

# **Quick Guide**

## **HDM3000 Digital Multimeter**

Version: 3.0

# Guaranty and Declaration

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## Product Certification

Qingdao Hantek Electronic Co., Ltd guarantees that the product conforms to the Chinese National Product Standards and the Industrial Product Standards in China as well as the ISO9001:2015 Standards and ISO14001:2004 Standards. Other international standard conformance certification is in progress.

## Contact Us

If you encounter any problems or requirements in the process of using the product or the manual, please contact us by e-mail:

[support@hantek.com](mailto:support@hantek.com)

## Safety Requirement

### General Safety Summary

Be aware of the following safety precautions to avoid injury and prevent damage to the product or any product connected to this product. To avoid possible hazards, be sure to use this product in accordance with the regulations.

#### **Use the correct power cord.**

You are only allowed to use the specified power cord approved by the country you are currently in.

#### **Ground the product.**

This product is grounded through the protective grounding wire of the power cable. To avoid electric shock, please ensure that the grounding terminal of the

power cable is connected to the protective grounding terminal reliably before connecting to any input or output terminals of the product.

**View all terminal ratings.**

To avoid fire and excessive current shock, please check all the ratings and markings on the product and consult the product manual for details of the ratings before connecting the product.

**Use appropriate overvoltage protection.**

Ensure that no overvoltage (such as voltage caused by lightning) reaches to this product. Or else the operator may expose to danger of electric shock.

**Do not open the lid while operating.**

Do not operate the product with the machine case open.

**Use appropriate fuse.**

Only specified fuses are allowed.

**Avoid exposed circuits.**

After powering on, do not touch exposed splices and components.

**Do not operate if the product is suspected to be out of order.**

If you suspect there is something wrong with the product, please contact maintenance personnel authorized by Hantek for testing. Any maintenance, adjustment or replacement of components must be performed by repairmen authorized by Hantek.

**Maintain good ventilation.**

Poor ventilation may cause the temperature of the instrument rising and then lead to damage to it. Good ventilation should be maintained when using, and the vents and fans should be checked regularly.

**Do not use in a humid environment.**

To avoid short circuit and electric shock, do not operate the instrument in damp environment.

**Do not operate in a flammable and explosive environment.**

In order to avoid damage to the instrument or personal injury, do not operate the instrument in a flammable and explosive environment.

**Please keep the surface of the product clean and dry.**

To avoid dust and moisture in the air affecting the performance of the instrument, please keep the surface of the product clean and dry.

**Anti-static protection.**

Static electricity may cause damage to the instrument. It would be better to test the

instrument in anti-static area. Before connecting the cable to the instrument, the inner and outer conductors should be grounded briefly to release the static electricity.

### **Pay attention to carrying safety.**

To avoid the instrument sliding in the process of carrying, causing damage to the keys on the panel, the knobs or interfaces, please pay attention to carrying safety.

### **Interference tests for all models comply with Class A standards, based on EN 61326:1997 +A1+A2+A3**

### **Input terminal protection limits.**

The protection limits are defined for the input terminals:

#### **1. Main input (HI and LO) terminals.**

The HI and LO input terminals are used for voltage, resistance, capacitance, connectivity, frequency, and diode test measurements. These two terminals define the following two protection limits:

- 1) HI to LO protection limit. The HI to LO protection limit is 1000 VDC or 750 VAC, which is also the maximum measurable voltage. This limit can also be expressed as a maximum of 1000 VPK.
- 2) Lo to the ground protection limit. LO input terminals can safely "float" to a maximum of 500 Vpk relative to the ground.

The HI terminal protection limit is up to 1000 VPK relative to the ground. Therefore, the sum of the "floating" voltage and the measured voltage must not exceed 1000 VPK.

#### **2. Sampling terminal.**

- 1) The HI and LO Sense terminals are used for DCV proportional measurements, four-wire resistance and temperature measurements. The measurement limit for all terminal pairs is 200 Vpk: LO Sense to LO input, HI Sense to LO input, HI Sense to LO Sense.

