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Safety Rules and Precautions

- The design of this product complies with IEC1010 (safety standard issued by ICE); please read this manual carefully prior to use;
- The user may operate the product according to this manual and the figures inside, which may help the user to use the meter correctly and conveniently;
- Please check the casing of this meter and the insulating layer are in good conditions before using;
- DO NOT use the meter to measure the voltages/currents beyond the limits;
- It may be dangerous if the voltage is higher than DC 36V/AC 25V, please use the meter cautiously in case of high voltage to avoid electrical shocks;
- It may also be dangerous if the voltage has common mode voltage with the earth; please ensure the common mode voltage is lower than 1,000 Vp-p.
- Please use the same type of fuse if it needs to be replaced;
- The battery voltage is not enough when LCD displays the icon of battery, the user should replace it with new one to ensure normal working;
- Remove the meter test leads before opening the bottom casing, tighten the screws after removing it back, and then the meter may be used; failure to do that might cause electric danger;
- Please take out battery if the product is not used for a long time to avoid the leakage, damaging the electronic parts;
- Please place and store the device in dry and clean environment;
- No user-serviceable parts inside, DO NOT dismantle, change or refit the meter; This digital multimeter is a tool for electric measurement, please use it correctly and keep good maintenance;

Overview

Model TRI7208 features:

- Model TRI7208 is manual ranging digital multimeter designs' excellent, the appearance is novel and natural. We have made especially efforts on the mistaken operations. The new protection circuit won't burn the meter unless under extreme conditions. The protection holster, bracket and magnet save and ease your operation.

Function list

Max display	1999	Resistance	▲
Auto power off	▲	Capacitance	▲
Data hold	▲	Frequency	▲
DC Voltage	▲	Temperature	▲
AC Voltage	▲	Continuity	▲
DC Current	▲	Diode test	▲
AC Current	▲	triode test	▲

Electrical symbol

	Safety note		Fuse
	High voltage danger		Compliance with safety standard
	Double insulation		Earth
	AC		Buzzer
	DC		Battery
	AC/DC		Diode

Operating Instructions

Check

Please check whether the meter and testing leads are in good conditions and ensure that the battery is enough before use;

Description of Signal Overload

When LCD only displays “1” (beyond the range) while measuring voltage/current, it means it is overloaded and higher range is needed. If LCD still displays “1” on the highest range position, at this moment please stop measuring and find out the reason;

However, in some positions, it's common and normal that the meter displays "1" although no measurement is being made, such as resistance, continuity, and diode etc.

POWER:

- The power switch is a self locking switch, use it to turn the meter on or off.

HOLD:

- The meter has data hold function, HOLD key lock and quit the data.
- The LCD displays "HOLD" and indicates data hold state.

AUTO POWER OFF

- Press the POWER, 15 minutes later the LCD display disappear if the meter is not used for this period. The meter goes into low power consumption and sleep state. (If to completely turn off the power press POWER). If to restart, press the power switch.

DC Voltage measurement

- Rotate "function/range switch" to " \overline{V} ", choose the suitable position.
- Insert the red test lead into V socket, black to COM socket.
- Connect the test leads to both ends of voltage source to be examined.
- Read the measured value from LCD.

AC Voltage measurement

- Rotate "function/range switch" to " \overline{V} ", choose the suitable position.
- Insert the black test lead into the "COM" socket and the red test lead into "V" socket.
- Connect the test lead in parallel to both ends of voltage source examined.
- Read the measuring results from LCD.

Preparation for current measurement

- Shut off the power of return circuit.
- Be careful that the open circuit voltage of the measured return circuit can't exceed 220V.
- When testing leads insert to "current input terminal", if the range switch isn't at the correct range, the meter will sound and light a warning.
- To use 10A jack for heavy current measurement, every 15 seconds need a stop to cool down the meter.
- The current measuring object is usually "the load current" in the return circuit. It has big difference from voltage measurement, so to use specified

jacket. When the meter at the current test state, can't test "voltage source". For example, Insert the testing leads to 220V socket, which leads to consequences resulting from short circuit.

DC Current measurement

- Estimate the value of current under test, rotate "function/range switch" to \overline{A} , choose the suitable position. If the current is heavy, should switch to 10A range.
- According to the range selected, insert the red test lead into the mA μ A or 10A socket; and the black test lead into "COM" socket.
- Switch off the power supply of the circuit under test.
- Switch off the loaded end of test circuit, place the meter in the test circuit in series.
- After correct connection, turn on the power of the test circuit.
- Read the measured value from LCD.

AC Current measurement

- Estimate the value of current under test, rotate "function/range switch" to \overline{A} , choose the suitable position. If the current is heavy, should switch to 10A range.
- According to the range selected, insert the red test lead into the mA μ A or 10A socket; and the black test lead into "COM" socket.
- Switch off the power supply of the circuit under test.
- Switch off the loaded end of test circuit, place the meter in the test circuit in series.
- After correct connection, turn on the power of the test circuit.
- Read the measured value from LCD.

