

SECTION 1 INTRODUCTION

GENERALIZATION

The instrument is a 5-digit portable multimeter powered by 220 V dc with high accuracy and performance. It has all the features of a digital millimeter and measures AC /DC voltage, AC/DC current, resistance, capacitance, dBm, TC, RTD, Diode Test, and Continuity Check, frequency/duty cycle ratio. Besides, it has the following features:

- A VFD Display that allows two properties of an input signal to be displayed at the same time.
- Accurate true rms AC value, bandwidth for type A measurement: 20Hz~50kHz ; bandwidth for type B measurement: 20Hz~1kHz.
- 1uV sensitivity in volts DC.
- 2-wired and 4-wired resistance measurement.
- Measurable capacity higher than 100mF.
- Selectable 1~2400Ω reference impedance dBm measurement.
- Display hold, relative data measurement, maximum value, minimum value and average value measurement
- Selectable manual or auto-range.
- Display rate: 5 readings/ second (slow) and 20 readings/second (slow).
- TC measurement: K graduation degree, inner temperature transmitter, auto-cold compensation, and temperature display in °C or°F.
- The built-in memory counter can store up to 50000 (group) independent measuring data.
- Panel calibration function (without open-case adjustment).
- Isolation of common Universal Serial Bus(USB) Port and RS232 serial port.
- Remote operation, surveillance and recording data with a computer. Standard SCPI command is supported, and remote control of the meter can be realized by equipment software.

OPEN-CASE INSPECTION

Carefully remove the meter from its shipping container and inspect it for possible damage or missing items. If the meter is damaged or something is missing, contact the place of purchase immediately. Save the container and packing material in case you have to return the meter.

Accessories:

test lead	1 piece
Power line	1 piece
USB wire	1 piece
DB/9 series wire	1 piece
CD	1 disk
Quick Reference Guide	1 book

SAFETY INFORMATION

The meter has been designed and tested according to GB4793.1(Equivalent of IEC Publication 1010-1 Safety Requirements for Electronic Measuring Apparatus). This manual contains information and warnings which must be followed to ensure safe operation and retain the meter in safe condition.

Warning	identifies conditions and actions that pose hazards to the user;
Caution	identifies conditions and actions that may damage the meter or the equipment under test;
Note	identifies symbols of the operation and explanations of the features. International symbols used on the meter and in this manual are explained in Table 1-1.



Warning

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

- Use the meter as the instructions of the producer; otherwise, the protective function shall be invalid.
- Do not use the meter if it is damaged. Before you use the meter, inspect the case. Look for cracks or missing plastic. 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 with the same type and electronic specification 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 around explosive gas, vapor, or dust.
- Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and earth ground.
- Make sure the meter works normally as per testing a known voltage. Do not use the meter if it operates abnormally. When in doubt, have the meter serviced.
- To avoid possible electric shock caused by false reading due to existing alternating voltage in all the DC voltage functions, including manual and auto ranging, make sure whether there is any alternating voltage existing or not before selecting a direct voltage range equals to or higher than the alternating voltage.
- Do not touch the exposed wire, connector or unused input jack or circuit under test when the meter is working.
- Use caution when working above 30 V ac rms, 42 V peak, or 60 V dc. Such voltages pose a shock hazard.
- Avoid working alone.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- To avoid possible fire or electric shock, do not connect TC with the live circuit.



Caution

To avoid possible damage to the meter or to the equipment under test:

- Set the rotary switch on the right range. Do not cut off the testing leads and circuit before switching. Forbid to switch during





the measuring process.

- Cut off the power and complete discharge before measuring resistance, capacitance, diodes, or continuity with the live circuit.
- Before measuring current, check the meter’s fuses (see Section 6 “Testing the Fuses”). Turn power OFF to the circuit before connecting the meter to the circuit. Remember: Plug the meter with the circuit in series when measuring current and do not connect test lead in parallel with any circuit.

SYMBOLS

Some common international electrical symbols used in this manual are shown below, see Table 1-1.

Table 1-1. International Electrical Symbols

Symbols	Meaning	Symbols	Meaning
○	OFF(power) SWITCH POSITION		DANGEROUS VOLTAGE
	ON(POWER) SWITCH POSITION		EARTH GROUND
~	AC LOOP		FUSE
— — —	DC LOOP		WARNING INFORMATION

