



XDM1051/1251 Series Digital Multimeter User Manual

For product support, visit: www.owon.com.hk/download

※: The illustrations, interface, icons and characters in the user manual may be slightly different from the actual product. Please refer to the actual product.

Sep. 2026 edition V1.0.3

Copyright © LILLIPUT Company. All rights reserved.

The LILLIPUT's products are under the protection of the patent rights, including ones which have already obtained the patent rights and those which are applying for. The information in this manual will replace all that in the materials published originally.

The information in this manual was correct at the time of printing. However, LILLIPUT will continue to improve products and reserves the rights to change specification at any time without notice.

owon[®] is the registered trademark of the LILLIPUT Company.

Fujian LILLIPUT Optoelectronics Technology Co., Ltd.

No. 19, Heming Road

Lantian Industrial Zone, Zhangzhou 363005 P.R. China

Tel: +86-596-2130430

Fax: +86-596-2109272

Web: www.owon.com.cn

E-mail: info@owon.com.cn

General Warranty

We warrant that the product will be free from defects in materials and workmanship for a period of 3 years from the date of purchase of the product by the original purchaser from our company. This warranty only applies to the original purchaser and is not transferable to a third party.

If the product proves defective during the warranty period, we will either repair the defective product without charge for parts and labour, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by our company for warranty work may be new or reconditioned like new. All replaced parts, modules and products become the property of our company.

To obtain service under this warranty, the customer must notify our company of the defect before the expiration of the warranty period. Customer shall be responsible for packaging and shipping the defective product to our designated service centre, a copy of the customer's proof of purchase is also required.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. We shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than our company representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of not our supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

Please contact the nearest sales and service offices for services.

Excepting the after-sales services provided in this summary or the applicable warranty statements, we will not offer any guarantee for maintenance definitely declared or hinted, including but not limited to the implied guarantee for marketability and special-purpose acceptability. We should not take any responsibilities for any indirect, special or consequent damages.

Table of Contents

1 Safety Information	1
1.1 General Safety Requirements	1
1.2 Safety Terms and Symbols	3
1.3 Measurement Limits	5
1.3.1 Main Input Terminals Measurement Limits	5
1.3.2 Current Input Terminal Measurement Limits	5
1.4 Measurement Category	6
2 Quick Start	7
2.1 General Inspection	7
2.2 Front Panel Overview	8
2.3 Rear Panel Overview	9
2.4 User Interface	10
2.5 Power On	10
2.6 Measurement Connections	11
3 Function and Operations	13
3.1 Measurement Configuration	13
3.1.1 Range	13
3.1.2 Measurement Speed	14
3.2 Basic Measurement Functions	16
3.2.1 Measuring DC Voltage	16
3.2.2 Measure AC voltage	17
3.2.3 Measuring DC Current	19
3.2.4 Measuring AC Current	21
3.2.5 Measurement Resistance	23
3.2.6 Continuity Testing	25
3.2.7 Diode Testing	26
3.2.8 Measurement Capacitance	28
3.2.9 Measurement Frequency and Period	30
3.2.10 Measure Temperature	32
3.3 Run/Stop (Data Hold)	33
3.4 Math	34
3.4.1 Max/Min	34
3.4.2 dB/dBm	35
3.4.3 Relative value	36
3.5 Record	36
3.5.1 Manual Record	36
3.5.2 Auto Record	37
3.6 Dual Display Function	38
3.7 Utility System Function	39

3.7.1 User Settings	39
3.7.2 Preset Setting	40
3.7.3 I/O Setting	41
4 Measurement Guidance	43
4.1 Load error DC voltage	43
4.2 True RMS AC measurement	43
5 Troubleshooting	45
6 Technical Specifications	46
7 Appendix	49
7.1 Appendix A: Accessories	49
7.2 Appendix B: General Care and Cleaning	49
7.3 Appendix C: Line Fuse Replacement	50

1 Safety Information

1.1 General Safety Requirements

Before any operations, please read the following safety precautions to avoid any possible bodily injury and prevent this product or any other products connected from damage. In order to avoid any contingent danger, this product is only used within the range specified.

- Check AC power input setting according to the standards in your own country.
- **Use Proper Power Cord.** Use only the power cord supplied with the product and certified to use in your country.
- **Product Grounded.** This instrument is grounded through the power cord grounding conductor. To avoid electric shock, the grounding conductor must be grounded. The product must be grounded properly before any connection with its input or output terminal.
- **Limit operation to the specified measurement category, voltage, or amperage ratings.**
- **Check all Terminal Ratings.** To avoid instrument damage and the risk of electric shock, check all the Measurement Limits and markers of this product. Refer to the user's manual for the Measurement Limits before connecting to the instrument. Do not exceed any of the Measurement Limits defined in the following section.
- **Do not operate without covers.** Do not operate the instrument with covers or panels removed.
- **Use Proper Fuse.** Use only the specified type and rating fuse for this instrument.
- **Avoid exposed circuit.** Do not touch exposed junctions and components when the instrument is powered.
- **Do not operate if in any doubt.** If you suspect damage occurs to the

instrument, have it inspected by qualified service personnel before further operations.

- **Use your instrument in a well-ventilated area.** Inadequate ventilation may cause increasing of temperature or damages to the device. Please keep well ventilated and inspect the intake regularly.
- **Do not operate in wet conditions.** In order to avoid short circuiting to the interior of the device or electric shock, please do not operate in a humid environment.
- **Do not operate in an explosive atmosphere.**
- **Keep product surfaces clean and dry.**
- **Only the qualified technicians can implement the maintenance.**

1.2 Safety Terms and Symbols

Safety Terms

Terms in this Manual. The following terms may appear in this manual:



Warning: Warning indicates the conditions or practices that could result in injury or loss of life.



Caution: Caution indicates the conditions or practices that could result in damage to this product or other property.

Terms on the Product. The following terms may appear on this product:

Danger: It indicates an injury or hazard may immediately happen.

Warning: It indicates an injury or hazard may be accessible potentially.

Caution: It indicates a potential damage to the instrument or other property might occur.

Safety Symbols

Symbols on the Product. The following symbol may appear on the product:

	Direct current (DC)		Warning, risk of electric shock
	Alternating current (AC)		Caution, risk of danger (refer to this manual for specific Warning or Caution information)
	Both direct and		Conforms to European Union
	Ground terminal		Chassis Ground
CAT I	IEC Measurement Category I. The maximum measurable voltage is		
CAT II	IEC Measurement Category II. Inputs may be connected to AC mains power (up to 600 VAC) under Category II overvoltage conditions.		

1 .Safety Information



This product complies with the WEEE Directive (2012/19/EC) marking equipment. The affixed product label indicates that you must not discard this electrical/electronic product in domestic household waste.

Diagram of the CAT II (600V) terminal block. It features four terminals: 10A, mA, COM, and Input. Above the 10A and mA terminals is a CAT I (1000V) terminal block. The 10A terminal is fused for Max 10A. The mA terminal is fused for Max 600mA. The COM terminal is fused for 1000V Max. The Input terminal is for 0V to 1000V and has a temperature measurement symbol.

1.3.1 Main Input Terminals Measurement Limits

ΩV-1(-)→1°C to COM Measurement Limit

- The Measurement Limit from $\Omega V \leftarrow \rightarrow ^\circ C$ to COM is 1000 VDC or 750 VAC, which is also the maximum voltage measurement. This limit can also be expressed as 1000 Vpk maximum.

1.3.2 Current Input Terminal Measurement Limits

The measuring range between the 10A input terminal and COM terminal is 10 A (DC or AC).

The measuring range between $\mu\text{A}/\text{mA}$ input terminals and COM terminal is 600 mA (DC or AC).

Note: The potential of all current input terminals remains approximately equal to that of the COM input terminal.

1.4 Measurement Category

The safety rating of the multimeter:

- **1000 V, CAT I:** IEC Measurement Category I. The maximum measurable voltage is 1000 Vpk in the HI -LO terminal.
- **600 V, CAT II:** IEC Measurement Category II. Inputs may be connected to AC mains power (up to 600 VAC) under Category II overvoltage conditions.

Measurement category definition

Measurement CAT I applies to measurements performed on circuits not directly connected to the AC mains. Examples are measurements on circuits not derived from the AC mains and specially protected (internal) mains-derived circuits.

Measurement CAT II applies to protect against transients from energy-consuming equipment supplied from the fixed installation, such as TVs, PCs, portable tools, and other household circuits.

Measurement CAT III applies to protect against transients in equipment in fixed equipment installations, such as distribution panels, feeders and short branch circuits, and lighting systems in large buildings.

Measurement CAT IV applies to measurements performed at the source of the low-voltage installation. Examples are electricity meters and measurements on primary over current protection devices and ripple control units.

2 Quick Start

2.1 General Inspection

After you get a new multimeter, it is recommended that you should make a check on the instrument according to the following steps:

1. Check whether there is any damage caused by transportation.

If it is found that the packaging carton or the foamed plastic protection cushion has suffered serious damage, do not throw it away first till the complete device and its accessories succeed in the electrical and mechanical property tests.

2. Check the Accessories.

The supplied accessories have been already described in the Appendix A: Accessories of this Manual. You can check whether there is any loss of accessories with reference to this description. If it is found that there is any accessory lost or damaged, please get in touch with our distributor responsible for this service or our local offices.

