

T3DMM4-5 / T3DMM5-5 / T3DMM6-5 4½, 5½ and 6½ Digit Digital Multimeters Quick Start Guide



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General Safety Summary

Read the following precautions carefully to avoid any personal injuries, or damage to the instrument or products connected to it. Use the instrument only as specified.

Use only the power cord supplied for the instrument.

Ground the instrument. The instrument is grounded through the ground conductor of the power cord. To avoid electric shock, always connect to grounded outlets. Make sure the instrument is grounded correctly before connecting its input or output terminals.

Connect the signal wire correctly. To avoid damage, observe input polarity and maximum voltage/current ratings at all times.

Observe all terminal ratings and signs on the instrument to avoid fire or electric shock. Before connecting to the instrument, read the manual to understand the input/output ratings.

Do not operate with suspected failures. If you suspect that the instrument is damaged, contact the Teledyne LeCroy service department immediately.

Do not operate in wet/damp conditions.

Do not operate in an explosive atmosphere.

Keep the surface of the instrument clean and dry.

Avoid touching exposed circuits or wires. Do not touch exposed contacts or components when the power is on.

Do not operate without covers. Do not operate the instrument with covers or panels removed.

Use only the fuse specified for the instrument.

Use proper overvoltage protection.

Use anti-static protection. Operate in an anti-static protected area. Ground measurement cable conductors before connecting to the instrument to discharge any static electricity before connecting the cables to the instrument.

Observe ventilation requirements. Ensure good ventilation. Check the vent and fan regularly to prevent overheating.

Safety Terms and Symbols

The following terms may appear on the instrument:

DANGER: Direct injury or hazard may occur.

WARNING: Potential injury or hazard may occur.

CAUTION: Potential damage to instrument/property may occur.

CAT I (1): IEC Measurement Category I, applicable for making measurements on 'other' circuits that are not directly connected to mains. See p. 6.

CAT II: IEC Measurement Category II, applicable for making measurements on circuits connected directly to utilization points (socket outlets and similar points) of the low voltage mains installation. See p. 5.

(1) CAT I as defined in IEC/EN 61010-031:2008. Note that Measurement Category I was removed in IEC/EN 61010-031:2015 and replaced by 'O', indicating "other circuits that are not directly connected to mains."

The following symbols may appear on the instrument:



CAUTION
Risk of injury or damage. Refer to manual.



WARNING
Risk of electric shock or burn



Earth
Ground
Terminal



Protective
Conductor
Terminal



Frame or
Chassis
Terminal



ON/
Standby
Power



Alternating
Current

Operating Environment

Temperature: 0 °C to 40 °C

Humidity: 5% to 90% relative humidity (non-condensing) up to +30 °C. Upper limit derates to 50% relative humidity (non-condensing) at +40 °C.

Altitude: ≤ 2000 m

Use indoors only.

Pollution Degree 2. Use in an operating environment where normally only dry, non-conductive pollution occurs. Temporary conductivity caused by condensation should be expected.

AC Power

Input Voltage & Frequency: 100-120 V at 50/60 Hz

or 200-240 V at 50/60 Hz

Manual AC selection with a slide switch.

Power Consumption: 20 W maximum

Mains Supply Connector: CAT II per IEC/EN 61010-1:2010, instrument intended to be supplied from the building wiring at utilization points (socket outlets and similar).

Fuse Type

Current Input Terminal: 250 VAC F 10 A, 3 AG

AC Mains: 250 VAC F 300 mA, 5x20 mm

Input Terminal Protection Limitation

Protection limitation is defined for the input terminal.

1. Main Input (HI and LO) Terminals

HI and **LO** terminals are used for Voltage, Resistance, Capacitance, Continuity, Frequency, Diode and Temperature measurement. Two protection limitations are defined:

HI-LO protection limitation: 1000 VDC or 750 VAC. This is the maximum measurable voltage. The limitation can be expressed as 1000 Vpk.

LO ground protection limitation: **LO** terminal can “float” 500 Vpk relative to the ground safely. The maximum protection limitation of **HI** terminal relative to the ground is 1000 Vpk. Therefore, the sum of the “float” voltage and the measured voltage can’t exceed 1000 Vpk.