SECTION 2 GETTING ACQUAINTED WITH THE INSTRUMENT

FRONT PANEL

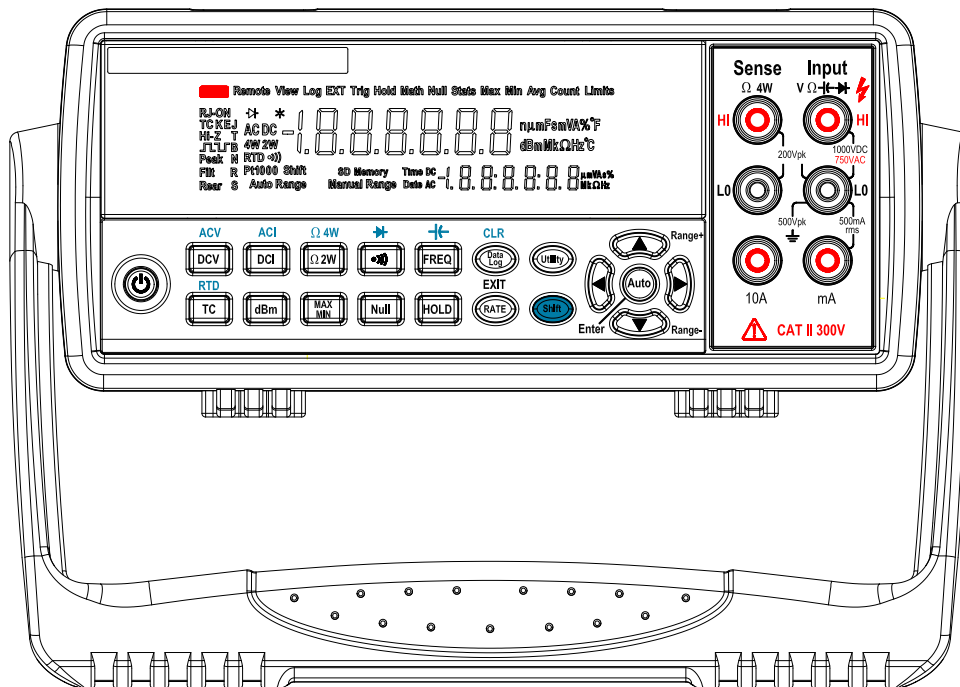


Figure 2-1

REAR PANEL

The rear panel contains the power-line cord connector, the power switch, a 0.25A/250V slow melt fuse, a USB communication port and a RS232 communication port.

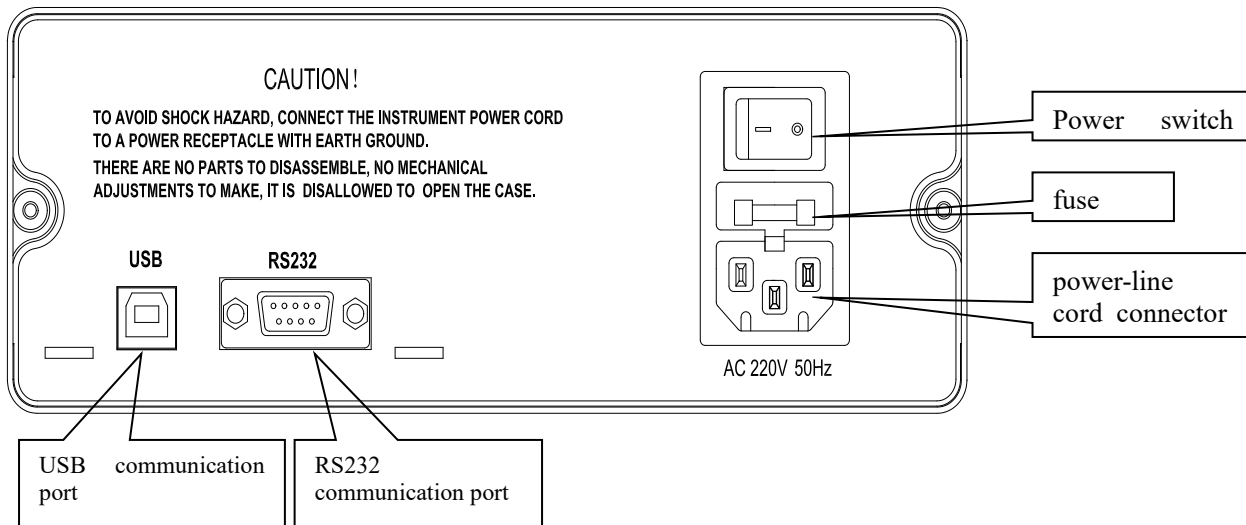


Figure 2-2

ADJUSTING HANDLE

The handle can be positioned to provide four different viewing angles. To adjust its position, pull the ends out to a hard stop and rotate it to a position. To remove the handle, adjust it to the vertical stop position and pull the ends all the way out. See Figure 2—3.

Handle position 1- instrument flat wise

Handle position 2-support fixed elevation, convenient for use

Handle position 3-lift up the instrument

Handle position 4-dismantle position for the hand shake

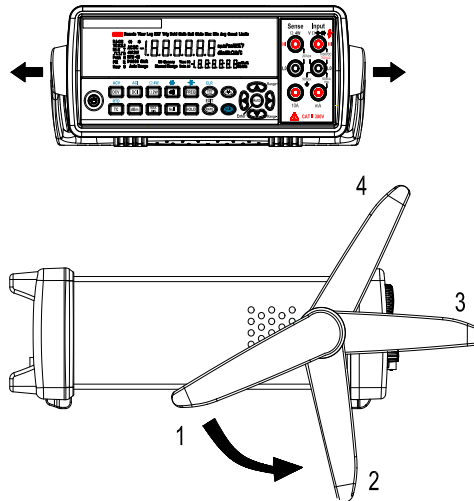


Figure 2-3

INPUT TERMINAL

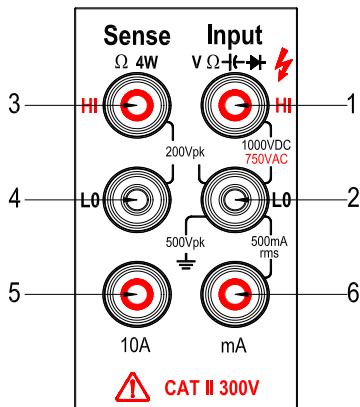


Figure 2-4

Input Terminals	Function Illustration
1	Input HI : direct voltage, direct mV voltage, alternating voltage, alternating mV voltage, resistance, diodes, continuity, frequency, RTD, TC, dBm.
2	Input Lo: all measured common(returned) terminals(-)
3	Sense HI: high terminal of 4-wired resistance
4	Sense Lo: low terminal of 4-wired resistance
5	mA: AC/DC current (A)
6	10A: AC/DC current (mA, microamp)

