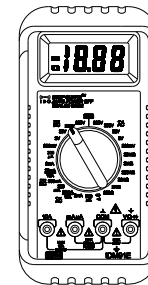




INSTRUCTION MANUAL
IDM91E DIGITAL MULTIMETER

EN FR IT DE JP



IDM 91E
DIGITAL MULTIMETER
INSTRUCTION MANUAL



⚠ WARNING

THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

TO AVOID ELECTRIC SHOCK, DISCONNECT MEASURING TERMINALS BEFORE OPENING ENCLOSURE.

INTRODUCTION

1-1 Unpacking and Inspection

Upon removing your new Digital Multimeter from its packing, you should have the following items:

1. Digital Multimeter.
2. Test lead set (one black, one red).
3. Instruction Manual.
4. Protective holster.

1-2 Meter Safety

Terms marked on Equipment

- ⚠ **ATTENTION** — Refer to Manual.
- ☐ **DOUBLE INSULATION** — Protection Class II.
- ⚠ **DANGER** — Risk of electric shock

Symbols in this Manual

⚠ This symbol indicates where cautionary or other information is found in the manual.

🔋 Battery

1-3 Front Panel

Refer to Figure 1 and the following numbered steps to familiarize yourself with the meter's front panel controls and connectors.

- 1. Digital Display** — The digital display has a 3-1/2 LCD readout (maximum reading 1999) with automatic polarity, overrange and low battery indicators.
- 2. Rotary Switch** — Select the Function and Range desired.
- 3. COM Input Terminal** — Ground input connector.
- 4. V Ω \rightarrow Input Terminal** — Positive input connector for Volts, Ohms and Diode.
- 5. mA μ A Input Terminal** — Positive input connector for mA and μ A measurements (up to 200mA).
- 6. 10A Input Terminal** — Positive input connector for Amp measurements (up to 10A).

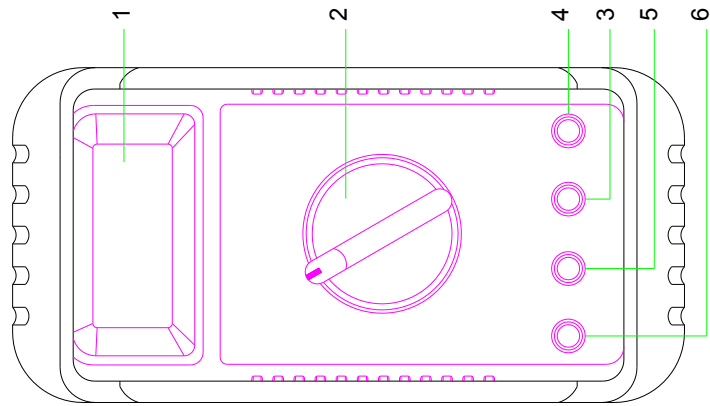


Figure 1

SPECIFICATIONS

2-1 General Specifications

This instrument has been designed and tested in accordance with IEC Publication 1010 Pt 1, Class II, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use. This level of safety can only be guaranteed while the limits of section 2.2 are observed.

Display : 3-1/2 digit Liquid Crystal Display (LCD) with a maximum reading of 1999.

Polarity Indication : Automatic, positive implied, negative indicated.

Zero Adjustment : Automatic.

Overrange Indication : "1" or "-1".

Low Battery Indication: "E3" is displayed when the battery voltage drops below operating voltage.

Measuring Rate: 2.5 times per second, nominal.

Auto Power Off: Approx. 30 minutes.

2-2 Environmental Conditions:

Maximum Altitude : 2000m

Installation Category : IEC 1010 600V CAT II 300V CAT III.

Pollution Degree : 2

Operating Temperature : 0°C to 50°C, 0 to 80% R.H.

Storage Temperature : -20°C to 60°C, 0 to 80% R.H when battery removed from meter.

Temperature Coefficient : 0.15 x (Specified accuracy) / °C, <18°C or >28°C.

Power Requirements : Alkaline 9V battery, NEDA 1604A, JIS 6AM6, IEC 6LF22.

Battery Life : Alkaline 300 hours.

Dimensions (WxHxD) : 84mm x 175mm x 31mm, without holster
95mm x 192 mm x 50 mm, with holster.

Weight (including battery) : 340 gms, without holster
550 gms, with holster.

Supplied Accessories : Protective Holster, Battery (installed) and Instruction Manual.

2-3 Electrical Specifications

Accuracy is \pm (% reading + number of digits) at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, less than 75% R.H.