#### **3. Current input terminal.**

The measurement limit is 10.5A (DC or AC) when using the 10A-current-input terminal and the LO terminal. The measurement limit is 3.1A (DC or AC) when using 3A-current-input terminal and the LO terminal.

### **Note:**

**To avoid blowing the fuse or damaging the multimeter, please follow the instructions below to use the current input terminals.**

- 1) When performing current test measurements, be sure to select an appropriate current input terminal according to the expected current size before switching on the multimeter power.
- 2) The maximum current input to 10A terminal shall not exceed 10.5A, otherwise, the

internal fuse will be blown; The maximum current input to 3A terminal shall not exceed 3.1A, otherwise, the rear panel current input fuse will be blown.

### **IEC measurement class II overvoltage protection.**

To avoid electric shock, the HDM3000 digital multimeter provides overvoltage protection for line-voltage mains connections meeting both of the following conditions:

1. The HI and LO input terminals are connected to the mains under Measurement Category II conditions, defined below.
2. The maximum line voltage of the power mains is 300 VAC.

**Warning: IEC II includes electrical devices connected to a mains at an outlet on a branch circuit.** These devices include most small appliances, test equipment, and other devices plugged into branch sockets.

The HDM3000 can be used to make measurements where the HI and LO input terminals are connected to power mains (up to 300 VAC) in these devices, or to branch sockets themselves. However, the HI and LO input terminals of the HDM3000 cannot be connected to power mains in permanently installed electrical devices, such as main circuit breaker switchboards, sub-panel disconnected box nor wired motors. These devices and circuits are prone to be in excess of the HDM3000 protection limit.

**Note: Voltages over 300 VAC can only be measured in circuits that are disconnected from the main power line.** However, there are also transient overvoltages in circuits that are disconnected from the mains. The HDM3000 can safely withstand occasional transient overvoltage up to 1500 Vpk. Do not use the device to measure circuits whose transient overvoltage may exceed this value.

# Safety Terms and Symbols

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



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## Warning

A warning statement indicates conditions and actions that may endanger the operator.

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## Attention

The attention statement indicates conditions and actions that may cause damage to or loss of data.

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## CAT I (1000V)

IEC measurement Category I. The maximum measurable voltage of the Hi-Lo terminal is 1000 Vpk.

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## CAT II (300V)

IEC measurement Category II. In case of Category II overvoltage, the input may be connected to the power mains (up to 300 VAC).

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

### Danger

It indicates that this action may cause immediate harm to you.

### Warning

It indicates that this action may cause potential harm to you.

### Attention

It indicates that this action may cause damage to the product or other equipment connected to this product.

Symbols on the product. The following symbols may appear on the product:



High  
voltage



Safety  
warning



Protective  
earthing  
terminal



Shell  
ground  
terminal



Measuring  
ground  
terminal

## Maintenance and Cleaning

## Maintenance

Do not place the instrument in a place exposed to sunlight for a long time.

## Cleaning

Please clean the instrument frequently according to the condition of the instrument. To clean the exterior surface, perform the following steps:

1. Turn off the power.
2. Wipe the dust outside the instrument with a soft cloth that is damp but not dripping (can use a mild detergent or water). When cleaning the instrument with LCD screen, please be careful not to scratch the LCD protection screen.



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### Attention

Do not let any corrosive liquid touch the instrument, so as not to damage the instrument.

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### Warning

Before re-energizing, make sure the instrument is dry enough to avoid electrical short circuit or even personal injury.

## Environmental Matters Need Attention

The following sign indicates that the product complies with the European Union requirements set out in Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).



### Recycling equipment

Some of the substances contained in this product may be harmful to the environment or human health. In order to avoid the harm these substances may cause to the environment or human, it is recommended that appropriate methods be used to recycle this product to ensure that most of the materials can be reused or recycled appropriately. For information on disposal or recycling, contact your local authority.

## Chapter 1 Quick Start

Format conventions in the document:

**Keys:**

For functional keys on the front panel of the instrument, a key icon is used in this book.

For example: The DC voltage measurement function key is represented by .