PRESS KEY

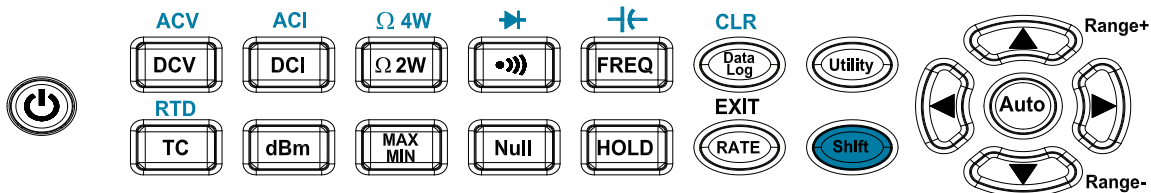


























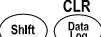








Figure 2-5

Press key	Illustration	Shift key function	Illustration
Note			
Press Shift to access “Blue Button Functions”, and symbol Shift will be on display.			
	In measurement mode, press to turn on or off the VFD screen.		
	Press to select DC voltage measurement mode.	 	Press to select AC voltage measurement mode.
	Press to select DC current measurement mode.	 	Press to select AC current measurement mode.
	Press to select 2-wired resistance measurement mode.	 	Press to select 4-wired resistance measurement mode.
	Press to select continuity measurement mode.	 	Press to select diode measurement mode.
	Press to select frequency measurement mode.	 	Press to select capacity measurement mode.
	Press to select K type TC measurement mode.	 	Press to select RTD measurement mode.
	Press to select dBm measurement mode.		
	Press to select maximum and minimum function measurement mode.		
	Press to select relative value measurement mode.		
	Press to select data hold function.		

	Press to select instrument setting function mode.		In setting function mode, press to select setting option.
	In measurement function mode, press to enter into storage setting function firstly, and then repress to start storing, and thirdly press to exit.		In storage function mode, press to select deleting the stored data firstly, and then repress to start deletes.
	In measurement function mode, press to change the measured rate; In setting mode and storage function mode, press to return to measurement function.		
	In measurement function mode, press to increase range; In setting function mode, press to change setting item value.		
	In measurement function mode, press to decrease range; In setting function mode, press to change setting item value.		
	In setting function mode, press to set blinking digit by moving towards left.		
	In setting function mode, press to set blinking digit by moving towards right.		
	In measurement function mode, press to shift between auto-range and manual range; In setting function, press to save setting item; In storage function, press to change setting item.		

DISPLAY SCREEN

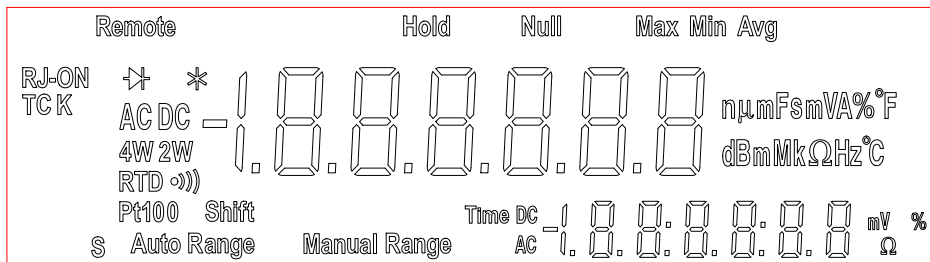




Figure 2-6

No.	Unit	Meaning
1	Remote	PC online communication indication
2	Hold	To hold present value
3	Null	relative value measurement

4	Max Min Avg	Maximum value and minimum value measurement, primary display shows MAX, MIN, AVG value in cycle while auxiliary display shows real-time value.
5	RJ-ON	To turn on cold-compensation
6	TC K	K graduation TC
7		diode measurement
8	*	measured data refreshing indication
9	AC DC	AC/DC measurement indication
10	2W 4W	2-wired or 4-wired resistance measurement indication
11		continuity test indication
12	RTD Pt100	Pt100 graduation RTD
13	S	measurement work: measurement rate indication (slow)
14	Shift	second function key indication
15	Auto Range	auto-range indication

16	Manual Range	manual range indication
17	-88888	primary display part (55000 digit)
18	Ω 、k Ω 、M Ω	the unit of resistance: ohm, Kilo-ohm, and Mega-ohm
	Hz、kHz	the unit of frequency: Hertz, Kilohertz
	A、mA、 μ A	The unit of current: Amperes (amps), Milliamp, Microampere.
	V、mV	The unit of voltage: Volt, Mill volt
	nF、 μ F、mF	The unit of capacitance: Nanofarad, Microfarad, Millifarad.
	$^{\circ}$ C、 $^{\circ}$ F	Degrees Celsius (default) or Fahrenheit.
	dBm	For ac volts functions, reading is shown in decibels of power above or below 1 mW(dBm).
	%	REL% measurement, Shows that the relative percentage.
19	Time	time indication in auxiliary display part
20	-1.8.8.8.8.8%	data and value in auxiliary display part

TURNING ON THE MULTIMETER

To turn on the multimeter, switch on the power key on the rear front. If the power is cut off, then wait for 5 seconds before repress the multimeter, otherwise the meter will not start.