Resistance measurement

- Rotate the "function/range switch" to Ω ranges and select the suitable range.
- Insert the black test lead into the COM socket; and the red test lead into Ω socket.
- If the circuit under test is powered, then switch it OFF and discharge capacitance completely. Raise one end of the measured resistance to the correct measurement mode. Usually don't permit to measure voltage in the resistance measuring range.
- Connect the test leads to the both ends of the resistance.

- Read the measured value from the LCD in 200M Ω range, 1M Ω basic data should be reduced.

Continuity measurement(circuit resistance < 30 Ω)

- Rotate the “function/range switch” to  position.(The same position as diode testing range)
- Insert the black test leads into COM socket; and red test lead to Ω socket.
- Switch off the power supply if the measured circuit has electricity. Continuity measurement can't be used to test circuit that are live.
- Connect the test leads to the both ends of the resistance.
- If the both ends under test are connected, the buzzer will beep continuously from which the users can make prompt judgement on the continuity of the circuit. If the two ends of the resistance are disconnected, there will be no beep, and the LCD displays over range “1”.

Diode measurement

- Rotate the “function/range switch” to  position.(The same position as continuity range)
- Insert black test leads to COM socket;and red to Ω socket.
- If the circuit under test is live, do switch it off. Diode measurement can't be used to test live circuits.
- Connect the red test lead to positive pole of the diode, black test lead to negative pole of the diode. The LCD displays “forward voltage drop”of the diode,it is usually 0.5-0.7V. If connect the test leads to the contrary poles, the diode don't breakover,LCD displays over range “1”.
- If testing results is not reasonable, the diode may be damaged. Please consult the professional staff.

Capacitance measurement

- Rotate“function/range switch”to Capacitance measurement position.
- In capacitance position, there is special “CX” socket for capacitance test.
- It is not allowed to test voltage at capacitance measuring state, or the fuse may be burn out and even a more serious consequence. If test online capacitance, cut off the power supply of the circuit and safely discharge the capacitance in circuit. Usually lift up one end of the capacitance to measure in complicated circuit.
- Connect the test leads to both ends of the capacitance.
- Read the measured value from the LCD.

Frequency measurement

- Rotate the “function/range” switch to Hz position.
- Insert the black test leads to COM socket, and red to Hz socket.
- Connect the test leads to frequency signal source.
- Read the frequency measured value from LCD.

Temperature measurement

- Rotate “function/range” switch to C position, the meter displays the room temperature.
- Insert K type thermocouple into input sockets: positive pole to socket, negative pole to COM socket. (If the thermocouple is oblate socket, use versatile socket to change over)
- Put the measuring end of the thermocouple at the object.
- Read the centigrade degree value from LCD.

hFE measurement

- Rotate the “function/range” to hFE position.
- There is special hFE socket for hFE measurement.
- Confirm if the triode is NPN or PNP type, and confirm the arrangement of triode pin e, b, c.
- Read the hFE value from LCD.
- Remark: hFE value at dozens of to several hundred is normal, accurate hFE measurement is meaningless in practical application. hFE parameter has sth to do with working current. The meter tests low current, only suitable for low power triode measurement.

Battery and fuse replacement

Caution:

To avoid any electric accident, do stop measuring and take out the test leads from test lead hole before replacing battery and fuse.

It must remove the protective casing of the meter before replacing battery and fuse. Screw off the screws on the bottom casing and open the casing.

It's advised to use good quality battery product as the leakage of bad quality battery may damage the electric parts of the meter. Same type of fuse must be used. Take out the burnt fuse carefully and install the new one, please keep enough clamping force and good contact.

Remove back the casing, tighten the screws and finally take back the protective casing.

Technical Specification

Display: LCD

Display mode: 3-1/2 digit (1999) ,polarities display

Beyond range: display “1” at the highest position;

DC precision: $\pm 0.5\%$ (1999)

Auto Power-OFF: about 15 minutes if no operation is made

Power supply: one 9V battery, static working current: about 1-5mA

Dimensions: 186mm x 93mm x 55mm (with protective casing)

Weight: about 370g (with battery and protective casing)

Working temperature: $0^{\circ}\text{C}\sim 40^{\circ}\text{C}$

relative humidity: $< 85\%$

Storage temperature: $-10^{\circ}\text{C}\sim 50^{\circ}\text{C}$

relative humidity: $< 85\%$

Temperature for accuracy: $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$

relative humidity: $< 70\%$

Accessories: operating manual, one pair of test leads, one 9V battery (6F22), one K type thermoelectric couple, packing box.

