

**EM420A/EM420B/EM420C**

# **Digital Multimeter**

**Users Manual**

**Read this 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 operating conditions, the repair will be billed at a nominal cost.

# SAFETY INFORMATION

This series digital multimeters have been designed according to IEC 61010 concerning electronic measuring instruments with a measurement category (CAT III 300V) and pollution degree 2.

## **Warning**

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

- 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.

- 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.
- Do not use the meter if it operates abnormally. Protection may be impaired. When in doubt, have the meter serviced.
- Do not operate the meter where explosive gas, vapor, or dust is present.
- Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and earth ground.
- Before use, verify the meter's operation by measuring a known voltage.
- When measuring current, turn off circuit power before connecting the meter in the circuit. Remember to place the meter in series with the circuit.
- When servicing the meter, use only specified replacement parts.
- Use caution when working with voltage above 30V ac rms, 42V peak, or 60V dc. Such voltages pose a shock hazard.
- When using the probes, keep your fingers behind the finger guards on the probes.
- When making connections, connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- Turn off the meter and remove the test leads from the

meter before you open the battery cover or the case.

- Do not operate the meter with the battery cover or portions of the case removed or loosened.
- To avoid false readings, which could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator (  ) appears.
- Do not use the meter in a manner not specified by this manual or the safety features provided by the meter may be impaired.
- Adhere to local and national safety codes. Individual protective equipment must be used to prevent shock and arc blast injury where hazardous live conductors are exposed.
- To avoid electric shock, do not touch any naked conductor with your hand or skin; and do not ground yourself while using the meter.
- Do not use the meter if the meter, a test lead or your hand is wet.
- Remaining endangerment:  
When an input terminal is connected to dangerous live potential, it is to be noted that this potential can occur at all other terminals!
- **CAT III** - Measurement Category III is for measurements performed in the building installation. Examples are measurements on distribution boards, circuit breakers, wiring, including cables, bus-bars, junction boxes, switches, socket-outlets in the fixed installation, and equipment for industrial use and

some other equipment, for example, stationary motors with permanent connection to the fixed installation.

Do not use the meter for measurements within Measurement Categories IV.

## **Caution**

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

- Disconnect circuit power and discharge all capacitors thoroughly before testing resistance, diode, continuity, capacitance or temperature.
- Use the proper terminals, function and range for your measurements.
- Before measuring current, check the meter's fuses and turn off power to the circuit before connecting the meter to the circuit.
- Before turning the rotary switch to change functions, disconnect the test leads from the circuit under test.
- Before inserting transistor into the Adapter, remove all test leads from the meter.

## Electrical Symbols

-  Alternating Current
-  Direct Current
-  Both direct and alternating current
-  Caution, risk of danger, refer to the operating manual before use.
-  Caution, risk of electric shock.
-  Earth (ground) Terminal
-  Fuse
-  Conforms to European Union directives
-  The equipment is protected throughout by double insulation or reinforced insulation.

## INTRODUCTION

This series multimeters are compact 3 1/2 digits digital multimeters designed to measure DC and AC voltage, DC and AC current, resistance, diode, transistor hFE, continuity, temperature, capacitance ( EM420B only ) and battery ( EM420A and EM420C only ). For EM420C, non-contact AC voltage detection and AC live line detection are also provided.

They feature polarity indication, data hold, MAX recording mode ( EM420A and EM420B only ), and etc. They are easy to operate and are ideal test tools.

Except where noted, the descriptions and instructions in this manual apply to EM420A, EM420B and EM420C. Illustrations use EM420A.