2. Sampling (HISense and LOSense) Terminals

HISense and **LOSense** terminals are used for 4-wire Resistance measurement. Two protection limitations are defined:

HISense-LOSense protection limitation: 2000 Vpk.

LOSense-LOSense protection limitation: 2 Vpk.

3. Current Input (I) Terminal

The **I** terminal is used for current measurement. The maximum current which can go through the **I** terminal is limited to 10 A by the fuse on the back panel.

NOTE:

Voltage on the current input terminal corresponds to voltage on the **LO** terminal. To keep good protection, only use a fuse of the specified type and value to replace this fuse.

IEC Measurement Category II Overvoltage Protection

To avoid the danger of electric shock, the Digital Multimeter provides overvoltage protection for line-voltage mains connections that meet both of the following conditions:

1. The HI and LO input terminals are connected to the mains under Measurement Category II conditions described in the warning below.
2. The maximum line voltage of the mains does not exceed:
300 VAC for T3DMM4-5
600 VAC for T3DMM5-5 and T3DMM6-5

WARNING:

IEC Measurement Category II includes electrical devices connected to mains at an outlet on a branch circuit, such as most small appliances, test equipments, and other devices that plug into a branch outlet or socket.

The multimeter is capable of making measurements with the **HI** and **LO** inputs connected to mains in such devices (≤ 300 VAC for T3DMM4-5 and ≤ 600 VAC for T3DMM5-5/T3DMM6-5) or to the branch outlet itself.

However, the **HI** and **LO** terminals of the multimeter can't be connected to mains in permanently installed electrical devices such as the main circuit-breaker panels, sub-panel disconnected boxes and permanently wired motors. Such devices and circuits are prone to exceed the protection limits of the multimeter.

Limits for Measurements on Other Circuits Not Directly Connected to Mains

Max. rated input voltage: 1000 Vrms

Transient overvoltage: 4000 Vpk

WARNING:

Voltages above 300 VAC (for T3DMM4-5) or 600 VAC (T3DMM5-5 / T3DMM6-5) can only be measured in circuits that are isolated from mains. However, there may be transient overvoltage in circuits that are isolated from mains. The multimeter is able to withstand occasional transient overvoltage up to 4000 Vpk. Please don't use this instrument to measure circuits where transient overvoltage may exceed this level.

Daily Maintenance and Cleaning

Maintenance

Protect the liquid crystal display from direct sunlight when storing or using the instrument.

NOTE:

To avoid damage to the instrument or test leads, please don't place them in mist, liquid or solvent.

Cleaning

Regularly clean the instrument and test leads.

- Wipe the external dust off the instrument and test leads using a soft rag. Be careful not to scratch the display screen when cleaning. Do not allow any liquid to enter the instrument.
- Use a damp soft rag to clean the instrument after removing the power plug. Or use 75% isopropyl alcohol / water solvent to get a more thorough cleaning.

NOTE:

To prevent the surface of the instrument or test leads from damage, please don't use any corrosive or chemical cleaning reagents. Please make sure the instrument is fully dry before reconnecting the power to avoid short circuits or personal injury.

General Inspection

Please check the instrument according to the following steps.

1. Inspect the shipping container.

Keep the shipping container and packaging material until the contents of the shipment have been completely checked and the instrument has passed both electrical and mechanical tests. It is always good practice to save the shipping container and packaging for use when returning the power supply to Teledyne LeCroy for service or calibration.

The consigner or carrier will be responsible for damage to the instrument resulting from shipping. Teledyne LeCroy will not provide free maintenance or replacement in this instance.

