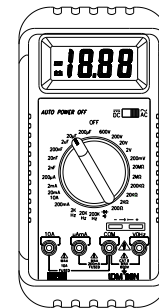




**INSTRUCTION MANUAL**  
**IDM93N DIGITAL MULTIMETER**

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**IDM 93N**  
**DIGITAL MULTIMETER**  
**INSTRUCTION MANUAL**



**⚠ WARNING**

THE SERVICING INSTRUCTIONS DESCRIBED WITHIN THIS MANUAL 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.

⊞ Fuse.

⊞ 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 digit LCD readout (maximum reading 1999) with automatic polarity, decimal point, overrange and low battery indicators.
2. Rotary Switch — Selects the desired function and range.
3. COM Input Terminal — Ground input connector.
4. V $\Omega$  Hz Input Terminal — Positive input connector for Volts, Ohms, Diode (Continuity) and Frequency measurements.

5.  $\mu\text{A}$  mA Input Terminal — Positive input connector for current measurements (up to 200mA).
6. 10A Input Terminal — Positive input connector for current measurements (up to 10A).
7. Capacitor Test Input terminals — Used for capacitance measurements.
8. AC/DC Switch — Select AC or DC for voltage and current measurements.

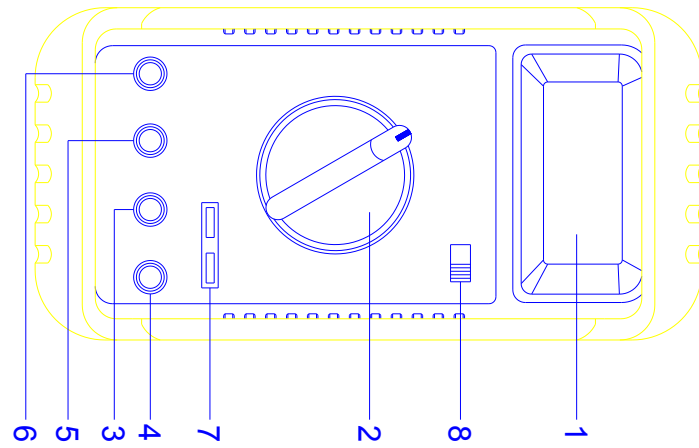


Figure 1



## **SPECIFICATIONS**

### **2-1 General Specifications**

This instrument has been designed in accordance with UL 3111 and 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.

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

**Low Battery Indication** : "⚡" is displayed when the battery voltage drops below specified operating voltage.

**Measuring Rate** : 2.5 times per second, nominal.

**Auto Power Off** : Approx. 30 minutes.

**Temperature Coefficient** :  $0.15 \times (\text{Specified accuracy}) / ^\circ\text{C}$ ,  $< 18^\circ\text{C}$  or  $> 28^\circ\text{C}$ .

**Power Requirements** : Alkaline 9V battery.

**Battery Life** : 150 hours typical (Alkaline).

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

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

**Accessories** : Protective Holster, battery (installed) and instruction manual.

## **2-2 Environmental Conditions**

### **Indoor Use**

**Maximum Altitude** : 2000 meters.

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

**Pollution Degree** : 2

**Operating Ambient** : 0°C ~ 30°C ≤ 80% R.H., 30°C ~ 40°C ≤ 75% R.H., 40°C ~ 50°C ≤ 45% R.H.

**Storage Temperature** : -20°C to 60°C, with battery removed from meter.

### 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 $\mu\text{V}$	$\pm(0.5\%\text{reading} + 1\text{digit})$	600V d.c. or 600 V a.c. rms
2V	1mV		
20V	10mV		
200V	100mV		
600V	1V		

**Input Impedance :** 10M $\Omega$ .

**(2) AC Volts**

<b>Range</b>	<b>Resolution</b>	<b>Accuracy</b>	<b>Over voltage protection</b>
200mV	100 $\mu$ V	$\pm(1.3\% \text{reading} + 4 \text{digits})$ 40Hz to 500Hz	600V d.c. or 600 V a.c. rms
2V	1mV		
20V	10mV		
200V	100mV		
600V	1V		

**AC Conversion Type** : Average Sensing rms indication.

**Input Impedance** : 10M $\Omega$ // less than 100pF

**(3) DC Current**

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

**Overload Protection :** 1A/415V fast blow fuse for mA,  $\mu$ A input.  
10A/415V fast blow fuse for 10A input.

**(4) AC Current**

Range	Resolution	Accuracy	Voltage Burden
200 $\mu$ A	0.1 $\mu$ A	$\pm(1.5\% \text{reading} + 3 \text{digits})$ 40Hz — 500Hz	600mV rms max.
2mA	1 $\mu$ A		
20mA	10 $\mu$ A		
200mA	100 $\mu$ A	$\pm(2.5\% \text{reading} + 7 \text{digits})$ 40Hz — 500Hz	900mV rms max.
10A	10mA		

**AC Conversion Type** : Average sensing rms indication.

**Overload Protection** : 1A/415V fast blow for mA,  $\mu$ A input.

10A/415V fast blow for 10A input.