## FRONT PANEL

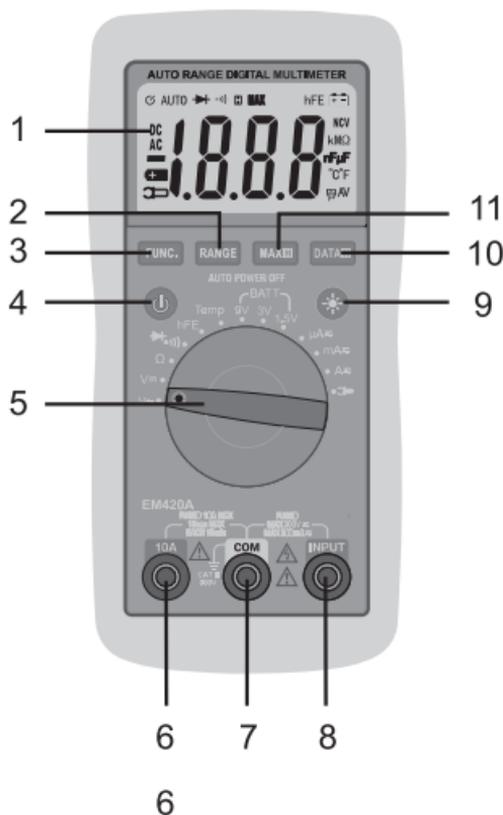


Figure 1

## 1. **Display**

3 1/2 digit LCD, with a max. reading of 1999

## 2. **" RANGE " Button**

Used to switch between autorange mode and manual range mode as well as to select desired manual range.

## 3. **" FUNC. " Button**

Used to switch the meter between:

1. DC current and AC current measurement.
2. Celsius and Fahrenheit measurement.
3. Diode and continuity test function.
4. DC voltage and AC voltage measurement ( EM420C only )

## 4. **Power Switch**

Used to turn on/off the meter.

## 5. **Function/Range Switch**

Used to select desired function and/or range.

## 6. **" 10A " Terminal**

Plug-in connector for the red test lead for current ( 200mA - 10A ) measurements.

## 7. **" COM " Terminal**

This **" COM "** terminal is a plug-in connector for the black test lead for voltage, current, resistance, diode, continuity, capacitance and battery measurements.

This terminal is also a plug-in connector for the Adapter

for transistor hFE measurements.

For temperature measurements, this terminal is a plug-in connector for the negative plug of the K type thermocouple.

## 8. " **INPUT** " Terminal

This " **INPUT** " terminal is a plug-in connector for the red test lead for voltage, current ( < 200mA ), resistance, diode, continuity, capacitance and battery measurements. This terminal is also a plug-in connector for the Adapter for transistor hFE measurements.

For temperature measurements, this terminal is a plug-in connector for the positive plug of the K type thermocouple.

## 9. " \* " Button

Press this button to turn on or off the backlight. The backlight will turn off automatically about 15 seconds later after it is turned on.

## 10. " **DATA** " Button

Used to enter/exit Data hold mode.

## 11. ● " **MAX** " Button ( EM420A and EM420B only )

Used to enter or exit MAX recording mode.

### ● **AC Detection Indicator ( EM420C only )**

An indicator for ac detection.

# GENERAL SPECIFICATION

**Display:** 3 1/2-digit LCD, with a max. reading of 1999

**Negative Polarity Indication:** Negative sign " – " shown  
on the display automatically

**Sampling Rate:** About 2 to 3 times/sec

**Low Battery Indication:** "  " shown on the display

**Battery:** 1.5V battery, AAA or equivalent, 3 pieces

**IP Degree:** IP20

**Operating Environment:** Temperature: 0°C to 40°C  
Relative Humidity: < 75%

**Temperature Coefficient:**

0.2 x (specified accuracy)/°C (< 18°C or > 28°C)

**Storage Environment:** Temperature: -10°C to 50°C  
Relative Humidity: < 85%

**Dimensions:** 158 X 75 X 35 mm

**Weight:** About 200g (including batteries)

# SPECIFICATIONS

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

Most accuracy specifications take the form of:

**±([% of Reading] + [number of Least Significant Digits])**

## DC Voltage

Range	Resolution	Accuracy	Overrange Indication
200mV	0.1mV	$\pm (0.8\% + 5)$	"OL" shown on the display
2V	0.001V		
20V	0.01V		
200V	0.1V		
300V	1V	$\pm (1\% + 5)$	

**Input Impedance:** 10M $\Omega$

**Overload Protection:** 300V DC/AC rms

**Max. Allowable Input Voltage:** 300V DC

## AC Voltage

Range	Resolution	Accuracy	Overrange Indication
2V	0.001V	$\pm (1.0\% + 5)$	"OL" shown on the display
20V	0.01V		
200V	0.1V		
300V	1V	$\pm (1.2\% + 5)$	