Technical Indexes

Accuracy: $\pm (a\% * \text{reading} + \text{word count})$, warranty period: one year

Temperature (get accurate value): $23\pm 5^{\circ}\text{C}$ relative humidity: $< 75\%$

DCV

Range	Accuracy (1999)	Resolution
200mV	$\pm (0.5\%+3)$	10 μV
2V		100 μV
20V		1mV
200V		10mV
1000V	$\pm (0.8\%+5)$	100mV

Input impedance: 10M Ω

Overload protection: 200mV range is 250V, other ranges are DC/AC peak value 1,000V

ACV

Range	Accuracy (1999)	Resolution
200mV	$\pm (1.0\%+5)$	100 μ V
2V		1mV
20V		10mV
200V		100mV
700V	$\pm (1.2\%+5)$	1V

Input impedance: 10M Ω

Overload protection: 3-1/2 digit (1999) 200mV, and other ranges: are DC/AC peak 1,000V.

Frequency range: 700V range: 40Hz/200Hz, other ranges: 40Hz/400Hz

Characteristics: average value response (calibration of effective value of the sine wave)

DCA

Range	Accuracy (1999)	Resolution
20mA	$\pm (1.0\%+2)$	10 μ A
200mA	$\pm (1.5\%+2)$	100 μ A
10A	$\pm (2.0\%+5)$	10mA

Max. input voltage drop: 200mV

Max. input current: 10A (time of measuring less than 10 seconds)

Overload protection: mA hole: 0.2A/250V fuse; 10A hole has no fuse

ACA

Range	Accuracy (1999)	Resolution
20mA	$\pm (1.8\%+3)$	10 μ A
200mA	$\pm (2.0\%+3)$	100 μ A
10A	$\pm (3.0\%+7)$	10mA

Max. input voltage drop: 200mV

Max. input current: 10A (time of measuring less than 10 seconds)

Overload protection: mA hole: 0.2A/250V fuse; 10A hole has no fuse

Frequency range: 40Hz/400Hz

Characteristics: (calibration of effective value of the sine wave)

Resistance(Ω)

Range	Accuracy (1999)	Resolution
200 Ω	$\pm (1.0\%+4)$	0.1 Ω
2K Ω	$\pm (1.0\%+2)$	1 Ω
20K		10 Ω
200K		100 Ω
2M Ω		1K Ω
20M Ω	$\pm (1.0\%+5)$	10K Ω
200M Ω	$\pm (2.0\%+5)$	100K Ω

Measured voltage: about 0.6V (about 2.8V at 200M Ω position)

Overload protection: DC/AC peak 250V

Remark:

- A. when use 200 Ω range, please make the meter pen short circuit first and measure the resistance of the lead, and then deduct the value from the later measurement (Ex.: the short circuit resistance of the lead of the two meter pens is 0.3 Ω , the measured resistance is 100 Ω , and the reading should be 100.3M Ω , then it should deduct 0.3 Ω from the reading, namely: 100.3-0.3=100.0 Ω);
- B. When use 200M Ω range, please make the meter test leads short circuit first, the meter displays 1.0M Ω , it's normal and shall not affect the accuracy, but the reading should deducted by this value (Ex.: the measured resistance is 100M Ω , the reading should be 101.0M Ω , then it should deduct 1.0M Ω from the reading, namely: 101.0-1.0=100.0M Ω);

Capacitance

Range	Accuracy (1999)	Resolution
20nF	$\pm (4.0\%+5)$	10pF
200nF		100pF
2 μ F		1nF
200 μ F	$\pm (5.0\%+10)$	100nF

Input protection: 0.2A/250V fuse protection, the fuse breaks when voltage input (the circuit of capacitance measurement is not allowed to have voltage input, or it may damage the electric circuit); please discharge the capacitor before measuring the capacitor.

Voltage output measurement: about 40mV

Frequency measurement: about 400Hz.

Frequency (Hz)

Range	Accuracy (1999)	Resolution
2kHz	$\pm (1.5\%+5)$	10Hz
20kHz	$\pm (1.5\%+5)$	10Hz

Input signal: 250mVpp □ 100 Vpp

Input limit: DC/AC peak 250V

Temperature

Range	Accuracy	Resolution
-40°C ~ 400 □	$\pm (2.0\%+5)$	1 □
400 □ ~ 1000 □	$\pm (2.0\%+15)$	1 □

Sensor: K type (nickel chromium-nickel aluminum) thermoelectric couple, banana plug

Characteristics of open circuit: display the ambient temperature

Protection in case of wrong voltage input: DC/AC peak 250V

Diode and continuity test

Range	Value	Testing Conditions
	Buzzer gives off long sound if the resistance between two measuring points is smaller than $(30\pm 20)\Omega$	Open-circuit voltage: about 2.8V
	Forward voltage drop of diode	Forward DCA: 1 mA Backward DCV: about 2.8V

Protection in case of wrong voltage input: DC/AC peak 250V

Maintenance

Clean

Please use soft wet cloth to clean the surface of the meter carefully, do NOT

use any solvent such as benzene, acetone or other.

Troubleshooting

In case of fault, please check the meter as below:

1. Check whether the operation is correct according to the instructions;
2. Check whether the meter pens and leads are in good condition as well as the connections;
3. Check whether the battery is enough; if the battery icon is displayed on LCD, please replace with a new one;
4. If it couldn't measure the current normally, please check whether the fuse is burnt.