EM3213

PEN PROBE STYLE

AUTORANGE DIGITAL MULTIMETER

OWNER'S MANUAL

Read this owner's 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 batteries or fuses. If the defect has been caused by a misuse or abnormal operating conditions, the repair will be billed at a nominal cost.

SAFETY INFORMATION

EM3213 digital multimeter has been designed according to IEC-1010 concerning electronic measuring instruments with a measurement category (CAT II 600 V) and Pollution degree 2.

⚠ 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 lead for damaged insulation or exposed metal. Check the test lead and test probe for continuity. Replace damaged test lead 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 circuit power 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 replaccement parts.
i. Use with 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 unit.

k. Connect the test lead before you connect the test probe. When you disconnect them, disconnect the test probe first.

l. Remove the test lead and test probe from the meter before you open the battery door.

m. Do not operate the meter with the battery door or portions of the cover removed or loosened.

n. 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.

o. 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!

p. CATII-Measurement Category II is for measurements performed on circuits directly connected to low voltage installation.(Examples are measurements on household appliances, portable tools and similar equipments .) Do not use the meter for measurements within Measurement Categories III and IV.

Caution

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

- Disconnect circuit power and discharge all highvoltage capacitors before testing resistance, diode or continuity.
- Use the proper function, and range for your measurements.
- Before measuring current, check the meter's fuses and turn off the power to the circuit before connecting the meter to the circuit.
- Before pushing the funtion switch to change functions, disconnect test lead and test probe from the circuit under test.
- Remove test lead from the meter before opening the meter case.

GENERAL DESCRIPTION

EM3213 instrument is a compact 3 1/2-digit autorange digital multimeter for measuring DC and AC voltage, DC and AC current, resistance, diode and continuity. They have the functions of auto-zeroing, polarity selection, data hold, overrange indication, backlight, auto power-off, and flashlight. They can be operated easily and be ideal instruments for use in fields, laboratory, workshop and home applications.

ELECTRICAL SYMBOLS

~ AC (Alternating Current)

⎓ DC (Direct Current)

⚠ Important safety information. Refer to the manual.

Dangerous voltage may be present.

Earth ground

Fuse

CE Conforms to European Union directives

Double insulated

Low battery

→| Diode

SPECIAL MARKS ON PANEL

For your safety, there are some marks on the panel. Be cautious.

600V MAX ⏚	To avoid electrical shock and damage to the meter,do not apply more than 600V voltage between COM and Earth Ground.
⚠	Note:There is danger! Adhere to the manual.
600V DC 600V AC 200mA MAX.	The max. voltage the meter can measure is 600V DC or AC. The max. current the meter can measure is 200mA DC or AC.
⚠	Note:Be particularly cautious while measuring high voltage. Do not touch any terminal or the tip of the test lead.
CAT II	The instrument complies with CAT II
⧈	Double insulated

FEATURES

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

2). Polarity: Auto polarity indication.

3). Overrange Indication : ".OL" on display

4). Auto Zeroing Function

5). Sampling Rate : Approximate 3 times per sec.

6). Reponse Time of Digital Display:

Vac 2 sec

Vdc 1 sec

Ω ⩽ 1 sec(<200kΩ)

Ω ⩽ 2 sec (< 2MΩ)

Ω ⩽ 5 sec (<20MΩ)

7). Operating temperature: 5-40℃,

8). Storage temperature: -20-60℃,

9). Battery : single button cell (CR2032)

10). Low battery indication : " " on LCD.

11).Relative humidity:

all ranges except 20MΩ range	0%~90% (0℃~35℃)
	0%~70% (35℃~50℃)
20MΩ range	0%~80% (0℃~35℃)
	0%~70% (35℃~50℃)

12). Dimensions : 155mm x 55mm x 26mm

13). Weight : about 130g(including batteries)