When powering on, the meter undertakes circuit inner inspection, which are used to inspect RAM, ROM A/D convertor and display screen, and the meter displays in full screen simultaneously. If no mistake is displayed, the meter enters into normal measurement state.

The multimeter is in initial state of starting measurement stored in NV memorizer after start. The default setting value has been shown in Table 3-6 (to change the setting value , see Section 5 “Changing the Default Settings”).

SECTION 3 OPERATION METHOD

The meter is powered by 220 V ac, when using first plug the power line into the jack and then switch on the power. Each set is equipped with a test lead as standard accessory, and the input terminal in the font panel can increase the measured voltage to 1000v, the current to 10A and the resistance to 50MΩ. To guarantee accuracy, please preheat for 30 minutes before measurement.

Note: before connected into the circuit under measurement, do not apply any value exceeding the limits prescribed in the font panel.


MEASURING VOLTAGE

Voltage is the difference in electrical potential between two points. The polarity of ac (alternating current) voltage varies over time, while the polarity of dc (direct current) voltage is constant over time.

Ranges available in volts functions are:

- DC voltage: 5.0000V, 50.000V, 500.00V, 1000.0V, both auto-range and manual-range are available.
- DC mill volt: 50.000mV, 500.00mV, only manual-range available.
- AC voltage: 5.0000V, 50.000V, 500.00V, 1000.0V, both auto-range and manual-range are available.
- AC voltage: 50.000mV, 500.00mV, only manual-range available.

MEASURING DC VOLTAGE

1. Press  key to select DC voltage measurement function;
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI, and then connect the test probe

to

the measured circuit, the polarity and voltage will be displayed simultaneously;


3. Read the result from the screen.



Warning

- Do not apply more than DC 1000 V or AC 750V rms voltage; the meter will possible be damaged though the value could be displayed.
- The meter beeps constantly if the input voltage is more than DC 1000V rms, which is over the meter's range.


MEASURING AC VOLTAGE

1. Press  key to select AC voltage measurement function;
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI, and then connect the test probe to the measured circuit;
3. Read the result from the screen.

dBm MEASUREMENT

The AC volts functions allow you to display readings as deviations in dB (decibels) above or below an established level.

Set up dBm measurements with the following procedure:

1. Press  key to select dBm measurement function;
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI, and then connect the test probe to the measured circuit;
3. Read the result from the screen.

Normally, dB is measured as dBm, which is a measure of decibels relative to 1 milliwatt. The meter assumes a resistance of 600Ω in making this calculation. This resistance can be set for any value for 1Ω to 2400Ω, using the meter's setup capabilities (see Section 5.) to change the resistance.


Note

If dBm is displayed, check that the reference resistance value closely matches the impedance of the system being measured.

A voltage measurement is converted to dBm using the following formula:

$$\text{dBm} = 10 \cdot \lg(1000 \cdot \text{value}^2 / \text{reference impedance})$$

MEASURING TC

1. Press  key to select TC measurement function;
2. Insert the TC jack with + symbol in the Input HI terminal, and the TC jack with - symbol in the Input Lo;
3. Read the result from the screen.

The temperature is shown on the primary screen, the ambient temperature on the auxiliary screen (if RJC is turn on). User can set whether open or close RJC (see Section 5).



Warning

To avoid possible electric shock or personal injury, do not connect the TC with the live circuit.

MEASURING RESISTANCE




Warning

To avoid possible damage to the meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring resistance.

Resistance is a hindrance to the movement of current. The unit of resistance is ohm. The meter measures resistance in way of output a bit of current to the circuit.


The resistance range of the measured meter is 500.00Ω, 5.0000KΩ, 50.000KΩ, 500.0KΩ, 5.0000MΩ and 50.000MΩ.

2-WIRE METHOD FOR MEASURING RESISTANCE (2W)



1. Press  key to select 2-wire resistance measurement function
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI; and then connect the test probe to the measured resistance in parallel;
3. Read the result from the screen.





Note

- **OL** appears on the display if the resistance under test is open or the value surpasses the maximum range.
- Because the meter's test current flows through all possible paths between the probe tips, the measured value of a resistor in a circuit is often different from the resistor's rated value.
- The test lead can add 0.1Ω to 0.2Ω of error to resistance measurements. To test the leads, touch the probe tips together and read the resistance of the leads. If necessary, you can press  to automatically subtract this value.
- Wait for several seconds for stable reading when measuring resistance more than 1MΩ.

4-WIRE METHOD FOR MEASURING RESISTANCE (4W)

1. Press   key to select 4-wired resistance measurement function ;
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI;
3. Insert the black test probe of another test lead in the Sense Lo terminal, and the red test probe in the Sense HI;
4. Then connect the test probe to the measured resistance in parallel;
5. Read the result from the screen.

