MT-1232

Autorange Digital Multimeter

User's Manual

1st Edition 2013

Contents

General

This product equipped with the LCD display of text height 15mm, is a 3 3/4 digital multimeter which has the merits of clear reading, stable performance and high reliability. It could be used to measure DC voltage, AC voltage, DC current, AC current, resistance, capacity, frequency/duty cycle, diode and make on-and-off test. Meanwhile, it is available for unit symbol display, automatic/manual range switching, automatic power off and alarm function. The multimeter, due to its complete functions, performs with high measurement accuracy and convenient operation, and is ideal for general electrical testing and troubleshooting

Open-package Inspection

Open the package box and take out the meter, check carefully if the following accessories are missing or damaged. If there is anything missing or damaged, please contact the distributor immediately.

Digital multimeter	1 PC
User's manual	1 copy
Test leads	1 pair
Temperature Probe (K-Thermocouple)	1 PC
Test Socket	1PC

Safety Note

The design of this meter is in accordance with IEC1010 clause (the safety standard issued by International Electrotechnical Commission). Prior to the operation of the instrument, please read the safety considerations before use.

1. When DC voltage is above 30V, AC voltage above 25V, current above 10mA, AC power line with inductive load or power line during electric fluctuation is measured, please beware of electric shock.
2. Prior to measurement, check if the measurement function switch is at the correct position. Check if the test lead is contacted reliably, connected correctly, and grounded well etc. in order to avoid electric shock.
3. Only if the meter is used with the matched test lead, does it meet the requirement of the safety standard. When the line of the test lead is damaged, it is necessary to replace with another one of the same model or the same electrical specification.
4. Don't use other unconfirmed or disapproved fuses to replace the fuse inside the meter. Only the same model or same

specification fuse can be replaced. Before the replacement, the test leads must be removed from the measuring point and ensure there is no any signal at the input terminal.

5. Don't use other unconfirmed or disapproved battery to replace the battery inside the meter. Only the same model or same electrical specification battery can be replaced. Before the replacement, the test lead must be removed from the measuring point and ensure there is no any signal at the input terminal.
6. When the electrical measurement is made, never let your body gets in touch with the ground directly, and don't touch uncovered metal terminal, output port, lead clamp and etc. where earth potential may exist. Dry clothes, rubber shoes, rubber cushion and other insulating material are usually used to keep your body insulated against the ground.
7. Don't store and use it in the high-temperature, high-humidity, inflammable and strong magnetic field environment.
8. It may damage to the meter and endanger the operator's safety if the voltage value beyond the permitted ultimate voltage value is measured. The ultimate voltage value permitted for measurement is marked on the instrument panel, and never measure the value exceeding the standard. Don't input the ultimate value out of regulation in order to avoid electric shock and the damage to the meter.
9. When the test lead is inserted into the current socket, don't measure any voltage for fear that the meter should be damaged and the operator's safety be endangered.
10. Don't try calibrating or repairing the meter. When necessary, only the qualified professional personnel who have had special training or gained approval can make it.
11. During measurement, the requirement of measurement

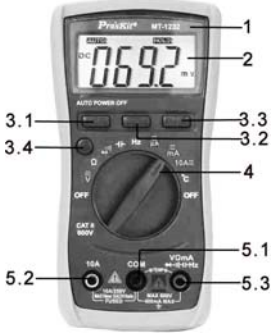
function must be in accordance with LCD display. Please be sure to disconnect the line of the test lead with the measured object first and ensure there is no any input signal. It is forbidden to switch the function/range selection switch during measurement

12. When "  " is shown on LCD display, please replace battery immediately to ensure the measurement precision.
13. It is not allowed to insert the test lead into the current terminal to measure voltage!
14. Please don't change the circuits of the meter freely for fear that the meter will be damaged and the safety endangered.
15. Description of Safety Symbols

	Warning!	V⎓	DCV
	High Voltage! Danger!	V~	ACV
	Ground	A⎓	DCA
		A~	ACA
	Double Insulation	CE	In accordance with the instruction of European Trade Union
	Low Battery		Fuse

Instrument Panel & Function Button Description

1. Instrument model number
2. LCD Display: Displays the measured data and unit.
3. Function Button



3.1 Hz/% (Frequency/Duty Cycle) Press this button to select the frequency or duty cycle mode. The measurement mode of voltage/frequency/duty cycle or current/frequency/duty cycle could be selected by pressing this button in AC/DC voltage or AC/DC current .

