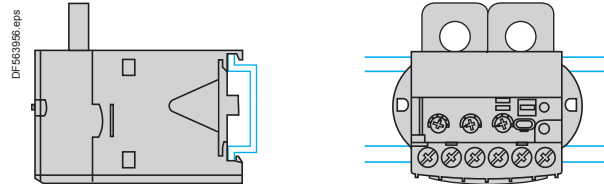
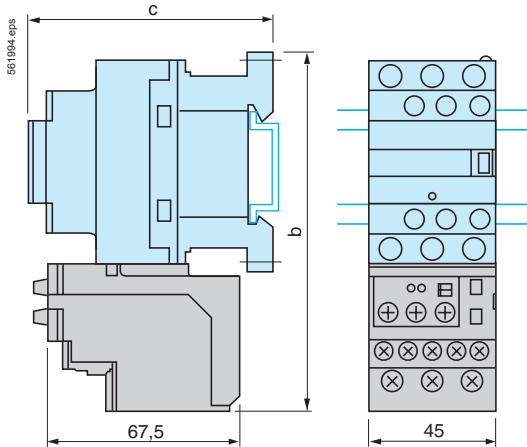


Mounting

LR97 D●●●●

Direct mounting beneath the contactor

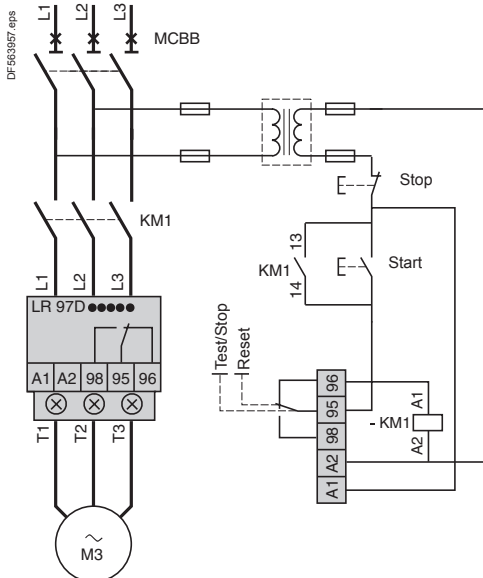
LT47 ●●●●



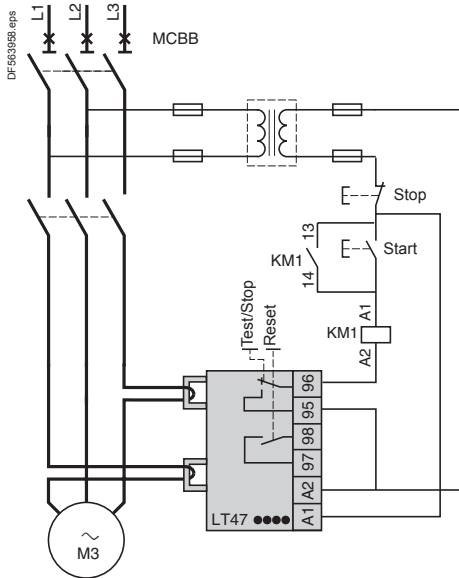
	LC1	D09...D18	D25...D38
b		123	137
c		See pages B8/65 and B8/66	

Schemes


LR97 D●●●●



LT47 ●●●●



Motor management system - TeSys U

Type of product	Range	Pages
Motor controller TeSys U		B12/2
Current transformers for TeSys U motor controller	From 30 to 800 A	B12/2
Type 2 coordination table for assemblies of: ■ circuit breaker + contactor + TeSys U controller + current transformer ■ fuses + contactor + TeSys U controller + current transformer		B12/3

Motor management system - TeSys T

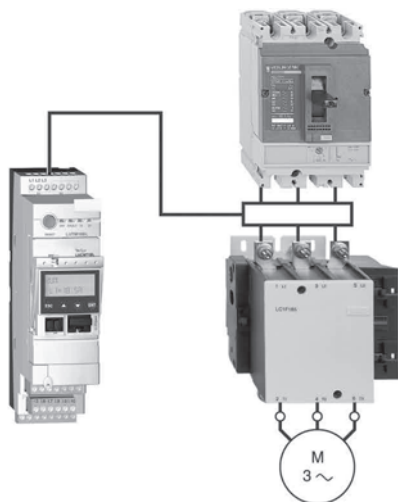
Controllers with Modbus, or CANopen, Devicenet, Profibus, Ethernet TCP/IP communication port		B12/4
Extension modules		B12/5
HMI terminal and cables		B12/5
Accessories		B12/6

Technical Data for Designers

B12/9

TeSys U

DF 528120.fr



LUT M + LUCM T1BL + LUTC ●●

References

Control bases (auxiliary supply voltage \sim 24 V)

Connection	Control	For use with contactor	Reference	Weight kg
Current transformers	Screws	LC1D●●	LUTM10BL	0.800
		LC1F●●●	LUTM20BL	0.800

Control units

Description	Class	For motor type	Setting range	Reference	Weight kg
Advanced	10	3-phase	0.35...1.05	LUCBT1BL	0.140
	20	3-phase	0.35...1.05	LUCDT1BL	0.140
Multifunction	5 to 30	3-phase	0.35...1.05	LUCMT1BL	0.175

Current transformers

Operating current		Reference	Weight kg
Primary	Secondary		
30	1	LUTC0301	0.550
50	1	LUTC0501	0.330
100	1	LUTC1001	0.450
200	1	LUTC2001	0.590
400	1	LUTC4001	0.870
800	1	LUTC8001	1.210

Function modules and communication modules

The TeSys U controller is compatible with the modules listed below:

- Thermal overload alarm module LUF W10,
- Motor load indication module LUF V2,
- Communication modules:
 - Modbus (LUL C033),
 - CANopen (LULC08),
 - DeviceNet (LULC09),
 - Advantys STB (LUL C15).

Note: Communication modules **LUL C07** (Profibus DP), **ASILUF C5** and **ASILUF C51** (AS-Interface) are not compatible with the TeSys U controller. Module **LUF W10** is only compatible with control units **LUCB T1BL** and **LUCD T1BL**.

TeSys U

Combinations providing type 2 coordination

With Circuit breaker

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3 400/415 V		Circuit breaker		Contactor		TeSys U controller	Current transformers
PkW	IeA	Reference	Rating A	I _{rm} ⁽¹⁾ A	Reference ⁽²⁾	Reference	Reference
18.5	35	GV3L40	40	560	LC1D50A	LUTM + LUC●	3 x LUTC0501
22	41	GV3L50	50	700	LC1D50A	LUTM + LUC●	3 x LUTC1001
30	55	GV3L65	65	910	LC1D65A	LUTM + LUC●	3 x LUTC1001
37	66	NSX80HMA	80	1040	LC1D80	LUTM + LUC●	3 x LUTC1001
45	80	NSX100HMA	100	1300	LC1D95	LUTM + LUC●	3 x LUTC1001
55	97	NSX160HMA	150	1350	LC1D115	LUTM + LUC●	3 x LUTC2001
75	132	NSX160HMA	150	1800	LC1D150	LUTM + LUC●	3 x LUTC2001
90	160	NSX250HMA	220	2200	LC1F185	LUTM + LUC●	3 x LUTC2001
110	195	NSX250HMA	220	2640	LC1F225	LUTM + LUC●	3 x LUTC4001
132	230	NSX400HMA	320	3200	LC1F265	LUTM + LUC●	3 x LUTC4001
160	280	NSX400HMA	320	4160	LC1F330	LUTM + LUC●	3 x LUTC4001
200	350	NSX630HMA	500	5000	LC1F400	LUTM + LUC●	3 x LUTC4001
220	385	NSX630HMA	500	5500	LC1F400	LUTM + LUC●	3 x LUTC4001
250	430	NSX630HMA	500	6000	LC1F500	LUTM + LUC●	3 x LUTC8001

With fuses

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3 400/415 V		Switch-disconnector fuse	aM fuses		Contactor	TeSys U controller	Current transformers
PkW	IeA	Reference	Size	Rating A	Reference ⁽²⁾	Reference	Reference
18.5	35	GS●F	14 x 51	40	LC1D40A	LUTM + LUC●	3 x LUTC0501
22	41	GS●J	22 x 58	50	LC1D50A	LUTM + LUC●	3 x LUTC1001
30	55	GS●J	22 x 58	80	LC1D80	LUTM + LUC●	3 x LUTC1001
37	66	GS●J	22 x 58	100	LC1D80	LUTM + LUC●	3 x LUTC1001
45	80	GS●J	22 x 58	100	LC1D95	LUTM + LUC●	3 x LUTC1001
55	97	GS●L	T0	125	LC1D115	LUTM + LUC●	3 x LUTC2001
75	132	GS●L	T0	160	LC1D150	LUTM + LUC●	3 x LUTC2001
90	160	GS●N	T1	200	LC1F185	LUTM + LUC●	3 x LUTC2001
110	195	GS●N	T1	250	LC1F225	LUTM + LUC●	3 x LUTC4001
132	230	GS●QQ	T2	315	LC1F265	LUTM + LUC●	3 x LUTC4001
160	280	GS●QQ	T2	400	LC1F330	LUTM + LUC●	3 x LUTC4001
200	350	GS2S	T3	500	LC1F400	LUTM + LUC●	3 x LUTC4001
220	385	GS2S	T3	500	LC1F400	LUTM + LUC●	3 x LUTC4001
250	430	GS2S	T3	500	LC1F500	LUTM + LUC●	3 x LUTC8001
315	540	GS2S	T3	630	LC1F630	LUTM + LUC●	3 x LUTC8001

(1) I_{rm}: setting current of the magnetic trip.

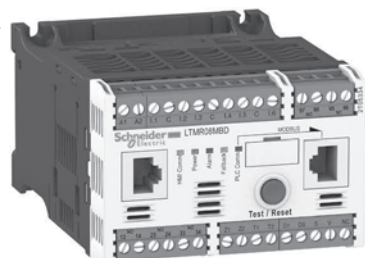
(2) For reversing operation, replace the prefix LC1 with LC2.

Protection components

TeSys T Motor Management System

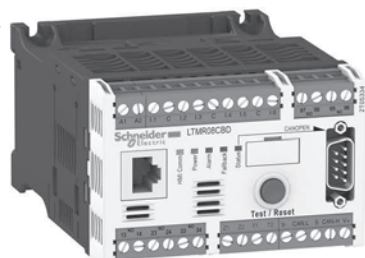
TeSys T

PF526387-47-M.eps



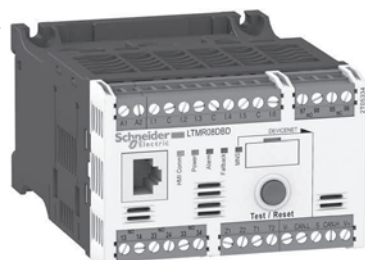
LTM R08MBD

PF526388-47-M.eps



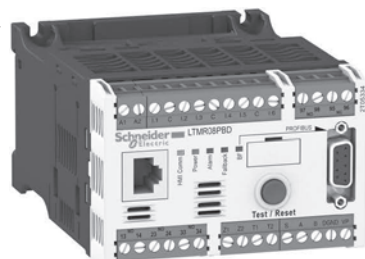
LTM R08CBD

PF526389-47-M.eps



LTM R08DBD

PF526390-47-M.eps



LTM R08PBD

CPB100750-00.eps

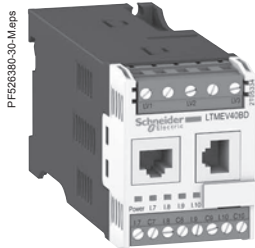


LTM R08EBD

Controllers

Setting range	Control voltage	Current range	Reference
A	V	A	
For Modbus			
8	⎓ 24	0.4...8	LTM R08MBD
	~ 100...240	0.4...8	LTM R08MFM
27	⎓ 24	1.35...27	LTM R27MBD
	~ 100...240	1.35...27	LTM R27MFM
100	⎓ 24	5...100	LTM R100MBD
	~ 100...240	5...100	LTM R100MFM
For CANopen			
8	⎓ 24	0.4...8	LTM R08CBD
	~ 100...240	0.4...8	LTM R08CFM
27	⎓ 24	1.35...27	LTM R27CBD
	~ 100...240	1.35...27	LTM R27CFM
100	⎓ 24	5...100	LTM R100CBD
	~ 100...240	5...100	LTM R100CFM
For DeviceNet			
8	⎓ 24	0.4...8	LTM R08DBD
	~ 100...240	0.4...8	LTM R08DFM
27	⎓ 24	1.35...27	LTM R27DBD
	~ 100...240	1.35...27	LTM R27DFM
100	⎓ 24	5...100	LTM R100DBD
	~ 100...240	5...100	LTM R100DFM
For Profibus DP			
8	⎓ 24	0.4...8	LTM R08PBD
	~ 100...240	0.4...8	LTM R08PFM
27	⎓ 24	1.35...27	LTM R27PBD
	~ 100...240	1.35...27	LTM R27PFM
100	⎓ 24	5...100	LTM R100PBD
	~ 100...240	5...100	LTM R100PFM
For Ethernet TCP/IP (communication protocols: Modbus/TCP and EtherNet/IP)			
8	⎓ 24	0.4...8	LTM R08EBD
	~ 100...240	0.4...8	LTM R08EFM
27	⎓ 24	1.35...27	LTM R27EBD
	~ 100...240	1.35...27	LTM R27EFM
100	⎓ 24	5...100	LTM R100EBD
	~ 100...240	5...100	LTM R100EFM
Filter			
Control voltage	Current max	Reference	
V	mA		
~ 150...240	130	LTM9F	

TeSys T



LTM EV40BD



LTM CU

Extension modules (with voltage measurement on the 3 phases)

Input control voltage	Number of inputs	Supply to the electronics	Reference
V			
⎓ 24	4	Via the controller	LTMEV40BD
~ 100...240	4	Via the controller	LTMEV40FM

HMI terminals

Description	Supply Voltage	Reference
Operator control unit	Languages: English French Spanish	Supply via the controller LTMCU
Kit for portable LTM CU		LTM9KCU
Magelis compact display.	⎓ 24 V external	XBTN410

Description	Number and type of connectors	Length m	Reference
Connecting cables for the LTM CU control unit	2 x RJ45	1	LTM9CU10
		3	LTM9CU30
Connecting cables for the XBT N410	SUB-D 25-way female RJ45	2.5	XBTZ938

Cables

Description	Number and type of connectors	Length m	Reference
Connecting cables for connecting the controller to the extension module	2 x RJ45	0.04	LTMCC004 ⁽¹⁾
		0.3	LTM9CEXP03
		1	LTM9CEXP10

Replacement connectors

Description	Number and type of connectors	Reference
Complete set of connectors for controllers and extension modules	10 screw terminals (all network versions included)	LTM9TCS
Connector extraction tool		LTM9TCT ⁽²⁾

⁽¹⁾ Sold in lots of 6.

⁽²⁾ Sold in packs of 3.

Protection components

TeSys T Motor Management System

TeSys T

Configuration tools

Description	Composition	Reference	Weight kg
Connection cable for PC	USB to RJ45 cable, length 2.5 m	TCSMCNAM3M002P	0.200

Current transformers ⁽¹⁾

Operational current		Reference	Weight kg
Primary	Secondary		
A	A		
100	1 ⁽²⁾	LT6CT1001	0.550
200	1 ⁽²⁾	LT6CT2001	0.550
400	1 ⁽²⁾	LT6CT4001	0.550
800	1 ⁽²⁾	LT6CT8001	0.680

Earth fault toroids (marketed under the Schneider Electric brand)

Rated operational current Ie	Internal Ø of toroid	Reference	Weight kg
A	mm		

Closed toroids, type A

65	30	50437	0.120
85	50	50438	0.200
160	80	50439	0.420
250	120	50440	0.530
400	200	50441	1.320
630	300	50442	2.230

Split toroids, type OA

85	46	50485	1.300
250	110	50486	3.200

PTC thermistor probes ⁽³⁾

Description	Nominal Operating Temperature (NOT) °C	Colour	Unit reference ⁽⁴⁾
Triple probes	90	Green/green	DA1TT090
	110	Brown/brown	DA1TT110
	120	Grey/grey	DA1TT120
	130	Blue/blue	DA1TT130
	140	White/blue	DA1TT140
	150	Black/black	DA1TT150
	160	Blue/red	DA1TT160
	170	White/green	DA1TT170

⁽¹⁾ The transformers offered for use with TeSys U starters are suitable. Please consult our "TeSys U starter-controllers" catalogue.

