



T835

# DIGITAL MULTIMETER INSTRUCTION MANUAL

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## 1. INTRODUCTION

It is a portable test instrument, compact and operated by battery. It has the following measurement features for domestic and hobby applications.

- DC and AC Voltage
- DC Current
- Resistance
- Temperature
- Diode and Continuity Test
- Data Hold

## 2. SAFETY INFORMATION

This manual contains information and warnings that must be followed for operating the meter safely and maintaining the meter in a safe operating condition. In the case of any doubt regarding the integrity of the instrument, make the multimeter unusable immediately.

The protection provided by the meter may be impaired if, for example:

- It shows visible damages.
- It fails in the execution of measurements.
- It was stored for a long time in unfavorable conditions.
- It was submitted the severe vibrations in transport.

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## Terms in this Manual

**CAUTION**  
It identifies practices or conditions that could result in damage to the instrument or the equipment in test.

**WARNING**  
It identifies practices or conditions that could result in personal injury or loss of life.

## Terms in the Instrument

**ATTENTION:** Refer to the manual.

**⚠ DANGER:** It indicates terminals where dangerous voltages can be present.

## WARNING

1. To avoid electric shock or damages to the instrument, do not apply voltages above 600V DC or AC RMS between input terminals of the instrument.
2. Observe the proper safety precautions when working with voltages above 60V DC or 30V AC RMS. Such voltages can expose the user to dangerous electric shocks.
3. Make sure that the test leads are in good conditions of security.

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## CAUTION

- To avoid damages to the instrument:
- Remove the test leads from test circuit before changing the measurement function.
  - Never connect voltages above 600V DC or 600V AC RMS.
  - Never connect voltage to the input terminals when the rotary switch is selected to measure resistance.
  - Maximum input voltage in thermocouple: 60V DC or 24V RMS AC.

## Use of the Proper Fuse

To avoid dangerous fires, use the correct fuse, of the same type and specification of operation current and voltage, as specified. The use of the fuse with different specification or short-circuit the fuse socket is prohibit and can cause extremely serious injury.

## 3. SPECIFICATION

### 3.1 General Specification

- Display: 3 ½ Digits (2000 Counts).
- Overrange Indication: "1" or "-1" only
- Data Hold Function.
- Low Battery Indication: Display shows
- Operation Environment: 0°C to 40°C, RH < 75%.
- Storage Environment: -20°C to 60°C, RH < 80%.

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- Internal Use.
- Power: 9V battery (NEDA1604, JIS006P).
- Dimensions: 138(H) x 72(W) x 38(D)mm.
- Weight: Approx. 153g (including battery).

### 3.2 Electrical Specification

Accuracy specified to one year calibration period, operation temperature of 18°C to 28°C (64°F to 82°F) and relative humidity < 70%.

#### DC Voltage

RANGE	RESOLUTION	ACCURACY
200mV	100µV	±(0.5%+2D)
2V	1mV	
20V	10mV	
200V	100mV	±(0.8%+2D)
600V	1V	

- Input Impedance: 10MΩ.
- Overload Protection: 600V DC / 600V AC RMS.

#### AC Voltage

RANGE	RESOLUTION	ACCURACY
200V	100mV	±(1.2%+10D)
600V	1V	

- Frequency Response: 40 to 400Hz.
- Input Impedance: 4.5MΩ.
- Overload Protection: 600V DC / 600V AC RMS.

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#### DC Current

RANGE	RESOLUTION	ACCURACY
200µA	0.1µA	±(1.0%+2D)
2mA	1µA	±(1.5%+2D)
20mA	10µA	
200mA	100µA	
10A	10mA	±(3.0%+5D)

- Overload Protection: Fast Action Fuse 0.25A/250V to mA input. Without fuse to 10A input (10A maximum for 15s).

