

## SAFETY INFORMATION

This multimeter has been designed according to IEC - 1010 concerning electronic measuring instruments with an overvoltage category (CAT II) and pollution 2. Follow all safety and operating instructions to ensure that the meter is used safely and is kept in good operating condition. Full compliance with safety standards can be guaranteed only with test leads supplied. If necessary, they must be replaced with the type specified in this manual.

## SAFETY SYMBOLS

⚠ Important safety information, refer to the operating manual.

⚠ Dangerous voltage may be present.

⏚ Earth ground.

□ Double insulation (protection class II).

⚡ Fuse must be replaced with rating specified in the manual.

## MAINTENANCE

- Before opening the case, always disconnect test leads from all energized circuits.
- For continue protection against fire, replace fuse only with the specified voltage and current ratings:  
F 200mA/250V(Quick Acting)
- Never use the meter unless the back cover is in place and fastened completely.
- Do not use abrasives or solvents on the meter. To clean it using a damp cloth and mild detergent only.

-1-

## DURING USE

- Never exceed the protection limit values indicated in specifications for each range of measurement.
- When the meter is linked to measurement circuit, do not touch unused terminals.
- Never use the meter to measure voltages that might exceed 600V above earth ground in category II installations.
- When the value scales to be measured is unknown beforehand, set the range selector at the highest position.
- Before rotating the range selector to change functions, disconnect test leads from the circuit under test.
- When carrying out measurements on TV or switching power circuits always remember that there may be high amplitude voltages pulses at test points, which can damage the meter.
- Always be careful when working with voltages above 60V dc or 30V ac rms. Keep fingers behind the probe barriers while measuring.
- Before attempting to insert transistors for testing, always be sure that test leads have been disconnected from any measurement circuits.
- Components should not be connected to the hFE socket when making voltage measurements with test leads.
- Never perform resistance measurements on live circuits.

## GENERAL DESCRIPTION

The meter is a handheld 3 1/2 digit multimeter for measuring DC and AC voltage, DC current, Resistance, Diode and Transistor with battery operated.

-2-

## RESISTANCE MEASUREMENT

1. Connect the red test lead to "V,Ω,mA" jack and black test lead to the "COM" jack. (The polarity of red lead is positive "+".)
2. Set the rotary switch at desired "Ω" range position.
3. Connect test leads across the resistor to be measured and read LCD display.
4. If the resistance being measured is connected to a circuit, turn off power and discharge all capacitors before applying test probes.

## DIODE TEST

1. Connect the red test lead to "V,Ω,mA" jack and the black test lead to the "COM" jack (The polarity of red lead is positive "+").
2. Set the rotary switch at "→" position.
3. Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode of the diode. The approx. forward voltage drop of the diode will be displayed. If the connection is reversed, only figure "1" will be shown.

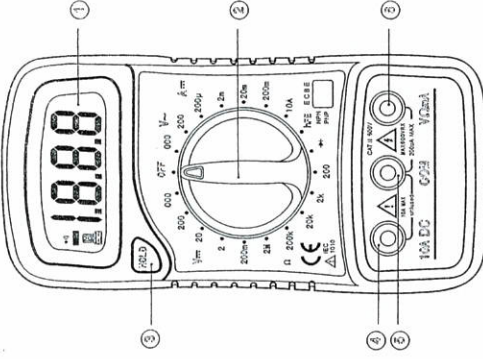
## TRANSISTOR TEST

1. Set the rotary switch at "hFE" position.
2. Determine whether the transistor under testing is NPN or PNP and locate the emitter, base and collector leads. Insert the leads into proper holes of the hFE socket on the front panel.
3. Read the approximate hFE value at the test condition of base current 10μA and Vce 3V.

NOTE:  
To avoid electrical shock, remove test leads from measurement circuits before testing a transistor.

-7-

## FRONT PANEL



-3-

## FRONT PANEL DESCRIPTION

1. Display  
3 1/2 digit, 7 segment, 15mm high LCD.
2. Rotary switch  
This switch is used to select functions and desired ranges as well as to turn on/off the meter.
3. Hold button  
When this button is pushed, the display will keep the last reading and "H" symbol will appear on the LCD until pushing it again.
4. "10A" jack  
"10A" jack
5. Plug in connector for red test lead for 10A measurement.
6. Plug in connector for black (negative) test lead.
7. "V,Ω,mA" jack  
Plug in connector for red (positive) test lead for voltage, resistance and current (except 10A) measurements.

## SPECIFICATIONS

Accuracy is specified for a period of one year after calibration and at 18 to 28°C (64°F to 82°F) with relative humidity to 80%.

## GENERAL

Maximum voltage between terminals and earth ground  
Fuse protection  
Power  
Display  
Measuring method  
Overrange indication  
Polarity indication  
Operating Environment  
Storage temperature  
Low battery indication  
Size  
Weight

:CAT II 600V  
:3V battery, NEDA 1640 or 6F22  
:LCD, 1999 counts, updates 2 1/3 sec.  
:Dual-slope integration A/D converter  
:Only figure "1" on the display  
: "-." displayed for negative polarity  
:0 to 40°C  
:-10°C to 50°C  
: "E" appears on the display  
:138mm X 69mm X 31mm  
:Approx. 160g

-4-

## DC VOLTAGE

Range	Resolution	Accuracy
200mV	100μV	±0.5% of rdg ± 2 digits
2V	1mV	±0.5% of rdg ± 2 digits
20V	10mV	±0.5% of rdg ± 2 digits
200V	100mV	±0.5% of rdg ± 2 digits
600V	1V	±0.8% of rdg ± 2 digits

Overload Protection: 250V rms. For 200mV range and 600V dc or rms, ac for other ranges.

## DC CURRENT

Range	Resolution	Accuracy
200μA	0.1μA	±1% of rdg ± 2 digits
2mA	1μA	±1% of rdg ± 2 digits
20mA	10μA	±1% of rdg ± 2 digits
200mA	100μA	±1.5% of rdg ± 2 digits
10A	10mA	±3% of rdg ± 2 digits

Overload Protection: F 200mA/250V fuse. (10A range unfused)

## AC VOLTAGE

Range	Resolution	Accuracy
200V	10mV	±1.2% of rdg ± 10 digits
600V	1V	±1.2% of rdg ± 10 digits

Overload Protection: 600V dc or rms, ac for all ranges.  
Frequency range: 40Hz to 400Hz  
Response: Average responding, calibrated in rms. of a sine wave.

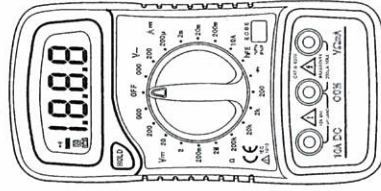
## RESISTANCE

Range	Resolution	Accuracy
200Ω	0.1Ω	±0.8% of rdg ± 3 digits
2KΩ	1Ω	±0.8% of rdg ± 3 digits
20KΩ	100Ω	±0.8% of rdg ± 3 digits
200KΩ	100Ω	±0.8% of rdg ± 3 digits
2MΩ	1KΩ	±0.8% of rdg ± 3 digits

Maximum open circuit Voltage: 3.2V  
Overload Protection: 250V dc or rms, ac for all ranges.

-5-

# OPERATOR'S INSTRUCTION MANUAL



## DIGITAL MULTIMETER

-6-