This chapter guides the user to quickly know the basic information of the multimeter such as the front and rear panels, the user interface and measuring connections.

Chapter 1 outline:

- General inspection
- Adjust the handle
- The front panel
- The rear panel
- Models and options
- First use of the multimeter
- Measuring connections

## **General inspection**

## **Check the transport package.**

If the transport package is damaged, please retain the damaged packaging or shock proof material until the good have been fully inspected and the equipment has passed the electrical and mechanical tests.

If the instrument is damaged due to transportation, the consigner or carrier shall be liable for the damage to the instrument. Qingdao Hantek Electronic Co., LTD. will not carry out free repair or replacement.

## **Check the whole instrument.**

If there is any mechanical damage, any parts missing, or the instrument does not pass the electrical and mechanical tests, please contact Qingdao Hantek Electronics Co., Ltd.

## **Check the attachments.**

Please check the attachments according to the packing list. If there is any damage or anything missing, please contact Qingdao Hantek Electronics Co., Ltd.

## **Adjust the handle.**

To adjust the handle of the digital multimeter, hold the handles on both sides and pull them outward. Then rotate the handle to the desired position. The operation is shown in the following picture.

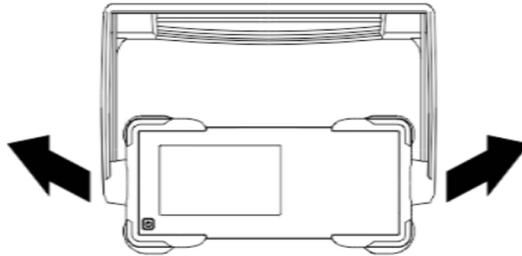


Fig. 1-1 Adjusting the handle

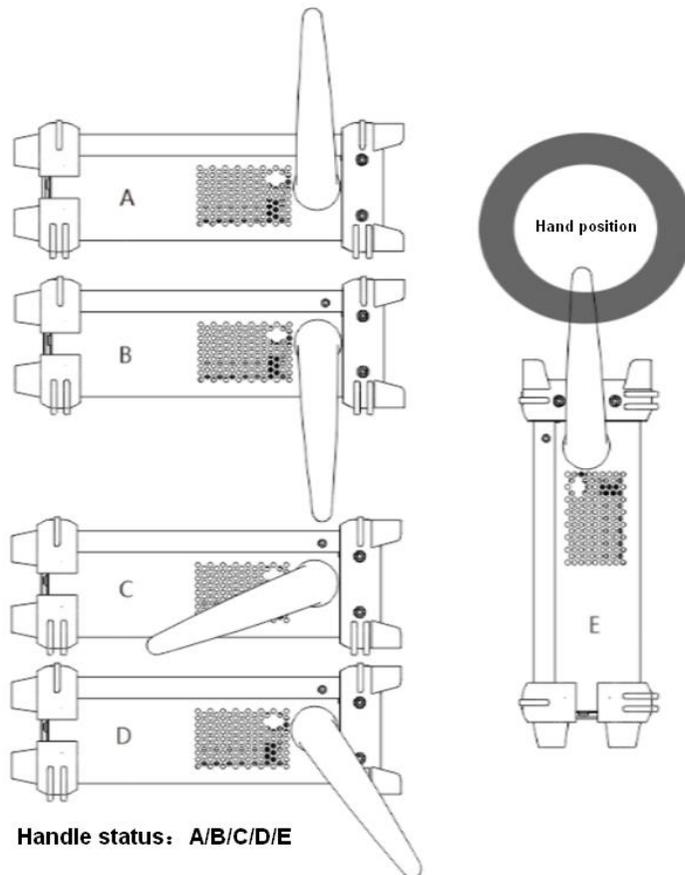


Fig. 1-2 Placing the instrument

## The front panel



HDM3000 front panel sketch map

Attachments	Descriptions
1	USB port
2	Help key
3	Preset/Default key
4	Display
5	Measuring configuration and operation key
6	Connecting terminal
7	Front/Rear switch
8	Soft key
9	Power key

Note: Text is provided on some front panel keys. This indicates that the key has a function that you can access by pressing and releasing [Shift] before pressing the key. For example, if you press and release [Shift] before pressing [Display], you will access the [Utility] function:



## The front panel menu references

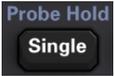
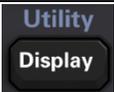
The following table summarizes the front panel keys and menu structure.