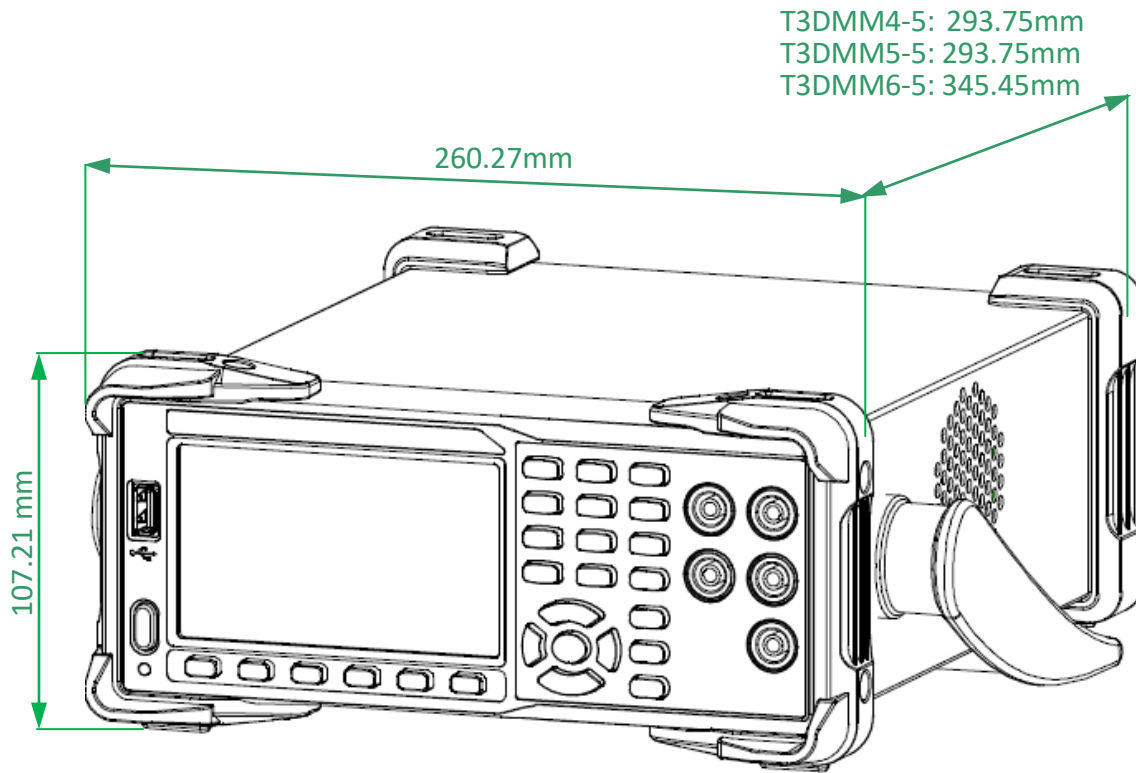
2. Inspect the instrument.

If the instrument is found to be damaged, defective or fails in electrical or mechanical tests, please contact the Teledyne LeCroy service department immediately.

3. Check the accessories.

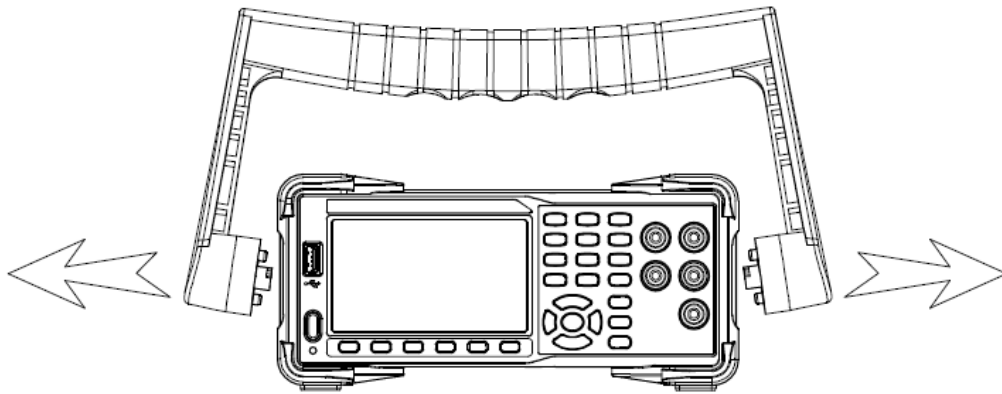
Please check that you have received the accessories on the packing list. If the accessories are incomplete or damaged, please contact Teledyne LeCroy immediately.