**Input Impedance:** 10M $\Omega$

**Frequency Range:** 40Hz - 400Hz

**Overload Protection:** 300V DC/AC rms

**Max. Allowable Input Voltage:** 300V AC rms

**Response:** Average, calibrated in rms of sine wave

## DC Current

Range	Resolution	Accuracy	Overrange Indication
200 $\mu$ A	0.1 $\mu$ A	$\pm (1.2\% + 5)$	"OL" shown on the display
2000 $\mu$ A	1 $\mu$ A		
20mA	0.01mA		
200mA	0.1mA		
2A	0.001A	$\pm (2.0\% + 10)$	
10A	0.01A		

### Overload Protection:

250mA/300V Fast fuse ( for " **INPUT** " terminal inputs only)

10A/300V Fast fuse ( for " **10A** " terminal inputs only )

### Max. Allowable Input Current:

200mA ( for " **INPUT** " terminal only)

10A ( for " **10A** " terminal only )

( For measurements > 2A: duration < 15 seconds,  
interval > 15 minutes )

## AC Current

Range	Resolution	Accuracy	Overrange Indication
200 $\mu$ A	0.1 $\mu$ A	$\pm (1.5\% + 5)$	"OL" shown on the display
2000 $\mu$ A	1 $\mu$ A		
20mA	0.01mA		
200mA	0.1mA		
2A	0.001A	$\pm (3.0\% + 10)$	
10A	0.01A		

### Overload Protection:

250mA/300V Fast fuse ( for " **INPUT** " terminal inputs only)

10A/300V Fast fuse ( for " **10A** " terminal inputs only )

### Max. Allowable Input Current:

200mA ( for " **INPUT** " terminal only)

10A ( for " **10A** " terminal only )

( For measurements > 2A: duration < 15 seconds,  
interval > 15 minutes )

**Frequency Range:** 40Hz - 400Hz

**Response:** Average, calibrated in rms of sine wave

## DC Current ( using current probe, EM420A and EM420B only )

	Range	Resolution	Accuracy	Overrange Indication
meter	 200A	0.1mV/0.1A	$\pm (1.2\% + 5)$	"OL" shown on the display
meter	 1000A	1mV/1A	$\pm (1.2\% + 5)$	

**Max. Input Voltage:** 200mV dc

**Note:** The current probe is optional accessory.

## AC Current ( using current probe, EM420A and EM420B only )

	Range	Resolution	Accuracy	Overrange Indication
meter	 200A	0.1mV/0.1A	$\pm (1.5\% + 5)$	"OL" shown on the display
meter	 1000A	1mV/1A	$\pm (1.5\% + 5)$	

**Max. Input Voltage:** 200mV ac

**Frequency Range:** 40Hz - 400Hz

**Response:** Average, calibrated in rms of sine wave

**Note:** The current probe is optional accessory.

## Resistance

Range	Resolution	Accuracy	Overrange Indication
200Ω	0.1Ω	$\pm (1.2\% + 5)$	"OL" shown on the display
2kΩ	0.001kΩ	$\pm (1\% + 5)$	
20kΩ	0.01kΩ		
200kΩ	0.1kΩ		
2MΩ	0.001MΩ	$\pm (1.2\% + 5)$	
20MΩ	0.01MΩ	$\pm (1.5\% + 5)$	

**Open Circuit Voltage:** About 1V

**Overload Protection:** 300V DC/AC rms

## Temperature

Range	Resolution	Accuracy
-20°C – 1000°C	1°C	-20°C – 0°C: $\pm (5\% + 4)$
		0°C – 400°C: $\pm (1\% + 3)$
		400°C - 1000°C: $\pm (2\% + 3)$
0°F – 1800°F	1°F	0°F – 50°F: $\pm (5\% + 8)$
		50°F – 750°F: $\pm (1\% + 6)$
		750°F - 1800°F: $\pm (2\% + 6)$

### Note:

1. Accuracy does not include error of the thermocouple probe.
2. Accuracy specification assumes ambient temperature

is stable to  $\pm 1^{\circ}\text{C}$ . For ambient temperature changes of  $\pm 5^{\circ}\text{C}$ , rated accuracy applies after 1 hour.

3. If the temperature being measured is lower than  $-40^{\circ}\text{C}$  or higher than  $1100^{\circ}\text{C}$ , the display will show " OL ".