Keys	Application
	Configure DC voltage measurement, including DCV ratio measurement: Range: Automatically adjust range (default), 100 mV, 1 V, 10 V, 100 V or 1000V Aperture PLC: 0.02, 0.2, 1, 10, 100. Default value: 10 Auto Zero: Off or On (default) Input Z: 10 M $\Omega$ (default) or Auto $\Omega$ (> 1 G) DCV ratio: Off (default) or On
	Configure DC current measurement: Terminals: 3 A or 10 A Range: Auto, 100 $\mu$ A, 1 mA, 10 mA, 100 mA, 1 A, 3 A or 10 A (Terminals set to 10 A). Aperture PLC: 0.02, 0.2, 1, 10, 100. Default value: 10 Auto Zero: Off or On (default)
	Configure AC voltage measurement: Range: Automatically adjust range (default), 100 mV, 1 V, 10 V, 100 V or 750 V AC Filter: >3 Hz, >20 Hz, >200 Hz
	Configure AC current measurement: Terminals: 3 A or 10 A Range: Auto, 100 $\mu$ A, 1 mA, 10 mA, 100 mA, 1 A, 3 A or 10 A (terminal set to 10 A) AC Filter: >3 Hz, >20 Hz, >200 Hz
	Configure 2-wire resistance measurement: Range: 100 $\Omega$ , 1 k $\Omega$ , 10 k $\Omega$ , 100 k $\Omega$ , 1 M $\Omega$ , 10 M $\Omega$ or 100 M $\Omega$ Note: The approximate current sourced for each range (for example, ~1mA) is shown on each range softkey.

	Aperture PLC: 0.02, 0.2, 1, 10, 100. Default value: 10  Auto Zero: Off or On (default)
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Keys	Application
	<p>Configure 4 wire resistance measurement.</p> <p>Range: 100 Ω, 1 kΩ, 10 kΩ, 100 kΩ, 1 MΩ, 10 MΩ or 100 MΩ.</p> <p>Note: The approximate current sourced for each range (for example, ~1mA) is shown on each range softkey.</p> <p>Aperture PLC: 0.02, 0.2, 1, 10, 100. Default value: 10</p>
	<p>Configure frequency and period measurements. Parameters include range, AC filter, and gate time.</p> <p>Range: 100 mV, 1 V, 10 V, 100 V, 750 V, Auto (default)</p> <p>AC Filter: &gt;3 Hz, &gt;20 Hz, &gt;200 Hz</p> <p>Gating time: 10 ms, 100 ms(default) or 1 s</p> <p>Timeout: 1 s(default) or Auto</p>
	<p>Configure capacitance measurement:</p> <p>Range: 1 nF, 10 nF, 100 nF, 1μF, 10μF, 100μF or Auto (default)</p>
	<p>Configure continuity measurement:</p> <p>Beeper: Close or On (default)</p>
	<p>Configure diode measurement:</p> <p>Beeper: Close or On (default)</p>
	<p>Configure 2-wire and 4-wire temperature measurements.</p> <p>Probe types: RTD2W, RTD4W (default), Thermis2W, Thermis4W</p>

	<p>Settings of RTD 2W or RTD 4W:</p> <p>R0: R0 is an RTD nominal resistor at 0 °C. The default value is 100 Ω</p> <p>Aperture PLC: 0.02, 0.2, 1, 10, 100. Default value: 10</p> <p>Units: °C, °F, or K</p> <p>Settings of Thermis2W and Thermis4W:</p> <p>Aperture PLC: 0.02, 0.2, 1, 10, 100. Default value: 10</p> <p>Auto Zero: Off or On (Default) (2-wire measurement only; Not suitable for 4-wire measurement)</p> <p>Units: °C, °F, or K</p>
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Keys	Application
	Run and stop the measurement.
	Save function.
	Take a single measurement.
	Take one or more hand-free measurement.
	Take a null measurement.
	Configure null functions, statistics, and limits.
	Configure the text and graphics that appear on the display and secondary measurements.