Dimensions

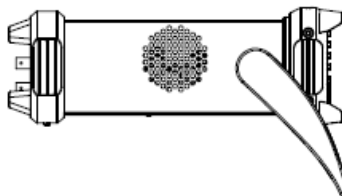
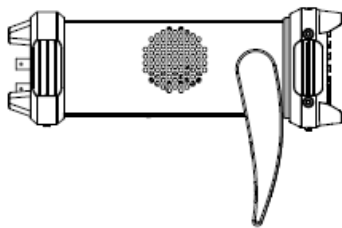
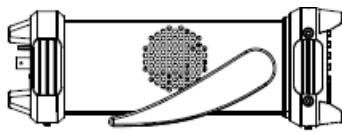


Handle Adjustment

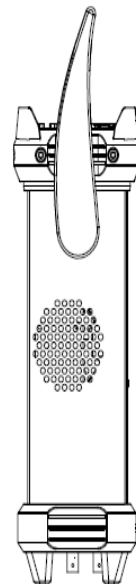
To adjust the handle position of the Multimeter, grip the handle by the two sides and pull outward. Then, rotate the handle to the appropriate position.



Handle Adjustment



Horizontal Position



Carrying Position

Front Panel



Front Panel Overview

A USB Host

Users can store the current state or measurement data into a USB storage device. Users can also read the state files or updated firmware from a USB storage device.

B Power Key

Turn the instrument on or off.













C LCD Display

The instrument provides a 4.3 inch high resolution color TFT-LCD display screen with 480*272 pixels that displays the function menus, measurement parameter settings, system status, and prompt messages.









D Menu Operation Keys

Press any softkey to activate the corresponding menu.

E Measurement and Assistant Function Keys

	DC Voltage / Current Measurement
	AC Voltage / Current Measurement
	2-Wire / 4-Wire Resistance Measurement
	Frequency / Capacitance Measurement
	Continuity / Diode Test
	Temperature Measurement / Enable Multiple Scan Card Function
	Enable Dual-display Function / Set Up the Utility
	Acquire Function / Help System
	Math Function / Display Function
	Auto Trigger / Stop
	Single Trigger / Hold Measurement Function
	Return to local control of the instrument (when in Remote mode). Some of the front panel keys have text above them. This indicates that the key has a function that you can access by pressing and releasing [Shift] before pressing the key.

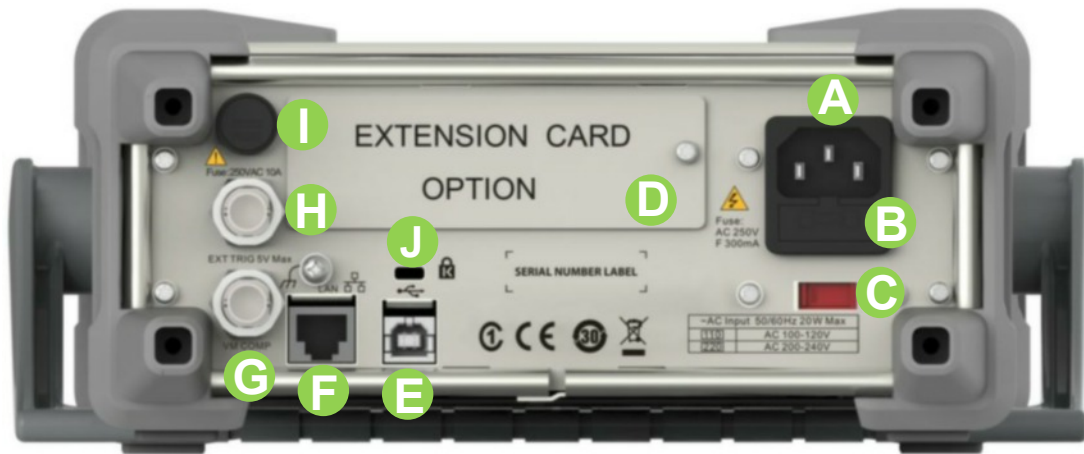
F Range and Direction Keys

	Increase the measurement range
	Decrease the measurement range
	Select auto or manual range
 	Set up measurement parameter Move the cursor Page up or down
 	Set up measurement parameter Move the cursor
	Apply the current setting

G Signal Input Terminals

The measured signal (device) will be connected into the multimeter through these terminals. Different measurement objects have different connection methods. For details, please refer to “**Measurement Connections**”.

Rear Panel



Rear Panel Overview

A Power Socket

The multimeter accepts two types of AC supplies. Please use the power cord provided in the accessories to connect the multimeter to the AC power through this socket.