## Battery ( EM420A and EM420C only )

Range	Resolution	Description
1.5V	0.01V	The approx. working voltage of the battery is shown on the display.
3V	0.01V	
9V	0.01V	
12V	0.01V	

**Overload Protection:** 250mA/300V Fast fuse

### Test Current:

1.5V range: about 50mA

3V range: about 30mA

9V range: about 12mA

12V range: about 120mA

**Note:** Only EM420C has 12V range.

## Capacitance ( EM420B only )

Range	Resolution	Accuracy	Ovrange Indication
20nF	0.01nF	$\pm (8\% + 10)$	"OL" shown on the display
200nF	0.1nF	$\pm (5\% + 5)$	
2 $\mu$ F	0.001 $\mu$ F		
20 $\mu$ F	0.01 $\mu$ F		
200 $\mu$ F	0.1 $\mu$ F		
1000 $\mu$ F	1 $\mu$ F	$\pm (8\% + 10)$	

**Open Circuit Voltage:** About 1V

## Transistor hFE Test

Range	hFE	Test Current	Test Voltage
PNP & NPN	0 ~ 1000	$I_b \approx 2\mu A$	$V_{ce} \approx 1V$

## Diode and Continuity Test

Range	Description	Remark
	The approximate forward voltage drop of the diode will be shown on the display.	Open Circuit Voltage: about 2.1V
	<p>The built-in buzzer will sound if the resistance is less than about 30Ω.</p> <p>The buzzer may or may not sound if the resistance is between 30Ω and 100Ω.</p> <p>The buzzer will not sound if the resistance is more than about 100Ω.</p>	Open Circuit Voltage: about 2.1V

**Overload Protection:** 300V DC/AC rms

# OPERATION INSTRUCTION

## Data Hold Mode

Press the " **DATA** " button to hold the present reading on the display, the symbol "  " will appear on the display as an indication.

To exit Data Hold mode, just press this button again; "  " will disappear.

## Manual Ranging and Autoranging

The meter defaults to autorange mode in measurement functions which have both autorange mode and manual range mode. When the meter is in the autorange mode, " **AUTO** " is displayed.

1. Press the " **RANGE** " button to change to the manual range mode. " **AUTO** " disappears.  
Each subsequent press of the " **RANGE** " button increments the range. After the highest range, the meter wraps to the lowest range.
2. To exit manual range mode, press and hold down the " **RANGE** " button for about 2 secs. The meter returns to autorange mode and " **AUTO** " is displayed.

## MAX Recording Mode ( EM420A and EM420B only)

MAX recording mode is available in some functions. To use MAX recording mode:

Press the "**MAX**  " button. The meter enters the MAX recording mode and the symbol "**MAX**" appears on the display as an indication. In this mode, the meter detects maximum input value and displays and holds the maximum value on the display. When input goes above the maximum value, the meter displays and holds the new value on the display.

To exit MAX recording mode, just press the "**MAX**  " button again; the symbol "**MAX**" will disappear.

## Measuring DC or AC Voltage

1. Connect the black test lead to the "**COM**" terminal and the red test lead to the "**INPUT**" terminal.
2. For EM420A and EM420B, set the range switch to the  $V_{\text{DC}}$  position for dc voltage measurements or to the  $V_{\text{AC}}$  position for ac voltage measurements.  
For EM420C, set the range switch to  $V_{\text{AC}}$  position

and then press the " **FUNC.** " button to select ac or dc voltage measurement, the display will show the corresponding symbol.

3. Select autorange mode or manual range mode with the " **RANGE** " button.

In manual range mode, if the magnitude of the voltage to be measured is not known beforehand, select the highest range first and then reduce it range by range until satisfactory resolution is obtained.

4. Connect the test leads across the source or circuit to be tested.
5. Read the reading on the display. For DC voltage measurements, the polarity of the red test lead connection will be indicated as well.

**Note:**

1. In low range, the meter may display an unstable reading before the test leads are connected to the circuit to be tested. It is normal and will not affect measurements.
2. In manual range mode, when the display shows " OL ", a higher range should be selected.
3. To avoid electric shock to you or damage to the meter, do not apply a voltage higher than 300V between the terminals.

## Measuring DC or AC Current

1. Connect the black test lead to the " **COM** " terminal. If the current to be measured is less than 200mA, connect the red test lead to the " **INPUT** " terminal. If the current is between 200mA and 10A, connect the red test lead to the " **10A** " terminal instead.
2. Set the range switch to  $\mu\text{A}\approx$ ,  $\text{mA}\approx$  or  $\text{A}\approx$  range position.