	<p>Store and invoke instrument state and preferences.</p> <p>Configure the I/O interface</p> <p>Perform system administration tasks, including calibration.</p> <p>Configure user preferences.</p> <p>Perform file management activities</p>
	<p>Learn about the instrument, see the most recent error message, or clear the error message.</p>
	<p>Select manual or Auto range. Press  to manually increase the range, press  to manually reduce the range.</p>

Keys	Application
	<p>Return to instrument local control (when in Remote mode), or indicate that the next front panel key will be "shifted", for example, [Probe Hold] instead of [Single].</p>

## [Acquire] Key



Soft keys	Description
Trigger setting	Configure the trigger.
VMC output	Set the voltmeter to complete the output slope.
Save readings	Save the reading to a file.

## [Math] Key



The availability of Math soft keys varies by measurement function.

Soft keys	Description
<b>Null</b>	Enable/disable use of null values and specify null value to use.
<b>dB / dBm</b>	Configure dB, dBm.
Statistical information	Enable, disable, and clear statistics.
Limiting value	Enables or disables upper and lower limits.

## [Display] Key



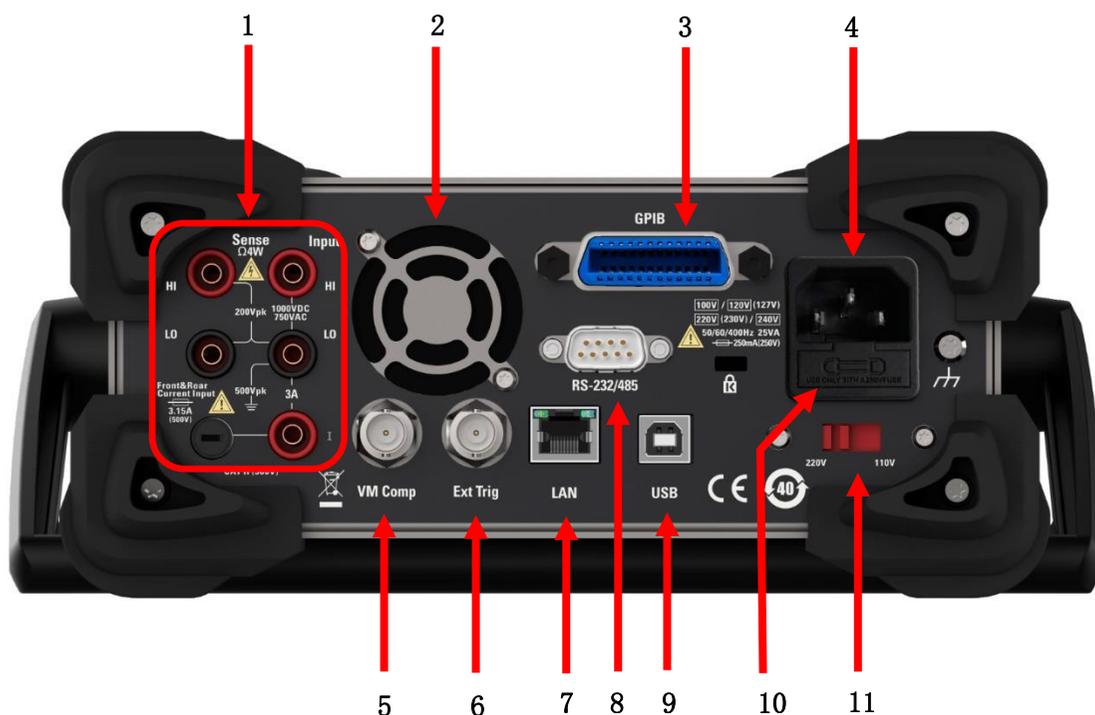
Soft keys	Description
<b>Display</b>	Choose what to display: number, bar meter, histogram, or trend chart.
<b>Label</b>	Enables or disables display messages.
<b>Label Text</b>	Edit the text displayed when the soft key LABEL is on.
<b>2nd Meas</b>	Choose auxiliary measurement
<b>Digit Mask</b>	Set the number of digits displayed in the measurement.