3. Check the Complete Instrument.

If it is found that there is damage to the appearance of the instrument, or the instrument can not work normally, or fails in the performance test, please get in touch with our distributor responsible for this business or our local offices. If there is damage to the instrument caused by the transportation, please keep the package. With the transportation department or our distributor responsible for this business informed about it, a repairing or replacement of the instrument will be arranged by us.

2.2 Front Panel Overview

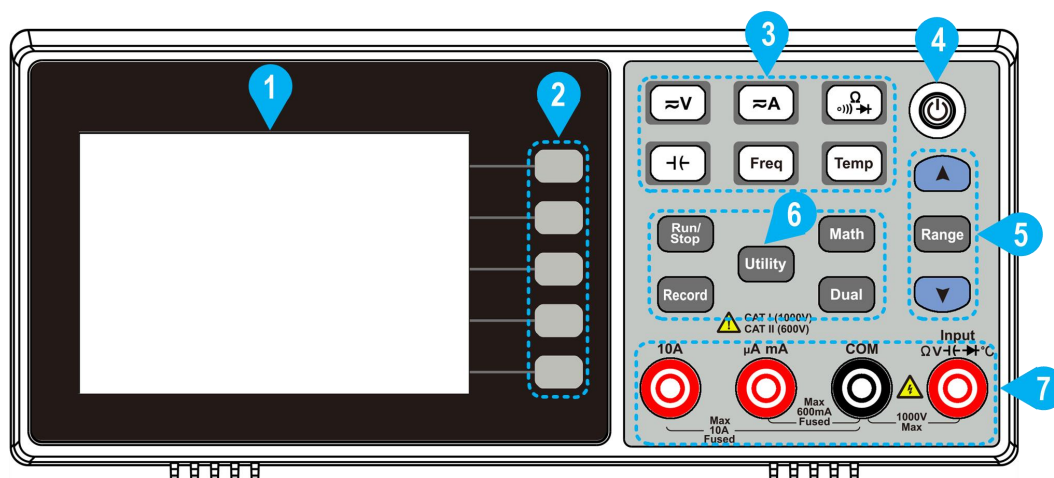


Figure 2- 1 Front Panel Overview

1	Display Screen	Display the user interface.
2	Menu selection Keys	Activate the corresponding menu.
3	Measurement Function Keys	switch DC or AC voltage measurement; switch DC or AC current measurement; switch resistance, continuity or diode measurement; capacitance measurement; frequency (period) measurement; temperature measurement.
4	Power key	Turn on / off instrument.
5	Range Direction keys	Press Range to switch Auto and Manual range mode. Press key to increase/decrease range manually.
6	Operation Keys	Run/Stop: auto trigger or stop trigger. Record: Access menus for manual record and auto record function. Utility: Enter system settings. Math: Perform mathematical calculations on measured results.
7	Signal Input Terminal	Signal input terminal for measurement tests.

2.3 Rear Panel Overview

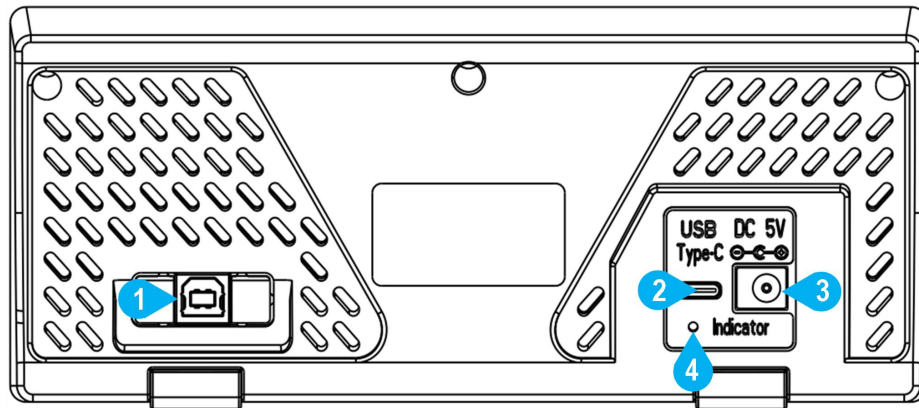


Figure 2-2 Rear Panel Overview (Take AC Power Supply for instance)

1	USB Device	USB Communication interface.
2	USB Type-C port	DC mains input connector.
3	Mains Input	DC mains input connector.
4	Indicator	Fully charged: green light; Charging: red light ; Charging fault: LED blinking.

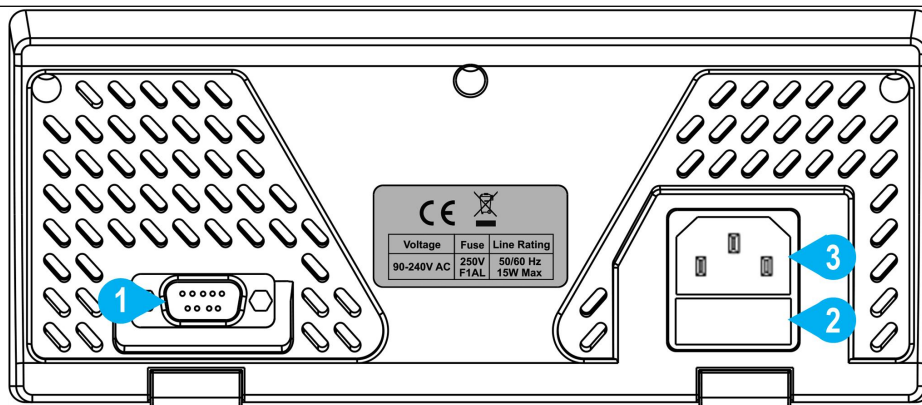


Figure 2-3 Rear Panel Overview

(Take -R model AC Power Supply for instance)

1	Communication interface	-R models can be connected to a computer through a serial port; -U model can be connected to the computer via USB Device.
2	Fuse	The fuse rating is 250 V, F1AL.
3	AC Mains Input	AC mains input connector.

2.4 User Interface

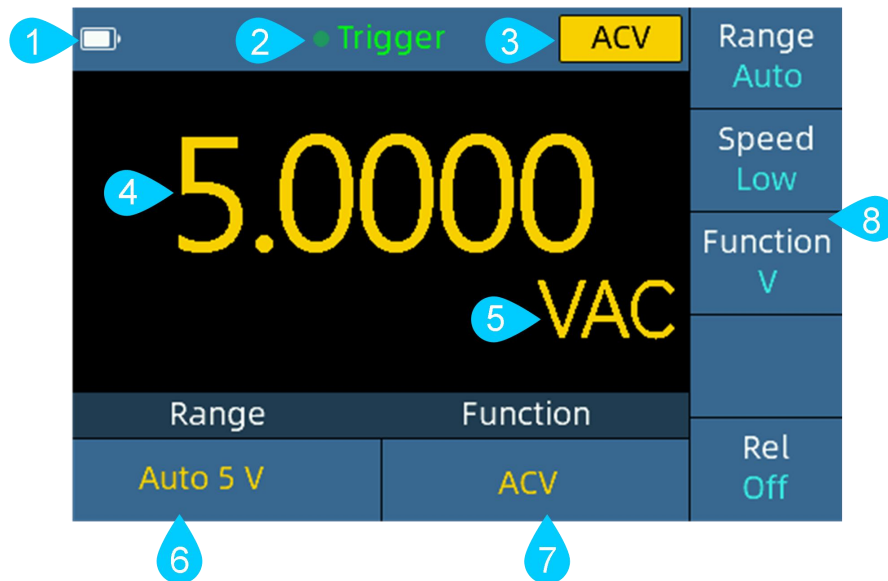


Figure 2-4 User Interface

- | | |
|---|---------------------------------|
| 1 | Battery indicator. |
| 2 | Trigger status indicator. |
| 3 | Measurement function indicator. |
| 4 | Current measurement value. |
| 5 | Measurement unit. |
| 6 | Current range status. |
| 7 | Measurement function. |
| 8 | Operation menu. |

2.5 Power On

- (1) Model with AC power supply: Connect the instrument to the AC supply using the supplied power cord.

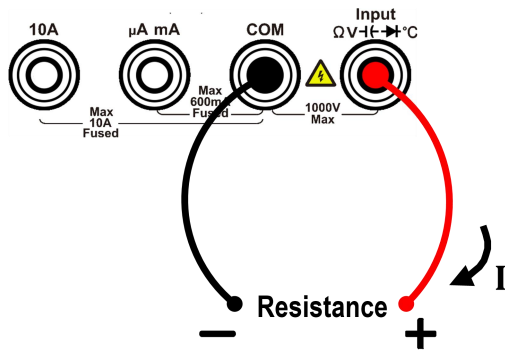
Model with DC power supply: use the USB to DC cable provided in the accessory to connect the instrument to the USB adapter, it can also be powered by USB Type-C.