**Note:** If the red test lead is connected to the " **10A** " terminal, you must set the range switch to the  $\text{A}\approx$  position.

If the red test lead is connected to the " **INPUT** " terminal, never set the range switch to the  $\text{A}\approx$  position.

3. Press the " **FUNC.** " button to select DC or AC current measurement, the display will show the corresponding symbol.
4. Select autorange or manual range mode with the " **RANGE** " button.
5. Turn off power to the circuit to be tested. Then discharge all high-voltage capacitors.
6. Break the circuit path to be tested, connect the test leads in series with the circuit.
7. Turn on power to the circuit and then read the display. For DC current measurements, the polarity of red lead connection will be indicated as well.

## Measuring DC or AC Current ( using current probe, EM420A and EM420B only )

1. If you want to measure DC current, you must use the DC current probe. If you want to measure AC current, you must use the AC current probe.  
Connect the negative (–) output lead of the selected current probe to the " **COM** " terminal, and the positive ( + ) output lead of the current probe to the " **INPUT** " terminal.
2. Set the range switch to  position.
3. Press the " **FUNC.** " button to select DC or AC current measurement, the display will show the corresponding symbol.
4. Select autorange or manual range mode with the " **RANGE** " button.  
In manual range mode, if the magnitude of the current to be measured is not known beforehand, select the highest range.
5. Clamp the conductor to be tested with the current probe's clamp.

### **Note:**

Each time only one conductor should be clamped. If you clamp two or more conductors, the reading will be wrong.

The conductor should be positioned in the center of the jaws in order to improve measurement accuracy.

6. Read the reading on the display. For DC current measurements, the polarity of the positive ( + ) output lead of the current probe will be indicated as well.

**Note:**

1. In manual range mode, when the display shows the overrange indicator " OL", a higher range should be selected.
2. Don't touch any naked conductor with hand or skin.
3. Matching problem about the meter and the sensitivity of the current probe:
  - The sensitivity of the matching current probe is 0.1A/0.1mV. If you use a matching current probe, the presently displayed value equals the presently measured value.
  - If you use a current probe whose sensitivity does not equal 0.1A/0.1mV, you should multiply the present reading by a factor which is determined by the current probe you are using, the result is the measured value.  
To determine the factor, please refer to the instruction of the current probe which you use.

## Measuring Resistance

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **INPUT** " terminal.

2. Set the range switch to  $\Omega$  position
3. Select autorange or manual range mode with the "**RANGE**" button.

In manual range mode, when the display shows the overrange indicator "OL", a higher range should be selected.

4. Connect the test leads across the object to be tested.  
Read the reading on the display.

**Note:**

1. For resistance measurements  $> 1M\Omega$ , 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, "OL" will be displayed as an overrange indication.
3. Before measurement, disconnect all power to the circuit to be tested and discharge all capacitors thoroughly.

## **Measuring Capacitance ( EM420B only )**

1. Connect the black test lead to the "**COM**" terminal and the red test lead to the "**INPUT**" terminal.
2. Set the range switch to desired "**1000 $\mu$ F**"," **20 $\mu$ F**" or "**nF**" range position.
3. Select autorange mode or manual range mode with the

" **RANGE** " button.

4. Make sure that the capacitor to be tested has been discharged thoroughly, then connect the test leads across the capacitor. ( For capacitors with polarity, the red test lead should be connected to the anode of the capacitor, and the black test lead should be connected to the cathode of the capacitor. )
5. Wait until the reading is stable, then read the reading on the display.

**Note:**

In low range, before the test leads are connected to the capacitor to be tested, the display may show a reading due to the stray capacitance of the test leads and the internal circuit of the meter. This is normal and will not affect measurement accuracy.

## Continuity Test

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **INPUT** " terminal.
2. Set the range switch to  $\bullet\))$  position.
3. Press the " **FUNC.** " button until the symbol " $\bullet\))$  " appears on the display.
4. Connect the test leads across the circuit to be tested. If the resistance is lower than about  $30\Omega$ , the built-in buzzer will sound.

### Note:

Before test, disconnect all power to the circuit to be tested and discharged all capacitors fully.

