3 1/2 DIGITS DIGITAL MULTIMETER WITH BATTERY TEST
OPERATION MANUAL

1. SAFETY RULES

- This meter is designed and tested in accordance with EN publication 61010-1, pollution degree II and installation category (overvoltage category) III 600V.
- This meter has been tested according to the following EC Directives
  - ♦ 89/336/EEC Electromagnetic Compatibility, EN61326
  - ♦ 73/23/EEC Product safety law of Low Voltage Directive, EN61010-1
- 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.

2. INTERNATIONAL SYMBOLS

⚠	Important information see manual	⊣◀	Diode
~	AC	•))	Continuity
⎓	DC	⏚	Ground
		⧈	Double insulation

3. SPECIFICATIONS

3.1 General Specifications

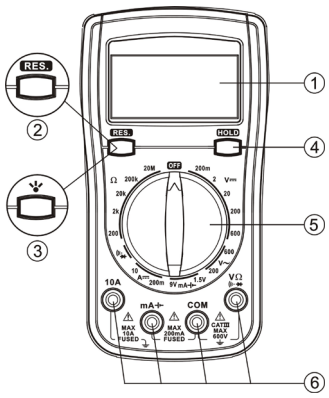
Display	:	3 1/2 digit LCD with max. reading of 1999.
Polarity	:	Automatic, (-) negative polarity indication.
Zero adjustment	:	Automatic.
Over range indication	:	Only the MSD "1" is displayed.
Power	:	Single, standard 9 volt battery NEDA 1604, JIS 006P, IEC6F22.
Auto Power Off	:	15 minutes
Dimension	:	150 (L) x 80 (W) x 40 (D) mm.
Net Weight	:	Approx. 300g. (Including battery).

3.2 Electrical Specifications

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

	Range	Resolution	Accuracy	Input Impedance	Overload Protection
DC Voltage	200mV	0.1mV	±(0.8%+1)	10MΩ	600V DC/ACrms
	2V	1mV			
	20V	10mV			
	200V	100mV			
	600V	1V			
AC Voltage	Range	Resolution	Accuracy	Frequency (Hz)	Input Impedance: 10MΩ Overload Protection: 600V DC/ACrms
	200V	100mV	±(1.5%+10)	40-400	
	600V	1V			
DC Current	Range	Resolution	Accuracy	Voltage drop	Overload Protection
	200mA	0.1mA	±(1.0%+3)	100mV	Fast 200mA/250V Fuse
	10A	100mA	±(2.0%+5)	100mV	Fast 10A/600V Fuse
Resistance	Range	Resolution	Accuracy	Open circuit voltage	Overload Protection
	200Ω	0.1Ω	±(1.0%+5)	≤0.7V	250V DC/AC rms <10 sec.
	2kΩ	1Ω			
	20kΩ	0.01kΩ			
	200kΩ	0.1kΩ			
	20MΩ	0.01MΩ	±(1.5%+5)		
Diode Test	⊣◀ •))	Test voltage	Test current	Open circuit Voltage	Overload protection
		0~1999mV	1.0±0.6mA	Approx. 2.8V	250V DC/AC rms <10 sec.
Continuity Test	⊣◀ •))	Test range	Test current	Open circuit Voltage	Overload protection
		Buzzer sounds when resistance value < 50±30Ω	Approx. 1.0mA	Approx. 2.8V	250V DC/AC rms <10 sec.
Battery Test	Range	37Ω working fine current	361Ω working fine current		Overload Protection
	1.5V AA load	40mA	/		250V DC/AC rms <10 sec.
	9V load	/	24mA		

4. PANEL DESCRIPTIONS



1. 3 1/2 digits LCD display
2. Power resume key (1801)
3. Back light key (1801B)
4. Data hold key
5. Multifunction selector
6. Input terminals

