

**830 SERIES**

**Digital Multimeter**

Owners Manual

**Read this owners manual thoroughly before use**

## WARRANTY

This instrument is warranted to be free from defects in material and workmanship for a period of one year. Any instrument found defective within one year from the delivery date and returned to the factory with transportation charges prepaid, will be repaired, adjusted, or replaced at no charge to the original purchaser. This warranty does not cover expandable items such as battery or fuse. If the defect has been caused by a misuse or abnormal operation conditions, the repair will be billed at a nominal cost.

## SAFETY INFORMATION

This multimeter has been designed according to IEC-61010 concerning electronic measuring instruments with a measurement category I ( CAT I ) and pollution degree 2.

The max. permitted transient voltage: 3700V.

## Electrical Symbols

~ Alternating Current

⋯ Direct Current

⚠ Caution, risk of danger, refer to the operating manual before use.

⚡ Caution, risk of electric shock.

⏏ Earth (ground) Terminal

⏏ Fuse

CE Conforms to European Union directives


☐ The equipment is protected throughout by

double or reinforced insulation.

## **Warning**

To avoid possible electric shock or personal injury, follow these guidelines:

- a. Do not use the meter if it is damaged. Before you use the meter, inspect the case. Pay particular attention to the insulation surrounding the connectors
- b. Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads before you use the meter.
- c. Do not use the meter if it operates abnormally. Protection may be impaired. When in doubt, have the meter serviced.
- d. Do not operate the meter around explosive gas, vapor, or dust.
- e. Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and earth ground.
- f. Before use, verify the meter's operation by measuring a known voltage.
- g. When measuring current, turn off power to the circuit before connecting the meter to the circuit. Remember to place the meter in series with the circuit.
- h. When servicing the meter, use only specified replacement parts.

- i. Use caution when working above 30V ac rms, 42V peak, or 60V dc. Such voltages pose a shock hazard.
- j. When using the probes, keep your fingers behind the finger guards on the probes.
- k. Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- l. Remove the test leads from the meter before you open the back cover or the case.
- m. Do not operate the meter with the back cover or portions of the case removed or loosened.
- n. To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the low battery indicator " " appears.
- o. To avoid electric shock, do not touch any conductor with hand or skin.
- p. Remaining endangerment:  
When an input terminal is connected to dangerous live potential it is to be noted that this potential at all other terminals can occur!
- q. CATI - Measurement category I is for measurements performed on circuits not directly connected to MAINS. Examples are measurements on circuits not derived from MAINS, and specially protected (internal) MAINS-derived circuits. In the latter case, transient stresses are variable; for that reason, the norm requires that the transient withstand capability of the equipment is made known to the user.

Do not use the meter for measurements within Measurement Categories II, III and IV.

## **Caution**




To avoid possible damage to the meter or to the equipment under test, follow these guidelines:

- a. Disconnect circuit power and discharge all capacitors before testing resistance, continuity, temperature or diode.
- b. Use the proper terminals, function, and range for your measurements.
- c. Before measuring current, check the meter's fuse and turn OFF power to the circuit before connecting the meter to the circuit.
- d. Before rotating the function/range switch to change functions, disconnect test leads from the circuit under test.
- e. Before attempting to insert transistor for testing, always be sure that the test leads have been removed from the meter.
- f. Remove test leads from the meter before opening the back cover or the meter case.

# GENERAL DESCRIPTION

This series multimeters are pocket-sized 3 1/2-digit digital multimeters for measuring DC and AC voltage, DC current, resistance, transistor and diode. Some models also provide signal output, continuity test, or temperature test. It is a very useful measurement tool.

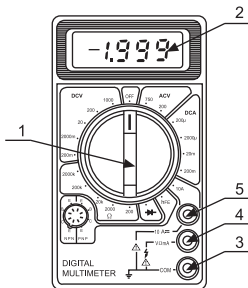
Following table shows functions of different models.

| MODEL           | DCV | ACV | DCA | $\Omega$ | hFE |  |  | °C |  |
|-----------------|-----|-----|-----|----------|-----|---|---|----|---|
| 830B            | *   | *   | *   | *        | *   | *   |   |    |   |
| 830C ( or 838 ) | *   | *   | *   | *        | *   | *   | *   | *  |   |
| 830D ( or 832 ) | *   | *   | *   | *        | *   | *   | *   |    | *   |

Explanation for the table:

“” means the feature of square wave output.

# INSTRUCTION



## 1. FUNCTION / RANGE SWITCH

This switch can be used to select the desired function and range as well as to turn on or off the meter.

To extend the life of the battery, the switch should be set to the "OFF" position when the meter is not in use.

## 2. DISPLAY

3 1/2-digit LCD

## 3. "COM" JACK

Plug in connector for black (negative) test lead.

## 4. "VΩmA" JACK

Plug in connector for red (positive) test lead for all voltage, resistance and current ( up to 200mA ) measurements.