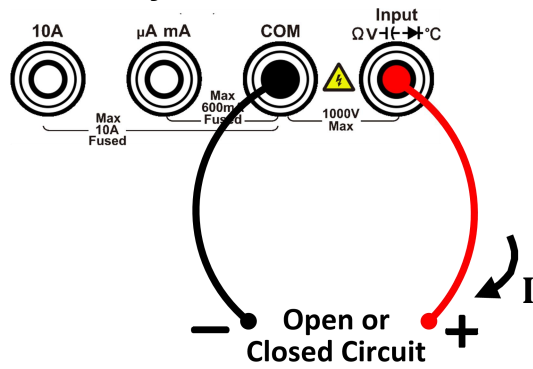
Warning:

To avoid electric shock, the instrument must be grounded properly. When using an adapter for power supply, it is recommended to use a grounded adapter, otherwise it may

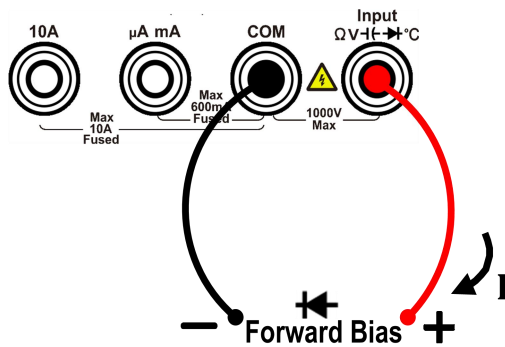
Resistance Measurement



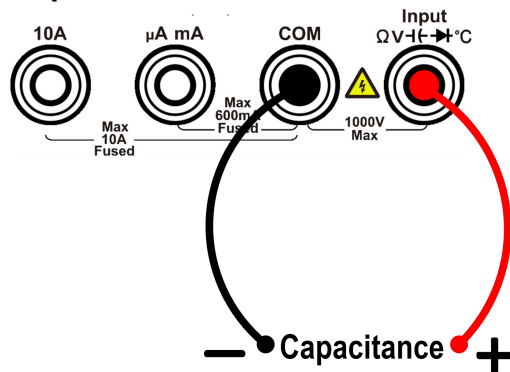
Continuity Measurement



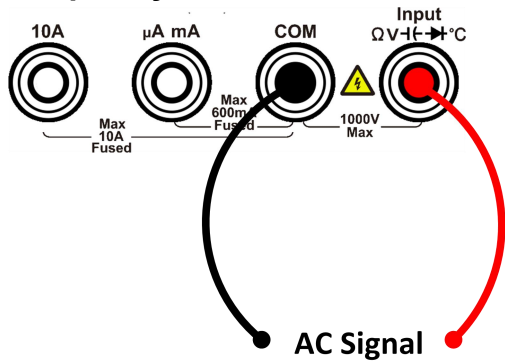
Diode Measurement



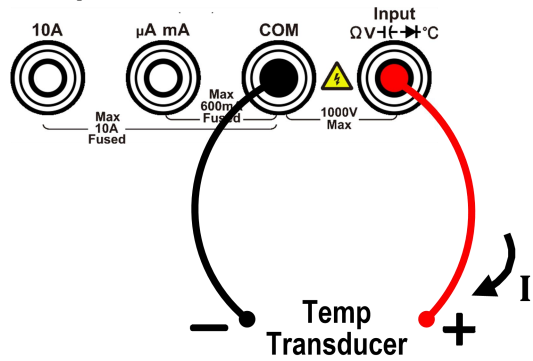
Capacitance Measurement



Frequency/Period Measurement



Temperature Measurement



3 Function and Operations

3.1 Measurement Configuration

Most of the measurement functions of the multimeter have modifiable measurement parameters. Changing the measurement parameters can change the range, measurement accuracy, measurement speed and input impedance of the multimeter. Modifying the measurement parameters according to the practical application can achieve faster measurement speed or higher measurement accuracy.

The default measurement configuration of the multimeter ensures accurate measurement results in most cases. Users can directly perform any measurement operation, and can also modify the measurement parameters under various measurement functions according to their needs.

3.1.1 Range

There are two ways to select the measuring range: auto and manual. Auto range can automatically select the measuring range for measurement according to the input signal, providing convenience for users. Under manual range, you can set the range using the front panel buttons or menu softkeys for higher reading accuracy.

Method 1: Use the front panel buttons to set the range.

Press the **Range** key to switch between auto and manual Range modes. Press the  /  direction keys to set the manual range mode and increase/decrease the range.

Method 2: Select the range in the measurement function menu.



Select auto range: In the measurement function menu, press **Range** softkey and select **Auto**.

Select manual range: In the measurement function menu, press **Range** softkey to select a measuring range other than Auto.

Description:

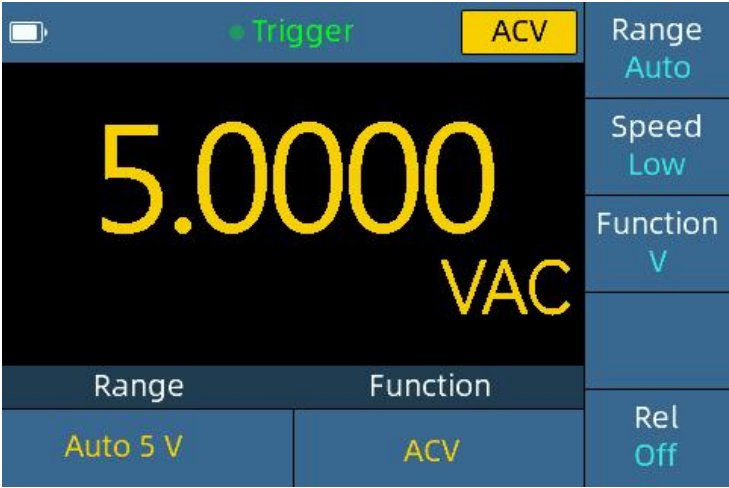
- When the input signal exceeds the current range, the multimeter will display "OL" or "OPEN".
- When set to factory settings, the range defaults to "Auto".
- It is recommended that users choose the "Auto" range when the measuring range cannot be predicted to protect the instrument and obtain more accurate readings.
- Connectivity tests and diode tests are fixed range.

3.1.2 Measurement Speed

The multimeter provides three measurement speed settings: Low, Medium and High.

Function	Low (Reading/s)	Medium(Reading/s)	High(Reading/s)
DCV	2	10	85
DCA	2	10	85
RES	2	10	85
ACV	2	5	10
ACA	2	5	10

Measurement rate is selectable for DCV, ACV, DCA, ACA and resistance functions. Press the **Speed** key to switch the rate.



3.2 Basic Measurement Functions

3.2.1 Measuring DC Voltage

This section describes how to configure DC voltage measurements.

Operation steps:

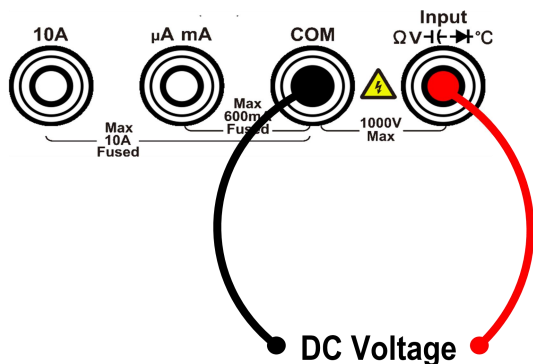
1. Enable the DC voltage measurement function.

Press the front panel  key, switch to DC voltage measurement, as shown in the figure below.



2. Connect the test leads.

As shown in the figure below.



3. Set the range.

Press the **Range** softkey to set the required range.

Description:

- There is 1000 V input protection at any range.
- All ranges except the 1000 V range have a 20% over-range.
- At 1000 V range, "OL" is displayed when the reading exceeds 5%

over-range.

4. Set speed.

Press the **Speed** softkey to select the measurement speed.

5. Set function.

Press the **Function** softkey to switch measurement unit.

6. Set the relative value.

Press the **Rel** softkey to turn on or off the relative operation function. When the relative operation is turned on, the reading displayed at this time is the actual measured value minus the set relative value. The default relative value is the measured value when the function is turned on.

7. Read the measured value.

The multimeter will measure the input signal according to the current measurement settings and display the measurement results in the screen.

8. Mathematical operations.

Mathematical operations (Max/Min, dBm/dB) can be performed on measured readings. For specific operations, please refer to "Math Operations".

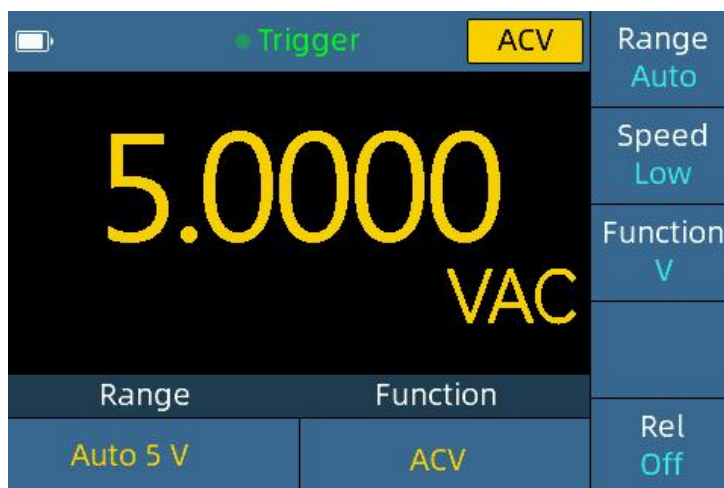
3.2.2 Measure AC voltage

This section describes how to configure AC voltage measurements.