⁽²⁾ For use with LTM R08●● controllers.

⁽³⁾ PTC: Positive Temperature Coefficient.

⁽⁴⁾ Sold in lots of 10.

PF526393_eps



LT6 CT4001

PF510576_eps



DA1 TT●●●

Protection components

TeSys T Motor Management System

TeSys T

Marking accessories (to be ordered separately)

Description	Composition	Sold in lots of	Unit reference	Weight kg
Clip-in markers (maximum of 5 per unit)	Strips of 10 identical numbers (0 to 9)	25	AB1R● ⁽¹⁾	0.002
	Strips of 10 identical capital letters (A to Z)	25	AB1G● ⁽¹⁾	0.002

Connection accessories

Description	Length m	Reference	Weight kg
For Modbus connection			
Cables fitted with 2 x RJ45 connectors	0.3	VW3A8306R03	0.045
	1	VW3A8306R10	0.065
	3	VW3A8306R30	0.125
T-junctions	0.3	VW3A8306TF03	0.032
	1	VW3A8306TF10	0.032
RS 485 line terminator	–	VW3A8306R	0.012

For CANopen connection

Cables	50	TSXCANCA50	4.930	
	100	TSXCANCA100	8.800	
	300	TSXCANCA300	24.560	
IP20 connectors SUB-D 9-way female	Elbowed (90°)	–	TSXCANKCDF90T	0.046
	Straight	–	TSXCANKCDF180T	0.049
Line end adapter switch	Elbowed (90°) with SUB-D 9-way connector for connection to PC or diagnostic tool	–	TSXCANKCDF90TP	0.051

For DeviceNet connection

Cables	50	TSXCANCA50	4.930
	100	TSXCANCA100	8.800
	300	TSXCANCA300	24.560

For Profibus DP connection⁽²⁾

Cables	100	TSXPBSCA100	–	
	400	TSXPBSCA400	–	
Connectors	With line terminator	–	490NAD91103	–
	Without line terminator	–	490NAD91104	–
	With line terminator and terminal port	–	490NAD91105	–

For Ethernet TCP/IP connection

Shielded twisted pair cables to standard EIA/TIA568

Cables fitted with 2 x RJ45 connectors for connection to terminal equipment	Straight	2	490NTW00002	–
		5	490NTW00005	–
		12	490NTW00012	–
		40	490NTW00040	–
		80	490NTW00080	–

Shielded twisted pair cables, UL and CSA 22.1 approved

Cables fitted with 2 x RJ45 connectors for connection to terminal equipment	Straight	2	490NTW00002U	–
		5	490NTW00005U	–
		12	490NTW00012U	–
		40	490NTW00040U	–
		80	490NTW00080U	–
Ethernet Connector	Elbowed 180°	–	LTM9CE180T ⁽³⁾	0.180

⁽¹⁾ When ordering, replace the ● in the reference with the number or letter required.

⁽²⁾ To order other connectors and cables (UL cables for harsh environments, etc.), please consult our Customer Care Centre.

⁽³⁾ Sold in packs of 6.

Technical Data for Designers

Contents

TeSys U:

- > presentation..... B12/10 to B12/11
- > characteristics B12/12 and B12/13
- > dimensions B12/14
- > schemes..... B12/15

TeSys T:

- > presentation..... B12/16 to B12/26
- > characteristics B12/27 to B12/30
- > curves B12/31
- > dimensions B12/32 to B12/33
- > schemes..... B12/34 to B12/37
- > combinations..... B12/38 to B12/41

TeSys motor starters - open version

TeSys U controllers

TeSys U

Presentation

Above 32 A, the TeSys U controller provides a motor starter management solution identical to that provided by TeSys U starter-controllers.

Used in conjunction with a short-circuit protection device and a contactor, it provides a motor starter whose functions are the same as those of a TeSys U starter-controller and, in particular, provides the following functions: overload protection, motor starter control and application monitoring.

It consists of a control unit whose adjustment range is compatible with the secondary of current transformers, plus a control base which also allows fitment of a function module or a communication module.

It requires a \sim 24 V external power supply.

The secondaries of current transformers, the \sim 24 V power supply, the 10 inputs and the 5 outputs are connected by screw terminal block.

Application example

Detecting blockage of a rock crusher by monitoring the motor current.

Operating conditions

- Power: 90 kW at 400 V.
- In: 185 A.
- Duty class S1.
- Control circuit voltage: \sim 230 V
- Control-command by PLC and serial link using the Modbus protocol.

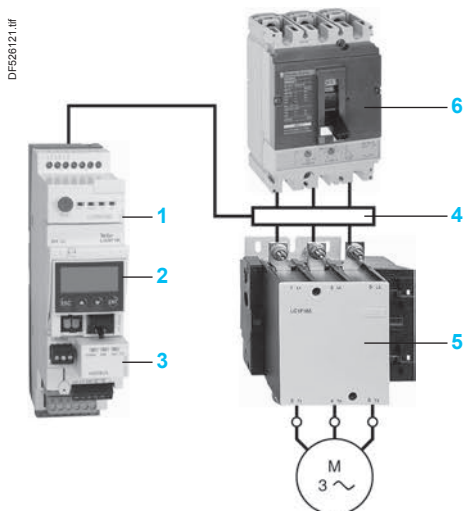
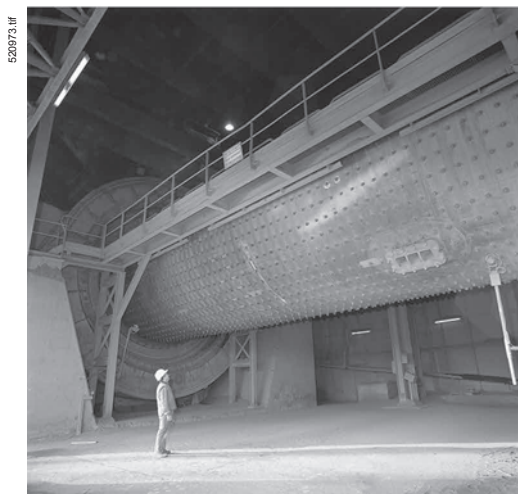
Products used

Description	Item	Quantity	Reference	Page
Controller	1	1	LUT M20BL	6/64
Multifunction control unit	2	1	LUCM T1BL	6/64
Modbus communication module	3	1	LUL C033	1/95
Current transformer	4	3	LUT C4001	6/64
Contactor	5	1	LC1 F185P7	–
Circuit breaker	6	1	NS 250HMA	–

Functions performed

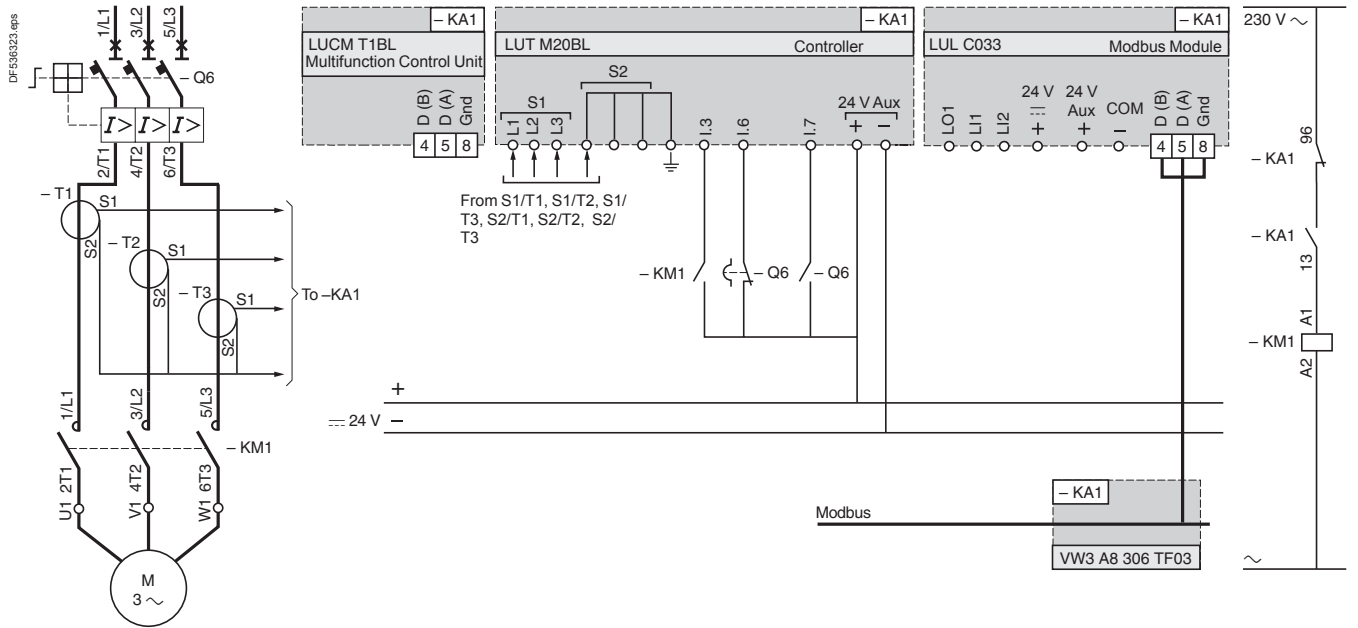
- Short-circuit protection with level of protection of 70 kA at 400V.
- Electronic protection against thermal overloads with an adjustment range of 4.
- Detection of crusher blockage by monitoring the induced overcurrent. To use the "over torque or jam" function, the following parameters must be entered:
 - trip: the answer yes/no enables or disables the function,
 - time before tripping: the time period during which the value of the current must be above the tripping threshold in order to cause tripping (adjustable from 1 to 30 s).
 - tripping threshold: value as a % of the load current ratio in relation to the setting current. If the ratio remains above this threshold for the time specified in the previous parameter, the product trips (adjustable from 100 to 800 %).

It is possible to set the parameter for an alarm at a preset threshold under the same conditions as above.



Application example

Scheme



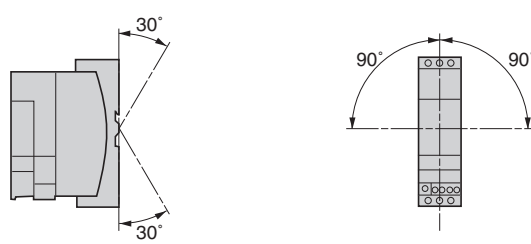
Other functions

The multifunction control unit incorporates other control and protection functions, such as: monitoring and control of phase current, alarm, ... Communication module LUL C033 also provides a programmable output and two programmable inputs.

TeSys motor starters - open version

TeSys U controllers

TeSys U

Environment		LUT M + LUCB T1BL or LUCD T1BL without LUL C		LUT M + LUCM T1BL or LUL C	
Control base and control unit type					
Product certifications		UL, CSA, ASEFA			
Conforming to standards		IEC/EN 60947-4-1, UL 508, CSA C22-2 N°14			
Rated insulation voltage of the outputs (Ui)	Conforming to IEC/EN 60947-1, overvoltage category III, degree of pollution: 3	V	250		
	Conforming to UL508, CSA C22-2 n°14	V	250		
Rated impulse withstand voltage of the outputs (Uimp)	Conforming to IEC/EN 60947-4-1	kV	4		
Degree of protection Conforming to IEC/EN 60947-1 (protection against direct finger contact)	Front panel (outside connection zone)		IP 40		
	Front panel and wired terminals		IP 20		
	Other faces		IP 20		
Protective treatment	Conforming to IEC/EN 60068		"TH"		
	Conforming to IEC/EN 60068-2-30	Cycles	12		
	Conforming to IEC/EN 60068-2-11	h	48		
Ambient air temperature around the device	Storage	°C	- 40...+ 85		
	Operation	°C	- 25...+ 70		- 25...+ 60
Maximum operating altitude		m	2000		
Operating positions Without derating	In relation to normal vertical mounting plane				
Flame resistance	Conforming to UL 94		V2		
	Conforming to IEC/EN 60695-2-12	°C	960 (parts supporting live components)		
		°C	650		
Shock resistance 1/2 sine wave = 11 ms	Conforming to IEC/EN60068-2-27 ⁽¹⁾		15 gn		
Vibration resistance 5...300 Hz	Conforming to IEC/EN 60068-2-6 ⁽¹⁾		4 gn		
Resistance to electrostatic discharge	Conforming to IEC/EN 61000-4-2	kV	In open air: 8 - Level 3		
		kV	On contact: 6 - Level 3		
Resistance to radiated fields	Conforming to IEC/EN 61000-4-3	V/m	10 - Level 3		
Immunity to fast transient currents	Conforming to IEC/EN 61000-4-4	kV	CT outputs and inputs: 4 - Level 4		
		kV	Inputs and supply: 2 - Level 3		
Immunity to radioelectric fields	Conforming to IEC/EN 61000-4-6	V	10		
Control base and control unit relays					
Immunity to dissipated shock waves	Conforming to IEC/EN 60947-4-1		Common mode	Serial mode	
	Output relays / power line	kV	4	2	
	Inputs	kV	2	1	
	Serial communication	kV	2	-	

(1) Without modifying the contact states, in the most unfavourable direction.

Control circuit supply characteristics

Operational voltage	V	~ 20.4...28.8	
Power consumption	W	2 max	
Associated protection	A	gG fuse. 0.5	
Cabling			
Connectors	Pitch	mm 5	
Flexible cable without cable end	1 conductor	mm² 0.2...2.5	
	2 identical conductors	mm² 0.2...1.5	
Flexible cable with cable end	Without insulated ferrule	1 conductor	mm² 0.25...2.5
		2 identical conductors	mm² 0.25...1
	With insulated ferrule	1 conductor	mm² 0.25...2.5
		2 identical conductors ⁽¹⁾	mm² 0.5...1.5
Solid cable without cable end	1 conductor	mm² 0.2...2.5	
	2 identical conductors	mm² 0.2...1	
Conductor size	1 conductor	AWG 24 to AWG 12	
Tightening torque	N.m	0.5...0.6	
Flat screwdriver	mm	3	

Input characteristics

Operational voltage	V	~ 24
Logic inputs		Logic state 1: $I \geq 6 \text{ mA}$ - 16 V Logic state 0: $I \leq 1.5 \text{ mA}$ - 5 V

Discrete output characteristics

Base controller type		LUT M10BL	LUT M20BL
Type		Single break volt-free contacts	
Load	a.c. supply	C 300	B 300
	d.c. supply	24 V/5 A	24 V/5 A
Permissible power in cat. AC-15	For 500 000 operating cycles	VA 180	500
Permissible power in cat. DC-13	For 500 000 operating cycles	W 30	30
Associated protection		A gG fuse, 4	gG fuse, 4
Used with contactor type ⁽²⁾		Control voltage ~ 24 V: LP1K, LC1 D09...D95. Control voltage ~ 24...240 V: LC1K, LC1D.	Control voltage ~ 100...240 V: LC1K, LC1D, LC1 F185...F500

Characteristics of external current transformers LUT C●●●1

Precision		Class 5P					
Precision limit factor		10					
Maximum operating temperature	°C	70					
Transformer ratio		30/1	50/1	100/1	200/1	400/1	800/1
Diameter of conductor passage hole	mm	28	22	35	32	—	—
Maximum wire c.s.a.	mm²	30 x 10	30 x 10	40 x 10	65 x 32	38 x 127	53 x 127

⁽¹⁾ Use a double cable end.