3.2 REL (Relative Value Measurement): The relative value measurement of Capacitance function could be conducted by pressing this button

3.3 D/¤ :(Data hold/ Backlight): Press the left side of this button, the reading is locked; press it again (the left side), the lock will release and back to normal measurement status. Press the right side of this button over 3 seconds, the backlight will come on, press this button(the right side) again the backlight turns off.

3.4 S: (Function Switch): Press this button, the function could switch between DC/AC and

4. Knob Switch: Used to change the measurement function and range.
5. Input Terminals

5.1. Current, Voltage, Diode, Resistance, Capacitance, Frequency, Buzzer, Temperature “-” Input terminal.

5.2.10A“+”input terminal.

5.3. Voltage, Diode, Resistance, Capacitance, Frequency, Buzzer, Temperature and“+” Input terminal with current less than 400mA.

Other Functions

Auto Power off

During measurement, the meter will automatically shut down (enter sleeping mode) to save power if function buttons and knob switch are not operated for 15 minutes. In auto power off mode, press any function buttons or rotate the knob switch, the instrument will get into the auto power on mode (working mode)

Properties

General Feature

1-1 Display: LCD

1-2 Max Display: 3999(3 3/4) counts automatic polarity display and unit display

1-3 Measuring Method: Dual integral A/D converter

1-4 Sampling Range: Approx. 3 times / sec.

1-5 Over Range Indication: Display “OL”

1-6 Low Battery Indication: “ ” symbol appears;

1-7 Operation Environment: (0~40)˚C Relative Humidity:<80%

1-8 Storage Environment: (0~50)˚C Relative Humidity:<80%

1-9 Power: 2 pcs 1.5V batteries (“AA” battery)

1-10 Dimension (size): 147×78×41mm

1-11 Weight: Approx. 183g

1-12 Accessories: User’s Manual (1 pc), color box (1 pc), 10A test leads (1 pair), K-Thermocouple, Test Socket(1 pc)

Technical Features

2-1. Accuracy: ± (a%× reading +digits),at (23±5)˚C, relative humidity<75%. One year calibration guarantee from the time dispatched from the factory.

2-2. Technical Specification

2-2-1. DCV

A) Turn the knob switch to "V⎓ "Range

B) The default state of the meter is automatic range status, which shows "AUTO" symbol

C) Put the test lead in contact with the testing point. The voltage and polarity of the point where the red pen is contacted will be displayed on the screen.

⚠ **Caution:**

1. Don't measure voltage over 600V. Otherwise, there is a danger of the meter being damaged.
2. When measuring high voltage, special attention should be given to personal safety and avoid your body getting in touch with high voltage circuit.

Range	Accuracy	Resolution
400mV	±(0.5%+4d)	100uV
4V		1mV
40V		10mV
400V		100mV
600V	±(1.0%+4d)	1V

- Input Impedance: 400m >40MΩ; 10MΩ at other Ranges.
- Overload Protection: 600V DC or 600V AC Peak Value.

2-2-2. ACV

A) Insert black test lead into the hole of “COM” and red test lead into “VΩmA Hz “

B) Rotate function switch to “V⎓“, press “SELECT” button to select the AC measurement mode.

C) The default state of the meter is in automatic range status, which shows “AUTO” symbol

D) Put the test lead in contact with the testing point. The voltage of the point where the red test lead is contacted will be displayed on the screen.

⚠ **Caution:**

1. Don’t measure voltage over 600V. ; Otherwise, the meter will be damaged.
2. When measuring high voltage, special attention should be given to personal safety and avoid your body getting in touch with high voltage circuit.

Range	Accuracy	Resolution
4V	±(0.8%+6d)	1mV
40V		10mV
400V		100mV
600V	±(1.0%+6d)	1V

- Input Impedance: >10MΩ
- Overload Protection: 600V DC or 600V AC Peak Value
- Frequency Response: (50~200) Hz
- Display: Average value response (RMS of sine wave).

2-2-3. DCA

A) Insert the black test lead into the “COM” input terminal and red test lead into the “VΩmA Hz “input terminal. (Max 400mA), or 10A input terminal (Max 10A).

B) Rotate function switch to Current. The default state of the meter is in automatic range status, which shows “DC” symbol. Then connect the test lead to the tested circuit in series, the tested current value and the current polarity of the point where the red pen is contacted will be displayed on the screen simultaneously.