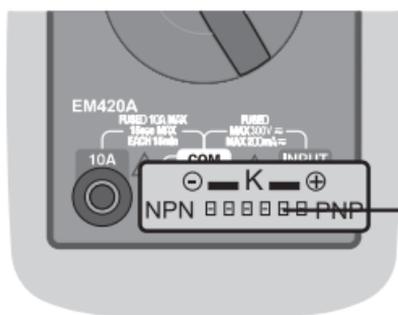
## Diode Test

1. Connect the black test lead to the " **COM** " terminal and the red test lead to the " **INPUT** " terminal. ( **Note:** The polarity of the red test lead is positive "+". )
2. Set the range switch to  position.
3. Press the " **FUNC.** " button until the symbol "" appears on the display.
4. 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.
5. The display show the approximate forward voltage drop of the diode. If the connections are reversed, " OL " will be shown on the display.

## Transistor hFE Test

1. Set the range switch to **hFE** position.
2. Refer to the Figure 2, connect the supplied Adapter to the " **COM** " terminal and the " **INPUT** " terminal. Don't reverse the connection.

- Identify whether the transistor is NPN or PNP type and locate the emitter, base and collector leads. Insert the leads of the transistor to be tested into the proper holes on the transistor test socket of the adapter .
- The display will show the approximate hFE value.



**Figure 2**

**Transistor Test Socket**

## Measuring Temperature

### Note

To avoid possible damage to the meter or other equipment, remember that while the meter is rated for  $-20^{\circ}\text{C}$  to  $+1000^{\circ}\text{C}$  and  $0^{\circ}\text{F}$  to  $1800^{\circ}\text{F}$ , 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 K type thermocouple.

The K type thermocouple provided with the meter is a present, it is not professional and can only be used for non-critical measurements. For accurate measurements, use a professional K type thermocouple.

1. Set the range switch to **Temp** position.
2. Press the "**FUNC.**" button to select celsius or fahrenheit measurement.
3. Connect the negative plug of the K type thermocouple to the "**COM**" terminal and the positive plug of the K type thermocouple to the "**INPUT**" terminal.
4. Carefully touch the sensing end of the thermocouple to the object to be tested.
5. Wait a while, then read the reading on the display.

## **Battery Test ( EM420A and EM420C only )**

1. Connect the black test lead to the "**COM**" terminal and the red test lead to the "**INPUT**" terminal.
2. According to the rated voltage of the battery to be tested, set the range switch to the corresponding **BATT** range position; for EM420A, the symbol "**+ ■**" will appear on the display indicating that the meter is in battery test function.
3. Connect the test leads to the two terminals of the battery to be tested.
4. Read the working voltage of the battery on the display. The polarity of the red test lead connection will be indicated as well.

## AC Detection ( EM420C only )

### Warning

To avoid electric shock, do not touch any naked conductor with hand or skin.

Because of the meter's detection limit, a line ( or conductor) under test may be live even if the built-in buzzer does not sound and the AC Detection Indicator does not light.

Before use, verify the meter's operation by detecting a known ac voltage and a known ac live line.

### To Detect AC Voltage:

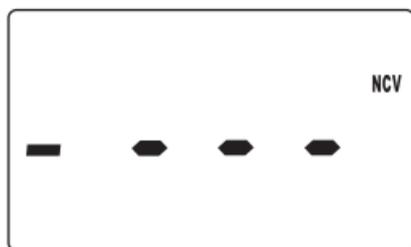
1. Make sure that the meter is on. Then set the range switch to the **TEST** position, the display will show " **EF** ". ( See Figure 3. )
2. Move the top of the meter close to the object to be tested. When the meter detects AC voltage, the built-in buzzer will beep and the AC Detection Indicator will flash red; and the intensity of the detected electrical field will be indicated by the number of the displayed bar-graph segments near the vertical center of the screen ( refer to Figure 4 ) and by the beeping rate of the built-in buzzer. The higher the intensity of the

detected electric field, the larger the number of the displayed bar-graph segments, and the faster the beeping rate of the buzzer. ( **Note:** The meter's electric field intensity indication is affected by the magnitude of the ac voltage of the conductor under test, the distance between the meter and the conductor, the insulation of the conductor, and etc. )

**Figure 3**



**Figure 4**



The number of the displayed bar-graph segments indicates the intensity of the detected electrical field.