Operation steps:

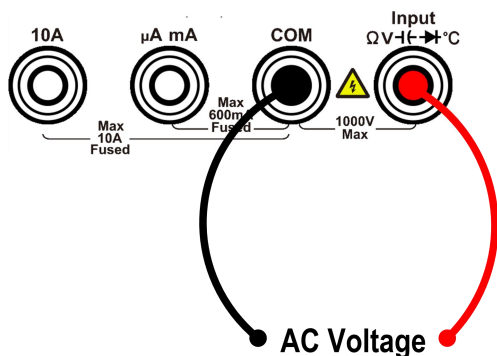
1. Enable the AC voltage measurement function.

Press the front panel  key, switch to AC voltage measurement, as shown in the figure below.



2. Connect the test leads.

As shown in the figure below.



3. Set the range.

Press the **Range** softkey to set the required range. Auto range can be automatically selected for the measurement based on the input.

Description:

- There is 750 Vrms input protection at any range.
- All ranges except the 750 Vrms range have a 10% over-range.
- "OL" is displayed when the reading exceeds 5% over-range at the 750 Vrms range.

4. Set speed.

Press the **Speed** softkey to select the measurement speed.

5. Set function.

Press the **Function** softkey to switch measurement unit.

6. Set the relative value.

Press the **Rel** softkey to turn on or off the relative operation function. When

the relative operation is turned on, the reading displayed at this time is the actual measured value minus the set relative value. The default relative value is the measured value when the function is turned on.

7. Read the measured value.

The multimeter will measure the input signal according to the current measurement settings and display the measurement results in the screen.

8. Mathematical operations.

Mathematical operations (Max/Min, dBm/dB) can be performed on measured readings. For specific operations, please refer to "Math Operations".

3.2.3 Measuring DC Current

This section describes how to configure DC current measurements.

Operation steps:

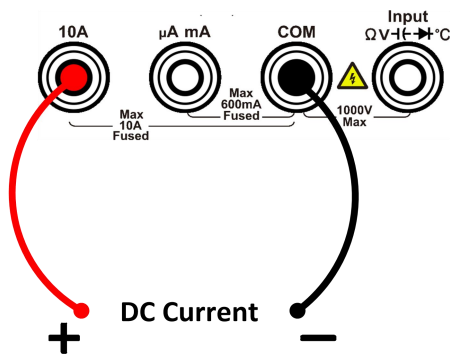
1. Enable the DC current measurement function.

Press the front panel  key, switch to DC current measurement, as shown in the figure below.

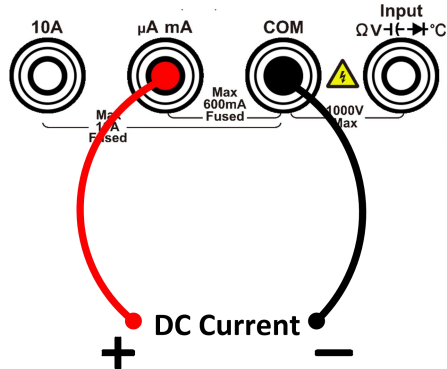


2. Connect the test leads.

Connection of test leads for Range A is shown in the figure below.



Connection of test leads for Range mA is shown in the figure below.



3. Set the range.

Press the **Range** softkey to set the required range. Auto range can be automatically selected for the measurement based on the input.

Description:

- Two fuses are adopted for input protection. A 10 A fuse is built into the 10 A input terminal, and a 1 A fuse is installed inside the μA mA input terminal for overcurrent protection.
- All ranges except the 10 A range have a 20% over-range.
- "OL" is displayed when the reading exceeds 5% over-range in the 10 A range.

4. Set speed.

Press the **Speed** softkey to select the measurement speed.

5. Set terminal.

Press the **Terminal** softkey to switch measurement terminal.

6. Set the relative value.

Press the **Rel** softkey to turn on or off the relative operation function. When the relative operation is turned on, the reading displayed at this time is the actual measured value minus the set relative value. The default relative

value is the measured value when the function is turned on.

7. Read the measured value.

The multimeter will measure the input signal according to the current measurement settings and display the measurement results in the screen.

8. Mathematical operations.

Mathematical operations (Max/Min) can be performed on measured readings. For specific operations, please refer to "Math Operations".

3.2.4 Measuring AC Current

This section describes how to configure AC current measurements.

Operation steps:

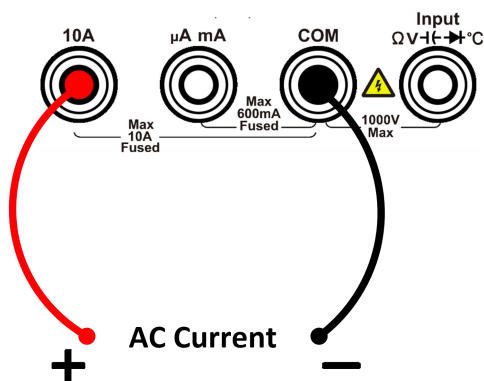
1. Enable the AC current measurement function.

Press the front panel  key, switch to AC current measurement, as shown in the figure below.



2. Connect the test leads.

Connection of test leads for Range A is shown in the figure below.



actual measured value minus the set relative value. The default relative value is the measured value when the function is turned on.

7. Read the measured value.

The multimeter will measure the input signal according to the current measurement settings and display the measurement results in the screen.

8. Mathematical operations.

Mathematical operations (Max/Min) can be performed on measured readings. For specific operations, please refer to "Math Operations".

3.2.5 Measurement Resistance

This section describes how to configure two-and four-wire resistance measurements.

Operation steps:

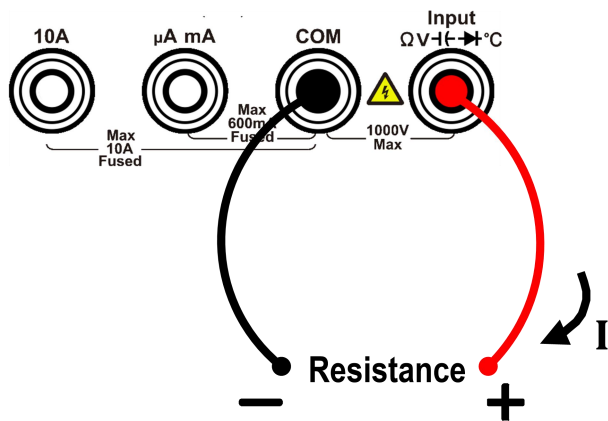
1. Enable resistance measurement function.

Press the front panel  key, switch to the resistance measurement mode, as shown in the figure below.



2. Connect the test leads.

As shown in the figure below.



3. Set the range.

Press the **Range** softkey to set the required range. Auto range can be automatically selected for the measurement based on the input.

Description:

- There is 1000 V input protection at any range.
- All ranges have a 20% over-range.
- "OL" is displayed when the reading exceeds 5% over-range in the 100 M Ω range.

4. Set speed.

Press the **Speed** softkey to select the measurement speed.

5. Set the relative value.

Press the **Rel** softkey to turn on or off the relative operation function. When the relative operation is turned on, the reading displayed at this time is the actual measured value minus the set relative value. The default relative value is the measured value when the function is turned on.

6. Read the measured value.

The multimeter will measure the input signal according to the current measurement settings and display the measurement results in the screen.

Description:

- When measuring low-resistance resistors, it is recommended to use relative value operation to eliminate impedance errors caused by test leads.
- When measuring a resistance, both ends of the resistance cannot be placed on a conductive table top or held by hand for measurement,

which will lead to inaccurate measurement results, and the greater the resistance, the greater the impact.

7. Mathematical operations.

Mathematical operations (Max/Min) can be performed on measured readings. For specific operations, please refer to "Math Operations".

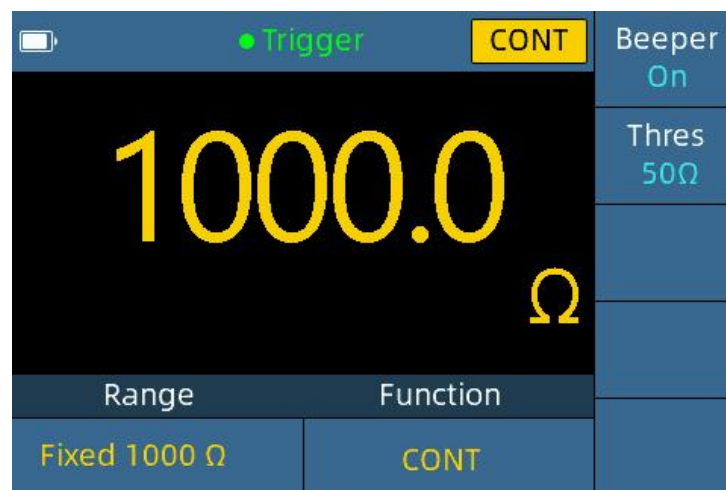
3.2.6 Continuity Testing

This section describes how to configure continuity tests.