(1) DC Volts

| Range | Resolution | Accuracy | Over voltage protection |
|-------|-------------|--|-----------------------------|
| 200mV | 100 μ V | $\pm(0.5\%\text{reading} + 1\text{digit})$ | 600V d.c. or 600 V a.c. rms |
| 2V | 1mV | | |
| 20V | 10mV | | |
| 200V | 100mV | | |
| 600V | 1V | | |

Input Impedance : 10M Ω .

(2) AC Volts

| Range | Resolution | Accuracy | Over voltage protection |
|--------------|-------------------|---|--------------------------------|
| 200mV | 100 μ V | $\pm(1.25\% \text{reading} + 4 \text{digit})$ 40Hz — 500Hz | 600V d.c. or 600 V a.c. rms |
| 2V | 1mV | | |
| 20V | 10mV | | |
| 200V | 100mV | | |
| 600V | 1V | | |

Input Impedance : 10M Ω , less than 100pF

(3) DC Current

| Range | Resolution | Accuracy | Voltage Burden |
|--------------|-------------------|--|-----------------------|
| 200 μ A | 0.1 μ A | $\pm(1.0\% \text{reading} + 1 \text{digit})$ | 600mV max. |
| 2mA | 1 μ A | | |
| 20mA | 10 μ A | | |
| 200mA | 100 μ A | $\pm(2.0\% \text{reading} + 3 \text{digit})$ | 900mV max. |
| 10A | 10mA | | |

Overload Protection : 1A/415V fast blow fuse for mA, μ A input.
10A/415V fast blow fuse for 10A input.

(4) AC Current

| Range | Resolution | Accuracy | Voltage Burden |
|-------------|-------------|--|----------------|
| 200 μ A | 0.1 μ A | $\pm(1.5\% \text{reading} + 3 \text{digit})$ 40Hz — 500Hz | 600mV rms max. |
| 2mA | 1 μ A | | |
| 20mA | 10 μ A | | |
| 200mA | 100 μ A | | 900mV rms max. |
| 10A | 10mA | $\pm(2.5\% \text{reading} + 3 \text{digit})$ 40Hz — 500Hz | |

Overload Protection : 1A/415V fast blow for mA, μ A input.
10A/415V fast blow for 10A input.

(5) Resistance

| Range | Resolution | Accuracy | Max.Test Current | Max.Open Circuit Voltage |
|---------------|-------------------|---|-------------------------|---------------------------------|
| 200 Ω | 0.1 Ω | $\pm(0.75\% \text{reading} + 4 \text{digit})$ | 2.5mA | 3.2V |
| 2K Ω | 1 Ω | $\pm(0.75\% \text{reading} + 1 \text{digit})$ | 200 μ A | 0.5V |
| 20K Ω | 10 Ω | | 40 μ A | |
| 200K Ω | 100 Ω | | 4 μ A | |
| 2M Ω | 1K Ω | | 400nA | |
| 20M Ω | 10K Ω | $\pm(1.5\% \text{reading} + 5 \text{digit})$ | 40nA | |

Overload Protection : 500V d.c/a.c max.

(6) Diode Check

| Range | Resolution | Accuracy | Max. Test Current | Max. Open Circuit voltage |
|-------|------------|--|-------------------|---------------------------|
| → 🔊 | 1mV | $\pm(1.5\% \text{reading} + 5 \text{digit})$ | 1.5mA | 3.2V |

* Overload Protection: 500V d.c/a.c max.

Instant Continuity Description:

Internal sounder operates when resistance is less than 50Ω .

(7) Auto Power Off:

The meter will automatically shut itself off after approximately 30 minutes when the rotary switch is not changed. The meter can be turned back on by switching to another range.

(8) Sounder Guard

The sounder will operate if the test lead is connected to the mA/ μ A (10A) input terminal while the rotary function selector is not in mA/ μ A (10A) position. There is no sounder guard on the 20mA/10A range of DC and AC function.

OPERATION

3-1 Preparation and Caution before Measurement

1. Allow at least 60 seconds after switching on before taking measurements.
2. Remove test leads from the circuit under test before changing the measurement range.
3. If the equipment is used near noise generating equipment, be aware that the display may become unstable or indicate large errors.

3-2 Voltage Measurements

1. Set the rotary switch at the required position.
2. Connect black test lead to "COM" terminal and red lead to "VΩHz" input terminal.
3. Connect test leads to measuring points and read the display value.