SPECIFICATIONS

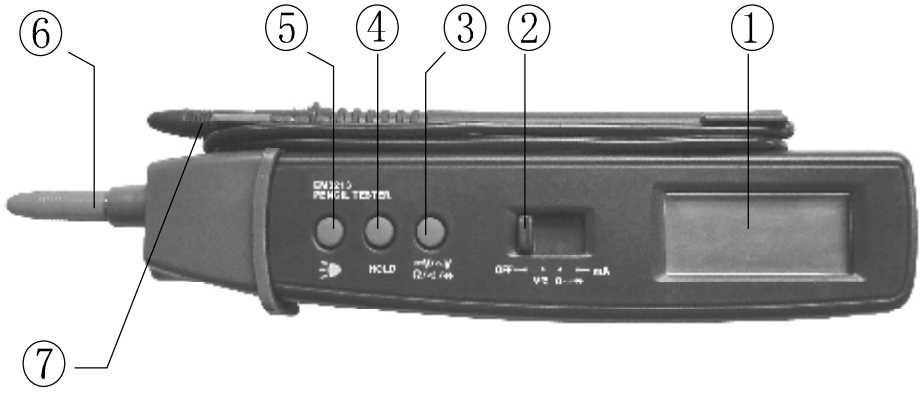
Accuracy is specified for a period of one year after calibration and at 23±5℃ with relative humidity up to 75%. Accuracy specifications take the form of:

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

Function	Range	Accuracy
V⎓	200mV	±(0.5%+2)
	2V-20V-200V	±(0.7%+2)
	600V	±(0.8%+2)
V~	2V	±(0.8%+3)
	20V-200V	±(1.2%+3)
	600	±(1.5%+3)
Ω	200Ω	±(1.2%+3)
	2kΩ, 20kΩ, 200kΩ, 2MΩ	±(1.0%+2)
	20MΩ	±(2.0%+2)
⊣◀	Test Voltage≈1.5V;Test Current≈ 0.5mA	

Function	Range	Accuracy
A ⎓	20mA 200mA	±(1.2% + 3)
A ~	20mA 200mA	±(1.5% + 5)
•)))	If R < 30Ω, the buzzer will sound	

FRONT PANEL DESRIPTION



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

2. Function Switch

The switch is used for selecting the function and range. To preserve the battery's life, set the switch in "OFF" position when the meter is not in use.

3. " SELECT " Button

   This button is used for the function's change between: V_{DC}/ V_{AC} , resistance/diode/continuity

4. "HOLD" button:

   After pressing this button, the present reading will be held on the display. To exit from the mode, just press this button again.

   This button also has the function to arouse the unit from sleep.

5. " ⇶ " button

   To enable the flashlight function, press this button for more than 2 seconds. To turn off the spotlight, do as above again.

   If this button is not pressed again, the spotlight will be turned off in 15 seconds,

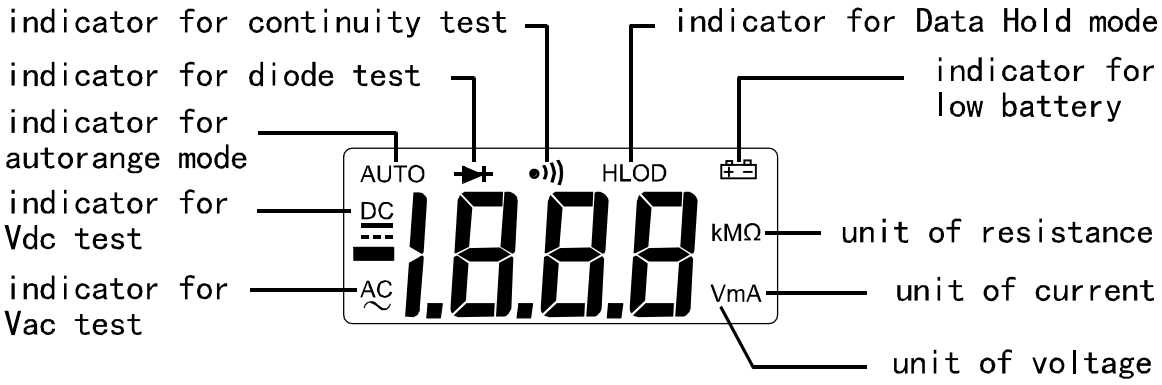
6. Test Probe

   Input probe(positive polarity) for the following tests: voltage, resistance, current (< 200mA), and diode

7. Test Lead

   Input lead (negative polarity).

DISPLAY DESRIPTION



OPERATING INSTRUCTION

Measuring DC Voltage

1. Set the function switch in V position,
2. Press the "SELECT" button to set the unit in DC range.
3. Connect the test probe and test lead across the source or load to be measured
4. The display will show the reading along with the polarity of the test probe.

NOTE:

Input impedance : about 10MΩ

The max. permitted input voltage: 600V, Time : 15 seconds

Measuring AC Voltage

1. Set the function switch in V position.
2. Press the "SELECT" button to set the unit in AC range.
3. Connect the test probe and test lead across the source or load to be measured.
4. Read the reading on the display.