5. OPERATION

⚠WARNING

1) When measuring voltage ensure that the instrument is not connected or switched to a current or resistance, or battery test, or diode/ continuity check range. Always ensure that the correct terminals are used for the type of measurement to be made.
2) Use extreme care when measuring voltage above 50V, especially from sources where high energy exists.
3) Avoid making connections to "live" circuits whenever possible.
4) When performing current measurements ensure that the circuit is not "live" before opening it in order to connect the test leads.
5) Before performing resistance measurements or diode test, ensure that the circuit under test is de-energised.
6) Always ensure that the correct function and range is selected. If in doubt about the correct range, start with the highest and work downwards.
7) Extreme care should be taken when using the instrument to conjunction with a current transformer connected to the terminals. High voltage may be produced at the terminals if an open circuit occurs.
8) Ensure that the test leads and prods are in good condition with no damage to the insulation.
9) Take care not to exceed the overload limits as given in the specifications.
10) Fuse for replacement must be of the correct type and rating.
11) Before opening the case of the instrument to replace the battery or fuse, disconnect the test leads from any external circuit, set the Multifunction selector to "OFF" position.

5.1 DC and AC voltage measurement

1. Connect the black test lead to the "COM" terminal and red test lead to the "VΩ" terminal.
2. Set the multifunction selector to desired DC V or AC V position and connect the test leads across the source or load under measurement.

5.2 DC current measurement

1. Connect the black test lead to the "COM" terminal and red test lead to the "mA" terminal for measurement up to 200mA.
2. Set the multifunction selector to desired current range position.
3. Connect the test leads in series with the current source to be measured.
4. For current measurement from 200mA to 10A (fused) follow generally the above procedure but connect the red test lead to "10A" terminal.

⚠CAUTION: Max. input overload: 250V rms < 10sec.

5.3 Resistance measurement

1. Connect the black test lead to the "COM" terminal and red test lead to the "VΩ" terminal.
2. Set the multifunction selector to desired resistance(Ω) range position.
3. Connect the test leads across the circuit to be tested.

⚠CAUTION: Ensure that the circuit to be tested is "dead".
Max. input overload : 250V rms < 10sec.

5.4 Diode test

1. Connect the black test lead to the "COM" terminal and red test lead to the "VΩ" terminal.
2. Set the multifunction selector to ⊣◀ (same as •))) position.
3. Connect the black and red test leads to the cathode (-) and anode (+) ends of the diode to be tested respectively.
4. Read the forward voltage drop (junction) value from the display. If reverse connected the prods to diode, display shows overload.

5.5 Continuity test

1. Connect the black test lead to the "COM" terminal and red test lead to the "VΩ" terminal.
2. Set the multifunction selector to •)) (same as ⊣◀) position.
3. Connect the test leads across the circuit to be tested, if the resistance less than approx. 50±30Ω, buzzer will be activated.

5.6 Battery test

1. Connect the black test lead to the "COM" terminal and red test lead to the "mA" terminal.
2. Set the multifunction selector to 1.5V position for AA size battery and 9V position for the IEC 6F 22 9V battery.
3. Connect the test leads to the battery, red test lead to the battery cathode (+), back test lead to the battery anode (-).

5.7 Auto power off

Automatic POWER OFF extends the life of the battery by turning the meter off if no rotary function switch is operated for about 15 minutes. The power will be resumed when pressing the power resume key (1801) / back light key (1801B).

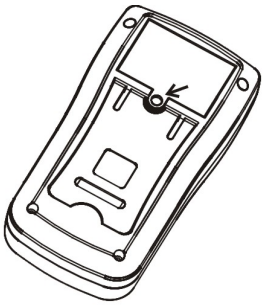
5.8 Data hold
The data hold key is used to hold data during measurement. Press the key once, reading will be held. Re-press the key reading will resume active.

5.9 Back light (1801B)
The back light key is used to switches ON and OFF the display back light.

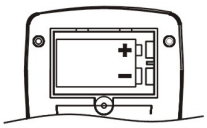
6. MAINTENANCE

⚠ CAUTION
BEFORE ATTEMPTING BATTERY AND FUSE REMOVAL OR REPLACEMENT, DISCONNECT TEST LEADS OR PROBES FROM ANY ENERGISED CIRCUITS TO AVOID SHOCK HAZARD.