TEST EQUIPMENT RISK ASSESSMENT (UK RECOMMENDATION)

Users of this equipment and/or their employers are reminded that Health and Safety legislation require them to carry out valid risk assessments of all electrical work so as to identify potential sources of electrical danger and risk of electrical injury such as from inadvertent short circuits. Where the assessments show that the risk is significant then the use of fused test leads constructed in accordance with the HSE guidance note GS38 "Electrical Test Equipment for use by Electricians" should be used.

⚠ WARNING

TO AVOID ELECTRIC SHOCK, HAZARD OR DAMAGE TO METER, DO NOT ATTEMPT TO MEASURE VOLTAGE THAT MIGHT EXCEED 600 V d.c. OR 600V a.c. rms.

DO NOT APPLY MORE THAN 600V d.c. OR a.c. rms BETWEEN THE COMMON INPUT TERMINAL AND EARTH GROUND.

NOTICE

UNSTABLE DISPLAY MAY OCCUR ESPECIALLY AT 300mV RANGE, EVEN IF TEST LEADS ARE NOT CONNECTED. IN THIS CASE, IF AN ERRONEOUS READING IS SUSPECTED, SHORT THE "V_Ω" TERMINAL AND THE "COM" TERMINAL, AND MAKE SURE THE DISPLAY READS ZERO.

3-3 Current Measurements

1. Set the rotary switch to the required position.
2. Connect black test lead to "COM" terminal.
3. Connect red test lead to "mA/μA" terminal for measurement up to 200mA.
For measuring current between 200mA and 10A, connect test lead to "10A" terminal.
4. Connect test leads to measuring points and read the display value.

3-4 Resistance Measurement

1. Set the rotary switch to the required position.
2. Connect black test lead to "COM" terminal and red lead to "VΩ→" input terminal.
3. Connect test leads to measuring points and read the display value.

3-5 Diode Check

1. Set the rotary switch to the "▶ ⌚" position.
2. Connect the black test lead to the "COM" terminal and the red test lead to the "V Ω ▶" input terminal.
3. Connect the test lead to the diode. Normally the forward voltage drop of good silicon diode is shown between .500V and .900V. If the diode under test is defective, "000" (short circuit) or "1" (non-conductance) is displayed. Reverse check of diode: If the diode under test is good "1" is displayed. If the diode under test is defective "000" or other values are displayed.

3-6 Continuity Check by sounder

1. Set the rotary switch at the "▶ ⌚" position.
2. Connect the black test lead to "COM" terminal and the red test lead to "V Ω ▶" input terminal.
3. Connect test leads to the circuit under test.
4. Built-in sounder operates if the resistance in the circuit under test is below 50 Ω .


MAINTENANCE


To keep the instrument clean, wipe the case with a damp cloth and detergent, do not use abrasives or solvents. Any adjustment, maintenance and repair of opened instrument with voltage present shall be avoided as far as possible and, if inevitable, shall be carried out by a skilled person who is aware of the hazard involved.

Whenever it is likely that the protection has been impaired, the instrument shall be made inoperative and be secured against any unintended operation.

The protection is likely to be impaired if, for example, the apparatus:

- shows visible damage,
- fails to perform the intended measurements,
- has been subjected to prolonged storage under unfavorable conditions,
- has been subjected to severe transport stresses.

 CAUTION (refer to user instructions).

 Double Square Symbol for Class II product.

BATTERY REPLACEMENT

The meter is powered by a single 9V battery. Refer to Figure 2A and use the following procedure to replace the battery:

1. **Disconnect the test leads and turn the meter off.** Remove the test leads from the front terminals.
2. Position the meter face down. Remove the three screws from the case bottom.
3. Lift the end of the case bottom gently until it unsnaps from the case top at the end nearest the LCD.
4. Lift the battery from the case top, and carefully disconnect the battery from battery connector leads.
5. Fit the battery connector leads to the terminals of a new battery and reinsert the battery into the case top. Make sure that the battery leads do not become pinched between the case bottom and case top.
6. Replace the case top and case bottom. Make sure that all gaskets are properly seated and the two snaps on the case top are engaged. Reinstall the three screws.

FUSE REPLACEMENT

Refer to Figure 2B and use the following procedure to examine or replace the meter's fuse:

1. Perform steps 1 through 3 of the battery replacement procedure.
2. Lift the circuit board from the case top. **Do not remove the screws from the circuit board.**
3. Remove the defective fuse by gently prying one end of the fuse loose and sliding the fuse out of the fuse holder.
4. **Install a new fuse of the same size and rating.** Make sure the new fuse is centered in the fuse holder.
5. **Make sure that the case top rotary switch and circuit board switch both are in the OFF position.**
6. Replace the case top and case bottom. Make sure that all gaskets are properly seated and the battery leads do not become pinched between the case halves, and the two snaps on the case top are engaged. Reinstall the three screws.