MEASURING RTD

1. Press   key to select RTD measurement function;
 2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI, and then connect the test probe to the output terminal of the measured resistance in parallel;
 3. Read the result from the screen.
- The temperature is shown on the primary screen, and the RTD is shown on the auxiliary screen.

MEASURING DIODE




Warning

To avoid possible damage to the meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before testing diodes.

Use the diode test to check diodes, transistors, and silicon-controlled rectifiers (SCR), and other semiconductor devices. The test sends a current through a semiconductor junction, and then measures the junction's voltage drop. A typical junction drops 0.5

V to 0.8 V.

To test a diode, proceed as follows:

1. Press  key to select diode measurement function;
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI, and the polarity of the black lead and red lead is “-” and “+” respectively.

Forward-bias reading: Place the red test lead on the component's positive terminal and place the black lead on the component's negative terminal. The reading is the approximate value of junction's voltage drop about 0.5 V to 0.8 V.

Reverse-bias reading: Place the black test lead on the component's positive terminal and place the red lead on the component's negative terminal. The display shows **OL**.

Note

In the live diodes testing, the resistance of other pathways and between the probe tips will affect the reading of reverse-bias voltage.

CONTINUITY TEST




Warning

To avoid possible damage to the meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before testing for continuity.

Continuity is the presence of a complete path for current flow. The continuity test features a beeper that sounds if a circuit is complete. The beeper allows you to perform quick continuity tests without having to watch the display.

To test continuity, proceed as follows:

1. Press  key to select continuity test function;
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI, and connect the probes to the measured circuit in parallel.

MEASURING CAPACITANCE




Warning

To avoid possible damage to the meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring capacity.

Capacitance is the ability of a component to store an electrical charge. The unit of capacitance is the farad (F). Most capacitors are in the nanofarad (nF) to microfarad (μ F) range.


The meter's capacitance ranges are: 10.000nF、100.00nF、1000.0nF、10.000 μ F、100.00 μ F、1000.0 μ F、10.000mF、100.00mF。

To test capacitance, proceed as follows:

1. Press  key to select capacitance test function;
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI, and connect the probes to the measured circuit in parallel;
3. Read the result from the screen.



Note

- $\square L$ appears on the display if the tested capacity is open or the value surpasses the maximum range.
- If the tested capacity is polar capacitance, then connect the red lead with the positive point and the black lead with the negative point.
- High capacitance test needs more time.
- To improve the measurement accuracy of small value capacitors, press  with the test leads open to subtract the residual capacity of the meter and leads automatically.
- The remaining voltage of capacity, insulated impedance and dielectric absorption could cause measuring errors.

MEASURING CURRENT



Warning




- Never attempt an in-circuit current measurement where the open-circuit potential to earth is greater than 1000 V. You may damage the meter or be injured if the fuse blows during such a measurement.
- You must open the circuit under test, then place the meter in series with the circuit.



Caution

- To avoid possible damage to the meter or to the equipment under test, check the meter's fuses before measuring current. Use the proper terminals, function, and range for your measurement. Never place the probes across (in parallel with) any circuit or component when the leads are plugged into the current terminals.

To measure AC or DC current, proceed as follows:

1. Turn off power to the circuit and discharge all high voltage capacitors.
2. Press  key to select DC current measurement function or Press   key to select AC current measurement function;
3. Insert the black test probe in the Input Lo terminal, and the red test probe in the mA or 10A;

Note

To avoid blowing the meter's 500 mA fuse, use the mA terminal only if you are sure the current is less than 500 mA.

4. Open the circuit path to be tested. Touch the black probe to the more negative side of the break; touch the red probe to the more positive side of the break. (Reversing the leads will produce a negative reading, but will not damage the meter).
5. Turn on power to the circuit, and read the measuring results from the screen.
6. Turn off power to the circuit and discharge all high voltage capacitors. Remove the meter and restore the circuit to normal operation.



Note

- Only manual range is available for 5A and 10A.
- Start measuring from the high range if the current can't be evaluated.
- For safety, the measuring time should be limited within 15s, while the interval should be more than 10 min when


measuring high current.

- If the input current is more than 1 0.000A, then the inner beeper sounds constantly indicating the value surpass the range.

MEASURING FREQUENCY

Frequency is the number of cycles a signal completes each second. The meter measures the frequency of a voltage or current signal by counting the number of times the signal crosses a threshold level each second.

Duty cycle (or duty factor) is the percentage of time a signal is above or below a trigger level during one cycle.







1. Press  key to select capacity test function;
2. Insert the black test probe in the Input Lo terminal, and the red test probe in the Input HI, and connect the probes to the measured circuit in parallel;
3. Read the result from the screen, frequency is shown on the primary screen, the duty cycle on the auxiliary screen.

SECTION 4 USING STORAGE AND COMMUNICATION FUNCTION

Storage capacity: 50000 groups

For initial use, undertake “deleting stored data” operation before using storage function.

DELETING STORED DATA

1. press  key to enter into storage setting;
2. Press  key to select deleting stored data function, the screen displays , and repress  key for confirmation of the function, and screen displays , and the meter enters into logging time setting after deleting, the screen displays 

SAVING DATA

Note

You can not save data if there has been some data stored in saving part (no matter full or not). Undertake “deleting stored data”

operation first before data storage.