⁽²⁾ For other combinations, use an intermediate relay between the output of controller LUTM and the contactor coil.

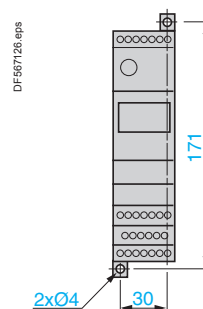
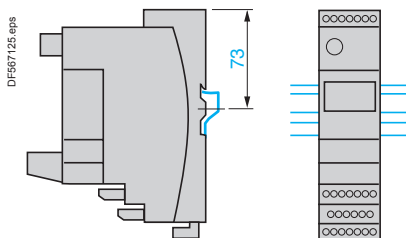
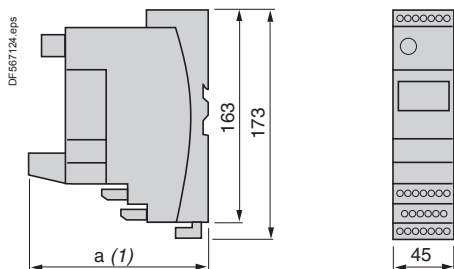
Dimensions, mounting

Controllers

LUTM ●0BL

Rail mounting

Rail mounting



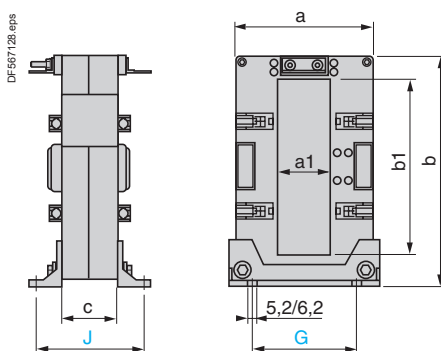
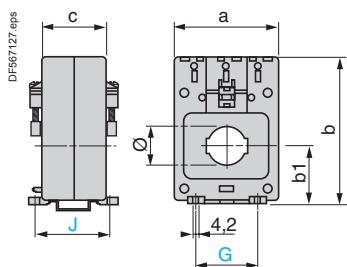
	a
With Modbus module	135
With Advantys STB, CANopen or DeviceNet modules	147

(1) Depth with communication module.

Current transformers

LUTC 0301...1001

LUTC 2001...8001

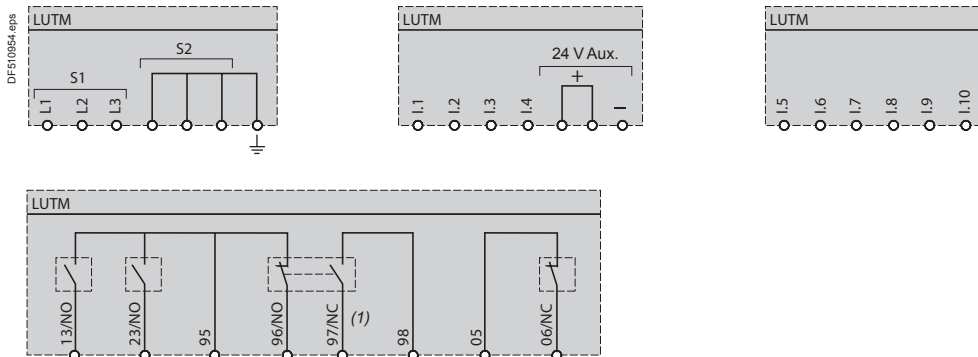


LUTC	a	b	b1	c	Ø	G	J
0301	78	108	42	46	28	45	54
0501	57	86	31	42	23	45	50
1001	78	108	42	46	35	45	54

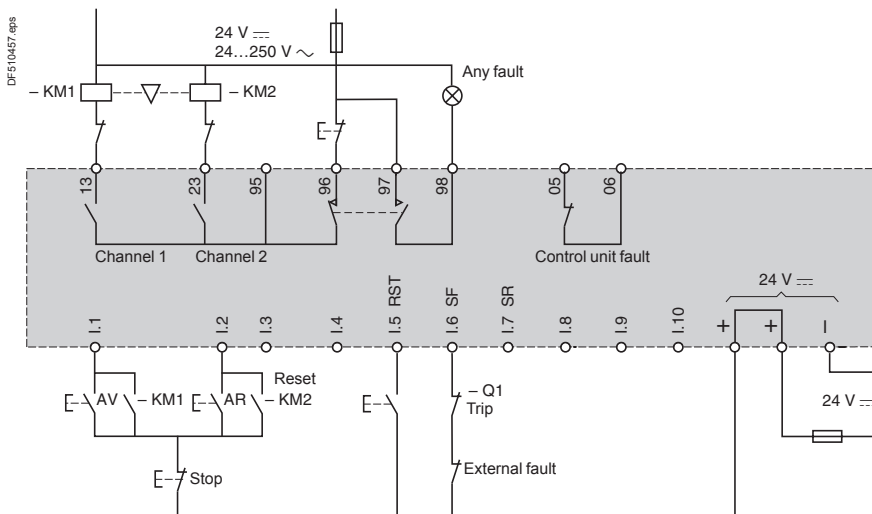
LUTC	a	a1	b	b1	c	G	J
2001	94	32	99	55	40	68	52
4001	99	38	170	127	40	75	64
8001	125	54	170	127	40	95	67

Schemes

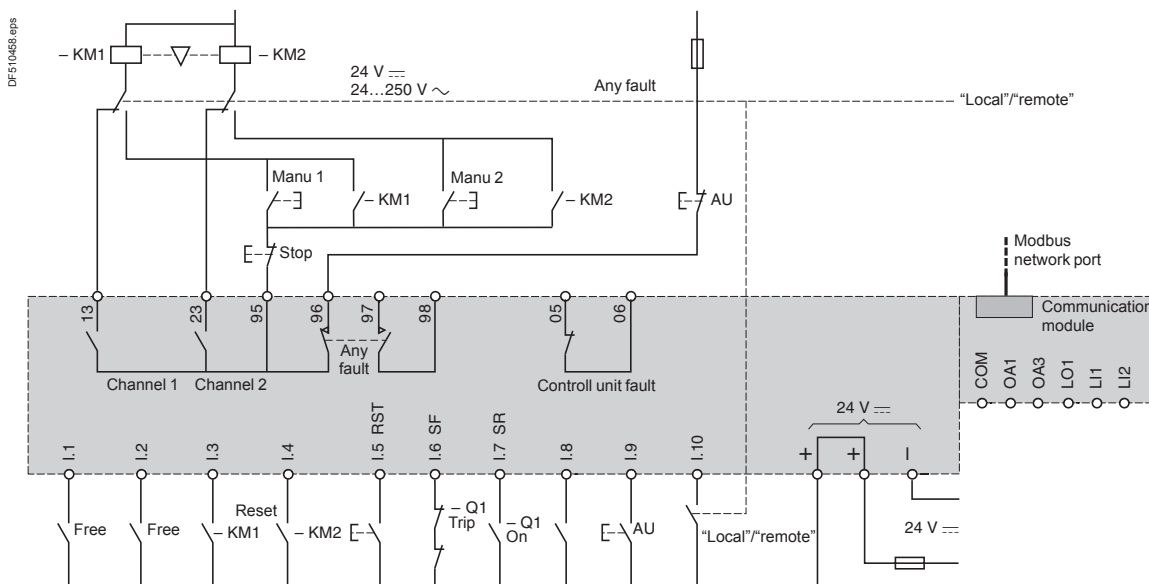
Reversing controller LUTM



3-wire control, pulsed start with maintaining contact



Control for Modbus communication module LUL C033



(1) The contacts are represented with controller powered up and not in a fault condition.

TeSys T

Presentation

TeSys T is a motor management system that provides protection, metering and monitoring functions for single-phase and 3-phase, constant speed, a.c. motors up to 810 A.

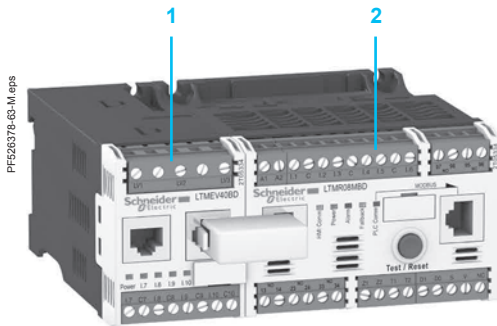
- Suitable for the harshest applications, this product range offers:
- high-performance multifunction protection, independent of the automation system
 - a local HMI control unit for reading, displaying and modifying the parameters monitored, diagnostics, etc.
 - configuration using SoMove software
 - connection to the automation system via a communication network (selection according to various protocols).

The TeSys T motor management system is used for motor control and protection in harsh industrial applications, in which downtime must be avoided because it is very costly: Oil & Gas, chemical industry, water treatment, metal, minerals and mining, pharmaceutical industry, microelectronics, tunnels, airports etc.

With TeSys T, unexpected stops of a process or manufacturing, associated with a motor, are anticipated via predictive analysis of fault situations. Fault tripping is therefore reduced to a minimum.

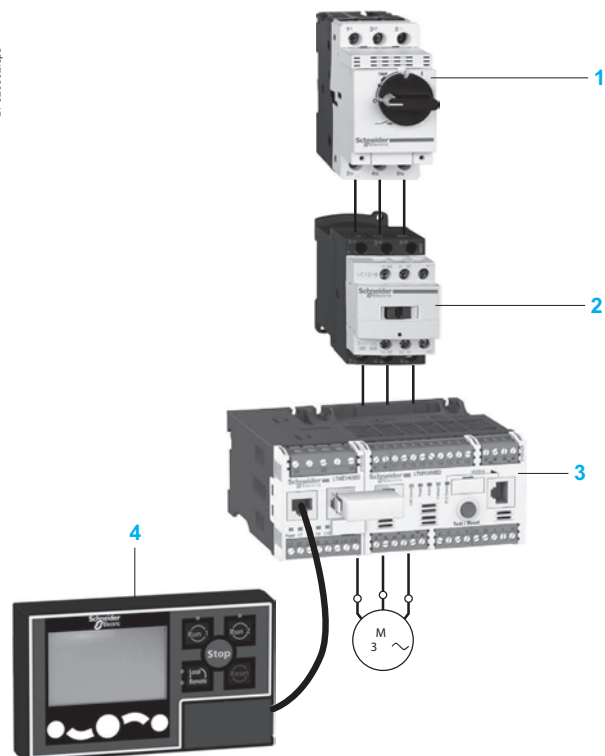
- Its use in motor control panels makes it possible to:
- increase the operational availability of installations
 - improve flexibility from project design through to implementation
 - increase productivity by making available all information needed to run the system.

The TeSys motor management system integrates perfectly with Schneider Electric low voltage equipment, such as Okken, Blokset and Prisma.



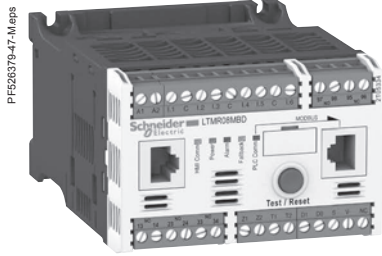
1 LTM EV40BD extension module
2 LTM R08MBD controller

DF 520382.eps

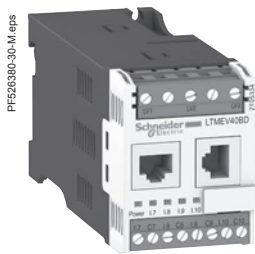


1 Magnetic Circuit breaker
2 Contactor
3 Controller with extension module
4 Operator control unit

TeSys T



LTM R08MBD



LTM EV40BD



LTM CU

Presentation

Composition of the motor management system

The system comprises:

- an LTM R motor management controller
 - with internal current transformer up to 100 A
 - above 100 A, by external current transformer up to 810 A
- an LTM E extension module
- an LTM CU operator control unit
- configuration software incorporated in the SoMove software application
- accessories for system set-up.

Communication

The LTM R controller is equipped with a communication interface to allow remote monitoring and control of the motor. All motor information is then available at automation system level.

The following networks are available:

- Modbus, CANopen, DeviceNet, ProfiBus DP and Ethernet TCP/IP (with two communication protocols, Modbus/TCP and EtherNet/IP).

TeSys T system functions

Protection functions:

- against thermal overload
- against phase imbalance and phase failure
- thermal motor protection via PTC probes
- against phase reversal
- against earth faults
- against long starting times and motor stalling
- against automatic load shedding and restarting
- against load fluctuations (I, U, P)
- against variations of Cos φ (power factor).

Metering functions

- Measurements (rms values):
 - current on the 3 phases
 - voltage on the 3 phases (shedding)
 - motor temperature
 - earth fault.
- Values calculated:
 - average current
 - frequency
 - Cos φ (power factor), power, power consumption...

Motor control functions

A motor managed by TeSys T can be controlled:

- locally, using the logic inputs present on the product, or via the HMI terminal
- remotely, via the network (connection by terminal block or connector except for DeviceNet: terminal block only).

Motor control modes

5 predefined motor control modes are incorporated in the controller:

- overload mode: monitoring of motors whose control is not managed by the controller,
- independent mode: starting of non-reversing motors,
- reverser mode: starting of reversing motors,
- 2-step mode: 2-step starting of motors (star-delta, by autotransformer and by resistor),
- 2-speed mode: 2-speed starting of motors (Dahlander, pole changer).

A 6th "Custom" mode is available to allow the user to create a specific motor control mode that is not predefined in the controller.

Statistical and diagnostic functions

- Fault statistics: counters per type of protection and history of the last 5 faults.
- Motor statistics: saving of motor statistics values.
- Diagnosis of faults affecting correct operation of the product.

TeSys T

The LTM R controller

The controller is the central component in the motor management system.

It manages the basic functions such as:

- measurement of 3-phase current via integral current transformers from 0.4 to 100 A (up to 810 A by external current transformers)
- measurement of earth current by external earth fault toroid
- measurement of motor temperature by PTC probe
- inputs and outputs for the various motor control modes, fault management and associated functions.

Characteristics

Supply

2 types of controller power supply are available:

- 24 V $\overline{\text{DC}}$
- 100...240 V \sim .

Current ranges

3 current ranges allow measurement of motor current from 0.4 to 100 A:

- 0.4...8 A
- 1.35...27 A
- 5...100 A.

For use with external current transformers, choose the 0.4...8 A range (1 or 5 A current transformer secondary).

Inputs

- 6 discrete logic inputs.

Outputs

- 3 relay logic outputs (1N/O).
- 1 relay output for fault signalling (1N/O + 1N/C).

Measurements

- Connections for a temperature probe.
- Connections for an earth fault toroid.

LTM E extension module

The extension module adds the following functionalities to the TeSys T controller:

- voltage measurement on the 3 phases. This enables it to calculate numerous engine monitoring parameters (power, frequency, Cos φ ...)
- 4 additional inputs.

Characteristics

Inputs

- 4 discrete logic inputs (independent).

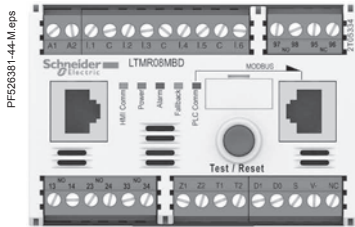
Power supplies

- 2 types of power supply for the inputs: 24 V $\overline{\text{DC}}$ and 100...240 V \sim .

□ A 24 V $\overline{\text{DC}}$ expansion module can be assembled with a 24 V $\overline{\text{DC}}$ controller or with a 100...240 V \sim controller.

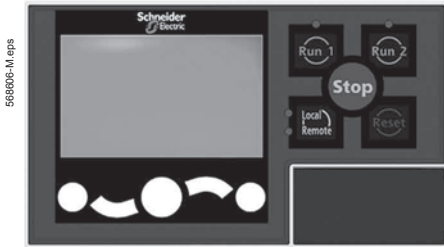
□ A 100...240 V \sim expansion module can be assembled with a 100...240 V \sim controller.