**(5) Resistance**

<b>Range</b>	<b>Resolution</b>	<b>Accuracy</b>	<b>Max.Test Current</b>	<b>Max.Open Circuit Voltage</b>
200 $\Omega$	0.1 $\Omega$	$\pm(0.8\% \text{reading} + 4 \text{digits})$	2.5mA	3.2V
2K $\Omega$	1 $\Omega$	$\pm(0.8\% \text{reading} + 1 \text{digit})$	200 $\mu$ A	0.5V
20K $\Omega$	10 $\Omega$		40 $\mu$ A	
200K $\Omega$	100 $\Omega$		4 $\mu$ A	
2M $\Omega$	1K $\Omega$		400nA	
20M $\Omega$	10K $\Omega$	$\pm(1.5\% \text{reading} + 5 \text{digits})$	40nA	

**Overload Protection** : 600V d.c/a.c max.

**(6) Diode Check**

Range	Resolution	Accuracy	Max. Test Current	Max. Open Circuit voltage
→ ∞	1mV	±(1.5%reading + 5digits)	1.5mA	3.2V

\* For 0.4V ~ 0.9V

**Overload Protection** : 600V d.c./a.c. max.

**Continuity** : Internal sounder operates when resistance is less than 50Ω.

**(7) Auto Power Off**

The meter will automatically shut itself off after approximately 30 minutes after power on.

The meter can be turned back on by switching to another range.



**(8) Capacitance**

Range	Resolution	Accuracy	Test Frequency
2nF	1pF	±(2.0%reading + 4digits)	40Hz
20nF	10pF		
200nF	100pF		
2 μF	1nF		
20 μF	10nF		
200 μF	100nF		

**(9) Frequency Counter**

<b>Range</b>	<b>Resolution</b>	<b>Accuracy 5Vrms Max</b>	<b>Sensitivity</b>	<b>Min. Input Frequency</b>	<b>Overload Protection</b>
2K Hz	1 Hz	±(1.0%reading + 3digits)	200m Vrms min.	20 Hz	600V d.c. or 600V a.c. rms
20K Hz	10 Hz			200 Hz	
200K Hz	100 Hz			20K Hz	

## **OPERATION**

This instrument has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Electronic Measuring Apparatus and has been supplied in a safe condition. This instruction manual contains some information and warnings which have to be followed by the user to ensure safe operation and to retain the instrument in safe condition.

## ***TEST EQUIPMENT RISK ASSESSMENT***

*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.*

### **3-1 Preparation and Caution before Measurement**

1. Allow at least 30 seconds after switching on before taking measurements.
2. Remove test leads from the circuit under test, before changing the measurement range.
3. If the meter is used near equipment that generates electro-magnetic interference, the display may be unstable or indicate incorrect measurement values.
4. ⚠ Maximum rated voltage to earth for voltage and current measurements terminals is 600V AC/DC CAT II, 300V AC/DC CAT III.

### **3-2 Voltage Measurements**

1. Set the rotary switch to the required position.
2. Set the DC/AC switch to the required position.
3. Connect black test lead to "COM" terminal and red test lead to the "V $\Omega$ Hz" input terminal.
4. Connect test leads to measuring points and read the displayed value.
5. "Warning : Do not exceed 600V d.c. or 600V a.c. limits stated in the specification".

**⚠WARNING** : TO AVOID ELECTRIC SHOCK HAZARD, OR DAMAGE TO THE METER, DO NOT ATTEMPT TO MEASURE VOLTAGES THAT MIGHT EXCEED 600 V rms. DO NOT APPLY MORE THAN 600V rms BETWEEN THE COMMON INPUT TERMINAL AND EARTH GROUND.


### **3-3 Current Measurements**

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


### **3-4 Resistance Measurement**

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

### **3-5 Diode Check**

1. Set the rotary switch to "  " position.
2. Connect the black test lead to the "COM" terminal and the red test lead to "VΩHz" input terminal.
3. Connect test leads to the diode. Normally the forward voltage drop of a good silicon diode is between .500V to .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 to the "  " position.
2. Connect the black test lead to the "COM" terminal and the red test lead to "VΩHz" input terminal.
3. Connect test leads to the circuit under test.
4. Internal sounder operates if the resistance of the circuit under test is below 50Ω.

### **3-7 Capacitance Measurement**

1. Set the rotary switch to the required position.
2. Observe polarity when measuring polarized capacitors.
3. Prior to test ensure capacitor has been discharged. Never apply voltage to the "Capacitor Test input terminals" as this may damage the instrument.
4. Insert the capacitor into "+-" input terminals and read the displayed value.