1. Press \odot key to enter into storage setting, and set as the following table:

setting item	setting method	default value
Storage record logging time L G.5t	Setting range: 00000~99999s, press \blacktriangle key or \blacktriangledown key to set blinking digit , press \blacktriangleleft key or \blacktriangleright key to select blinking bit, press Auto key to save set value and enter into next item.	0s
Storage record interval time L G.tE	Setting range: 00000~99999s, press \blacktriangle key or \blacktriangledown key to set blinking digit , press \blacktriangleleft key or \blacktriangleright key to select blinking bit, press Auto key to save set value and enter into next item.	1s
Numbers of storage record L G.CE	Setting range: 00000~50000, press \blacktriangle key or \blacktriangledown key to set blinking digit , press \blacktriangleleft key or \blacktriangleright key to select blinking bit, press Auto key to save set value and enter into the stored logging data displayed screen.	100 items
Numbers of stored data L G.CE	number of stored data displayed in the primary screen	

2. Repress \odot key to enter into data storage function, and when the logging time is reached, the auxiliary screen shows word “Time” and time ; and when the logging time is over, then the meter starts to store, and the number is displayed in the auxiliary screen.
3. When the stored data reaches the numbers of logged data, stop and exit from the storage; and press \odot key or \odot key to stop and exit in the storage process.

USING COMMUNICATION FUNCTION



Warning




Make sure your PC has been connected with the earth ground when employing this function!



The meter provides USB and RS232 jacks to communicate with a PC, and you can select in Section 5.







Refer to the DMMVIEW_I and DMMCOMM_I Software Guide or the on line help.

SECTION 5 INSTRUMENT SETTING

The meter allows you to change the default-operating configuration of the meter by changing setup options made at the factory.

In measurement mode, press  key to enter into maintenance setting. In the setup mode, each setup option appears in the auxiliary screen and the default value appears in the primary screen. Press  to change the setup option. Press  key to store the set value (**SAVE** on the primary screen indicates the maintained item has been stored).

To exit the setup mode, press  key or  key.

Selection		Function	Factory Default
	Communication selection	USB、RS232 shifts, press ▲key or ▼key to select.	USB
	Temperature units	°C and °F shifts, press ▲key or ▼key to select.	°C
	TC RJC	ON or OFF, press ▲key or ▼key to select.	ON
	dBm reference value	Set Range: 1~2400, Use ◀ or ▶ to select digit flashes. Use ▲ or ▼ to increment or decrement digit.	600Ω
	buzzer	ON or OFF, press ▲key or ▼key to select.	ON
	Restore factory default	YES or NO, press ▲key or ▼key to select.	-----

SECTION SIX MAINTENANCE

This section provides the information necessary for the user to perform basic maintenance. Users should not attempt to

perform maintenance not described in this section. Qualified service personnel should refer to this Manual for complete maintenance, service.

GENERAL MAINTENANCE

- Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- Take off the battery if you will not use the meter for a long time.
- Dirt or moisture in the terminals can affect readings and can falsely activate the Input Alert feature.

Clean the terminals as follows:

1. Turn the meter off and remove all test leads.
2. Shake out any dirt that may be in the terminals.
3. Soak a new swab with alcohol. Work the swab around in each terminal.


TESTING FUSE



Warning

To avoid electrical shock or personal injury, remove the test leads and any input signals before replacing the battery or fuses. To prevent damage or injury, install ONLY specified replacement fuses with the amperage, voltage, and speed ratings.

To check the fuse, proceed as follows:

1. Insert a probe in the Input HI, and another probe in the mA or 10A terminals;
2. Turn on the meter, press  key to select 2-wire resistance measurement function. If the resistance is about 0.00Ω to several ohms, the fuse is good. An open reading means that fuse is blown.

10A	10A/250V FAST Φ5×20mm
mA	0.5A/250V FAST Φ5×20mm

REPLACING FUSE



Warning

To avoid electrical shock or damage to the meter, only use replacement fuses specified in Table 6-1.

Replace the meter's fuses as follows:

1. Turn the meter off and remove the test leads from the terminals.
2. Press the mA or 10A current terminal and rotate in 45° counter-clockwise, and then take off the current terminal and fuse.
3. Install ONLY specified replacement fuses with the amperage, voltage, and speed ratings. Insert the current terminal of the fuse case back to the jacks, and press the current terminal and rotate in 45° clockwise, the fuse will be fixed when released.