## [Utility] Key



Soft keys	Description
<b>Store/Recall</b>	Store and recall status and preference files, set boot default values.
<b>Manage Files</b>	Perform basic file management tasks and screen capture.
<b>I/O Config</b>	Configure LAN.
<b>Test/Admin</b>	Perform self – test, calibration, firmware update tasks
<b>System Setup</b>	Set user preferences, date, and time.

## The rear panel



### 1. Connect the terminals and the current input fuse.

The multimeter uses two types of fuses to provide input protection for small and large current ranges. The internal fuse provides the maximum protection limit of 10.5A for the input of large current range. The fuse will be blown when the input current exceeds 10.5A. The rear panel current input fuse provides the maximum protection limit of 3.1A for small current range input, and the fuse will be blown when the input current exceeds 3.1A. The multimeter is equipped with a high current input fuse when leaving the factory. If you need to replace the small current range fuse, please do it in the following way:

- 1) Turn off the power of the multimeter and unplug the power cord.
- 2) Use the straight screwdriver to push in slightly and rotate along the direction shown in the picture to pull out the fuse holder.
- 3) Replace specified fuses.
- 4) Put the fuse holder into the card slot.

Note: the large current input fuse is located inside the instrument and is not allowed to

be replaced by the user. If needing replacement, please contact Qingdao Hantek Electronic Co., Ltd.

**2. The fan**

**3. The GPIB interface (non-standard)**

This interface can be configured using the Keysight IO Libraries Connection Expert utility.

**4. Power jack**

This multimeter can input two specifications of AC power supply. Connect alternating current to the multimeter through the socket using the power cord provided in the attachment.

Note: Please select the correct voltage range (using voltage selector) before connecting AC.

**5. VM Comp**

You can use the VMC OUT soft key to set the edge slope of the VM Comp (voltmeter complete) output on the rear panel of the instrument. This connector emits a signal whenever completing a measurement, allowing you to send signals to other devices in the measurement system.

**6. External trigger input**

You can trigger a multimeter by adding a trigger pulse to the [Ext Trig] connector. At this point, you need to select an external trigger source.

**7. LAN interface**

Through this interface, the multimeter is connected to the network for remote control.

**8. The RS232 interface**

Through this interface, the computer is connected to the multimeter. You can control the multimeter remotely using the SCPI command or PC software.

**9. USB Device interface**

Through this interface, the computer is connected to the multimeter. You can control the multimeter remotely using the SCPI command or PC software.

**10. The power fuse**

The multimeter leaves the factory with a power fuse installed. If needing to replace the fuse, please do it in the following way:

- 1) Turn off the power of the multimeter and unplug the power cord.
- 2) Use the screwdriver to press the tongue, and then pull out the fuse seat.
- 3) Select the correct voltage range at the voltage selector.

4) Replace the specified specification of the fuse.

5) Put the fuse holder into the card slot.

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### Attention



To avoid electric shock or fire, use the specified fuse and ensure that the fuse bracket is not short-circuited.

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## 11. Voltage selector

Select the correct voltage range according to the AC specification you are using. Two AC input voltage ranges are available: 110 V and 220 V.