Voltage measurement between phases up to 690 V nominal.



LTM R●●

TeSys T



LTM CU

Human/Machine Interfaces (HMI)

Depending on the application, 2 types of HMI can be used with the LTM R controller.

- The LTM CU operator control unit:
 - entirely dedicated to the TeSys T range
 - only for control/monitoring of an LTM R controller.
- A Magelis XBT N410 terminal for control/monitoring of 1 to 8 LTM R controllers.

Dedicated exclusively to TeSys T controllers, control unit LTM CU makes it possible to:

- configure the parameters of the LTM R controller
 - display information on controller configuration and operation
 - monitor the alarms and faults generated by the controller
 - local control of the motor via the local control interface (keys can be customised).
- Three different languages can be loaded into the LTM CU controller at the same time.

By default, these 3 languages are:

- LTM CU: English, French and Spanish

Note: *English is the only compulsory language.*

A language download utility (LangTool), together with all the other languages, are available on the website “www.schneider-electric.com”.

This tool allows the languages present in the LTM CU control unit to be adapted.

The LTM CU HMI control unit has an RJ45 port, protected by a flexible cover to provide a good level of protection (IP54).

This port on the front panel allows connection to a PC, via a connecting cable, in order to use SoMove software.

In this case, the control unit acts as a transmitter and all information can then be viewed in SoMove.

The LTM CU HMI can be used as a portable version by using the separate kit LTM9KCU. This kit consists of two snap-on plastic shells (tool-free mounting) fitted with a simple fixing system that uses magnets for mounting on all types of metal surfaces.

Two applications have been predefined for TeSys T. Depending on the application loaded, the HMI terminal makes it possible to:

- configure and monitor a motor starter (LTM_1T1_V1.dop)
- monitor and modify certain parameters on up to 8 motor starters (LTM_1T8_X_V1.dop)⁽¹⁾.

XBT L1000 programming software is needed for loading applications into the HMI terminal.

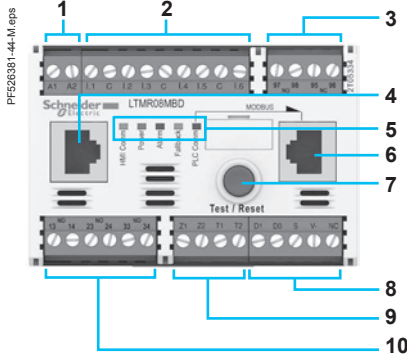
These applications are available on the website “www.schneider-electric.com”.

(1) *Replace the X with an E for the English version, or an F for the French version.*

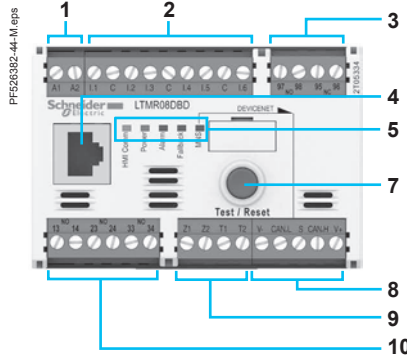
TeSys T

LTM R controllers

Modbus



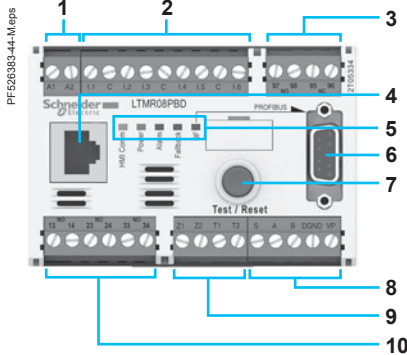
DeviceNet



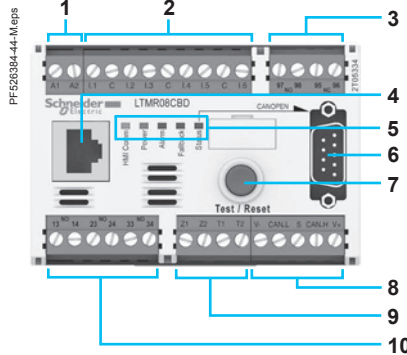
Controllers feature the following on their front panel:

- 1 Controller power supply.
- 2 Input connections.
- 3 Fault outputs (N/O+N/C).
- 4 Port for connection to the HMI terminal, a PC or an extension module (RJ45).
- 5 Controller status LEDs.
- 6 Network port for connection to the network by connector (except DeviceNet) ⁽¹⁾.
- 7 Test/Reset button.
- 8 Connection to the network by terminal block (except Ethernet TCP/IP).
- 9 Connection for an earth fault toroid and temperature probes.
- 10 Outputs for motor control mode function.

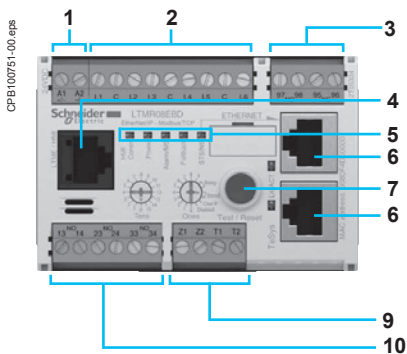
Profibus DP



CANopen

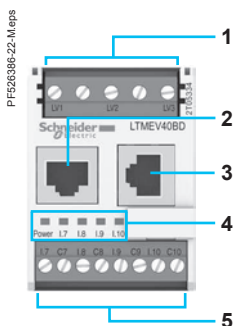


Ethernet TCP/IP (communication protocols: Modbus/TCP and EtherNet/IP)



⁽¹⁾ Connection using power extension (daisy-chaining) is possible for Ethernet TCP/IP.

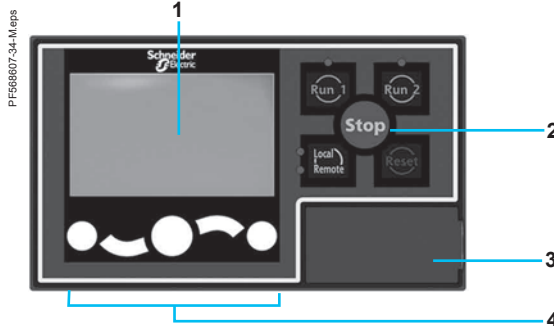
LTM EV40 extension modules



Extension modules have the following on their front face:

- 1 Inputs for voltage measurement.
- 2 Port for connection to the HMI terminal or to the PC.
- 3 Port for connection to the controller.
- 4 Extension module status LEDs.
- 5 Connection of additional inputs.

LTM CU operator control unit



The control unit has the following on its front face:

- 1 Screen LCD display.
- 2 Local control interface including control keys and LEDs.
- 3 RJ45 port on front panel for connection to a PC (protected by a cover).
- 4 Contextual navigation keys.

TeSys T

Thermal and current protection functions

Functions Description	Setting range	Controller LTM R	Controller and extension module (LTM R + LTM E)	Alarm threshold	Fault threshold
Thermal overload: thermal protection of motor by monitoring current consumption	Class: 5, 10, 15, 20, 25, 30. Inverse ther/definite time				
Motor temperature: thermal monitoring of the motor using temperature probes (winding, paper...). Up to 3 sensors in series.	PTC binary PTC/NTC analogue: 20 ...6500 Ohm				
Phase imbalance: monitors the symmetry of currents. To be used for imbalance < 80 % of the average current ⁽¹⁾ .	10...70% I average 0.2...20 s				
Phase failure: monitors the symmetry of currents. To be used for imbalance < 80 % of the average current ⁽¹⁾ .	0.1...30 s				
Phase reversal: signals when the phase sequence is different from the defined sequence (motor running).	A-B-C A-C-B				
Long starting time: monitors the motor starting time	100...800 % of FLC ⁽²⁾ 1...200 s				
Locked rotor: locking detected by a sudden increase in current after the start phase	100...800 % of FLC ⁽²⁾ 1...30 s				
Min/max current load limit variations: monitors motor load through variations of current around preset thresholds.	min.: 30...100 % of FLC ⁽²⁾ 1...200 s max.: 20...800 % of FLC ⁽²⁾ 1...250 s				
Earth fault: signals internal insulation faults, by vectorial summing of external currents, via earth fault toroid.	internal: 50...500 % min FLC ⁽²⁾ 0.5...25 s external: 0.02...10 A 0.1...25 s				
Frequent starting: Protects the motor against overheating due to frequent starting.	0...999.9 s				

Voltage and power protection functions

Phase imbalance: monitors the symmetry of voltage between phases. To be used for imbalance < 40 % of the average voltage ⁽³⁾ .	3...15 % 0.2...20 s				
Phase failure: monitors the symmetry of voltage between phases. To be used for imbalance > 40 % of the average voltage ⁽³⁾ .	0.1...30 s				
Phase reversal: signals when the phase sequence is different from the defined sequence (motor stopped).	A-B-C A-C-B				
Voltage variations. Min/max voltage limits: monitors voltage variations around preset thresholds.	min.: 70...99 % 0.2...25 s max.: 101...115 % 0.2...25 s				
Load shedding: opens outputs O.1 and O.2 if voltage drops below a preset threshold.	68...115 % 1...9999 s				
Power variations. Min/max power limits: monitors power variations around preset thresholds.	20...800 % 1...100 s				
Variations of Cos φ. Min/max limits of Cos φ: monitors variations of Cos φ around preset thresholds.	0...1 s 1...25 s				

Function performed.

⁽¹⁾ Average current value measured on the 3 phases.

⁽²⁾ FLC: Full Load Current (setting current).

⁽³⁾ Average voltage value measured on the 3 phases.

TeSys T

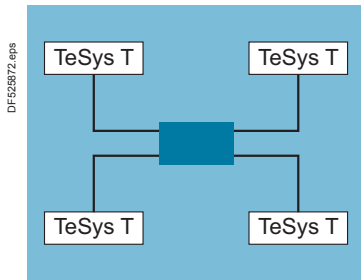
Motor control functions			
Functions	Description	With controller LTM R	With controller LTM R and extension module LTM E
Control modes	Local, via terminal block	X	X
	Local, via HMI terminal ⁽¹⁾	X	X
	Remote, via network	X	X
Operating modes	Overload	X	X
	Independent	X	X
	Reverser	X	X
	2-step	X	X
	2-speed	X	X
	"Custom" mode	X	X
Fault management	Manual reset	X	X
	Automatic reset	X	X
	Remote reset	X	X

Metering functions and statistics				
Functions	Description	Measurement range	With controller LTM R	With controller LTM R and extension module LTM E
Measurements ⁽²⁾	Current/Phase	0.08...1000 A	X	X
	Earth current	0.1633 x CT ratio	X	X
	Average current	0.08...1000 A	X	X
	Current imbalance between phases	0...200 %	X	X
	Thermal capacity level	0...200 %	X	X
	Motor temperature rise	0...6500 Ohm	X	X
	Frequency	0... 100 Hz		X
	Voltage between phases	~ 0...830 V		X
	Voltage imbalance between phases	0...200 %		X
	Active power	0...6553.5 kW		X
	Reactive power	0...6553.5 kWr		X
	Cos φ (power factor)	0...100		X
	Active power consumption	0...400 kWh		X
	Reactive power consumption	0...400 kWh		X
Fault statistics	Protection fault counters		X	X
	Protection alarm counters		X	X
	Diagnostic fault counters		X	X
	Motor control function counters		X	X
	Fault history		X	X
Fault diagnostics	Internal watchdog fault		X	X
	Controller internal temperature		X	X
	Temperature sensor connection		X	X
	Current connection		X	X
	Voltage connection			X
	Motor control commands (start, stop, run check back and stop check back)		X	X
	Control configuration checksum		X	X
	Loss of communication		X	X
Motor statistics	Number of motor control commands (0.1/0.2 starts)		X	X
	Operating time		X	X
	Number of starts/hour		X	X
	Last start I max.		X	X
	Duration of last start		X	X
Thermal overload statistics	Time to trip		X	X
	Time to restart		X	X
System operating statistics	Run, ON, Start, alarm, fault.		X	X

(1) HMI: Human Machine Interface.

(2) See measurement details page B12/28.

TeSys T



Star topology

Star topology

In a star topology, all the peripherals are linked via an intermediate peripheral (hub or switch).

In industrial Ethernet applications, the use of full duplex switches (instead of hubs) as central peripherals is strongly recommended.

Daisy chain topology

Daisy chaining, at bus level, is another connection topology commonly used in industrial automation system networks. The cable segments link several peripherals to each other, constituting the peripheral "section" of the network cable.



Daisy chain topology

Ethernet: different network topologies

Ring topology

In a ring topology, all the peripherals or components of the network infrastructure are connected within a loop.

This type of topology makes it possible to achieve different levels of redundancy of the network.

Ethernet ring

Ethernet rings are generally the main networks in applications where a high level of reliability is required. If a ring topology is required, the switches handling this function must be used.

Redundancy

Redundancy of the network infrastructure is the key to development of applications with high operational reliability.

Implementing a single or double ring architecture makes it possible to provide protection against breaks in network segments.

Single ring

The first level of redundancy can be achieved by installing a single ring.

ConneXium switches can be used to establish main network ring configurations.

The ring is created using RSTP protocol.

If a section of the line fails, the ring structure converts into a line type configuration.

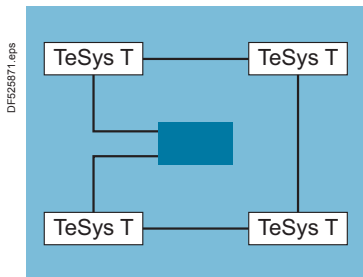
Ethernet: different communication protocols

LTM R controllers communicating over an Ethernet network can communicate either using the Modbus/TCP communication protocol or using the EtherNet/IP communication protocol. Both protocols are loaded in the controller. One must be selected for the operation.

Note: EtherNet/IP communication protocol is supported by ODVA, also promoter of DeviceNet communication solution. Note that in EtherNet/IP, IP stands for Industrial Protocol.