SECTION SEVEN PERFORMANCE INDEX

SAFETY AND COMPLIANCE

Maximum voltage between any terminal and earth ground.	1000V dc or ac RMS voltage
Legal Compliance	Complies with IEC61010.1-2001 to 300V Over voltage IV Pollution Degree 2 (Safety Standard issued by IEC)
Fuse Protection for mA or μ A inputs	0.5A 250V FAST Fuse
Fuse Protection for A input	10A 250V FAST Fuse
Identification tags	CE

PHYSICAL INDEX

Display (VFD)	Digital: 55000 counts primary display; 5500 counts secondary display; updates 5/second(slow), 20/second(fast).
Operating Temperature	0~50°C
Storage Temperature	-10~55°C
Relative Humidity	0°C~30°C \leq 75%

	30°C ~ 40°C ≤50%
Altitude	0-2000m(according to IEC61010 CAT. II ,300V)
Power	250V±10%AC, power frequency: 50Hz or 60Hz, power:
Consumption	About 5W
Temperature coefficient	0.15 × (specified accuracy)% / °C, range<18 °C or >28 °C)
EMC	Complies with IEC61326-1,Group 1,Class B
Size	245 × 220 × 82 (mm)
Weight	About 2000g
Calibration Interval	One Year

BASIC INDEX

Function	Range / Description
DC voltage	0 to 1000V
AC voltage,TRMS	2.5 mV to 760V
DC current	0 to 10A
AC current,TRMS	20 μA to 10A
Resistance	0 to 50MΩ
Capacitance	0.5nF to 110.00mF
Diode	About 3.5V
TC Test	K
RTD Test	Pt100
Frequency	3Hz to 100kHz
Data storage	50000 groups

DETAILED ACCURACY INDEX

Accuracy is specified for a period of one year after calibration, at 23±5°C, with relative humidity to 75%.

Accuracy specifications are given as: ± ([% of reading] + [number of least significant digits]) (“Counts” refers to the number of increments or decrements of the least significant digit).

AC mV, ACV, AC uA, AC mA and ACA specifications are ac couple, true rms and are valid from 5% of range to 100% of range. AC crest factor can be up to 3.0 at full-scale.

DC VOLTAGE MEASUREMENT

Function	Range	Measurement Range	Resolution	Accuracy
DCmV	50mV	-55.000mV~55.000mV	0.001mV	0.1%+10
	500mV	-550.00mV~550.00mV	0.01mV	0.025%+5
DCV	5V	-5.5000V~5.5000V	0.0001V	0.025%+5
	50V	-55.000V~55.000V	0.001V	0.03%+5
	500V	-550.00V~550.00V	0.01V	0.1%+5
	1000V	-1000.0V~1000.0V	0.1V	0.1%+5

DC CURRENT MEASUREMENT

Function	Range	Measurement Range	Resolution	Accuracy
DCI	500uA	-550.00uA~550.00uA	0.01uA	0.15%+20
	5000uA	-5500.0uA~5500.0uA	0.1uA	0.15%+10
	50mA	-55.000mA~55.000mA	0.001mA	0.15%+20
	500mA	-500.00mA~500.00mA	0.01mA	0.15%+10
	5A	-5.5000A~5.5000A	0.0001A	0.5%+10
	10A	-10.000A~10.000A	0.001A	0.5%+10

AC VOLTAGE CURRENT (TYPE A)

Measurement Function	Range	Measurement Range	Resolution	Accuracy						
				20Hz~45Hz	45Hz~65Hz	65Hz~400Hz	400Hz~1KHz	1KHz~10KHz	10KHz~20KHz	20KHz~50KHz
ACmV	50mV	0~55.000mV	0.001mV	2%+80	0.7%+30	0.7%+30		2%+30	3%+60	5%+100
	500mV	0~550.00mV	0.01mV	2%+80	0.7%+30	0.7%+30		2%+30	3%+60	5%+100
ACV	5V	0~5.5000V	0.0001V	2%+80	0.5%+30	0.7%+30		2%+30	3%+60	5%+100
	50V	0~55.000V	0.001V	2%+80	0.5%+30	0.7%+30		2%+30	3%+60	5%+100
	500V	0~550.00V	0.01V	2%+80	0.5%+30	0.7%+30	2%+30	-----	-----	-----
	1000V	0~760.0V	0.1V	2%+80	0.5%+30	0.7%+30	2%+30	-----	-----	-----
ACA	10A	0~10.000A	0.001A	2%+40	1.5%+20			3%+80	-----	-----
	5A	0~5.5000A	0.0001A	2%+40	1%+20			3%+80	-----	-----
ACmA	50mA	0~55.000mA	0.001mA	1.5%+80	0.5%+30			1%+30	2%+60 ³	2%+60
	500mA	0~500.00mA	0.01 mA	1.5%+80	0.5%+30			1%+30	2%+60 ³	2%+60
ACuA	500uA	0~550.00uA	0.01uA	1.5%+80	0.5%+30			1%+30	2%+60 ³	2%+60
	5000uA	0~5500.0uA	0.1uA	1.5%+80	0.5%+30			1%+30	2%+60 ³	2%+60

1.<20kHz is adapt to 5~110% range, ≥20kHz is adapt to 10~110% range.
2.1000V and 10A range is adapt to 10~110% range.
3.50mV、500mV range is 30Hz~50KHz.
4.ACmA、ACuA range is 20Hz~30KHz.