Operation steps:

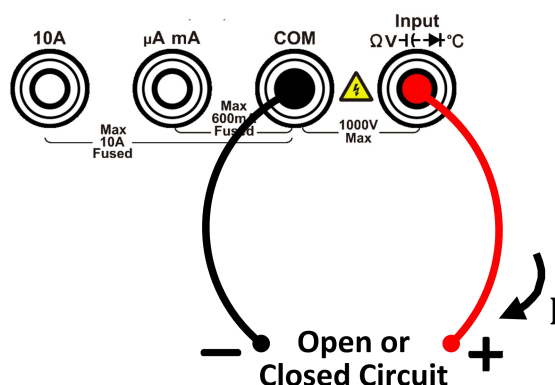
1. Enable the connectivity testing feature.

Press the front panel  key, switch to connectivity measurement, as shown in the figure below.



2. Connect the test leads.

As shown in the figure below.



3. Set the beeper.

Press the **Beeper** softkey to turn the beeper function on or off. When the Beeper is turned on, if the resistance of the circuit under test is less than the set threshold, the beeper will make a continuous sound.

4. Set the threshold.

Press the **Thres** softkey to set the short circuit resistance value. Press the **</>** softkey to move the cursor position, press **+ / -** to increase or decrease the value at the cursor and then press **OK** to enter input threshold value.

5. Read the measured value.

The multimeter will measure the input signal according to the current measurement settings and display the measurement results in the screen.

Description:

- Before the test circuit is on and off, disconnect the circuit power and discharge all high-voltage capacitors to avoid damaging the multimeter.

Circuit resistance to be measured	Display and beep
$\leq$ Preset resistance threshold	Display measured resistance and beeps (if beeper enabled)
Preset resistance threshold to 1000 Ω	Display measured resistance with no beeper
>measured value exceeds 20% over-range	Display OPEN with no beeper

6. Mathematical operations.

Mathematical operations (Max/Min) can be performed on measured readings. For specific operations, please refer to "Math Operations".

3.2.7 Diode Testing

This section describes how to configure diode tests.

Operation steps:

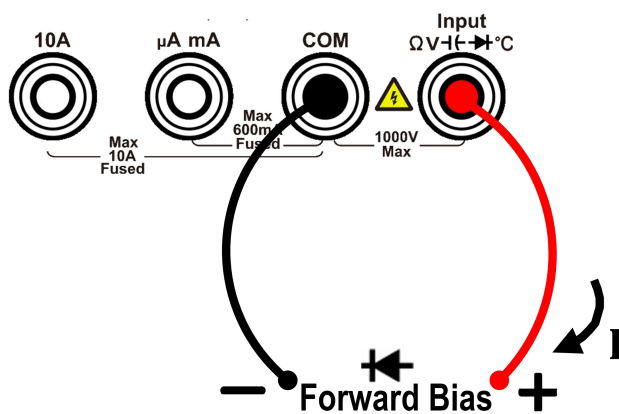
1. Enable the diode test function.

Press the front panel  key, switch to diode measurement, as shown in the figure below.



2. Connect the test leads.

As shown in the figure below.



3. Set the beeper.

Press the **Beeper** softkey to turn the beeper function on or off. When the beeper is turned on, such as the diode is turned on, the beeper will make a continuous sound.

4. Set the threshold.

Press the **Thres** softkey to set the diode threshold value. Press the **</>** softkey to move the cursor position, press **+ / -** to increase or decrease the value at the cursor and then press **OK** to enter input threshold value.

5. Read the measured value.

If the diode is on, the multimeter screen will display the measured voltage, otherwise the screen will display "OPEN".

Description:

- Before testing the diodes, disconnect the circuit and discharge all high

voltage capacitors to avoid damaging the multimeter.

Forward pressure drop of diode	Display and beep
0 to 3 V	Displays the measured voltage. The multimeter will beep when the voltage drops below the set threshold (if the buzzer is enabled).
> 3 V	Display OPEN with no beeper

6. Evaluate measurement results

Invert the probe and measure the voltage in the diode again. The diodes were evaluated according to the following criteria:

- If the multimeter displays "OPEN" when in reverse bias mode, the diode is OK.
- If the multimeter displays a voltage value of approximately 0V while in forward and reverse bias modes, and the multimeter continuously beeps, the diode is shorted.
- If the multimeter displays "OPEN" when in forward and reverse bias modes, the diode is OPEN.

7. Mathematical operations.

Mathematical operations (Max/Min) can be performed on measured readings. For specific operations, please refer to "Math Operations".

3.2.8 Measurement Capacitance

This section describes how to configure capacitance measurements.

Operation steps:

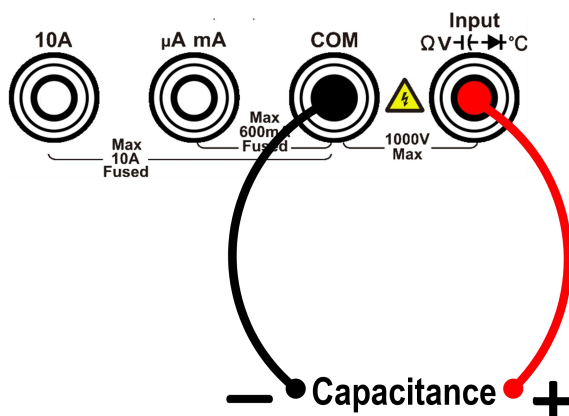
1. Enable the capacitance measurement function.

Press the front panel  key, switch to capacitance measurement, as shown in the figure below.



2. Connect the test leads.

As shown in the figure below.



Description:

- Before measuring the electrolytic capacitor, please use the test lead to short-circuit the two pins of the electrolytic capacitor for a moment to discharge, and then measure.

3. Set the range.

Press the **Range** softkey to set the required range. Auto range can be automatically selected for the measurement based on the input.

Description:

- There is 1000 V input protection at any range.
- All ranges have a 10% over-range.
- "OL" is displayed when the reading exceeds range.

4. Set the relative value.

Press the **Rel** softkey to turn on or off the relative operation function. When

the relative operation is turned on, the reading displayed at this time is the actual measured value minus the set relative value. The default relative value is the measured value when the function is turned on.

5. Read the measured value.

The multimeter will measure the input signal according to the current measurement settings and display the measurement results in the screen.

Description:

- Before measuring the electrolytic capacitor with a multimeter, the two short pins of the electrolytic capacitor should be connected with the test lead each time for discharge, and then it can be measured.

6. Mathematical operations.

Mathematical operations (Max/Min) can be performed on measured readings. For specific operations, please refer to "Math Operations".

3.2.9 Measurement Frequency and Period

This section describes how to configure frequency and period measurements.

Operation steps:

1. Enable frequency or period measurement functions.

Press the front panel **Freq** key, select frequency in the menu to enter the frequency measurement interface, as shown in the figure below.

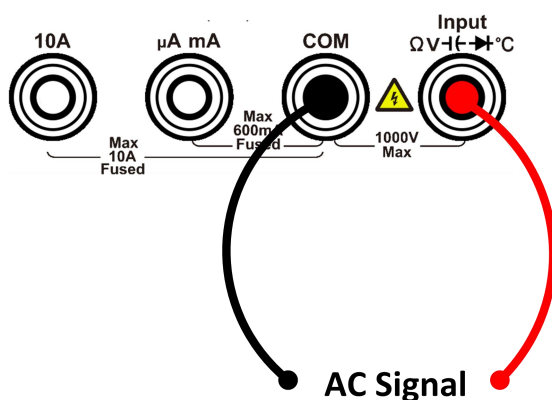


Press the front panel **Freq** key, select period in the menu to enter the period measurement interface, as shown in the figure below.



2. Connect the test leads.

As shown in the figure below.



3. Set the range.

Press the **Range** softkey to set the required range. Auto range can be automatically selected for the measurement based on the input.

Description:

- Frequency range: 10 Hz to 60 MHz.
- There is 750 Vrms input protection at any range.

4. Set the relative value.

Press the **Rel** softkey to turn on or off the relative operation function. When the relative operation is turned on, the reading displayed at this time is the actual measured value minus the set relative value. The default relative value is the measured value when the function is turned on.

5. Read the measured value.

The multimeter will measure the input signal according to the current

measurement settings and display the measurement results in the screen.

6. Mathematical operations.

Mathematical operations (Max/Min) can be performed on measured readings. For specific operations, please refer to "Math Operations".

3.2.10 Measure Temperature

This section describes how to configure temperature measurement. A temperature sensor probe is required. Supported probe models: KITS90 and PT100.

Operation steps:

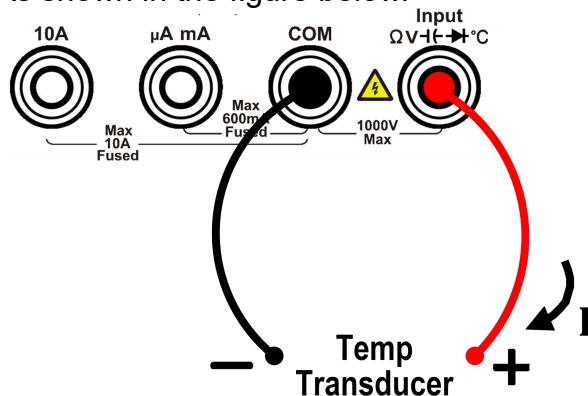
1. Enable the temperature measurement function.

Press the front panel **Temp** key, enter temperature measurement mode, as shown in the figure below.



2. Connect the test leads.

As shown in the figure below.



3. Set the probe type.

Press the **Load** softkey to select the probe type: KITS90 or PT100. It is a sensor that converts temperature variations into voltage changes and features a wide temperature measurement range.