#### Resistance

RANGE	RESOLUTION	ACCURACY
200Ω	0.1Ω	±(0.8%+4D)
2kΩ	1Ω	±(0.8%+2D)
20kΩ	10Ω	
200kΩ	100Ω	
20MΩ	1kΩ	±(3.0%+3D)

- Open Circuit Voltage: 3V DC (maximum).
- Overload Protection: 250V DC/250V AC RMS.

#### Temperature

- Range: -20°C to 750°C.
- Resolution: 1°C.
- Accuracy: -20°C ~ 400°C ± (1.0%+3D).
- 401°C ~ 750°C ± (2.0%+10D).
- Thermocouple measuring range: -40°C ~ 204°C
- Thermocouple Accuracy: ±0.75% or ±2.2°C

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## 4. FRONT PANEL DESCRIPTION

Refer to Figure 1 to identify controls and terminals.

1. Display: Shows the reading value.
2. Rotary Switch: Turns ON and OFF the instrument and select the function and the measurement range.
3. Temperature Socket: Used to measure temperature with K Type thermocouple.
4. Input Terminals: Terminals to connect the test leads.
  - COM - Common terminal, to connect the black test lead, used in all functions, except hFE measurement.
  - VΩmA - Positive terminal, to connect the red test lead, used in AC and DC voltage, DC current until 200mA and resistance measurement and diode and continuity test.
  - 10A DC - Positive terminal, to connect the red test lead, used to measure current between 200mA and 10A.

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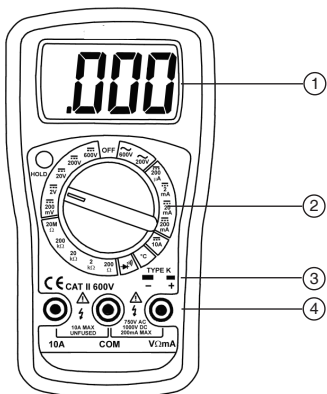


Figure 1

## 5. OPERATION

### WARNING

Read and understand completely this instruction manual before using the instrument.

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Error in operation or in discordance with the warnings and instructions of this manual, can result in material damages and serious or deadly injuries.

### Preparation and Caution Before Measurement

1. Wait at least 30 seconds after power on the instrument before making measurements.
2. The rotary switch must be positioned in the proper measurement function before connecting the test leads to the device to be tested. Make sure to disconnect the test leads from test points before changing the rotary switch for a new function or range.
3. If the multimeter is used next to equipment that generates electromagnetic interference, the display can become unstable or present incorrect values.
4. Do not allow that the instrument enters in contact with water or any another liquid.

### 5.1 AC / DC Voltage Measurement

#### WARNING

Do not apply more than 600V DC or AC RMS between the VΩmA and COM input terminals, or 500V DC or AC RMS between any terminal and ground potential. Exceed these limits can result in dangerous electric shock and damage to the instrument.

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Take care to avoid contact with the circuit under test, when working with high voltage.

1. Connect the red test lead to the VΩmA input terminal and the black test lead to the COM input terminal.
2. Set the rotary switch to desired AC (AC) or DC (DC) range position.

**NOTE:** If the voltage amplitude is unknown, select the highest measurement range, and work down when necessary.

3. Connect the test leads to the circuit under test. The polarity to DC voltage is automatically displayed. When the input voltage exceed the range limit, the display will show the most significant digit (1).
4. Read the measurement in the display.

### 5.2 DC Current Measurement

1. Connect the red test lead to the VΩmA input terminal and the black test lead to the COM input terminal to measure current up to 200mA. To measure current between 200mA and 10A, connect the red test lead to the 10A input terminal. The maximum measurement time for 10A is 15 seconds.
2. Set the rotary switch to desired DCA range position.

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**NOTE:** If the current amplitude is unknown, select the highest measurement range, and work down when necessary.

3. Turn off all power from the circuit under test, and discharge all capacitors before opening the circuit to connect the multimeter in series with the circuit.
4. Connect the test leads and turn on the power. Make the display reading. The polarity to DC current is automatically displayed.