## 5. "10A" JACK

Plug in connector for red (Positive) test lead for current ( between 200mA and 10A ) measurements. There is no fuse protection for the "10A" jack.

## SPECIFICATIONS

Accuracy is specified for a period of one year after calibration, at 18°C to 28°C, with relative humidity up to 75%.

Accuracy specifications take the form of:

$\pm ( [ \% \text{ of Reading} ] + [\text{number of Least Significant Digits}]$

### DC Voltage

| RANGE  | RESOLUTION  | ACCURACY        |
|--------|-------------|-----------------|
| 200mV  | 100 $\mu$ V | $\pm (2.5\%+5)$ |
| 2000mV | 1mV         |                 |
| 20V    | 10mV        |                 |
| 200V   | 100mV       |                 |
| 1000V  | 1V          |                 |

Input Impedance: 1M $\Omega$

Max. Input Voltage:

200mV range: 250Vdc;

the other ranges: 1000Vdc



## AC Voltage

| RANGE | RESOLUTION | ACCURACY         |
|-------|------------|------------------|
| 200V  | 100mV      | $\pm (3.0\%+10)$ |
| 750V  | 1V         |                  |

Input Impedance: about 500k $\Omega$

Frequency Response: 40~400Hz

Max. Input Voltage: 750Vac

Display: sine wave rms, average response

## DC Current

| RANGE        | RESOLUTION  | ACCURACY        |
|--------------|-------------|-----------------|
| 200 $\mu$ A  | 100nA       | $\pm (2.5\%+5)$ |
| 2000 $\mu$ A | 1 $\mu$ A   |                 |
| 20mA         | 10 $\mu$ A  |                 |
| 200mA        | 100 $\mu$ A |                 |
| 10A          | 10mA        | $\pm (3.0\%+5)$ |

Overload Protection: F 250mA/250V Fused  
(10A range unfused)

Max. Input Current: 10A



( For inputs > 2A : measurement duration<10 secs,  
interval >15 minutes )

## Resistance

| RANGE  | RESOLUTION | ACCURACY   |
|--------|------------|------------|
| 200Ω   | 0.1Ω       | ± (2.5%+5) |
| 2000Ω  | 1Ω         |            |
| 20kΩ   | 10Ω        |            |
| 200kΩ  | 100Ω       |            |
| 2000kΩ | 1kΩ        |            |

Max. Open Circuit Voltage: about 3V.

## Diode and Continuity

| RANGE   | INSTRUCTION  |
|---|--|
|    | Test voltage: about 2.8V<br>Test current: about 1mA<br>The approximate forward voltage drop in mV will be displayed. |
|  | The built-in buzzer will sound when the resistance is less than about 50Ω .  |

## Temperature

| RANGE         | RESOLUTION | ACCURACY     |
|---------------|------------|--------------|
| 0°C ~ +1000°C | 1°C        | $\pm(2\%+5)$ |


1. Accuracy does not include error of the thermocouple probe.
2. Accuracy specification assumes ambient temperature stable to  $\pm 1^\circ\text{C}$ . For ambient temperature changes of  $\pm 5^\circ\text{C}$ , rated accuracy applies after 1 hour.

## Transistor hFE

Vce: about 3V; Ib: about 10 $\mu$ A;

Display hFE: 1~1000

## Signal Output

| RANGE  | FREQUENCY | OUTPUT LEVEL      |
|--|-----------|-------------------|
| <br>(square wave) | 50Hz      | 3V <sub>p-p</sub> |

# GENERAL SPECIFICATION

Display: ----- 3 1/2 digits LCD with a max.  
reading of 1999

Polarity: ----- auto polarity indication.

Overrange indication: ----- only figure "1" shown on the  
display

Operating environment: -- temp. 0 ~ 40°C; <75%RH.

Storage environment: -----temp. -10°C ~ 50°C; <85%RH

Battery: ----- 9V, 6F22 or equivalent

Low battery indication: ---- "E" appears on the LCD.

Dimensions: -----126 × 70 × 26mm

Weight: ----- about 130g(including battery)

# OPERATION INSTRUCTION

## Measuring DC Current

1. Connect the black test lead to the "COM" jack.  
Connect the red test lead to the "VΩmA" jack if the current to be measured is less than 200mA. If the current to be measured is between 200mA and 10A, connect the red test lead to the "10A" jack instead.
2. Set the range switch to the desired **DCA** range.  
If the magnitude of the current to be measured is not known beforehand, set the range switch to the highest range and then reduce it range by range until satisfactory resolution is obtained.
3. Turn off power to the circuit which you will measure.  
Discharge all capacitors of the circuit.
4. Break the circuit path to be measured, connect the test leads in series with the circuit.
5. Turn on power to the circuit, then read the display.  
The polarity of the red test lead connection will be indicated as well.