4. Set reference temperature (only applicable to KITS90 probe).

Press the **Ref** softkey to select internal or fixed reference temperature. Press the **Compen** or **Cold** softkey, then use the **< / >** keys to move the cursor, and the **+ / -** keys to adjust the value at the cursor.

5. Set the unit.

Press the **Unit** softkey to select a unit for the measurement. °C (Celsius), °F (Fahrenheit), K (open temperature). The temperature conversion relationship is as follows:

- $^{\circ}\text{F} = (9/5) \times ^{\circ}\text{C} + 32$
- $\text{K} = ^{\circ}\text{C} + 273.15$

6. Set the relative value.

Press the **Rel** softkey to turn on or off the relative operation function. When the relative operation is turned on, the reading displayed at this time is the actual measured value minus the set relative value. The default relative value is the measured value when the function is turned on.

7. Read the measured value.

The multimeter will measure the input signal according to the current measurement settings and display the measurement results in the screen.

8. Mathematical operations.

Mathematical operations (Max/Min) can be performed on measured readings. For specific operations, please refer to "Math Operations".

3.3 Run/Stop (Data Hold)

Press **Run/Stop** panel key to keep the current reading on the display.

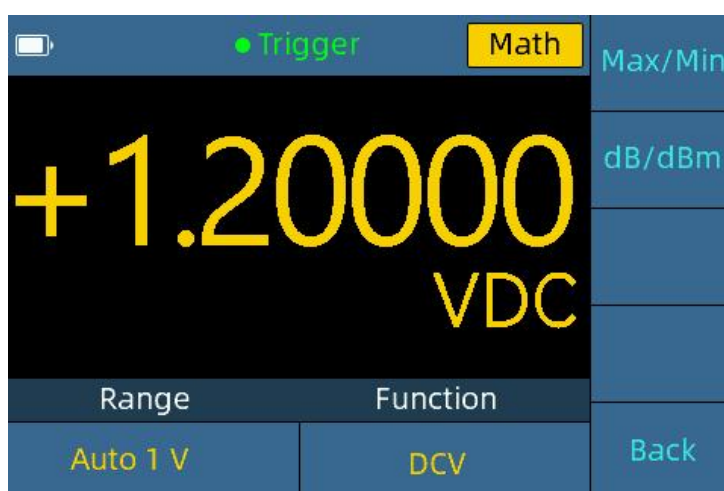
1. Press **Run/Stop** panel key to stop the trigger, and the current reading is

kept on the display screen.

2. Press **Run/Stop** key again to continue triggering.

3.4 Math

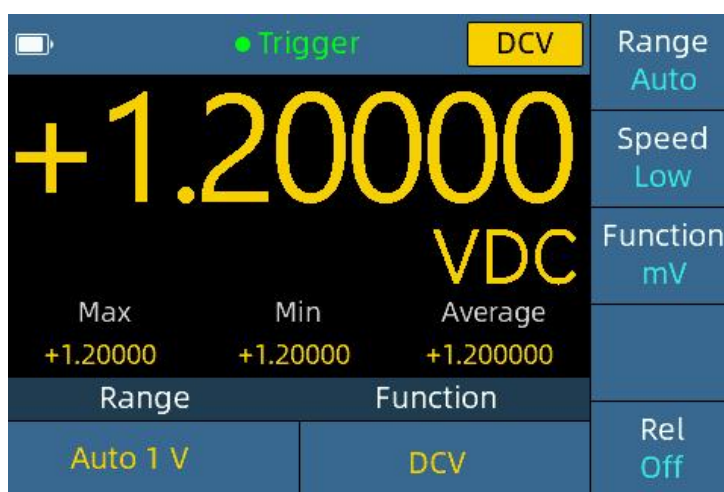
Mathematical operations mainly include three functions: Max/Min, dBm/dB and relative operations. Different mathematical operation functions are selected to meet the measurement requirements of different conditions. Different measurement functions can perform different mathematical operations. Press **Math** panel key to enter the mathematical operation interface.



3.4.1 Max/Min

It used to count the maximum value, minimum value and average value.

Press **Math** panel key, press **Max/Min** softkey and then press **Display** to select **On**.



Description:

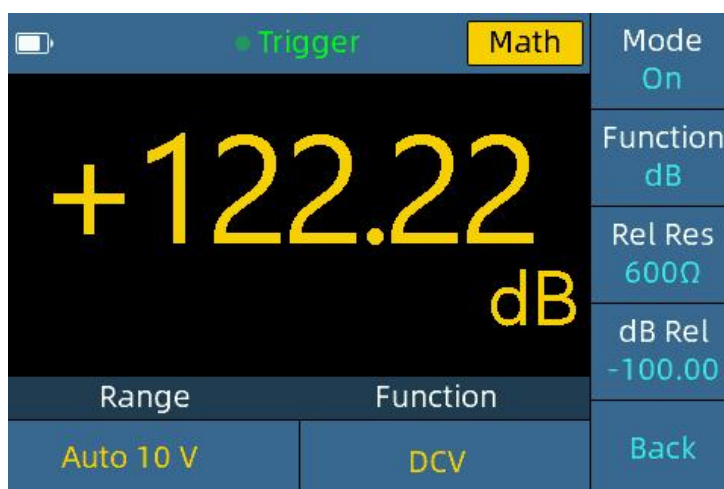
- Press **Clear** softkey to clear all current reading and start counting again.

3.4.2 dB/dBm

The dB and dBm scaling functions only apply to ACV and DCV measurements. The functions allow you to scale measurements relative to a reference value.

Operation steps:

1. Press **Math** panel key, press **dB/dBm** softkey to enter dB/dBm menu.
2. Press **Mode** softkey to enable or disable dB/dBm function.
3. Press **Function** softkey to select dB.



Description:

- **dB function:** dB is used to represent relative values and perform relative calculations for dBm values. When the dB function is enabled, the multimeter calculates the dBm value of the next reading, then subtracts the stored dB set value from it and displays the result, namely:

$$\text{dB} = 10 \times \text{Log}_{10} [(\text{Reading}^2 / R_{\text{REF}}) / 1 \text{ mW}] - \text{dB set value}$$

Reading denotes the measured voltage and R_{REF} stands for the reference resistance.

- **dBm function:** dBm represents absolute power values. The dBm calculation uses the measured voltage to compute the power value across the reference resistance, namely:

$$\text{dBm} = 10 \times \text{Log}_{10} [(\text{Reading}^2 / R_{\text{REF}}) / 1 \text{ mW}]$$

Reading denotes the measured voltage and R_{REF} stands for the reference resistance.

3.4.3 Relative value

When the relative calculation of the current measurement function is turned on, the reading displayed on the screen is the difference between the actual measurement value and the "relative value". This relative value is specific to the current measurement function, even when you return to use this function after exiting this function.

Read value = actual measurement value - relative value

Under the basic measurement interface, press the **Rel** softkey, switch to **On**, the measured value upon activation is stored as the reference value.

The unit is determined by the current measurement function, as shown in the figure below (taking DCV measurement as an example).



3.5 Record

The recorder function includes manual and automatic recording. You can use either mode to log data. Data from manual and automatic recording is saved in separate internal data tables. The maximum capacity is 1000 records for each mode. After data collection, you can view records in the data table. For USB models, data files can be accessed and exported via a computer. For COM port models, data can only be exported by connecting to a host computer.

3.5.1 Manual Record

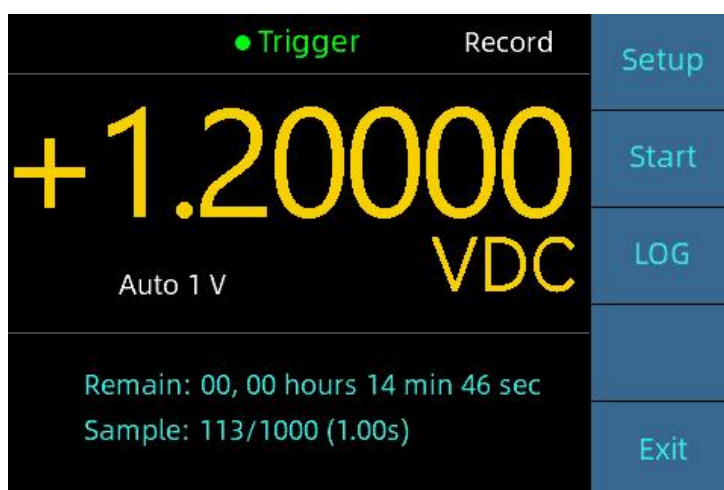
1. Press **Record** panel key to enter record interface.
2. Press **Manual** softkey to enter manual record interface.



3. Press the **Save** softkey to store the current reading in the internal data table by sequence number. The main screen also displays the latest three data records in real time. For modes with a high sampling rate, press the **Run/Stop** key to halt data acquisition first, then press **Save** to store current data for higher capture accuracy.
4. Press the **LOG** softkey to check saved data. Use **Prev** or **Next** to scroll pages. Press **Browse** to switch between fast and slow browsing speeds. In fast browse mode, the page jumps by 20 pages at a time.
5. Press the **Del All** softkey, then press **OK** to erase all data in the table.