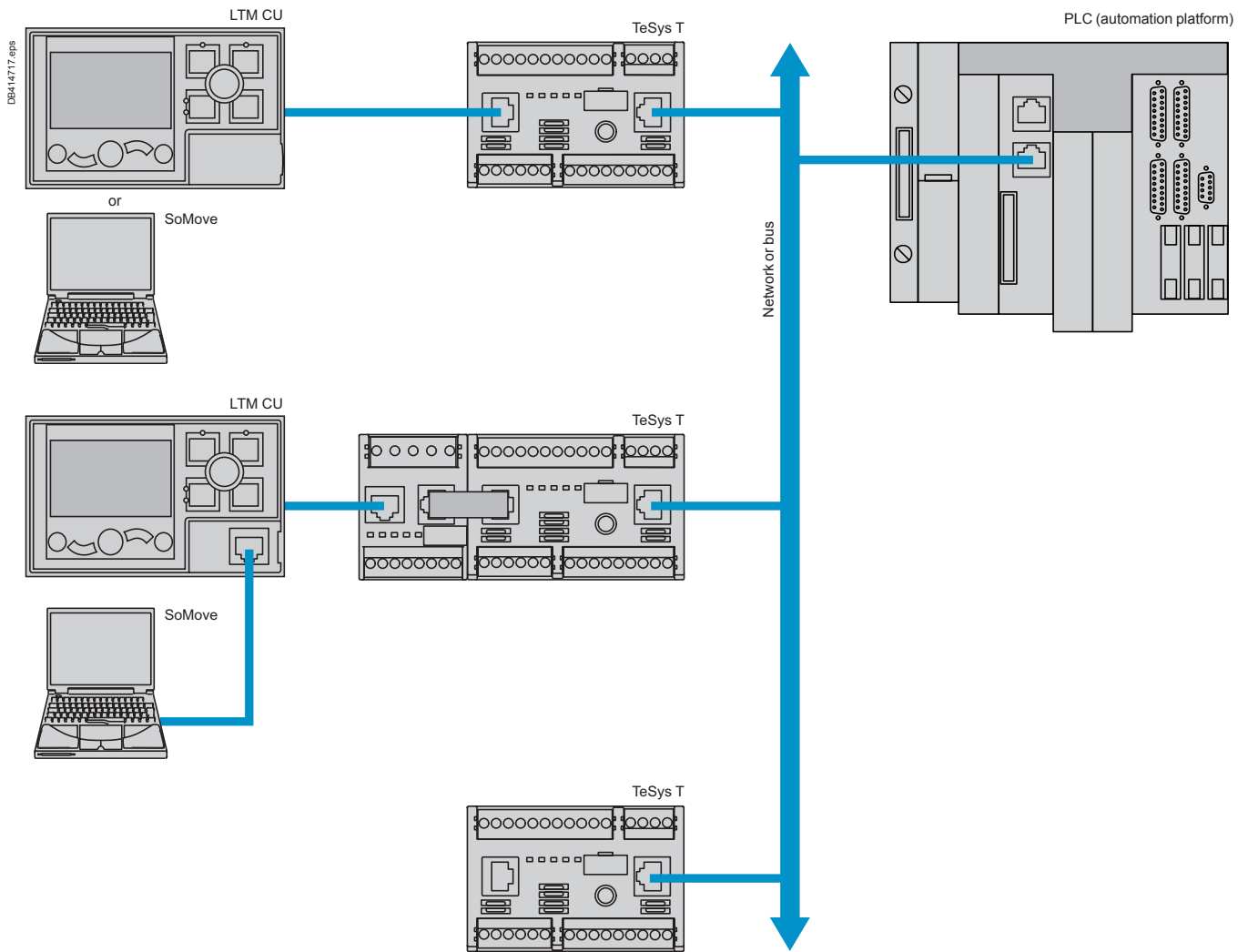
- IP address Class for Ethernet TCP/IP version: Class A 20 ETH10/100.

Services available on Ethernet TCP/IP version		
	In Modbus/TCP	In Ethernet/IP
Web Server	■	■
Modbus messaging	■	
IO Messaging		■
Explicit Messaging		■
Client FDR	■	■
SNMP network administrator	■	■
RSTP	■	■
Discovery	■	■
Master IP	■	■
Broadcast Storm Protection	■	■

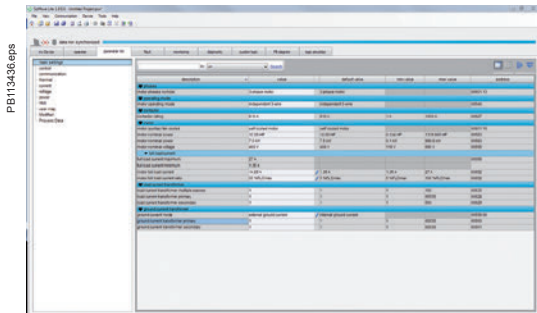


Ring topology

Possible configurations and applications



TeSys T



Example of TeSys T configurator setup screen

Configuration with SoMove

The TeSys T configurator is incorporated in the SoMove software application, as from version 2.5. ⁽¹⁾

It allows configuration, commissioning and maintenance of motor starters protected by TeSys T.

A library containing predefined motor control mode functions is available in order to:

- allow standardisation
- avoid errors
- reduce motor starter setup times.

5 predefined motor control modes are incorporated in the controller:

- overload mode: monitoring of motors whose control is not managed by the controller
- independent mode: starting of non-reversing motors
- reverser mode: starting of reversing motors
- 2-step mode: 2-step starting of motors (star-delta, by autotransformer and by resistor)
- 2-speed mode: 2-speed starting of motors (Dahlander, pole changer).

By using logic functions, a "Custom" mode makes it possible to:

- easily adapt these predefined motor control mode functions to the specific needs of your applications
- create a link with the motor starter environment or
- create new functions.

The functions thus defined can be saved and used to build your function library for future applications.

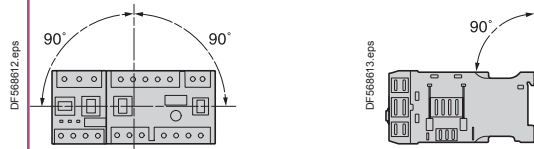
To create special functions, a logic editor is incorporated in the configurator and allows a choice of 2 programming languages:

- function block
- structured text.

⁽¹⁾ An update file is available, free of charge, on the website "www.schneider-electric.com". It will enable you to take advantage of the latest functions in the TeSys T motor management system.

TeSys T

Environment							
Product type		LTM R controllers		LTM EV40 extension modules			
Conforming to standards		IEC/EN 60947-4-1, UL60947-4-1A, CSA 22-2 n°60947-4-1, IACS E10					
Product certifications		UL, CSA, CE, CCC, EAC/GOST, RCM/CTIC'K, Atex, Marine (BV, LROS, DNV, RINA, ABS) ⁽¹⁾					
Rated insulation voltage of the outputs (Ui)	Conforming to IEC/EN 60947-1, overvoltage category III, degree of pollution 3	V	690				
	Conforming to UL 508, CSA C222 n° 14	V	690				
Rated impulse withstand voltage (Uimp)	Conforming to IEC/EN 60947-4-1						
	~ 100...240 V supply, inputs and outputs	kV	4	4			
	~ 24 V supply, inputs and outputs	kV	0.8	0.8			
	Communication circuits	kV	0.8	-			
Short-circuit withstand	Conforming to IEC/EN 60947-4-1	kA	100				
	Conforming to IEC/EN 60068		"TH"				
Protective treatment	Conforming to IEC/EN 60068-2-30		12 x 24 hour cycles				
	Conforming to IEC/EN 60070-2-11	h	48				
	Conforming to IEC/EN 60070-2-11						
Ambient air temperature around the device	Storage	°C	-40...+80				
	Operation	°C	-20...+60				
Operating position without dating	In relation to normal vertical mounting plane		±30° in relation to mounting plate, ±90°				
Flame resistance	Conforming to UL 94	°C	960 (for parts supporting live components)				
	Conforming to IEC/EN 60695-2-12	°C	650 (for other parts)				
Shock resistance (1/2 sine wave, 11 ms)	Conforming to IEC/EN 60068-2-27 ⁽²⁾		15 gn				
Vibration resistance	Conforming to IEC/EN 60068-2-6 ⁽²⁾		4 gn (plate mounted)				
	5...300 Hz		1 gn (mounted on rail)				
Resistance to electrostatic discharge	Conforming to IEC/EN 61000-4-2	kV	In open air: 8 - Level 3 On contact: 6 - Level 3				
Immunity to radiated electromagnetic interference	Conforming to IEC 61000-4-3	V/m	10 - Level 3				
Immunity to fast transient bursts	Conforming to IEC 61000-4-4	kV	On supply and relay outputs: 4 - Level 4 Other circuits: 2 - Level 3				
Immunity to radioelectric fields	Conforming to IEC/EN 61000-4-6	V	10 - Level 3				
Immunity to dissipated shock waves	Conforming to IEC/EN 61000-4-5		Common mode	Serial mode	Common mode	Serial mode	
	Relay outputs and supply	kV	4	2	-	-	
	~ 24 V inputs	kV	1	1	1	1	
	~ 100...240 V inputs	kV	2	1	2	1	
	Voltage inputs	kV	-	-	4	2	
	Communication	kV	2	-	2	-	
	Temperature sensor (IT1/IT2)	kV	1	0.5	-	-	
Altitude derating			2000 m	3000 m	3500 m	4000 m	4500 m
	Rated operational voltage (Ui)		1	0.93	0.87	0.8	0.7
	Max. operating temperature		1	0.93	0.92	0.9	0.88



(1) Certain certifications are pending; please consult your Customer Care Centre.

(2) Without modifying the contact states, in the most unfavorable direction.

Controller and extension module characteristics

Product type		Controllers		Extension modules	
		LTM R...BD	LTM R...FM	LTM EV40BD	LTM EV40FM
Control supply					
Operational voltage (U)	Conforming to IEC/EN 60947-1	V	~ 24	~ 100...240	–
Resistance to voltage dips	Conforming to IEC/EN 61000-4-11	V	0 for 3 ms 70 % of U for 500 ms		–
Associated protection		A	gG fuse, 0.5		–
Operational voltage	Limit values	V	~ 20.4...26.24	~ 93.5...264	–
Current consumption	50/60 Hz	mA	~ 56...127	~ 8...62.8	–
Connectors	Pitch	mm	5.08		5.08
Flexible cable without cable end	1 conductor	mm ²	0.2...2.5		0.2...2.5
	2 identical conductors	mm ²	0.2...1.5		0.2...1.5
Flexible cable with cable end	Without insulated ferrule	1 conductor	0.25...2.5		0.25...2.5
		2 identical conductors	0.5...1.5		0.5...1.5
	With insulated ferrule	1 conductor	0.25...2.5		0.25...2.5
		2 identical conductors	0.2...1		0.2...1
Solid cable without cable end	1 conductor	mm ²	0.2...2.5		0.2...2.5
	2 identical conductors	mm ²	0.2...1		0.2...1
Conductor size			AWG 24 to AWG 14		AWG 24 to AWG 14
Tightening torque		N.m	0.5...0.6		0.5...0.6
Flat screwdriver		mm	3		3

Input characteristics

Nominal values	Conforming to IEC/EN 61131-1		Type 1 positive logic (⎓: resistive, ~: capacitive)				
	Voltage	V	~ 24	~ 100...240	~ 24	~ 100...240	
	Current	mA	~ 7	~ 3.1 for 100 V ~ 7.5 for 240 V	~ 7	~ 3.1 for 100 V ~ 7.5 for 240 V	
Logic inputs	Logic state 1	Voltage	V	15 min	79 < U < 264	15 min	79 < U < 264
		Current	mA	2 min...15 max	2 min at 110 V... 3 min at 220 V	2 min...15 max	2 min at 110 V... 3 min at 220 V
	Logic state 0	Voltage	V	5 max	0 < U < 40	5 max	0 < U < 40
		Current	mA	15 max	15 max	15 max	15 max
Response time	Change to state 1	ms	15	25	15	25	
	Change to state 0	ms	5	25	5	25	

Output characteristics

Type			Volt free, single break			
Load	~		250 V / 5 A B300			
	⎓		30 V / 5 A			
Permissible power in cat. AC-15	For 500 000 operating cycles	VA	480 / I _e max: 2 A			
Permissible power in cat. DC-13	For 500 000 operating cycles	W	30 / I _e max: 1.25 A			
Associated protection		A	gG fuse, 4			
Max. frequency		Hz	2			
Max. operating level		op. cycles/h	1800			
Response time	Change to state 1	ms	10 max			
	Change to state 0	ms	10 max			

Measurement details

Current			1 % for the 0.4...8 A and 1.35...27 A ranges 2 % for the 5...100 A range			
Voltage			1 % from 100 to 830 V			
Earth fault current	Internal measurement without earth fault toroid		5...15 % for current > 0.1 A in the 0.4...8 A range current > 0.2 A in the 1.35...27 A range current > 0.3 A in the 5...100 A range			
	External measurement with earth fault toroid		< 5 % or 0.01 A			
Temperature measurement			2 %			
Power factor			10 %			
Active and reactive power			15 %			
Internal clock			±30 min / year			

TeSys T

Bus and network characteristics

Type of bus/network	Modbus	CANopen	DeviceNet	Profibus DP	Ethernet
Physical interface	2-wire RS 485	ISO 11898	ISO 11898	polarised 2-wire RS 485	IEEE 802.3
Addressing	1 to 247	1 to 127	1 to 64	1 to 125	0 to 159 ⁽¹⁾
Transmission speeds	1.2 to 19.2 kb/s	10, 20, 50, 125, 250, 500, 800 and 1000 kb/s + Auto baud	125 to 500 kb/s	9.6 kb to 12 Mb/s	10/100 Mb/s, with automatic recognition
Connections	RJ45/terminal block	9-way SUB-D/terminal block	Terminal block	9-way SUB-D/terminal block	RJ45
Cables	2 shielded twisted pairs	4 twisted, shielded wires	4 twisted, shielded wires	2 shielded twisted pairs, type A	2 shielded twisted pairs

LTM CU operator control unit

Environment

Conforming to standards			IEC/EN 61131-2, UL60947-4-1A, CSA 22-2 n°60947-4-1
Product certifications			UL, CSA, CE, EAC/GOST, RCM/CTIC'K
Ambient air temperature around the device	Storage	°C	-40...+80
	Operation	°C	-20...+60
Relative humidity			15...95 % without condensation
Protective treatment	Conforming to IEC/EN 60068-2-30		12 x 24 hour cycles
Degree of protection	Conforming to IEC 60947-1		IP54
Shock resistance	Conforming to IEC/EN 60068-2-27		15 gn / 11ms
Vibration resistance	Conforming to IEC/EN 60068-2-6 5...30 Hz		4 gn
Flame resistance	Conforming to IEC 60947-1	°C	650
	Conforming to UL 94		V2

Electrical characteristics

Supply to the product			Powered via the controller
Maximum current		mA	140
Maximum power dissipated		W	1
Resistance to electromagnetic discharge	Conforming to IEC/EN 61000-4-2	kV	In open air: 8. Level 3 On contact: 4. Level 3
Immunity to radiated electromagnetic interference	Conforming to IEC/EN 61000-4-3	V/m	10 - Level 3
Immunity to fast transient bursts	Conforming to IEC/EN 61000-4-4	kV	2, shielded access. Level 3
Immunity to radioelectric fields	Conforming to IEC/EN 61000-4-6	V	10. Level 3
Immunity to shock waves	Conforming to IEC/EN 61000-4-5	kV	2, shielded access. Level 3

Physical characteristics

Mounting			Flush mounted
Display			Backlit LCD
Signalling			By 4 LEDs
Cabling			RJ45

(1) For DHCP, stored IP, addressing limited by subnet mask.

TeSys T

LT6 CT●●● external current transformer characteristics

Conforming to standards		IEC 60185, BS 7626			
Precision		Class 5P			
Precision limit factor		15			
Rated insulation voltage (Ui)		690			
Maximum operating temperature	°C	50			
Transformer ratio	A	100/1	200/1	400/1	800/1
Diameter of conductor passage hole	mm	35	35	35	35
Maximum cabling c.s.a.	mm²	30 x 10	30 x 10	30 x 10	incorporated ⁽¹⁾

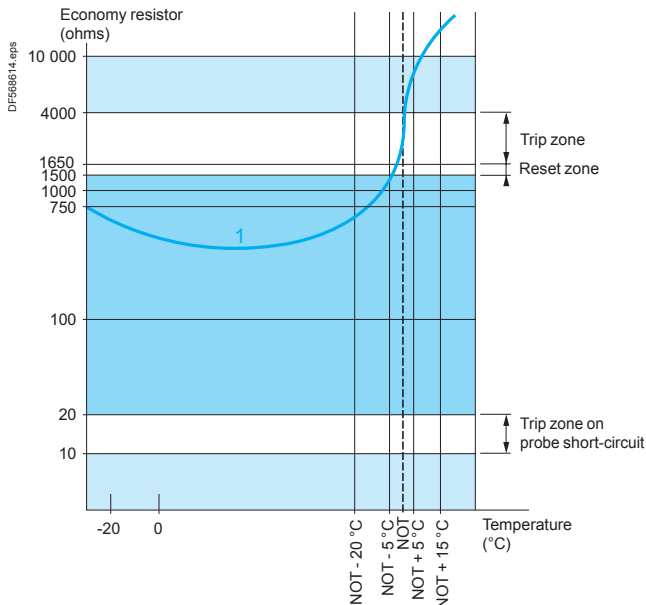
Earth fault toroid characteristics

Toroid type		50437	50438	50439	50440	50441	50442	50485	50486
Rated insulation voltage Ui	V	1000							
Operating temperature	°C	- 35...+ 70							
Protection index		IP30 (connections IP20)							
Transformer ratio		1/1000							
Rated operational current Ie	A	65	85	160	250	400	630	85	250
Max. conductor c.s.a. per phase	mm²	25	50	95	240	2 x 185	2 x 240	50	240

DA1 TT●● probe characteristics

Conforming to standards		IEC 60034-11 mark A	
Economy resistor	At 25 °C	Ω	3 x 250 in series
Rated operational voltage (Ue)	Per probe	V	--- 2.5 max
Rated insulation voltage (Ui)		kV	2.5
Insulation			Reinforced
Length of connecting cables	Between probes	mm	250
	Between probe and motor terminal plate	m	1

Guaranteed operating zones: example with 3 probes type DA1 TT●● (250 Ω at 25 °C) in series, conforming to standard EC 60034-11, mark A.