### 5.3 Resistance Measurement

1. Connect the red test lead to the VΩmA input terminal and the black test lead to the COM input terminal.
2. Set the rotary switch to desired resistance (Ω) range position.

#### WARNING

To avoid possible damage to the meter or to the equipment under test, disconnect the circuit power and discharge all high-voltage capacitors before measuring resistance.

3. Connect the test leads to the circuit under test and make the resistance reading in the display. **NOTE:** If the measured resistance exceed the maximum value for the selected range, the display will show (1). Select the next range. To measure resistance around 1MΩ or bigger, the instrument can take some seconds to stabilize the reading. it is normal to high resistance readings.

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### 5.4 Diode Test

1. Connect the red test lead to the VΩmA input terminal and the black test lead to the COM input terminal.
2. Set the rotary switch to  $\rightarrow|$  position.
3. Connect the test leads to the diode. Normally, the forward voltage of a silicon diode is between 0.4V and 0.9V. If the diode is damaged, the display will show 000 (short-circuit condition) or 1 (open condition).
4. Invert the connection of test leads. If the diode is good, 1 must be displayed. If it is damaged, (short-circuit or resistive), 000 or a near value will be displayed.

### 5.5 Continuity Test

1. Turn off all power of the circuit under test. Discharge all capacitors of circuit. Any voltage present during the continuity test will result in reading error and can damage the instrument if the voltage exceed overload protection limit. Set the rotary switch to the  $\rightarrow|$  range position.
2. Connect the red test lead to the VΩmA input terminal and the black test lead to the COM input terminal.
3. Connect the test leads to the circuit or device under test. Make sure that the power of circuit or device is turned off.

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4. The open circuit will be indicated as overrange condition.
5. The buzzer will sound if the resistance of the circuit is less than approximately 30Ω. After complete all tests, disconnect the test leads from circuit and instrument.

### 5.6 Temperature Measurement

1. Set the rotary switch to °C position. The display must show environment temperature.
2. Insert the K type thermocouple plug in the temperature measurement socket, checking the proper polarity (+ and -).
3. Touch the end of temperature sensor to the area or surface of the object to be measured.
4. Make the display reading.

**NOTE:** The meter must be keep away from source of very high temperature.

#### WARNING

Maximum input voltage in thermocouple: 60V DC or 24V RMS AC.

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### 5.7 Data Hold

The reading will be hold when the HOLD key is pressed. If the key is pressed once again, it will release the hold and allow a further measurement.

## 6. MAINTENANCE

### WARNING

To avoid electric shock, remove the test leads from the circuit before opening the multimeter.

1. Repairs and services not covered by this instruction manual must be done only by qualified technician.
2. Periodically wipe the housing with a damp soft cloth and mild detergent. Do not use abrasives or solvents.

### 6.1 Battery Replacement

This instrument is supplied with 9V (NEDA 1604, JIS006P). To replace the battery, follow the procedure listed below.

1. Disconnect the test leads from the circuit under test and turn off the meter.
2. Disconnect the test leads from the meter.
3. Place the meter with front panel over a soft surface.
4. Remove the screws located in the rear case.

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5. Carefully separate the front case from the rear case.
6. Carefully remove the old battery replacing for a new one.
7. Replace front case in the rear case.
8. Refasten the screws.

### 6.2 Fuse Replacement

Refer to the following procedure to analyze or replace the fuse.

1. Repeat the step 1 to 5 of item Battery Replacement.
2. Remove the damaged fuse.
3. Install the new fuse, with the same size and specification.
4. Replace the front case in the rear case.
5. Refasten the screws.

## 7. ACCESSORIES

After receiving your instrument, please check if the listed accessories are included in the giftbox:

1. Digital Multimeter
2. Test Leads (one pair)
3. Instruction Manual
4. Battery (installed)
5. Holster
6. K Type Thermocouple

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