### **To Detect AC Live Line:**

1. Make sure that the meter is on. Connect the red test lead to the "**INPUT**" terminal, then set the range switch to **TEST** position.
2. Touch the probe of the red test lead to the naked central conductor of the line to be tested. If the line is an ac live line with voltage of 110V to 220V at 50Hz to 60Hz, the built-in buzzer will beep and the AC Detection Indicator will flash red.

## **Auto Power Off**

If you have not operated the meter for about 15 minutes, the meter will turn off automatically and go into Sleep mode.

To arouse the meter from sleep, just turn the rotary switch or press a button.

If you press the " **DATA** " button to arouse the meter from sleep, the automatic power-off feature will be disabled.

# **MAINTENANCE**

## **Warning**

Except replacing battery and fuse, never attempt to repair or service the meter unless you are qualified to do so and have the relevant calibration, performance test, and service instructions.

Store the meter in a dry place when the meter is not in use. Do not store the meter in an environment with intense electromagnetic field.

## **General Maintenance**

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.

Dirt or moisture in the terminals can affect readings.

Clean the terminals as follows:

1. Set the range switch to **OFF** position and remove the test leads from the meter.
2. Shake out any dirt which may exist in the terminals.
3. Soak a new swab with alcohol.
4. Work the swab around in every terminal.

If the meter fails, check and replace ( as needed ) the batteries and fuses, and/or review this manual to verify proper use of the meter.

## Battery and Fuse Replacement

### **Warning**

**To avoid false readings, which could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator (  ) appears.**

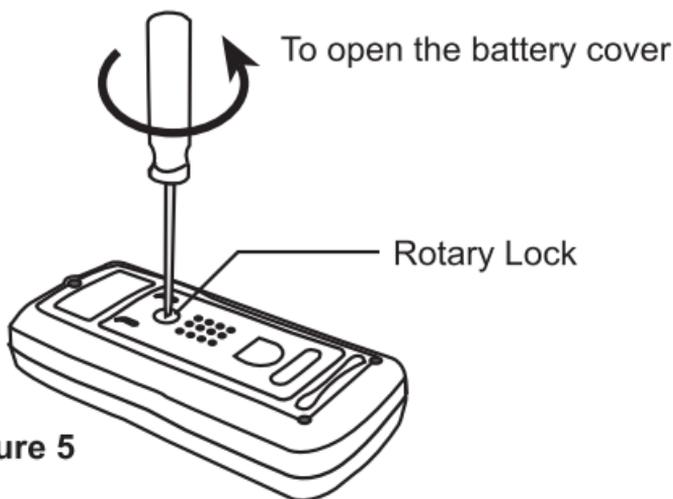
**To prevent damage or injury, use only replacement fuses specified.**

**Before opening the battery cover or the case, turn off the meter and remove the test leads.**

When the symbol "  " appears on the display, the batteries are low and must be replaced immediately. To replace the batteries, use an appropriate screwdriver to gently turn the rotary lock on the battery cover by 90° in the indicated direction ( refer to Figure 5 ). Remove the battery cover and replace the exhausted batteries with new ones of the same type ( 1.5V battery, AAA or equivalent ), make sure that the polarity connections are correct. Reinstall the battery cover, and then gently turn the rotary lock clockwise by 90° to lock the battery cover.

**Note:**

Excess force will cause damage to the rotary lock.  
Don't use a screwdriver which is not big enough.



**Figure 5**

To replace the 250mA/300V fuse, open the battery cover as described earlier. Replace the blown fuse with a new

one of the same rating. Reinstall the battery cover and lock this cover.

To replace the 10A/300V fuse, remove the screws on the back cover and remove the back cover. Replace the blown fuse with a new one of the same rating. Reinstall the back cover and the screws.

This meter uses two fuses:

**F1:** 250mA/300V Fast fuse, Min. Interrupt Rating 1500A, Ø5×20mm

**F2:** 10A/300V Fast fuse, Ø5×20mm

( **Note:** 10A/300V FAST fuse can only be replaced at specified service station. )

## ACCESSORIES

**Manual :** 1 piece

**Test Lead:** 1 pair

**Adapter:** 1 piece

**DC Current Probe** ( optional )

**AC Current Probe** ( optional )

## PRESENT

**K Type Thermocouple:** 1 piece

## NOTE

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

## Zhangzhou Eastern Intelligent Meter Co., Ltd

Eastern Industrial Park, Jintang Road, Jinfeng  
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### 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.