## Models and Options

Model	Reading resolution	Maximum reading rate	Dc voltage accuracy	11 kinds of measurements	Standard interface
HDM3055	5½	30Krdgs/s	150ppm	AC/DC voltage/ AC/DC current/ 2&4wire resistance/ frequency/ period/ diode/ conductance/ thermocouple/ temperature	USB,232,485(front single panel input)
HDM3055S	5½	30Krdgs/s	150ppm		USB,232,485(rear single panel input)
HDM3055A	5½	30Krdgs/s	150ppm		USB,232,485
HDM3055B	5½	30Krdgs/s	150ppm		USB,232,485,LAN
HDM3055H	5½	30Krdgs/s	150ppm		USB,232,485,LAN,GPIB
HDM3065	6½	30Krdgs/s	35ppm		USB,232,485(front single panel input)
HDM3065S	6½	30Krdgs/s	35ppm		USB,232,485(rear single panel input)
HDM3065A	6½	30Krdgs/s	35ppm		USB,232,485
HDM3065B	6½	30Krdgs/s	35ppm		USB,232,485,LAN
HDM3065H	6½	30Krdgs/s	35ppm		USB,232,485,LAN,GPIB

# First use of the multimeter

When using the multimeter for the first time, refer to the steps below to start the multimeter.

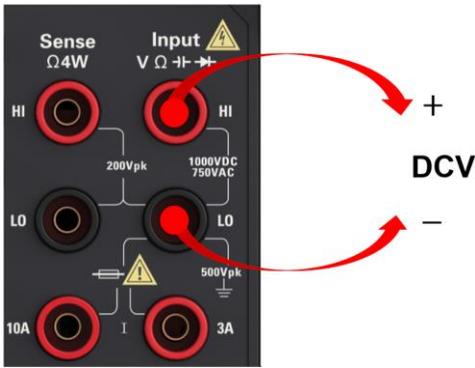
1. Connect the AC power supply.
  - 1) Adjust the power supply voltage selector on the rear panel according to your power supply voltage.
  - 2) Connect the multimeter to the AC power supply using the power cord.
2. Start the multimeter.

Press the power button on the front panel to start the instrument.
3. Start-up process  
Normal startup: Display the user interface.
4. If the instrument does not start normally, please follow the following steps to check.
  1. Check whether the power cord is in good connection.
  2. If the instrument is still not started after checking without error, please check whether the power fuse has been blown. If necessary, please replace the fuse.
  3. If the instrument is still not started after the above check, please contact Qingdao Hantek Electronic Co., Ltd.

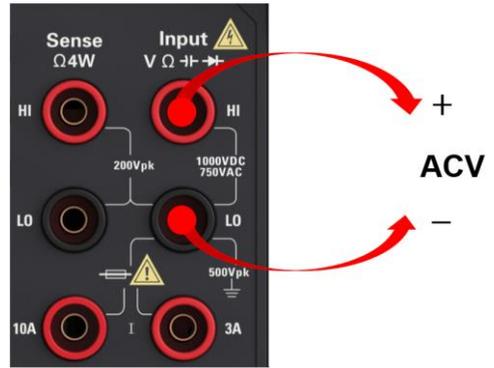
# Measuring connection

This multimeter provides a variety of measuring functions. After selecting the required measuring function, connect the measured signal (device) to the multimeter as shown in the following figure. In the process of measurement, do not switch the measuring function at will, otherwise it may damage the multimeter. For example, do not use the measuring lead to measure AC voltage when it is connected to the current terminals.

