

# PEN TYPE MULTIMETER OPERATION MANUAL

## 1. SAFETY RULES

- This meter is designed and tested in accordance with IEC publication 1010, pollution degree II and installation category (overvoltage category) II.
- This meter has been tested according to the following EC Directives
  - 89/336/EEC (EMC of Nov., 1992, Electromagnetic Compatibility)
  - 73/23/EEC (Product safety law of June 11, 1979, Low Voltage Directive of February 19, 1973)
- This meter is designed to be indoor use at temperature 5°C to 40°C and altitude up to 2,000m.
- To ensure that the meter is used safely, follow all safety and operating instructions in this operation manual. If the meter is not used as described in this operation manual, the safety features of this meter might be impaired.
- Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Disconnect the live test lead before disconnecting the common test lead.
- Make sure power is off before cutting, unsoldering, or breaking the circuit. Small amount of current can be dangerous.
- Do not apply more than 600Vdc or 600Vac rms between a terminal and earth ground.
- To avoid electrical shock, use CAUTION when working above 60Vdc or 25Vac rms. Such voltages pose a shock hazard.
- Never make measurements with the battery cover or bottom case off.
- To avoid electrical shock or damage to the meter, do not exceed the input limits.

## 2. INTERNATION SYMBOLS

	Important information see manual		Diode
	AC		Continuity
	DC		Ground
			Double insulation

## 3. FEATURES

- Compact size and easy operation
- Ergonomic design for better hand gripping
- Auto polarity and zero adjustment
- DC / AC voltage, DC current, Resistance
- Diode / continuity test
- Data hold

### 3.1 General Specifications

Display	: 3 1/2 digit LCD with max. reading of 1999.
Polarity	: Automatic, (-) negative polarity indication.
Zero adjustment	: Automatic.
Over range indication	: Only the MSD "1" display.
Low battery indication	: The symbol "" is displayed
Power	: Single, standard 9 volt battery NEDA 1604, JIS 006P, IEC6F22.
Dimension	: 232 (L) x 45 (W) x 31 (D) mm.
Weight	: Approx. 160gm. (including battery)
Packing	: Complete with battery.
Option	: Crocodile clip.

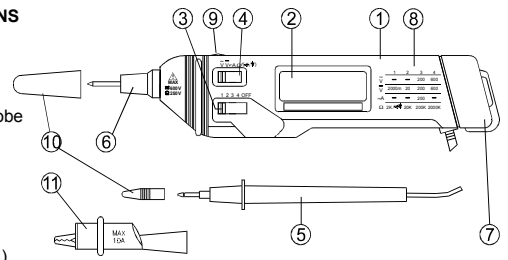
### 3.2 Electrical Specifications

Accuracies are  $\pm$  (% of reading + number of least significant digits) at 23°C  $\pm$  5°C, <75% RH.

DC Voltage	Range	Resolution	Accuracy	Input Impedance	Overload Protection: 600V DC/AC P-P
	2000mV	1mV	$\pm(0.8\%+1)$	1M $\Omega$	
	20V	10mV			
	200V	100mV			
	600V	1V			
AC Voltage	Range	Resolution	Accuracy	Frequency (Hz)	Input Impedance: 450K $\Omega$ Overload Protection: 600V DC/AC P-P
	200V	100mV	$\pm(1.5\%+10)$	40-200	
	600V	1V			
DC Current	Range	Resolution			Accuracy
	200mA	100 $\mu$ A	$\pm(2.0\%+2)$	1 $\Omega$	
Resistance	Range	Resolution	Accuracy	Open circuit voltage	Overload Protection: 250V DC/AC rms <10 sec.
	2K $\Omega$	1 $\Omega$	$\pm(1.0\%+3)$	<3.0V	
	20K $\Omega$	10 $\Omega$			
	200K $\Omega$	100 $\Omega$			
2000K $\Omega$	1K $\Omega$				
Diode Test	2K $\Omega$		Accuracy	Test current	Test Voltage
			(0 - 1.999)	1.0 $\pm$ 0.6mA	3.2V max.
Continuity Test	2K $\Omega$		Accuracy		
			Less than approx. 100 $\Omega$		

## 4. PANEL DESCRIPTIONS

- Case
- 3 1/2 digit LCD display
- Range switch
- Function switch
- Fixed test lead with probe
- Fixed probe tip and fuse cap
- Battery cover
- Function / range table
- Data hold switch
- Pin covers
- Crocodile clip (optional)



## 5. OPERATION

- The mark next to the probe tip is for warning that the input voltage should not exceed the indicated values. This is to prevent damage to the internal circuitry.
- The range switch should be set to the range which you want to test before operation.

### 5.1 DC Voltage measurement

Set the FUNCTION and RANGE switch to desired DCV position and connect the test leads across the source or load under measurement. If the voltage range is not known beforehand, set the range switch to the highest range and work down. The polarity will be indicated when the tip probe is connected.

### 5.2 AC Voltage measurement

Set the FUNCTION and RANGE switch to ACV position and connect the test leads across the source or load under measurement.

### 5.3 DC Current measurement

Set the FUNCTION and RANGE switch to 200mA position, connect the test leads IN SERIES with the load in which current to be measured.

### 5.4 Resistance measurement

Set the RANGE switch to desired k $\Omega$  range, if the resistance being measured is connected to a circuit, turn off power and discharge all capacitors before applying probes.

CAUTION

MAXIMUM INPUT PROTECTION 250Vrms <10sec.

### 5.5 Diode test

Set the FUNCTION switch to  $\Omega$  () () position, connect test leads across the diode. Tip probe to the anode of the diode and black test lead to the cathode.

CAUTION

MAXIMUM INPUT PROTECTION 250Vrms <10sec.

### 5.6 Continuity test

Set the FUNCTION switch to  $\Omega$  () () position, connect test leads across the circuit to be tested. If resistance less than approx. 100 $\Omega$ , buzzer will be activated.

CAUTION

MAXIMUM INPUT PROTECTION 250Vrms <10sec.

### 5.7 Data Hold

A push switch is used to hold data during measurement. Pressing and hold the key, reading will be held. Release the key, reading will resume active.

## 6. MAINTENANCE

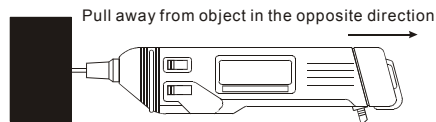
CAUTION

BEFORE ATTEMPTING BATTERY AND FUSE REMOVAL OR REPLACEMENT, DISCONNECT TEST LEAD FROM ANY ENERGIZED CIRCUITS TO AVOID SHOCK HAZARD.

### 6.1 Fuse replacement

With proper use of the meter the fuse should never need replacement. To replace fuse, turn the fuse cap counter clockwise and the fuse cap will come off. Take out the used fuse and replace with 0.2A / 250V fast acting new fuse.

Remarks: Pinhead of the meter is detachable for fuse replacing purpose. It is strictly prohibited to use the pinhead as a screwdriver for vigorous drilling. Should the meter be stuck to any object, use a pulling force to withdraw gently as described below:



### 6.2 Battery replacement

When the battery needs replacement, a battery symbol "" will be displayed in the upper left hand side of the LCD display. To replace the battery, remove the screw at the battery cover. Replace with a 9V NEDA 1604 or IEC6F22 new battery.

### 6.3 Cleaning

Periodically wipe the case with a soft damp cloth and mild household cleanser. Do not use abrasives or solvents. Ensure that no water gets inside the equipment to prevent possible shorts and damage.

**FOR TECHNICAL ASSISTANCE, PLEASE CONTACT:**