3.5.2 Auto Record

1. Press **Record** panel key to enter record interface.
2. Press **Auto** softkey to enter auto record interface.

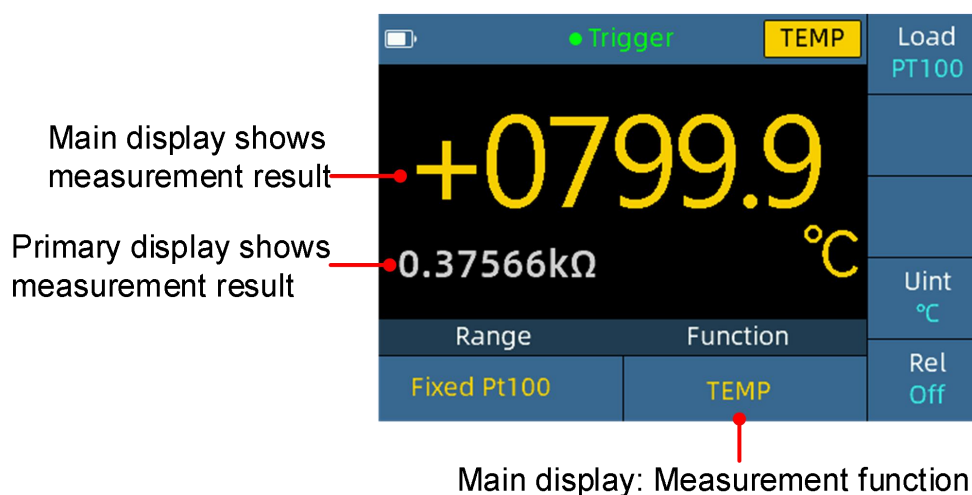


3. Press **Setup** softkey to set auto record length and interval time.
4. Press **Start** softkey to record data, then press **Stop** softkey to stop record.

- Press the **LOG** softkey to view saved data. Data can also be exported to a computer (refer to File Access for detailed operations). Use **Prev** or **Next** to flip pages, and press **Browse** to toggle between fast and slow browsing speeds.
- Press the **Del All** softkey, then press **OK** to erase all data in the table.

3.6 Dual Display Function

Press **Dual** panel key to select the corresponding mode to turn on the dual Display mode, as shown in the figure below (taking TEMP measurement as an example).



The main and auxiliary measurement functions correspond to the following table.

Primary measurement function	Auxiliary measurement function	
ACV	Frequency	
ACA	Frequency	
Frequency	Duty	
Period	Duty	
Temp	KITS90	Sensor
		Reference temperature
	PT100	Sensor

Operation steps:

- Press the measurement function key to activate the measurement function for the main display.

2. Press **Dual** panel key, the sub-display function list appears on the right menu. Select the desired sub-display function.
3. Press **Dual** panel key, press **Off** softkey to turn off dual display.

Description:

- Measurements are performed with both functions, and the main and sub-displays update readings respectively.
- When dual display is enabled, only the readings from the main display will be saved by the recording function.

3.7 Utility System Function

In the auxiliary system function settings, you can set the parameters of multimeter system-related functions. Press **Utility** panel key to enter the system settings menu interface.

3.7.1 User Settings

Press **Utility** panel key, press **User Setup** softkey to enter user setting interface.

Display

Press **Display** softkey to set language, brightness and automatic power off time.

Sounds

Press **Sound** softkey to enable or disable the key or alarm sound. The buzzer warning settings are linked to the buzzer configurations for CONT and DIODE measurement functions.

Date & Time

Press **Date & Time** softkey can edit current date and time. Press **< / >** softkey to select time or date, press **+ / -** softkey to increase or decrease the selected time or date, press Back to exit setting operation.

AutoOff (Only built-in battery model)

Press **AutoOff** softkey can set automatic power off time, select off the instrument will not power off automatically.

3.7.2 Preset Setting

Press **Utility** panel key, press **Preset Setup** softkey to enter preset setting interface.

Power On

Press **PowerOn** softkey to select Default or Last (Measurement configuration before last power-off) serves as the initial state upon next power-on.

Factory Setting

Press **Factory Reset** softkey, then press **OK** softkey, the instrument will resets measurement settings, restores user system configurations and clears stored measurement data.

Parameters	Factory Setting
Power On	Default
Brightness	High
Auto Screen Off	Off
Auto Power Off	Off
Key tone	Off
Beeper	On
SCPI Communication	On
User Data	Clear

Measure Setting

Press **Measure Reset** softkey, then press **OK** softkey, the instrument will restore measurement configurations to factory defaults.

Parameters			Factory Setting
Test Function			DCV
Basic Function	DCV/ACV	Range	Auto
		Speed	Low
		Function	V
		Relative	Off
	DCA/ACA	Range	Auto
		Speed	Low
		Terminal	mA
		Relative	Off
	RES	Range	Auto
		Speed	Low
		Relative	Off
	CONT	Beeper	On
		Threshold	50Ω
	DIODE	Beeper	On
		Threshold	0.5V

Parameters			Factory Setting
	CAP	Range	Auto
		Relative	Off
	Freq	Mode	Frequency
		Relative	Off
	Temp	Load	KITS90
		Reference	Internal
		Compensation	0.00°C
		Unit	°C
		Relative	Off
Math	Max/Min	Display	Off
	dB/dBm	Mode	Off
		Function	dBm
		Relative resistance	600 Ω
		dB Relative	0.00
Record	Auto Record	Length	1000
		Interval	1s

3.7.3 I/O Setting

Press **Utility** panel key, press **I/O Config** softkey to enter I/O setting interface.

SCPI

Press **SCPI** softkey to enable or disable SCPI command function.

Serial

Press **Serial** softkey to set baud, data bits, stop bits and parity.

- Press **Baud** softkey to set baud. Make sure that the baud rate matches that of the computer.
- Data bits are fixed at 8 bits.
- Press **Stop Bits** softkey to select 1, 1.5 or 2.
- Press **Parity** softkey to select None, Odd or Even.

File Access (Only USB interface model)

File access is used to view internal device files. Detailed steps to export data:

1. Connect the device to your PC via USB.
2. Press **Utility** panel key, press **I/O Config** softkey to enter I/O setting interface.
3. Press the **File Access** softkey. The device will be recognized as a virtual USB flash drive by the computer.

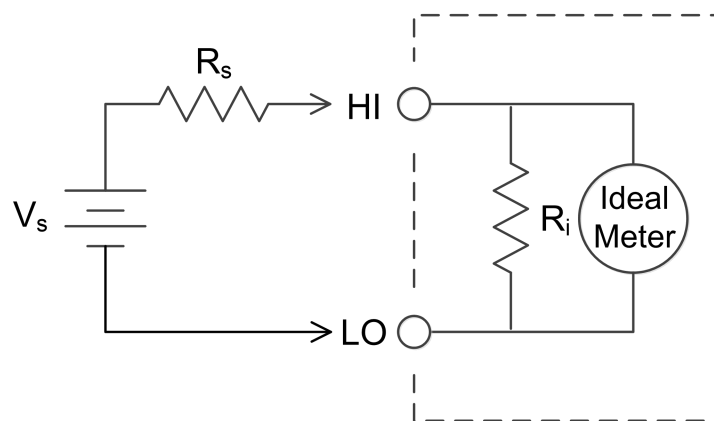
4. Open File Explorer to copy internal files from the device to your PC.
5. Press **Exit** to stop file access.

4 Measurement Guidance

This chapter guides you on how to eliminate common potential measurement errors to achieve high measurement accuracy.

4.1 Load error DC voltage

If the resistance of the Device-Under-Test (DUT) accounts for a large proportion of the input resistance of the multimeter itself, a measurement load error will occur, as shown below.



V_s = ideal DUT voltage

R_s = DUT Source resistance

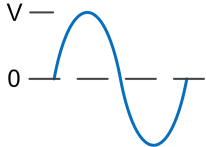
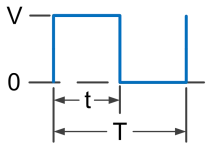
R_i = Multimeter input resistance (10 M Ω or > 10 G Ω) (Select according to the range)

$$\text{Error (\%)} = \frac{100 \times R_s}{R_s + R_i}$$

4.2 True RMS AC measurement

The AC measurement of this multimeter has a true RMS response. The power dissipated by the resistor is proportional to the square of the applied voltage, independent of the signal waveform. If the waveform contains negligible energy outside the effective bandwidth of the multimeter, this multimeter can accurately measure the true RMS voltage or current.

This multimeter has an effective AC voltage bandwidth of 1 kHz and an effective AC current bandwidth of 1 kHz.

Waveform	Crest factor (C.F.)	AC effective value	AC + DC RMS
 A sine wave oscillating between 0 and V. The peak is labeled V and the zero level is labeled 0.	$\sqrt{2}$	$\frac{V}{\sqrt{2}}$	$\frac{V}{\sqrt{2}}$
 A triangle wave oscillating between 0 and V. The peak is labeled V and the zero level is labeled 0.	$\sqrt{3}$	$\frac{V}{\sqrt{3}}$	$\frac{V}{\sqrt{3}}$
 A square wave with a 50% duty cycle. The high level is labeled V and the low level is labeled 0. The pulse width is labeled t and the period is labeled T. Below the diagram is the text "(50% 占空比)".	1	$\frac{V}{\text{C.F.}}$	$\frac{V}{\text{C.F.}}$

The AC voltage and AC current functions of the multimeter can measure the AC coupled true RMS, only the RMS of the AC component of the input waveform (the DC component is blocked). As shown in the figure above, for sine waves, triangle waves, and square waves, since these waveforms do not produce DC offset, the RMS of AC is equal to the RMS of AC + DC. However, for asymmetric waveforms, such as pulse sequences, the AC-coupled true RMS measurement of this multimeter will block the contained DC voltage component.