### **3-8 Frequency Measurement**

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

## **MAINTENANCE**

**⚠WARNING :** *TO AVOID ELECTRICAL SHOCK REMOVE TEST LEADS BEFORE OPENING THE COVER.*

### **4-1 General 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 the 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.



#### **4-2 Battery Installation or 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 switch the meter off. Remove the test leads from the front terminals.
2. Remove the holster.
3. Position the meter face down. Remove the three screws from the case bottom.
4. Lift the end of the case bottom until it gently unsnaps from the case top at the end nearest the LCD.  
Lift the battery from the case top, and carefully disconnect the battery from battery connector leads.
6. Snap the battery connector 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.
7. Replace the case top and case bottom. Reinstall the three screws and replace the holster.

### 4-3 Fuse Replacement

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

1. Perform steps 1 through 4 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 lifting 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 the circuit board switch both are in the OFF position.**
6. Replace the case top and case bottom. Make sure that the O-rings of case screws are properly seated, 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 6.3x32mm 415V Fast HBC 10KA

### Battery and Fuse Replacement

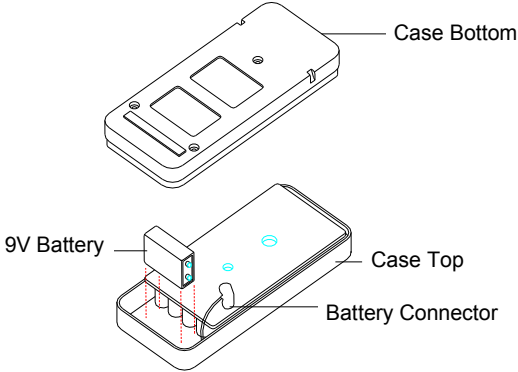


Figure 2A

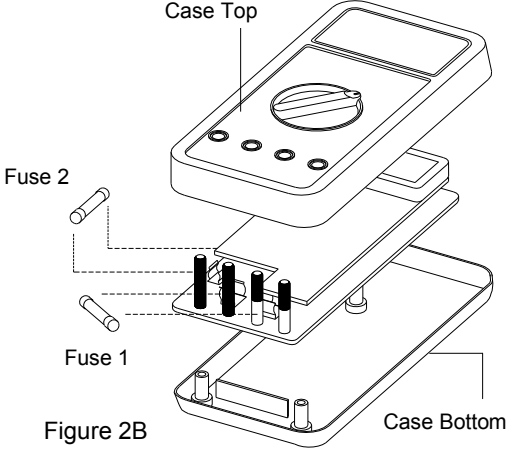
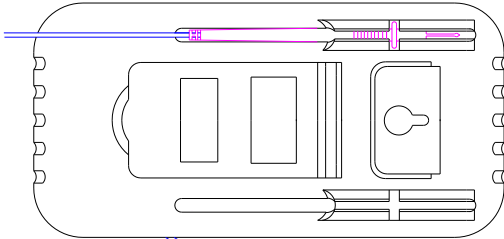
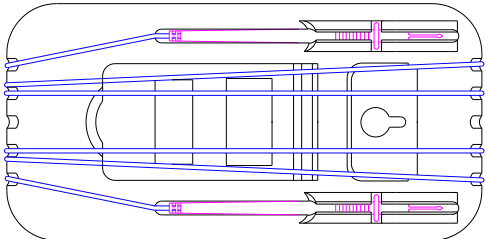


Figure 2B

**HOW TO USE THE PROBE HOLDER**

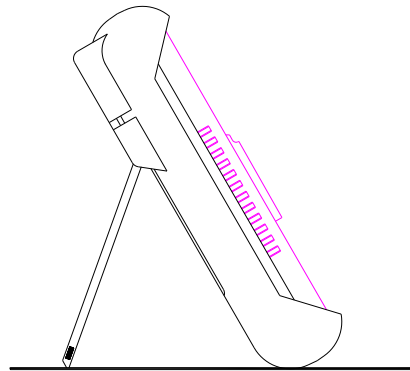


Clip one probe on the holster for one handed meter operation.

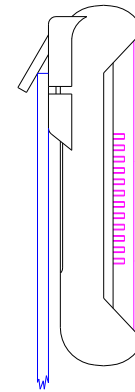


Wrap the leads around the holster to store the test probes.

### HOW TO USE THE TILT STAND AND HOLSTER

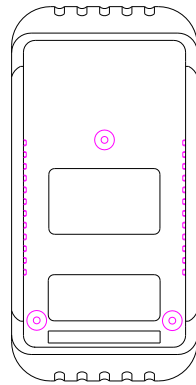


Swing the stand out for easier meter reading.

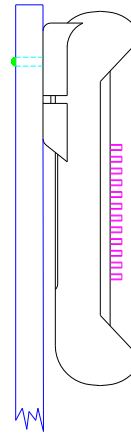


Swing the upper holder out and hook it over a door.

### HOW TO USE THE TILT STAND AND HOLSTER



Meter in holster face down.



Hang on a nail at the workbench

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