6.1 Fitting and replacing the battery
1. Ensure that the instrument is not connected to any external circuit, set the Multifunction selector to OFF position and remove the test leads from the terminals.
2. Remove the screw of the battery compartment on the bottom of the back case.
3. Replace the spent battery with the same type and rating.
4. Reinstate the battery compartment, tighten and securing screw.

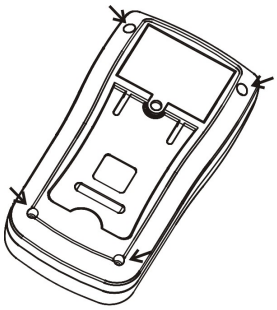


A. Remove the screw of the battery compartment

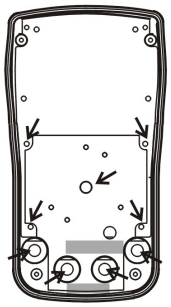


B. Open the compartment and replace the spent battery with the same type and rating.

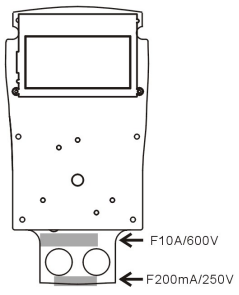
6.2 Replacing the fuses
1. Ensure that the instrument is not connected to any external circuit, set the Multifunction selector to OFF position and remove the test leads from the terminals.
2. Remove four screws at the bottom of the back case. (It is recommended that the battery is also removed)
3. Remove the bottom case carefully, see figure (A).
4. Remove nine screws, see figure (B).
5. Remove the PCB module and reverse the direction.
6. Find the two fuses as shown in figure (C). Replace new fuses only with the identical type and rating. (The meter is protected by two fast acting fuses 200mA/250V and 10A/600V at mA and 10A current ranges. Fuses rarely need replacement and blow almost always as a result of operating error.)
7. Reinstate the PCB module and casing. (Tips: Before reinstate the PCB module, remember the Multifunction selector is at “OFF” position.)



A. Remove 4 screws



B. Remove 9 screws



C. Replace new fuses only with the identical type and rating

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.

7. ACCESSORIES

The accessories contained inside the packaging are the following:
- Pair of test leads
- Instruction manual
- 9V Battery
- Certificate of test

8. SERVICE

8.1 Warranty Conditions

This meter is guaranteed against any material fault or manufacturer’s defect, in accordance with the general conditions of sale. During the warranty period (one year), faulty parts may be replaced, with the manufacturer reserving the right to decide either to repair or replace the product.

In the event of returning the meter to the after-sales service or to a regional branch, the outward transport is payable by the customer. The delivery must be agreed in advance with consignee.

For delivery indicate, by means of an enclosed note, as clear as possible, the reasons for returning it. Use only the original packing.

Any damage caused by shipment using NOT the original packaging will be charged in any case to the consignor.

The manufacturer will not be responsible for any damage to persons or things.

The warranty does not apply to the following cases:
- Accessories and battery are not included in warranty.
- Repairs following unsuitable use of the meter or by combining the latter with incompatible meter or accessories.
- Repairs resulting from incorrect shipping.
- Repairs resulting from servicing carried out by a person not approved by the company.
- Modifications to the meter without explicit authorisation from our technical department.
- Adaptation to a particular application not provided for by the definition of the meter or by the instruction manual.

Our products are patented. The logotypes are registered. We reserve the right to modify specifications and prices as part of technological developments which might be necessary.

8.2 Service
If the meter should not work properly, before contacting the DEALER OR THE SERVICE CENTRE, check the battery condition, the test leads, etc., Change them if necessary.
If the meter still does not work, check if your operating procedure agrees with the description in this manual.

In the event of returning the meter, it must be re-sent to the after-sales service (at address or to a regional branch), the outward transport is payable by the customer. The delivery must be agreed in advance with consignee.

For delivery indicate the reasons for returning it. (By means of an enclosed note, as clear as possible) Use only the original packing.

Any damage caused by delivery with NO original packaging will be charged in any case to the consignor.

FOR TECHNICAL ASSISTANCE,
PLEASE CONTACT:

1801 / 1801B
REV5/JUN.05

Remarks: Due to our policy of continual product development, we reserve the right to amend the specifications of the mentioned products without notice