AC VOLTAGE CURRENT (TYPE B)

Measurement Function	Range	Measurement Range	Resolution	Accuracy		
				20Hz~45Hz	45Hz~400Hz	400Hz~1KHz
ACV	5V	0~5.5000V	0.0001V	2%+80	0.5%+30	3%+30
	50V	0~55.000V	0.001V	2%+80	0.5%+30	2%+30
	500V	0~550.00V	0.01V	2%+80	0.5%+30	2%+30
	1000V	0~760.0V	0.1V	2%+80	0.5%+30	2%+30
ACmV	50mV	0~55.000mV	0.001mV	2%+80	0.5%+30	0.7%+30
	500mV	0~550.00mV	0.01mV	2%+80	0.5%+30	0.7%+30
ACA	10A	0~10.000A	0.001A	2%+40	1.5%+20	
	5A	0~5.5000A	0.0001A	2%+40	1%+20	
ACmA	50mA	0~55.000mA	0.001mA	1.5%+80	0.7%+30	
	500mA	0~500.00mA	0.01mA	1.5%+80	0.7%+30	
ACuA	500uA	0~550.00uA	0.01uA	1.5%+80	0.7%+30	
	5000uA	0~5500.0uA	0.1uA	1.5%+80	0.7%+30	

RESISTANCE MEASUREMENT

Function	Range	Measurement Range	Resolution	Accuracy
OHM	500Ω	0~550.00Ω	0.01Ω	0.05%+10
	5KΩ	0~5.5000KΩ	0.0001KΩ	0.05%+5
	50KΩ	0~55.000KΩ	0.001KΩ	0.05%+5
	500KΩ	0~550.00KΩ	0.01KΩ	0.05%+5
	5MΩ	0~5.5000MΩ	0.0001MΩ	0.2%+5
	50MΩ	0~55.000MΩ	0.001MΩ	1%+10

1. Use the Null mode to zero the error readings.
2. The accuracy does not include the error caused by the lead resistance.

CAPACITY MEASUREMENT

Function	Range	Measurement Range	Resolution	Accuracy
CAP	10nF	0~11.00nF	0.01nF	5%+50
	100nF	0~110.0nF	0.1nF	5%+5
	1000nF	0~1100nF	1nF	5%+5
	10μF	0~11.00μF	0.01uF	5%+5
	100μF	0~110.0μF	0.1uF	5%+5
	1000μF	0~1100μF	1uF	5%+50
	10mF	0~11.00mF	0.01mF	5%+50
	100mF	0~110.0mF	0.1mF	5%+50

1. Use the Null mode to zero the residual readings.
2. For readings high than 10mF, the last digit of the reading is invalid.

ACCURACY FOR FREQUENCY COUNTER

Function	Range	Measurement Range	Resolution	Accuracy	Sensitivity
Frequency	10Hz	0~10.000Hz	0.001Hz	0.02%+4	500mV_RMS
	100Hz	0~100.00Hz	0.01Hz	0.02%+4	
	1000Hz	0~1000.0Hz	0.1Hz	0.02%+4	
	10kHz	0~10.000kHz	0.001kHz	0.02%+4	
	100kHz	0~100.00kHz	0.01kHz	0.02%+4	
DUTY		10%~90%	0.1%	0.3%/KHz+0.3%	

1. For signal reading lower than 3Hz, the reading is Zero.

DIODE FUNCTION

Function	Range	Measurement Range	Resolution	Sensitivity
DIODE	2V		0.0001V	1%+10

CONTINUITY TEST

Function	Range	Measurement Range	Resolution	Sensitivity
Continuity Test	600Ω		0.1Ω	≤30ΩBB

TC MEASUREMENT

Graduation No.	Measurement Range	Resolution	Accuracy
K	-200.0°C~1372.0°C	0.1°C	0.5%+0.5°C
	-328.0°F~2501.6°F	0.1°F	0.5%+1°F
1. By using ITS-90 temperature scale . 2. The accuracy does not include the error of internal temperature compensation.			

RTD MEASUREMENT

Graduation No.	Measurement Range	Resolution	Accuracy
Pt100	-200.0°C~800.0°C	0.1°C	
	-328.0°F~1472.0°F	0.1°F	
1. By using ITS-90 temperature scale 2. Attached lead resistance is excluded			

CHARGED VOLTAGE

Measurement Function	Range	Overload Voltage
Current	10.000A	0.04V/A
	5.0000A	0.04V/A
	500.00mA	1.8mV/mA
	50.000mA	1.8mV/mA
	5000.0μA	103uV/μA
	500.00μA	103uV/μA

INPUT FEATURE

Function Position	Input Impedance (Standard Value)					
V	10MΩ, <100pF					
mV	>2.5GΩ					
	Common Mode Rejection Ratio			Normal Mode Rejection		
DCV, DCmV	80dB (dc to 50Hz / 60Hz/1KΩ)			40dB (50Hz / 60Hz)		
ACV, ACmV	80 dB (dc to 50Hz / 60Hz/1KΩ)					
	Open Circuit Test Voltage			Full-scale Voltage		
ohm	2.0V			2.0V		
Diode	< 3.5V			2.0V		
Continuity	< 1.5V			500mV		
	Typical short-circuit current					
ohm	500Ω	5KΩ	50KΩ	500KΩ	5MΩ	50MΩ
	0.8mA	0.2mA	20μA	2μA	0.2μA	<0.1μA
Diode	0.2mA (Typical Value)					

SECTION 8 NOTES FOR THE MANUAL

- The present operation instruction is subject to change without notice.
- The content of the operation instruction is regarded as correct. Whenever any user finds its mistakes, omission, etc., he or she is requested to contact the manufacturer.
- The Company is not liable for any accident and hazard arising from the customer misuse or inadvertent operation.
- The functions described in this operation instruction should not be used as grounds to apply this product to a particular purpose.