NOTE:

Input impedance : about 10MΩ

Frequency : 40Hz ～ 400Hz

The max. permitted input voltage: 600V, Time : 15 seconds

Measuring DC Current

1. Set the function switch in " mA " position.
2. Press the "SELECT" button to set the unit in DC range.
3. Connect the test probe and test lead in series with the circuit to be measured.
4. Read the DC current value and polarity of the test probe on LCD.

NOTE:

The max. permitted current for "VmAΩ" jack is 200mA, overcurrent will cause blowing to the fuse.

Measuring AC Current

1. Set the function switch in " mA " position.
2. Press the "SELECT" button to set the unit in AC range.
3. Connect the test probe and test lead in series with the circuit to be measured.
4. Read the reading on the display.

NOTE:

The max. permitted current for "VmAΩ" jack is 200mA, overcurrent will cause blowing to the fuse.

Measuring Resistance

1. Set the function switch in the " Ω •)) / ⊣◀ " position.
2. Connect the test lead and test probe across the resistance to be measured , read the value on LCD.

Note:

1. If the resistance is ≥ 1MΩ , it takes several seconds to stabilize. It is normal.

2. If the input terminals is in open circuit, overload mark will be displayed on LCD.
3. Before measuring resistance, make sure that the power supply has been switched off and all the capacitors have been discharged.

Measuring Diode

1. Set the function switch to " Ω •)) / ⊣▶⊢ " position, Press "SELECT" button to make the display show " ⊣▶⊢ ".
2. Connect the test probe and test lead across the diode (test probe to the positive pole of the diode, test lead to the negative pole of the diode).
3. Read the forward voltage on LCD.

Audible Continuity

1. Set the function switch to " Ω •)) / ⊣▶⊢ " position.
2. Press the "SELECT" button for two times to make the dislay show " •)) ".
3. Connect the test probe and test lead across the circuit to be measured, If its resistance is <30Ω, the buzzer will sound.

Auto Power-off

If the instrument is not used or stays in a range position for more than 15 minutes, the power supply will be switched off and the instrument will be in sleep status. To arouse the instrument from sleep, turn the function switch or press the "HOLD" button.

Battery Replacement

To replace the batteries, remove the screws from the battery compartment cover, replace the old batteries with the new batteries of the same type, rejoin the cover and reinstall the screws.

NOTE:

1. To avoid electrical shock, remove the test probe and test lead from any measured circuit before opening the case.
2. Before replacing battery, set the function switch in OFF position.
3. Pay attention to the polarity of the new battery, don't reverse it, otherwise the unit will be damaged.
4. Only use the specified battery:
   Button cell CR2032 X 1

Fuse Replacement

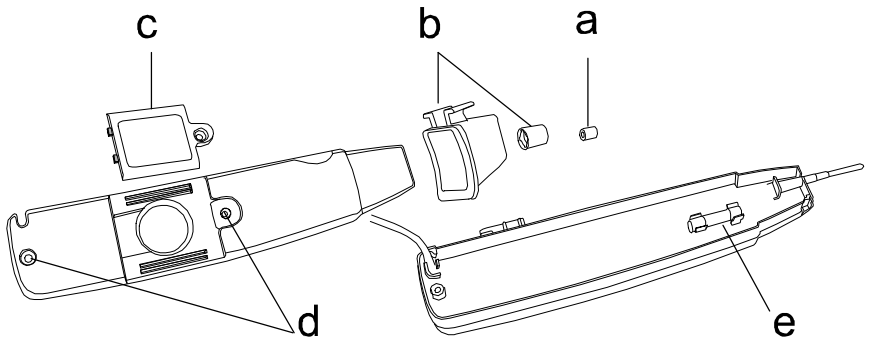
Fuse rarely needs replacement and is blown almost always as a result of operator's error.

To replace fuse, use the fuse with specified ratng:

F250mA/250V(ϕ 5 X 20mm)

To replace the meter's fuse:

1. Turn off the power supply.
2. Remove the screw "a", carefully remove the parts in "b" position(see figure).
3. Remove the screws in "d" position, remove the battery door "c", than remove the the back case.
4. Remove the fuse "e" by gently prying one end loose, then sliding the fuse out of its bracket.
5. Install the specified fuse.
6. Reinstall the screws, battery door and the parts.



ACCESSORIES

Battery: CR2032 1 unit

Manual: 1 unit