1 3 probes type DA1●●● (250 Ω at 25 °C) in series.

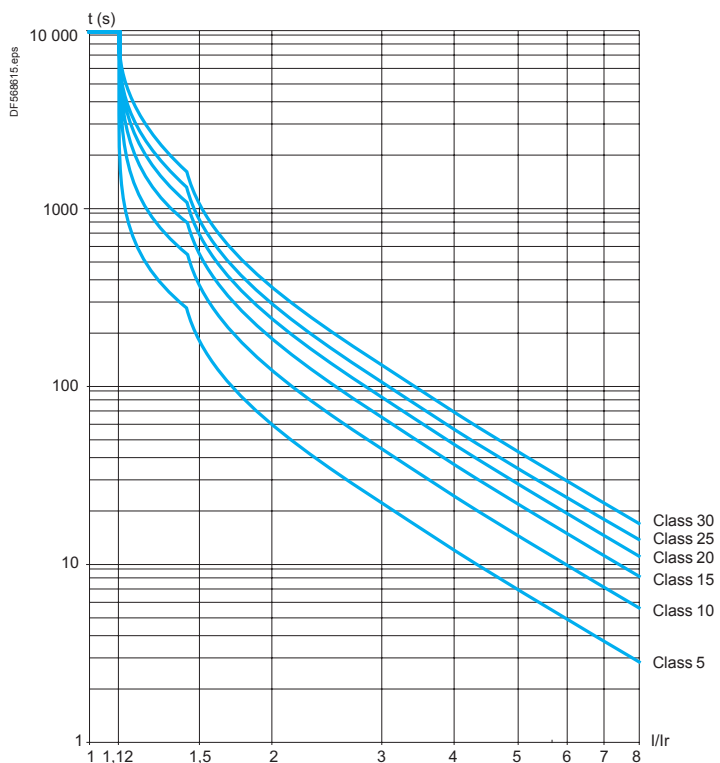
NOT: Nominal Operating Temperature.

Protection unit tripped.

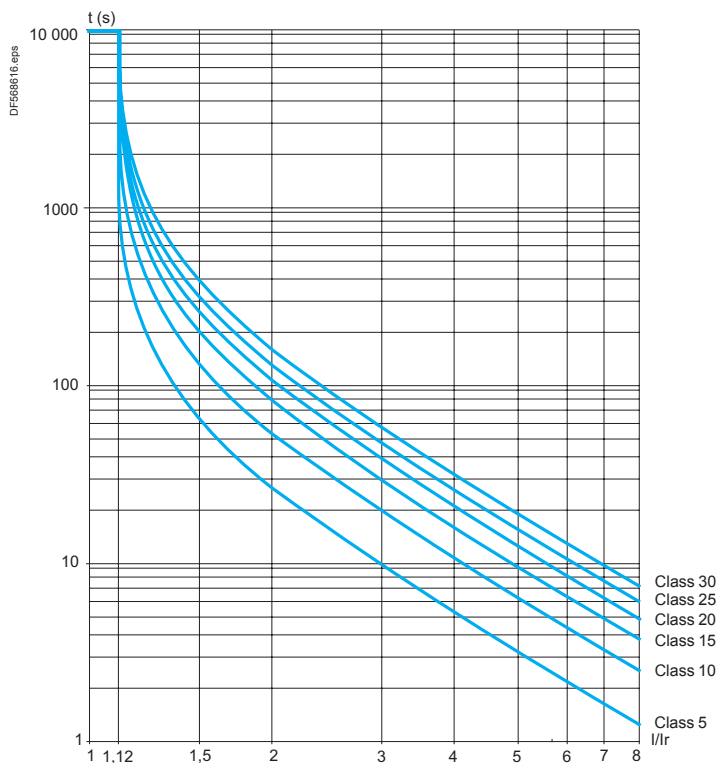
Protection unit reset.

⁽¹⁾ Electrical connection to be made using M10 bolt.

Cold state curves

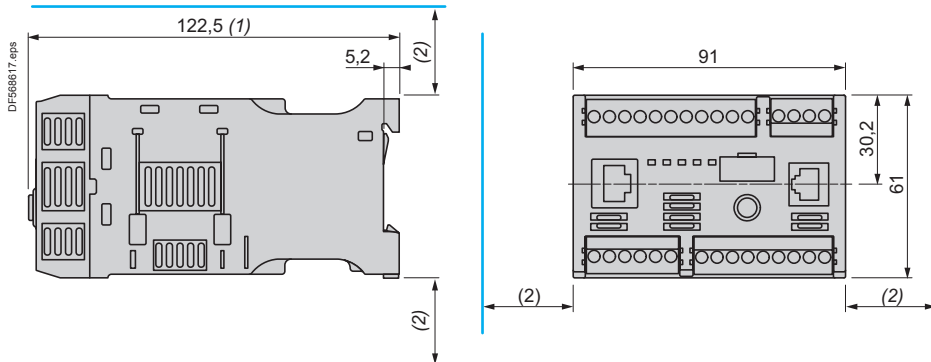


Hot state curves

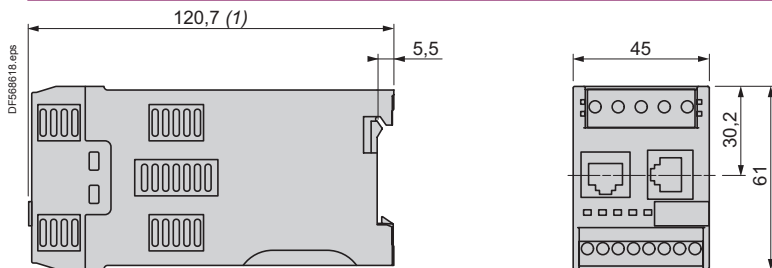


TeSys T

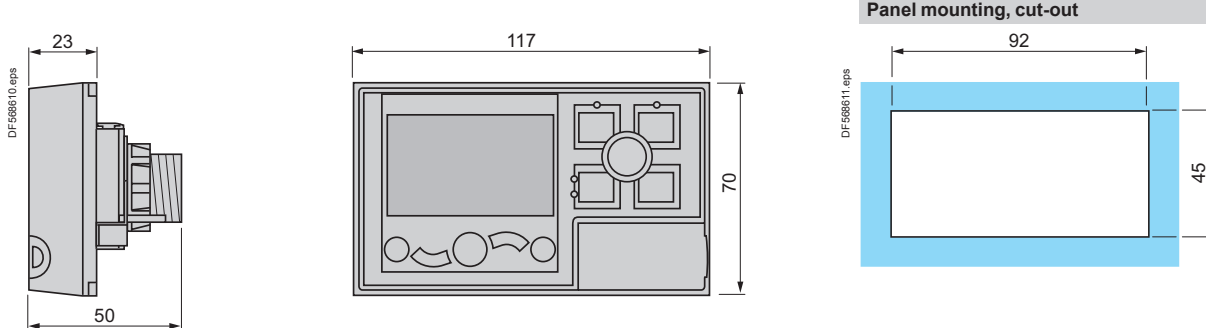
LTM R●● controllers



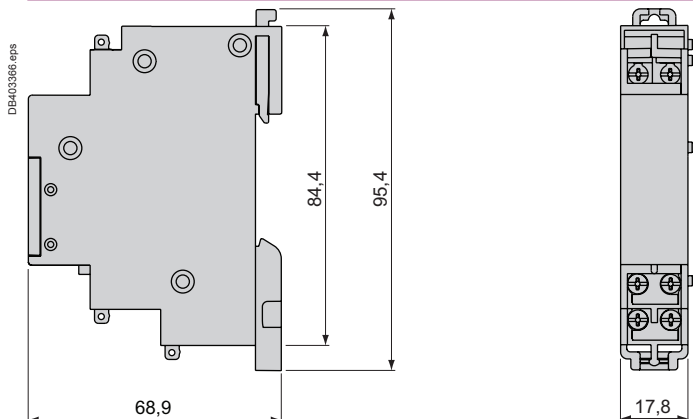
LTM EV40●● extension modules



LTM CU operator control unit



LTM 9F

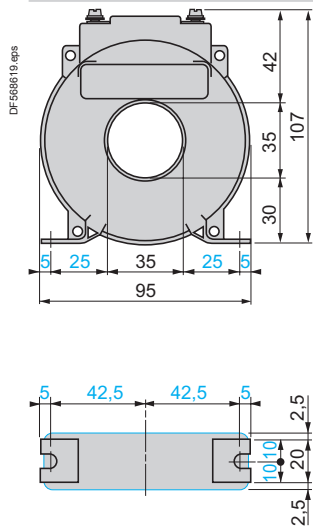


- (1) 140 mm with RJ45 connector for connection to extension module and to network,
166 mm with Profibus DP/CANopen connector.
- (2) Leave a gap around the device of: 9 mm at 45 °C, 9 to 40 mm from 45 to 50 °C, 40 mm at 60 °C.

TeSys T

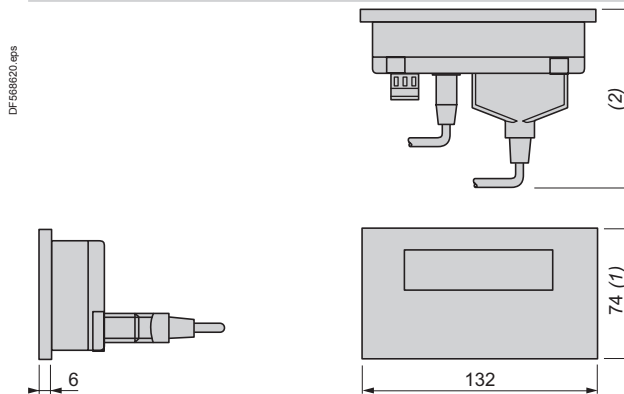
Current transformers

LT6 CT



HMI terminal

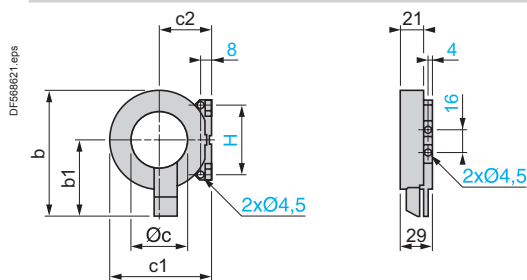
XBT N410



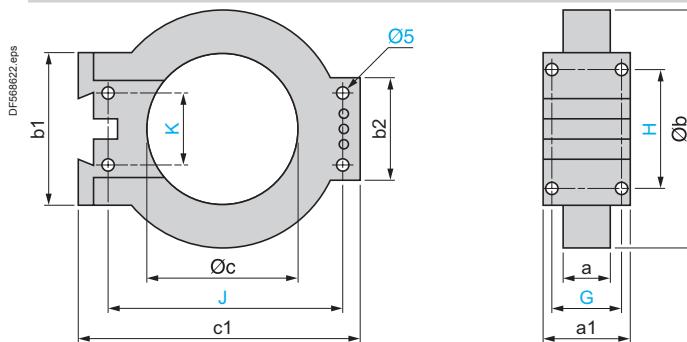
- (1) 104 mm with fixing clips (supplied with the product).
- (2) 58 mm with SUB-D 25-way elbowed cable **XBT Z9680** for Twido, TSX Micro and Premium or **XBT Z998** for Advantys STB.
104 mm with SUB-D 25-way cable **XBT Z68/Z9681** for Twido, TSX Micro and Premium

Earth fault toroids

50437 and 50438



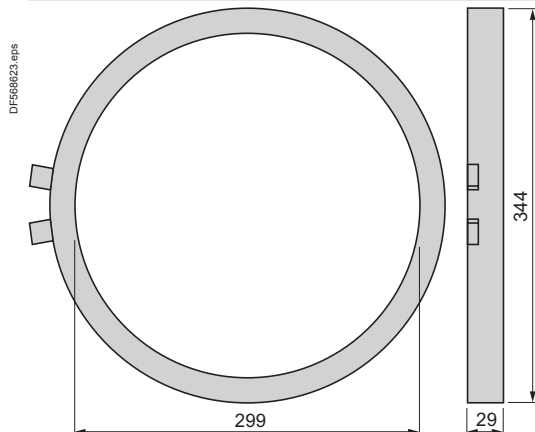
50439, 50440 and 50441



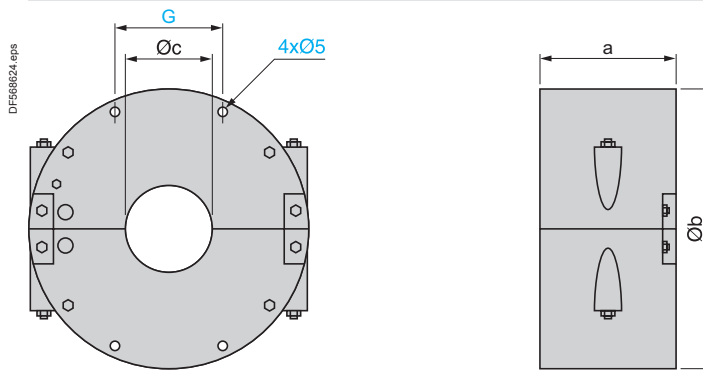
Type	b	b1	$\varnothing c$	c1	c2	H
50437	83	53	30	60	31	50
50438	109	66	50	87	45	60

Type	a	a1	$\varnothing b$	b1	b2	$\varnothing c$	c1	G	H	J	K
50439	26.5	44	122	80	55	80	150	35	65	126	40
50440	26.5	44	164	80	55	120	190	35	65	166	40
50441	29	46	256	120	90	196	274	37	104	254	60

50442



50485 and 50486

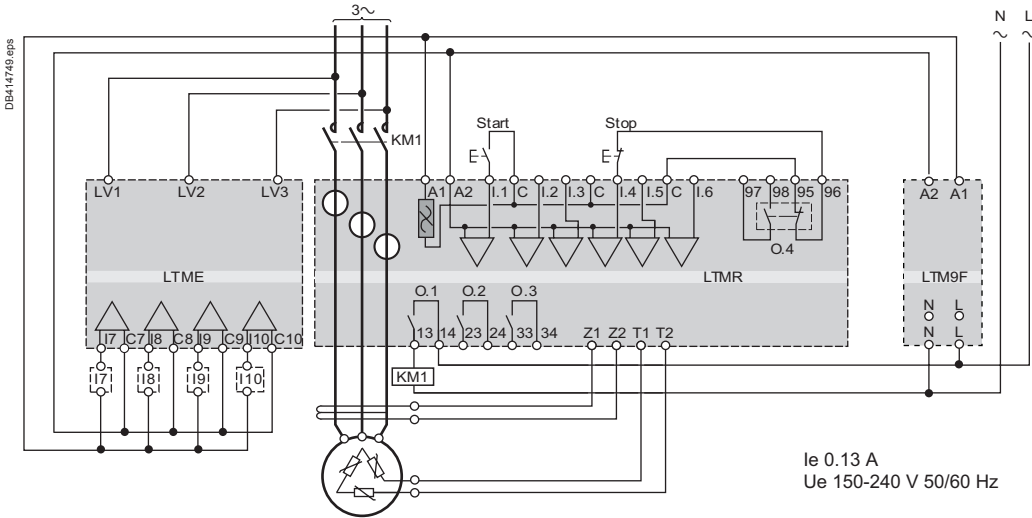


Type	a	$\varnothing b$	$\varnothing c$	G
50485	72	148	46	57
50486	78	224	110	76

TeSys T

Schemes

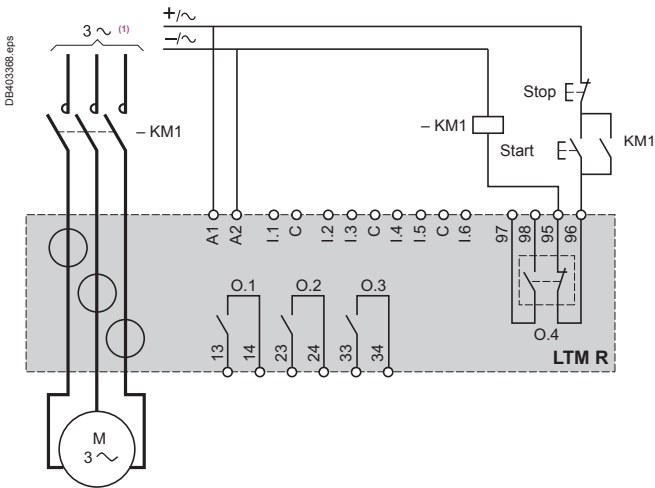
LTMR●●FM wiring with LTM 9F filter



Note: inputs MUST be connected across the common terminals (C).