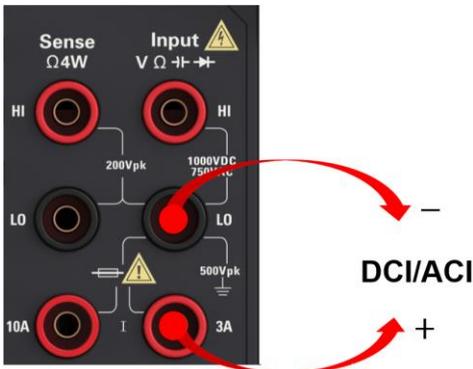
**DCV measurement**



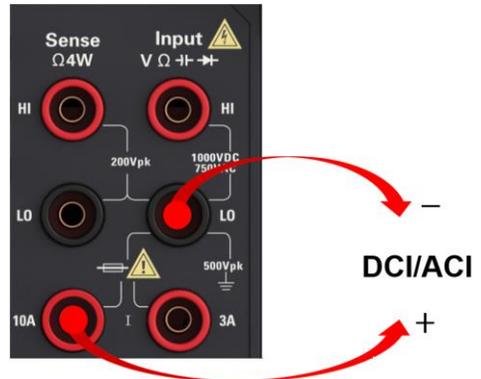
**ACV measurement**



**DCI/ACI measurement (Small current)**



**DCI/ACI measurement(Large current)**

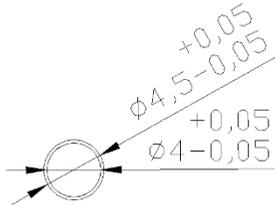


Note: To avoid damaging the multimeter, be sure to follow the instructions below for DC/AC current measurements.

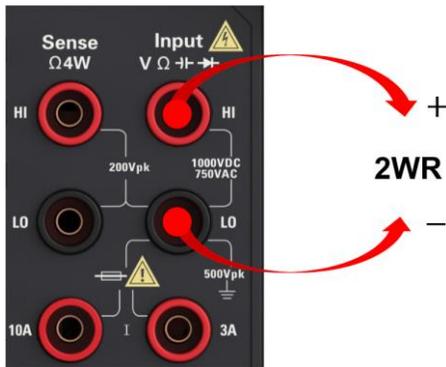
1. When measuring the current, make sure to select the correct current input terminal according to the expected current size before switching on the multimeter

power.

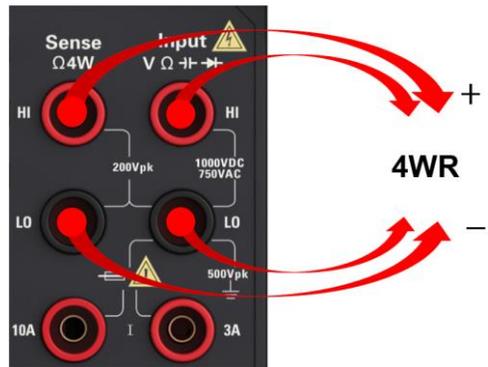
- The input terminal of the multimeter has an outer diameter of 4.5mm and an inner diameter of 4mm, with a tolerance of  $\pm 0.05\text{mm}$  (as shown below). The minimum inner diameter is 3.95mm. Special note: Please use the accessories of Hantek company or purchase the suitable probe. If the probe size selected by the customer is not suitable, resulting in damage to the multimeter input terminal, in this case, our company need pay for maintenance!



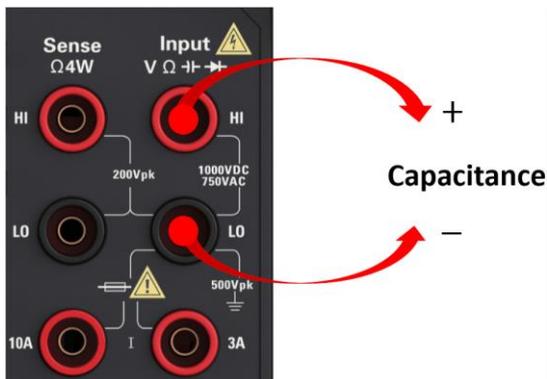
### Resistance Measurement (2-wire)



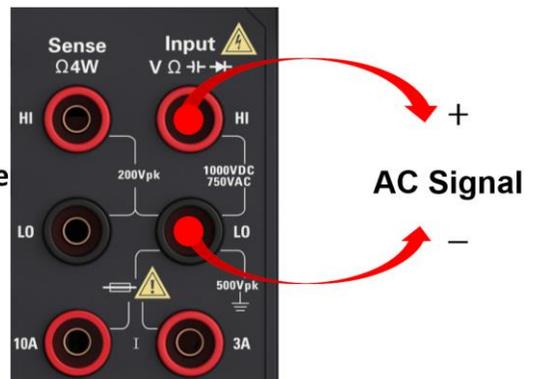
### Resistance Measurement (4-wire)



### Capacitance Measurement



### Frequency/Period Measurement



### Continuity Measurement



### Diode Measurement