FUSE SPECIFICATION

1A 6.3x32mm 415V Fast HBC 10KA

10A 6.3x20mm 415V Fast HBC 10KA

Battery Replacement

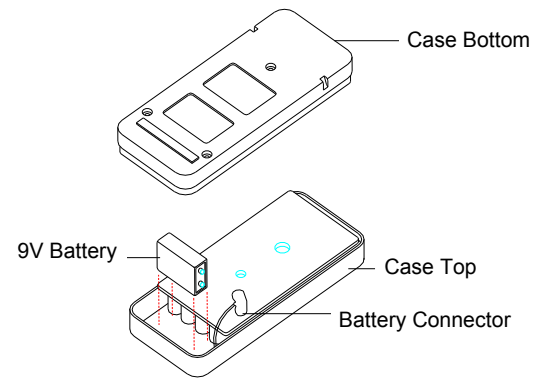


Figure 2A

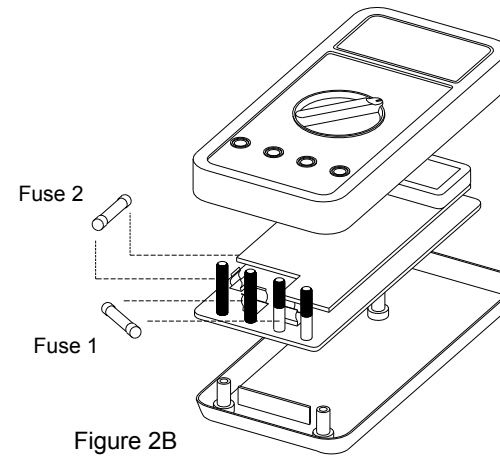
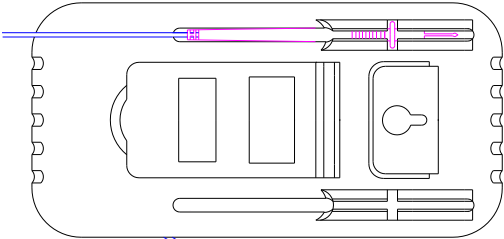
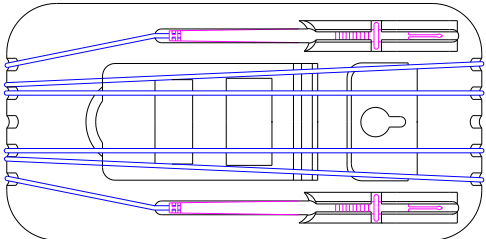


Figure 2B

HOW TO USE THE PROBE HOLDER

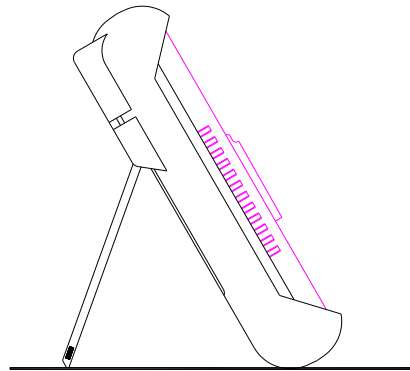


Clip one probe on the holster for one handed meter operation.

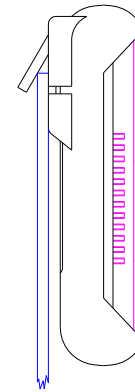


Wrap the leads around the holster to store the test probes.

HOW TO USE THE TILT STAND AND HOLSTER

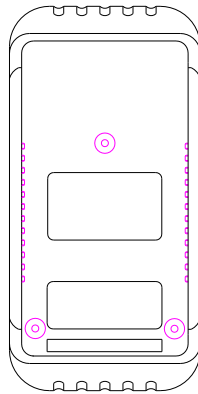


Swing the stand out for easier meter reading.

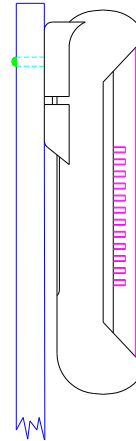


Swing the upper holder out and hook it over a door.

HOW TO USE THE TILT STAND AND HOLSTER



Meter in holster face down.



Hang on a nail at the workbench

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