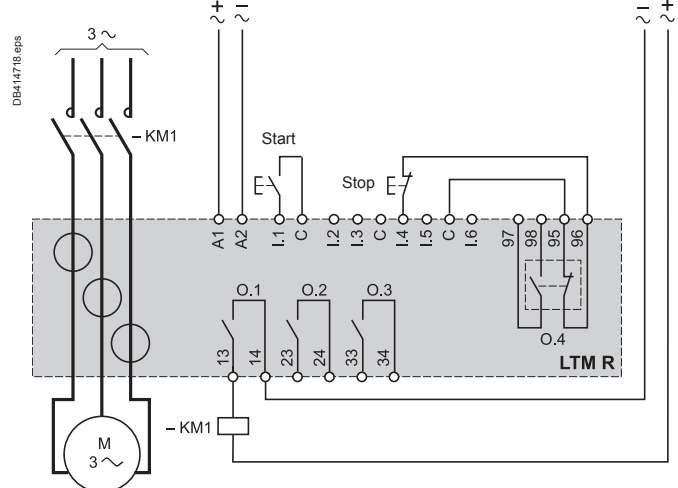
Overload mode

3-wire local-control



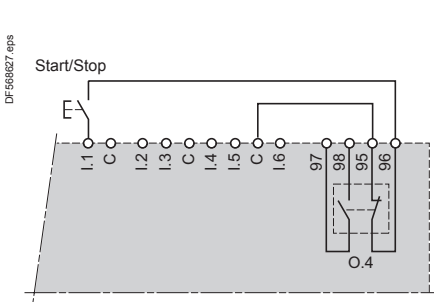
Independent mode

3-wire local-control

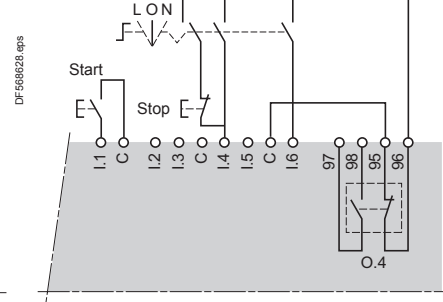


(1) Connection of a single-phase motor is possible. In this case, do not use the central current transformer.

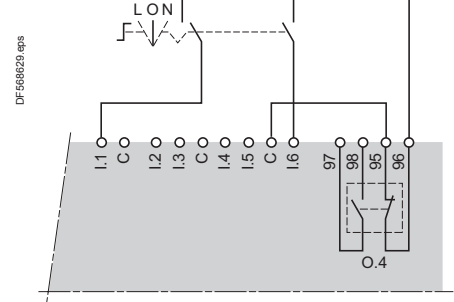
2-wire local-control



3-wire with switchable local/network control



2-wire with switchable local/network control



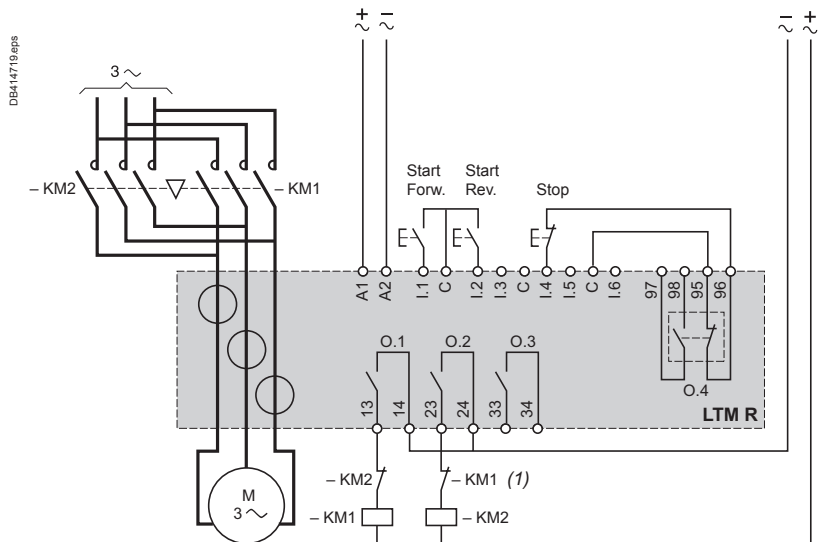
L: Local control
O: Stop
N: Network control

TeSys T

Schemes

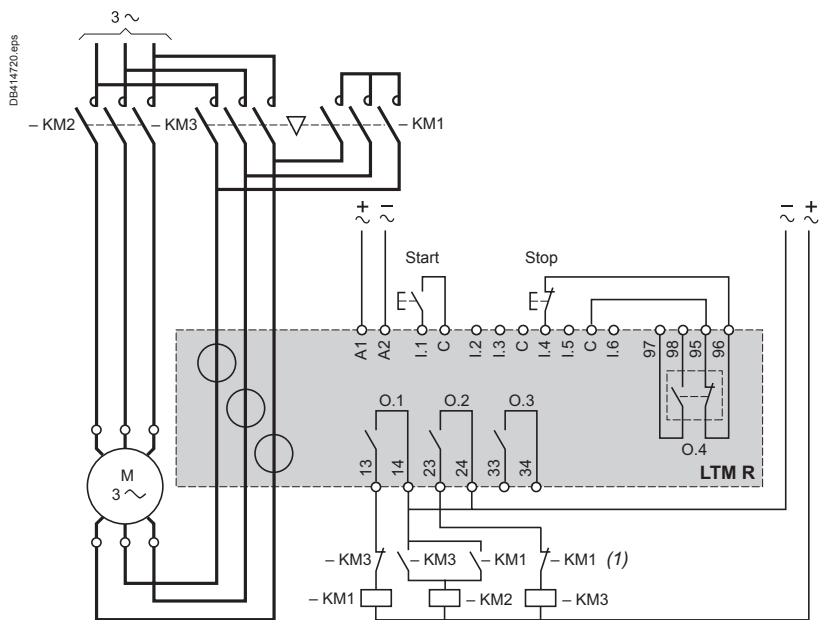
Reverser mode

3-wire local-control



2-step mode, star-delta application

3-wire local-control



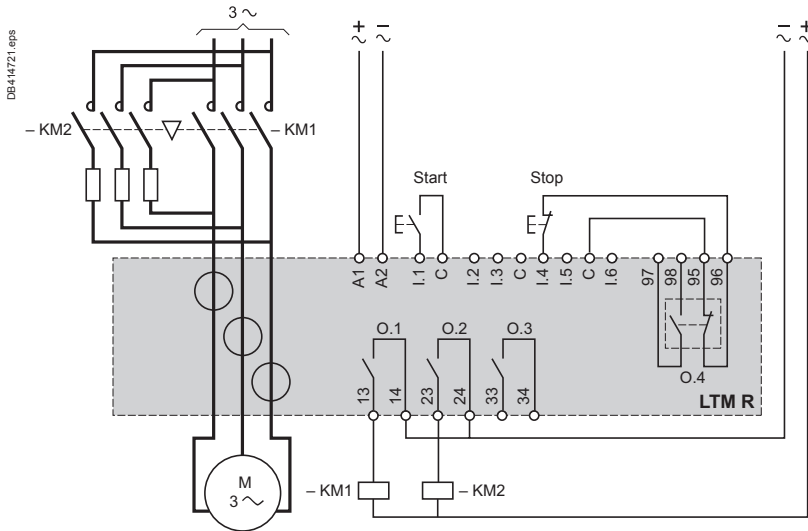
(1) Contacts for interlocking KM1 and KM2 are not obligatory because the controller electronically interlocks outputs O.1 and O.2.

TeSys T

Schemes

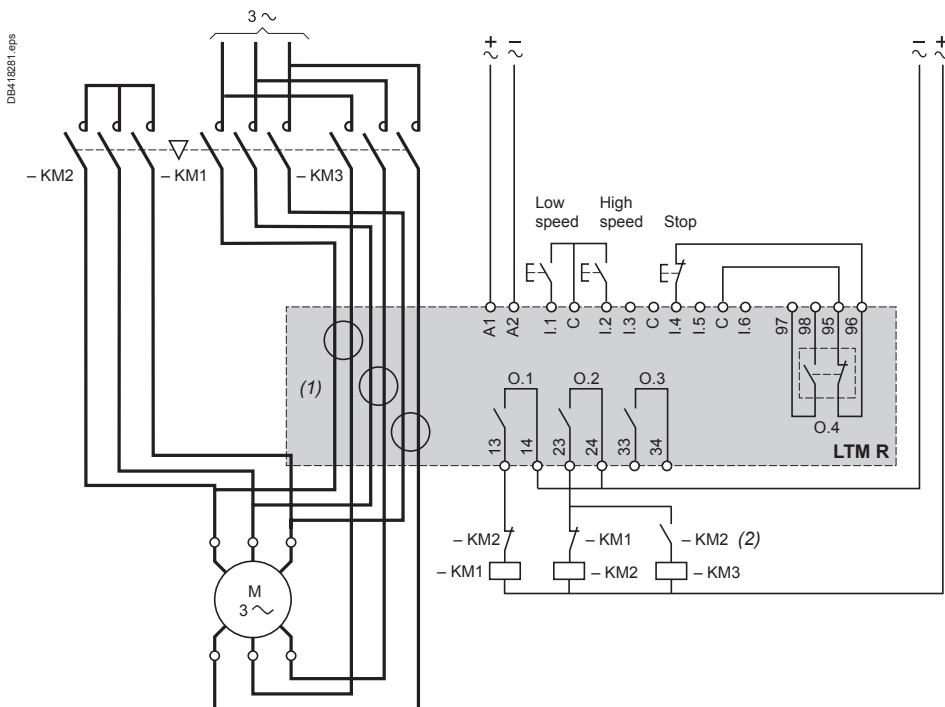
2-step mode, primary resistor application

3-wire local-control



2-speed mode, Dahlander application

3-wire local-control

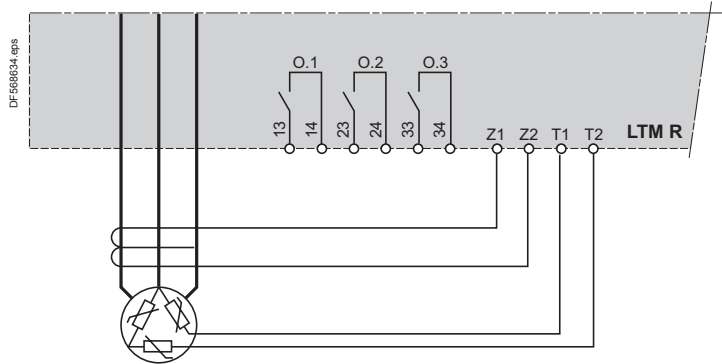


(1) For a Dahlander application, all the power cables must pass through current transformers. The controller can also be placed upstream of the contactor. In this case, and if the Dahlander motor is used in "variable torque" mode, all the cables downstream of the contactors must be of identical size.
 (2) Contacts for interlocking KM1 and KM2 are not obligatory because the controller electronically interlocks outputs O.1 and O.2.

TeSys T

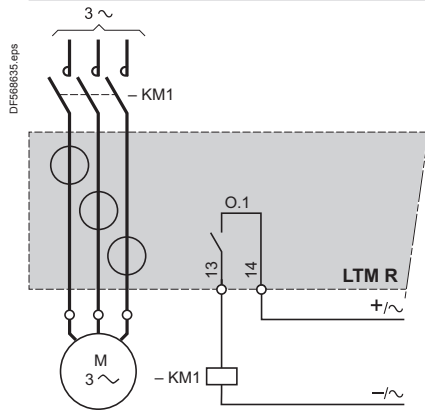
Schemes

Earth fault toroid and motor temperature probe connection

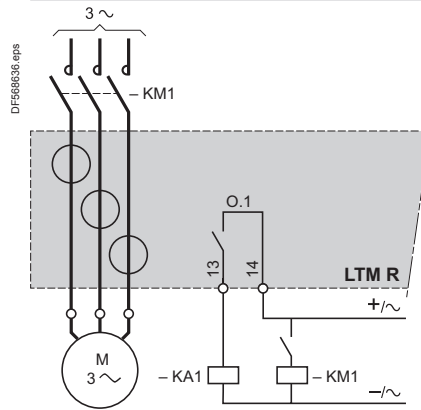


Connection of outputs for motor control mode function

Without intermediate relay



With intermediate relay



TeSys T

0.37 to 355 kW at 400/415 V: type 2 coordination

With switch-disconnector, contactor and class 10 controller

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3 400/415 V		Switch-disconnector	aM fuses		Contactor	TeSys T controller	External current transformer
P	I _e	Reference ⁽¹⁾	Size	Rating	Reference ⁽²⁾	Reference	Reference
kW	A			A			
0.37	1.1	GS1DD	10 x 38	2	LC1D09	LTMR08●●	–
0.55	1.5	GS1DD	10 x 38	2	LC1D09	LTMR08●●	–
0.75	1.9	GS1DD	10 x 38	4	LC1D09	LTMR08●●	–
1.1	2.7	GS1DD	10 x 38	4	LC1D09	LTMR08●●	–
1.5	3.6	GS1DD	10 x 38	4	LC1D09	LTMR08●●	–
2.2	4.9	GS1DD	10 x 38	6	LC1D09	LTMR08●●	–
3	6.5	GS1DD	10 x 38	8	LC1D09	LTMR27●●	–
4	8.5	GS1DD	10 x 38	10	LC1D09	LTMR27●●	–
5.5	11.5	GS1DD	10 x 38	16	LC1D12	LTMR27●●	–
7.5	15.5	GS1DD	10 x 38	16	LC1D25	LTMR27●●	–
10	19	GS●F	14 x 51	25	LC1D25	LTMR27●●	–
11	22	GS●F	14 x 51	25	LC1D25	LTMR27●●	–
15	29	GS●F	14 x 51	32	LC1D32	LTMR100●●	–
18.5	35	GS●F	14 x 51	40	LC1D40A	LTMR100●●	–
22	41	GS●J	22 x 58	50	LC1D50A	LTMR100●●	–
30	55	GS●J	22 x 58	80	LC1D65A	LTMR100●●	–
37	66	GS●J	22 x 58	100	LC1D80	LTMR100●●	–
45	80	GS●J	22 x 58	100	LC1D95	LTMR100●●	–
55	97	GS●K	T00	125	LC1D115	LTMR08●●	LT6CT2001
75	132	GS●L	T0	160	LC1D150	LTMR08●●	LT6CT2001
90	160	GS●N	T1	200	LC1F185	LTMR08●●	LT6CT2001
110	195	GS●N	T1	250	LC1F225	LTMR08●●	LT6CT4001
132	230	GS●QQ	T2	315	LC1F265	LTMR08●●	LT6CT4001
160	280	GS●QQ	T2	355	LC1F400	LTMR08●●	LT6CT4001
200	350	GS2S	T3	500	LC1F400	LTMR08●●	LT6CT8001
250	430	GS2S	T3	500	LC1F500	LTMR08●●	LT6CT8001
315	540	GS2S	T3	630	LC1F630	LTMR08●●	LT6CT8001
355	610	GS2V	T4	800	LC1F630	LTMR08●●	LT6CT8001

(1) GS●: GS1 for direct operator, GS2 for external operator.