AC-coupled true RMS measurement is ideal for measuring small AC signals with large DC offsets, for example, measuring AC ripples that occur in DC power output. However, in some cases it is necessary to measure the true RMS value of AC + DC, which can be calculated by combining the DC measurement and the AC measurement:

$$ac + dc = \sqrt{ac^2 + dc^2}$$

5 Troubleshooting

1. The instrument is powered on but no Display.

- 1) Check if the power is connected properly.
- 2) Check if the AC Mains Line Voltage Selector is in the proper voltage scale.
- 3) Check if the line fuse which is below the AC Mains Input is used appropriately and in good condition (see page 50, Appendix C: Line Fuse Replacement).
- 4) Restart the instrument after the steps above.
- 5) If the problem still exists, please contact us for our service.

2. The reading does not change when a current signal is input.

- 1) Check whether the test lead is correctly inserted into the current input terminals (I terminal and LO Input terminal).
- 2) Check whether the current terminal fuse at the front panel is burned out.
Please refer to "7 Current Terminal Fuse" in "Front panel overview" on page 8.
- 3) Check whether the DCI or ACI measurement function is enabled.
- 4) Check whether the DCI measurement function is used to measure AC current.

If you encounter other problems, try to reset the settings or restart the instrument. If it still can not work properly, please contact us for our service.

6 Technical Specifications

The instrument shall operate continuously for more than 30 minutes at the specified operating temperature to meet the following specifications.

Note: When measuring low voltage, small capacitance or high resistance with the multimeter, properly ground the multimeter to suppress power frequency interference and improve measurement accuracy.

Function	Range ^[1]	Resolution / Frequency range	Accuracy $\pm$ (% of reading + LSB) ^[2]
DC Voltage	100.000 mV	0.001 mV	0.1% + 10
	1.00000 V	0.00001 V	0.05% + 5
	10.0000 V	0.0001 V	0.05% + 5
	100.000 V	0.001 V	0.1% + 5
	1000.00 V ^[3]	0.01 V	0.1% + 10
True RMS AC Voltage^[4]	500.00 mV	20 Hz – 45 Hz	1% + 30
	5.0000V	45 Hz – 65 Hz	0.5% + 30
	50.000V	65 Hz – 1 kHz	0.7% + 30
	500.00V		
DC Current	750.0 V		
	100.000 μ A	0.001 μ A	0.15% + 40
	1.00000 mA	0.00001 mA	0.15% + 10
	10.0000 mA	0.0001 mA	0.15% + 40
	100.000 mA	0.001 mA	0.15% + 10
	1.00000 A	0.00001 A	0.3% + 40
True RMS AC Current^[6]	10.0000 A ^[5]	0.0001 A	0.5% + 10
	500.00 μ A	20 Hz – 1 kHz	0.5% + 20
	5.0000mA		
	50.000mA		
Resistance^[7]	500.00 mA		
	5.0000 A		1.5% + 20
	10.000 A		
	100.000 Ω	0.001 Ω	0.15% + 20
	1.00000 k Ω	0.00001 k Ω	0.15% + 20
	10.0000 k Ω	0.0001 k Ω	0.15% + 20
	100.000 k Ω	0.001 k Ω	0.15% + 20
Diode	1.00000 M Ω	0.00001 M Ω	0.3% + 20
	10.0000 M Ω	0.0001 M Ω	0.5% + 20
	100.000 M Ω	0.001 M Ω	3% + 50
	3.0000 V	0.0001 V	1% + 10

6 .Technical Specifications

Continuity		1000.0 Ω	0.1 Ω	The threshold can be adjust
Frequency		10.000 Hz – 60 MHz ^[8]	/	$\pm (0.2\% + 10)$
Capacitance^[9]		50.00 nF 500.0nF 5.000uF 50.00uF 500.0 uF	/	2.5% + 10
		5.000 mF 50.00 mF	/	5% + 10
Temperature	K type ^[10]	-200 –1300°C	0.1°C	$\pm (1\% + 2^\circ\text{C})$
	PT100	-200 – 800°C	0.1°C	$\pm (1\% + 2^\circ\text{C})$
Max. reading		120000		
Record interval		10 ms – 3600 s		
Record Length		Manual record: 1,000 points Auto record: 1,000 points		

- [1] Except for the 1000 V, 10 A and 100 M Ω ranges of DCV, DCI and Resistance functions which support 5% overrange, all other ranges allow 20% overrange. For ACV and ACI functions, the 750 V and 10 A ranges support 5% overrange, while all other ranges allow 10% overrange.
- [2] Specifications are for 30-minute warm-up, "Low" measurement rate and calibration temperature 18°C - 28°C.
- [3] For each additional volt over ± 500 VDC add 0.02 mV of error.
- [4] Specifications are for amplitude of sine wave input > 5% of range.
- [5] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that higher than DC 7 A or AC RMS 7 A.
- [6] Specifications are for amplitude of sine wave input > 5% of range.
- [7] Specifications are for 2–wire ohms using the relative operation of math. Without relative operation, add $\pm 0.20 \Omega$ additional error in 2-wire ohms function.
- [8] Except for special marks, when frequency ≤ 10 M Hz, the specification is applicable to >1V AC input voltage, when frequency > 10 MHz, the specification is applicable to >3V AC input voltage. When the measured signal is large (e.g., mains voltage), it is recommended to use the secondary display function of ACV for measurement.
- [9] Specifications are for using the relative operation of math. Using of non-film capacitor may generate additional errors. Specifications are for

from 5% to 110% on ranges.

[10]Accuracy is based on ITS-90 relative to the cold junction temperature. The internal cold junction temperature refers to the temperature within the banana jacks, with an accuracy of $\pm 2^{\circ}\text{C}$.

General Specifications

Display	3.5-inch TFT LCD with resolution 480*320	
Battery	4400mah, 3.7V Note: It is recommended to use a 5V 2A charger XDM1051-U/XDM1051-R does not have a built-in battery.	
Work Temperature	Full temperature: 0°C - 50°C, 80% RH and 40°C, non-condensing	
Storage Temperature	-20°C to 70°C	
EMC	Complies with EMC Directive (2004/108/EC) and standard EN 61326-1:2013.	
Safety	Complies with Low Voltage Directive (2006/95/EC) and standard EN 61010-1:2010.	
Interface	RS232 or USB Device	
Programmer Language	Standard SCPI, compatible with commands of main stream multimeters	
Warm Up Time	30 minutes	
Dimension (W*H*D)	200mm x 86.5mm x 64mm	
Weight	XDM1051-U XDM1051-R	Approx. 0.45kg
	XDM1251	Approx. 0.48kg

Adjustment interval: The recommended calibration interval is one year.

7 Appendix

7.1 Appendix A: Accessories

Standard Accessories

- Power Cord
- Test Lead
- Quick Guide
- USB Cable
- Fuse

7.2 Appendix B: General Care and Cleaning

General Care

Do not store or leave the instrument where the liquid crystal display will be exposed to direct sunlight for long periods of time.

Cleaning

To clean the instrument exterior, perform the following steps:

1. To prevent electrical shock, disconnect the instrument from AC mains power and disconnect all test leads before cleaning.
2. Clean the outside of the instrument using a wet soft cloth not dripping water. Do not make any scuffing when cleaning the LCD screen.
3. To avoid damage to the instrument, do not use any corrosive chemical cleaning agent.

Caution: To avoid any damage to the instrument, do not exposed it to any sprays, liquids, or solvents.



Warning: Before power on again for operation, it is required to confirm that the instrument has already been dried completely, avoiding any electrical short circuit or bodily injury resulting

form the moisture.

7.3 Appendix C: Line Fuse Replacement

The line fuse is in the plastic fuse box below the power line input on the rear panel.

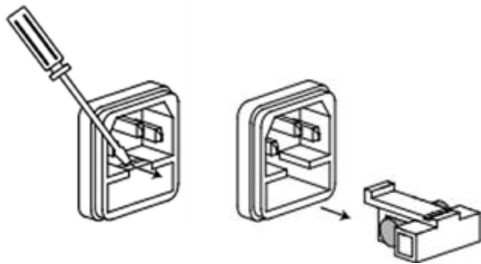
 **Warning:** Disconnect the line cord at the rear panel and remove all test leads connected to the instrument before replacing the line fuse. Failure to do so could expose the operator to hazardous voltages that could result in personal injury or death.

Use only the correct fuse type. Failure to do so could result in personal injury or instrument damage.

Voltage	Fuse
100 - 120 V AC	250 V, F1AL
200 - 240 V AC	250 V, F0.5AL

To perform the line fuse replacement, follow these steps:

1. Turn off the multimeter, remove all measurement leads and other cables from the instrument, including the power cord.
2. Use a flat-blade screwdriver to remove the fuse box.



3. Replace the fuse with a new one, which should match with the voltage; install it into the fuse box, and push the fuse box back on to the rear panel.