⚠ **Caution:**

1. If “OL” is displayed on LCD, it indicates the tested current value has exceeded the present range limit, please select higher range to complete the measurement.
2. The Max input value is 400mA or 10A. (Depending on the terminal where the red test lead is contacted)

Range	Accuracy	Resolution
400uA	±(1.0%+10d)	0.1uA
4000uA		1uA
40mA		10uA
400mA		100uA
10A	±(1.2%+10d)	10mA

- Max measurement voltage drop: Full Range mA is 0.4V, A is 100mV;
- Max input current: 10A (less than 15 seconds);
- Overload Protection: 0.4A/250V restorable fuse, 10A/250V fuse.

2-2-4. ACA

A) Insert the black test lead into the “COM” input terminal and red test lead into the “VΩmA Hz “input terminal. (Max 400mA), or 10A input terminal (Max 10A).

B) Rotate function switch to Current. Press “SELECT” button to select the AC measurement mode. Then connect the test lead to the tested circuit in series, the tested current value and the current polarity of the point where the red test lead is contacted will be displayed on the screen simultaneously.

⚠ Caution:

1. If “OL” is displayed on LCD, it indicates the tested current value has exceeded the present range limit, please select higher range to complete the measurement.
2. The Max input value is 400mA or 10A. (Depending on the terminal where the red test lead is contacted) The overrated current will lead to fuse melt or even damage the meter.

Range	Accuracy	Resolution
400uA	±(1.5%+10d)	0.1uA
4000uA		1uA
40mA		10uA
400mA		100uA
10A	±(2.5%+15d)	10mA

- Max measurement voltage drop: Full Range mA is 0.4V, A is 100mV; Max input current: 10A (less than 15 seconds);
- Overload Protection: 0.4A/250V restorable fuse, 10A/250V fuse; Frequency Response: 10A Range (50~200)Hz.

2-2-5. Resistance (Ω)

A) Insert the black test lead into “COM” terminal and red test lead into “VΩmA Hz“terminal.

B) Rotate the Range to “Ω”. Cross connect the two test leads to the tested resistor.

C) When measuring the low resistance, please short-circuit the test leads at first to test the wire resistance, and then deduct it from the actual resistance.

⚠ **Caution:**

1. If “OL” is displayed on LCD, it indicates the tested resistance value has exceeded the present range limit, please select higher range to complete the measurement. When measuring the Resistor higher than 1MΩ, the instrument will take several seconds to make the reading stable. It is normal when measuring the high resistor.
2. When the input terminal is open circuit, it will display “OL”.
3. When measuring in-line resistor, be sure that the power is off and all capacitors are discharged completely.

Range	Accuracy	Resolution
400Ω	±(0.8%+5d)	0.1Ω
4kΩ	±(0.8%+4d)	1Ω
40kΩ		10Ω
400kΩ		100Ω
4MΩ		1kΩ
40MΩ	±(1.2%+10d)	10kΩ

• Open Voltage circuit: Less than 200mV;

• Overload Protection: 250V DC or AC Peak Value;

Note: When measuring at Range 400Ω, please short-circuit the test leads at first to test the wire resistance, and then deduct it from the actual resistance.

2-2-6.Diode and Continuity Test

A) Insert the black test lead to “COM” terminal and the red test lead to “VΩmA Hz” terminal. (The polarity of red test lead is“+”).

B) Rotate the Range to “ ”. Press “SELECT” button to select the Diode measurement mode.

C) Forward Measurement: Connect the red test lead to the diode positive polarity and the black test lead to the diode negative polarity. The approximate value of diode forward voltage drop will show on the display.

4. Backward Measurement: Connect the red test lead to the diode negative polarity and the black test lead to the diode positive polarity. “OL” symbol will be displayed on the screen.
5. The complete diode testing includes forward and backward measurement, if the result does not meet the above; it means the diode is bad.
6. Press “S” button to select the Continuity measurement mode.
7. Connect the test leads to two points of the tested circuit. If the built-in buzzer sounds, the resistance between the two points is less than 50Ω.

Range	Display	Test Condition
	Forward Voltage Drop of Diode	Forward DC Current is Approx. 0.5mA, Backward Voltage is Approx. 1.5V
	Buzzer makes a long sound if resistance is less than 50Ω	Open circuit voltage is Approx. 0.5V

• Overload Protection: 250V DC or AC Peak Value.