## Measuring DC Voltage

1. Connect the red test lead to the "VΩmA" jack and the black test lead to the "COM" jack.
2. Set the range switch to the desired **DCV** range.  
If the magnitude of the voltage to be measured is not known beforehand, set the range switch to the highest range position and then reduce it range

- by range until satisfactory resolution is obtained.
3. Connect the test leads across the source or circuit to be measured.
  4. Read the voltage value on the display. The polarity of the red test lead connection will be indicated as well.

## Measuring AC Voltage

1. Connect the red test lead to the "V $\Omega$ mA" jack and the black test lead to the "COM" jack.
2. Set the range switch to the desired **ACV** range.
3. Connect test leads across the source or circuit to be measured.
4. Read the voltage value on the display.

## Measuring Resistance

1. Connect the red test lead to the "V $\Omega$ mA" jack and the black test lead to the "COM" jack.
2. Set the range switch to the desired  $\Omega$  range.
3. Connect the test leads across the load to be measured.
4. Read the reading on the display.

### Note:


1. For resistance above 1M $\Omega$ , the meter may take a few seconds to stabilize reading. This is normal for high resistance measurements.

2. When the input is not connected, i.e. at open circuit, "1" will be displayed as the overrange indication.
3. Before measuring in-circuit resistance, make sure that the circuit under test has all power removed and all capacitors are fully discharged.

## Transistor hFE Test

1. Set the range switch to the **hFE** range.
2. Determine whether the transistor to be tested is PNP or NPN type and locate the emitter, base, collector leads. Insert the leads into the proper holes of the transistor test socket on the front panel of the meter.
3. The meter will display the approximate hFE value.

## Diode Test

1. Connect the red test lead to the "VΩmA" jack and the black test lead to the "COM" jack.
2. Set the range switch to the  range.
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.
4. The approximate forward voltage drop of the diode will be displayed in mV. If the connection is reversed, only figure "1" will be displayed on the LCD.

## Continuity Test

1. Connect the red test lead to the "VΩmA" jack and the black test lead to the "COM" jack.
2. Set the range switch to  $\bullet \Omega$  position.
3. Connect the test leads to the circuit to be measured.
4. If the circuit resistance is lower than about  $50\Omega$ , the built-in buzzer will sound.

## Measuring Temperature

### NOTE



To avoid possible damage to the Meter or other equipment, remember that while the Meter is rated for  $0^{\circ}\text{C}$  to  $+1000^{\circ}\text{C}$ , the K Type Thermocouple provided with the meter is rated to  $250^{\circ}\text{C}$ . For temperatures out of that range, use a higher rated thermocouple.

The K Type Thermocouple provided with the meter is a present, it is not professional and can only be used for measurements for reference purpose. For accurate measurements, use a professional thermocouple.

1. Set the range switch to the " $^{\circ}\text{C}$ " range.
2. Connect the "+" plug of the K type thermocouple to the "VΩ mA" jack, and the "-" plug of the K type thermocouple to the "COM" jack.
3. Touch the measuring end of the thermocouple to the object to be measured.
4. Wait a while, read the reading on the LCD display.



## Test Signal Output

1. Set the range switch to "  " ( or "  " ) range.
2. A test signal will appear between the "VΩ mA" and the "COM" terminals.

The output level is about 3Vp-p.

A coupling capacitor should be used when you connect the meter to a circuit.


### Note:

1. Don't apply other voltage to the terminals.
2. There is no shortcircuit protection.

## MAINTENANCE

- To continue protection against fire, replace fuse only with the specified voltage and current ratings: F 250mA/250V (Fast action),  $\phi$  5 x 20mm
- Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.

## BATTERY AND FUSE REPLACEMENT

If the sign "  " appears on the LCD display, it indicates that the battery should be replaced. If the error of the reading is too large, it also indicates that the battery should be replaced. To replace the battery, remove the screws on the back cover and open the back cover. Replace the exhausted

battery with a new one of the same type. Reinstall the back cover and the screws.

The fuse rarely needs to be replaced and is blown as a result of the operator's error. To replace the fuse, open the back cover, replace the blown fuse with a new one of the same ratings (F250mA/250V, Fast action). Reinstall the back cover and the screws.

## **ACCESSORIES**

Manual: 1 piece

Test Lead: 1 Pair

## **PRESENT ( for 838, 830C only )**

K Type thermocouple: 1 piece

## **NOTE**

1. This owners manual is subject to change without notice.
2. Our company will not take the other responsibilities.
3. The content of this manual can not be used as the reason to use the meter for any other applications.

## DISPOSAL OF THIS ARTICLE

Dear Customer,  
If you at some point intend to dispose of this article, then please keep in mind that many of its components consist of valuable materials, which can be recycled.  
Please do not discharge it in the garbage bin, but check with your local council for recycling facilities in your area.