(2) For reversing operation, replace the prefix LC1 with LC2.

TeSys T

0.06 to 250 kW at 400/415 V: type 2 coordination

With Circuit breaker, contactor and class 10 controller

Standard power ratings of 3-phase motors 50/60 Hz
in category AC-3
400/415 V

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3 400/415 V			Circuit breaker	Contactor	TeSys T controller	External current transformer
P	I _e	I _{cc}	Reference	Reference	Reference	Reference
kW	A	kA				
0.06	0.2	130	GV2L03	LC1D09	LTMR08●●	–
0.09	0.3	130	GV2L03	LC1D09	LTMR08●●	–
0.12	0.44	130	GV2L04	LC1D09	LTMR08●●	–
0.18	0.6	130	GV2L04	LC1D09	LTMR08●●	–
0.25	0.85	130	GV2L05	LC1D09	LTMR08●●	–
0.37	1.1	130	GV2L05	LC1D09	LTMR08●●	–
0.55	1.5	130	GV2L06	LC1D09	LTMR08●●	–
0.75	1.9	130	GV2L07	LC1D09	LTMR08●●	–
1.1	2.7	130	GV2L07	LC1D18	LTMR08●●	–
1.5	3.6	130	GV2L08	LC1D18	LTMR08●●	–
2.2	4.9	130	GV2L10	LC1D18	LTMR08●●	–
3	6.5	130	GV2L14	LC1D18	LTMR08●●	–
4	8.5	130	GV2L14	LC1D18	LTMR27●●	–
5.5	11.5	130	GV2L16	LC1D25	LTMR27●●	–
7.5	15.5	50	GV2L20	LC1D25	LTMR27●●	–
9	18.1	50	GV2L22	LC1D25	LTMR27●●	–
11	22	50	GV2L22	LC1D25	LTMR27●●	–
15	29	50	GV3L32	LC1D40A	LTMR100●●	–
18.5	35	50	GV3L40	LC1D50A	LTMR100●●	–
22	41	50	GV3L50	LC1D50A	LTMR100●●	–
30	55	50	GV3L65	LC1D65A	LTMR100●●	–
37	66	70	NSX80HMA	LC1D80	LTMR100●●	–
45	80	25	NSX100HMA	LC1D115	LTMR100●●	–
45	80	70	NSX100HMA	LC1D115	LTMR100●●	–

TeSys T

0.06 to 250 kW at 400/415 V: type 2 coordination

With Circuit breaker, contactor and class 10 controller

Standard power ratings of 3-phase motors 50/60 Hz
in category AC-3
400/415 V

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3 400/415 V			Circuit breaker	Contactor	TeSys T controller	External current transformer
P	I _e	I _{cc}	Reference	Reference	Reference	Reference
kW	A	kA				
55	97	36	NSX160NMA	LC1D115	LTMR08●●	LT6CT2001
55	97	70	NSX160HMA	LC1D115	LTMR08●●	LT6CT2001
75	132	36	NSX160NMA	LC1D150	LTMR08●●	LT6CT2001
75	132	70	NSX160HMA	LC1D150	LTMR08●●	LT6CT2001
90	160	36	NSX250NMA	LC1F185	LTMR08●●	LT6CT2001
90	160	70	NSX250HMA	LC1F185	LTMR08●●	LT6CT2001
110	195	36	NSX250NMA	LC1F225	LTMR08●●	LT6CT2001
110	195	70	NSX250HMA	LC1F225	LTMR08●●	LT6CT2001
132	230	70	NSX400HMA	LC1F265	LTMR08●●	LT6CT4001
132	230	130	NSX400LMA	LC1F265	LTMR08●●	LT6CT4001
160	280	70	NSX400HMA	LC1F330	LTMR08●●	LT6CT4001
160	280	130	NSX400LMA	LC1F330	LTMR08●●	LT6CT4001
200	350	70	NSX630HMA	LC1F400	LTMR08●●	LT6CT4001
200	350	130	NSX630LMA	LC1F400	LTMR08●●	LT6CT4001
220	388	70	NSX630HMA	LC1F500	LTMR08●●	LT6CT4001
220	388	130	NSX630LMA	LC1F500	LTMR08●●	LT6CT4001
250	430	70	NSX630HMA	LC1F500	LTMR08●●	LT6CT6001
250	430	130	NSX630LMA	LC1F500	LTMR08●●	LT6CT6001

Substitution table

Motor current	Old range LT6P multifunction protection relay			New range TeSys T controllers		
	Reference	Reference	External current transformer Reference	Reference	Reference	External current transformer Reference
	~ 100...240 V	≡ 24 V		~ 100...240 V	≡ 24 V	
I < 5 A	LT6P0M005FM	LT6P0M005S144	–	LTMR08●FM	LTMR08●BD	–
5 A < I < 25 A	LT6P0M025FM	LT6P0M025S144	–	LTMR27●FM	LTMR27●BD	–
25 A < I < 100 A	LT6P0M005FM	LT6P0M005S144	LT6CT1001	LTMR100●FM	LTMR100●BD	–
100 A < I < 200 A	LT6P0M005FM	LT6P0M005S144	LT6CT2001	LTMR08●FM	LTMR08●BD	LT6CT2001
200 A < I < 400 A	LT6P0M005FM	LT6P0M005S144	LT6CT4001	LTMR08●FM	LTMR08●BD	LT6CT4001
400 A < I < 800 A	LT6P0M005FM	LT6P0M005S144	LT6CT8001	LTMR08●FM	LTMR08●BD	LT6CT8001

TeSys T

0.37 to 400 kW at 690 V: type 2 coordination

With switch-disconnector, contactor and class 10 controller

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3		Switch-disconnector ⁽¹⁾	aM fuses		Contactor	TeSys T controller	External current transformer
P	I _e	Reference	Size	Rating	Reference	Reference	Reference
kW	A			A			
0.37	0.64	GS●F	14 x 51	1	LC1D09	LTMR08●●	–
0.55	0.87	GS●F	14 x 51	2	LC1D09	LTMR08●●	–
0.75	1.1	GS●F	14 x 51	2	LC1D09	LTMR08●●	–
1.1	1.6	GS●F	14 x 51	2	LC1D09	LTMR08●●	–
1.5	2.1	GS●F	14 x 51	4	LC1D09	LTMR08●●	–
2.2	2.8	GS●F	14 x 51	4	LC1D09	LTMR08●●	–
3	3.8	GS●F	14 x 51	6	LC1D09	LTMR08●●	–
4	4.9	GS●F	14 x 51	6	LC1D09	LTMR08●●	–
5.5	6.7	GS●F	14 x 51	8	LC1D25	LTMR08●●	–
7.5	8.9	GS●F	14 x 51	10	LC1D25	LTMR27●●	–
11	12.8	GS●F	14 x 51	16	LC1D25	LTMR27●●	–
15	17	GS●G	T000	20	LC1D32	LTMR27●●	–
18.5	21	GS●G	T000	25	LC1D32	LTMR27●●	–
22	24	GS●G	T000	32	LC1D40A	LTMR27●●	–
30	32	GS●G	T000	40	LC1D50A	LTMR100●●	–
37	39	GS●J	22 x 58	50	LC1D65A	LTMR100●●	–
45	47	GS●J	22 x 58	63	LC1D80	LTMR100●●	–
55	57	GS●J	22 x 58	80	LC1D115	LTMR100●●	–
75	77	GS●KK	T00	100	LC1D115	LTMR100●●	–
90	93	GS●KK	T00	125	LC1F150	LTMR08●●	LT6CT2001
110	113	GS●KK	T00	125	LC1F185	LTMR08●●	LT6CT2001
132	134	GS●L	T0	160	LC1F265	LTMR08●●	LT6CT2001
160	162	GS●N	T1	200	LC1F265	LTMR08●●	LT6CT2001
200	203	GS●N	T1	250	LC1F330	LTMR08●●	LT6CT4001
220	224	GS●QQ	T2	250	LC1F400	LTMR08●●	LT6CT4001
250	250	GS●QQ	T2	315	LC1F400	LTMR08●●	LT6CT4001
290	292	GS●QQ	T2	355	LC1F500	LTMR08●●	LT6CT4001
315	313	GS●QQ	T2	355	LC1F500	LTMR08●●	LT6CT4001
355	354	GS2S	T3	400	LC1F630	LTMR08●●	LT6CT4001
400	400	GS2S	T3	500	LC1F630	LTMR08●●	LT6CT8001

(1) GS●: GS1 for direct operator, GS2 for external operator.

Notes

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Notes

A series of horizontal dotted lines for writing notes.

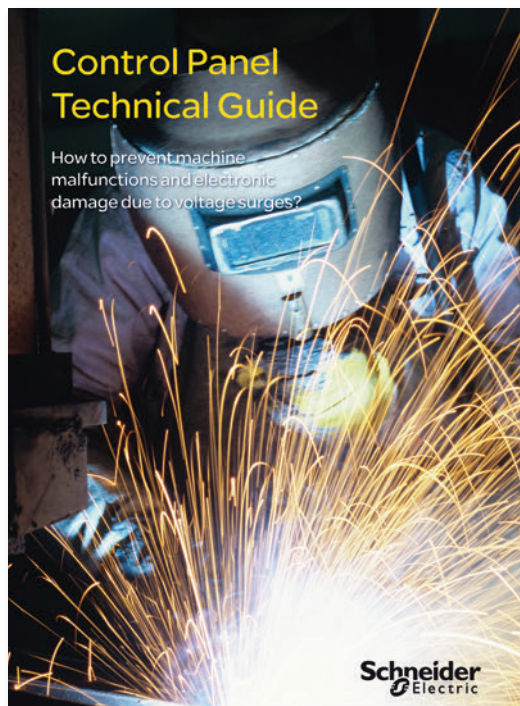
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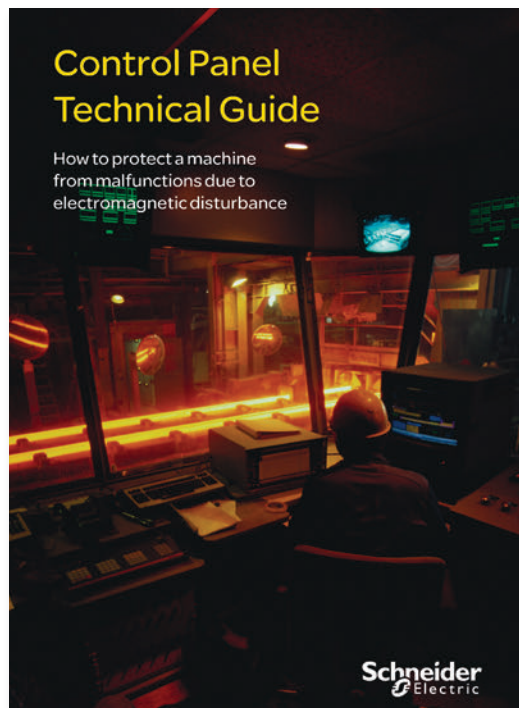
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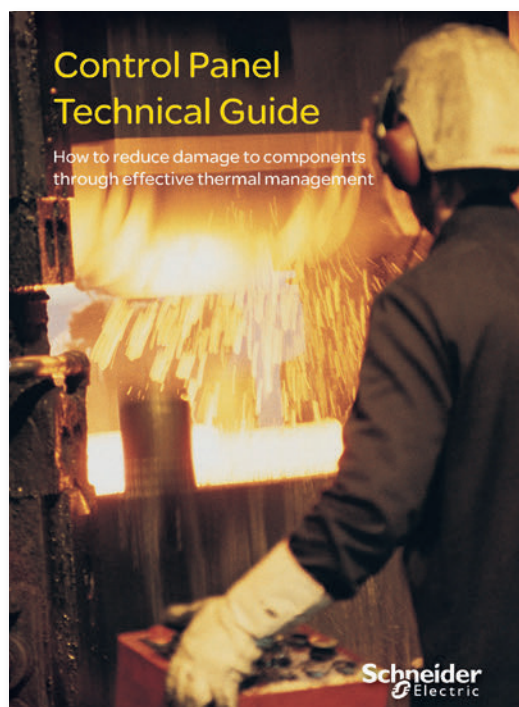
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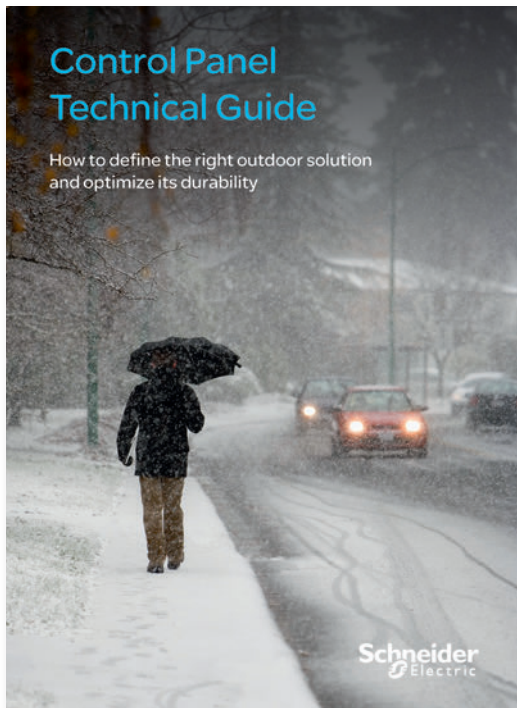
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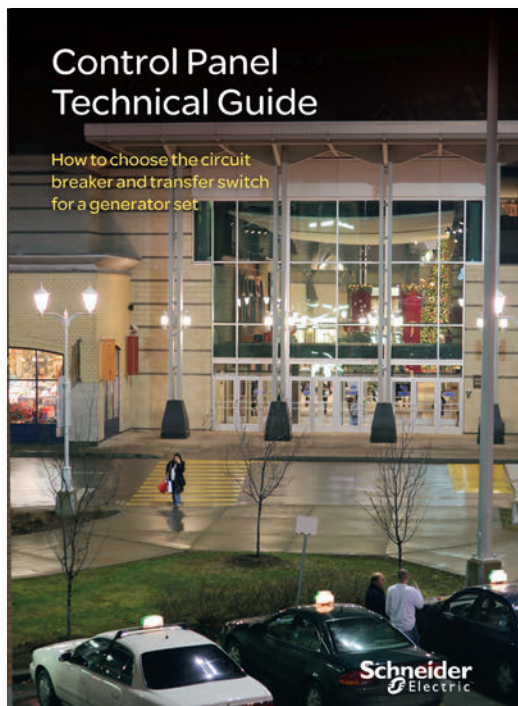
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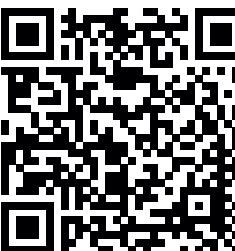
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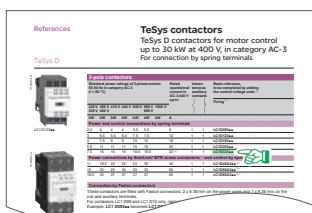


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