CAUTION: DO NOT INPUT VOLTAGE AT THIS RANGE!

2-2-7. Capacitance (F)

A) Rotate function switch to “ ”.

B) Insert the black test lead to “COM” terminal and red test lead to “VΩmA Hz ” terminal or insert the test socket.

C) Connect the tested capacity by the test leads to “COM”, “VΩmA Hz ” input terminal or insert the test socket hole Cx - / +, the screen will show capacitance parameter. (The relative value measurement could be conducted by pressing “REL” button.)

⚠ **Caution:**

1. Fully discharge the tested capacitor in case it damages the meter.
2. When measuring in-line capacitor, the power should be turned off and all capacitors should be discharged completely.
3. It takes about 30 seconds to input stable reading at 100uF Range.

Range	Accuracy	Resolution
4nF	±(5.0%+9d)	1 pF
40nF	±(3.5%+8d)	10pF
400nF		100pF
4μF		1nF
40μF		10nF
100μF	±(5.0%+8d)	100nF

• Overload Protection: 250V DC or AC Peak Value.

2-2-8. Frequency (Hz)

A) Connect test leads and shielded cable to “COM”, “VΩmA Hz” terminals.

B) Rotate function switch to “Hz”. Connect test leads and the cable to the signal source or the tested load. The tested signal will show on the screen.

Caution:

1. When inputting AC RMS over 10V, it could show reading, but excess vibration may appear.
2. It is recommended to test weak signals by shielded cable under noisy circumstances.
3. Select ACV when testing the frequency of high voltage. Then press “Hz/DUTY” button to enter frequency measurement status.
4. Don’t input voltage of over 250V DC or AC peak value in case it damages the meter.

Range	Accuracy	Resolution
1Hz	±(0.5%+10d)	0.001Hz
10Hz		0.01Hz
100Hz		0.1Hz
1kHz		1Hz
10kHz		10Hz
100kHz		100Hz
1MHz		1kHz
10MHz		10kHz
0.1-99.9%	For your reference	0.1V

• Input Sensitivity: >0.7V RMS

• Overload Protection: 250V DC or AC Peak Value.

2-2-9. Temperature (˚C)

A) Rotate function switch to (˚C).

B) Insert the cathode (black pin) of cold end (free end) of thermocouple into “COM” jack and anode into “VΩmA Hz” terminal. Then put the working end (temperature measurement end) of thermocouple on the surface or inside the object to be tested. Then you can read temperature from the screen, and the data is in Centigrade.

⚠ **Caution:**

1. When the input terminal is open-circuit, it will display the normal temperature.
2. Don’t change the temperature probe at random, or the value accuracy could not be guaranteed.
3. Don’t measure voltage at temperature range.

Range	Accuracy	Resolution
(-20~1000)˚C	<400˚C±(1.0%+5d) ≥400˚C±(1.5%+15d)	1˚C

• Sensor: K Type Thermocouple (Nickel-chromium--nickel silicon) (banana plug).

⚠ **Caution: DO NOT INPUT VOLTAGE AT THIS RANGE!**

Instrument Maintenance

This is a precision instrument and the user shall not modify the electric circuit as well.

1. Keep the instrument away from water, dust and shock.
2. Do not store and operate the meter under the condition of high temperature, high humidity, combustible, explosive and strong magnetic place.
3. Wipe the case with a damp cloth and detergent; do not use abrasives and alcohol.
4. If the instrument is not operated for a long time, please take out the battery to avoid leakage.
5. Pay attention to the status of the 1.5v battery. When the LCD displays a flashing “”symbol, the battery shall be replaced.

The steps are as follows:

5-1. Loosen the screw on the back cover that secures the battery case and remove the battery case.

5-2. Remove the 1.5V batteries and replace them with two new ones. Although a 1.5V battery of any standard can be used, but in order to lengthen the operation life, alkaline batteries should be used.

5-3. Mount the battery case back and tighten the screw.

Precaution:

1. Don’t input voltage higher than DC 1000V or AC Peak Value.
2. Don’t measure voltage at current, resistance, diode and buzzer range.
3. Don’t use the instrument when the battery has not been mounted properly or the back cover ahs not been tightened.
4. Prior to the replacement of battery or fuse, please remove the test leads from the measuring point and switch off the meter.