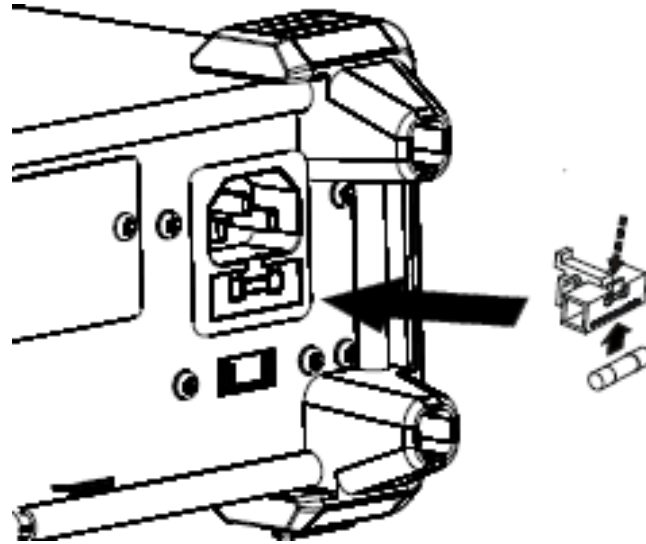


Note: The correct voltage scale must be first selected (through the Voltage Selector) before power connection.

B Power Fuse

The multimeter is already installed with a power fuse before leaving factory. To change the fuse please:

- 1) Turn off the multimeter and remove the power cord.
- 2) Press down the block tongue using a straight screwdriver (in the direction of the dotted arrow in the figure below) and pull out of the fuse seat.
- 3) Select a proper voltage scale.
- 4) Replace a specified fuse.
- 5) Reinstall the fuse seat into the slot.



Changing the fuse

C AC Voltage Selector



Select the correct voltage scale (110 V or 220 V) for the AC supply used.

D Inspection card (option)

An optional 16-channel Data Acquisition Module can be installed in the instrument.

E USB Device

Connect the PC through this interface. You can use SCPI commands or PC software to control the Multimeter remotely.

LAN

F Through this interface, the multimeter can be connected to the network for remote control.

VMC Output

G The multimeter outputs a low-tru pulse from the [VM Comp] connector after every measurement

H Ext Trigger

Trigger the multimeter by connecting a trigger pulse through the [Ext Trig] connector. Note the external trigger source must be selected.

I Current Input Fuse

The multimeter is already installed with a current Input fuse to provide 10 A maximum input protection before leaving factory. To replace a new one, please:

- 1) Turn off the multimeter and remove the power cord.
- 2) Turn the fuse seat counterclockwise as shown in the figure using a straight screw driver and then pull out the fuse seat
- 3) Place a new 10 A specified fuse.
- 4) Reinstall the fuse seat into the slot.

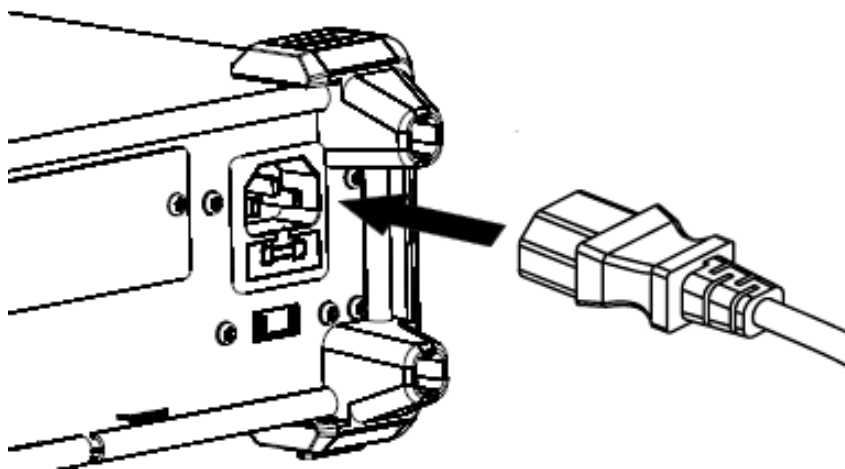
J Instrument Kensington Lock Point

A Kensington lock (not supplied) can be used to lock the multimeter to a fixed place if necessary.

Starting the Multimeter



Before connecting the instrument to a power source please adjust the AC voltage selector on the rear panel of your multimeter according to your local power supply voltage. Then connect the power cord as shown in the following figure.

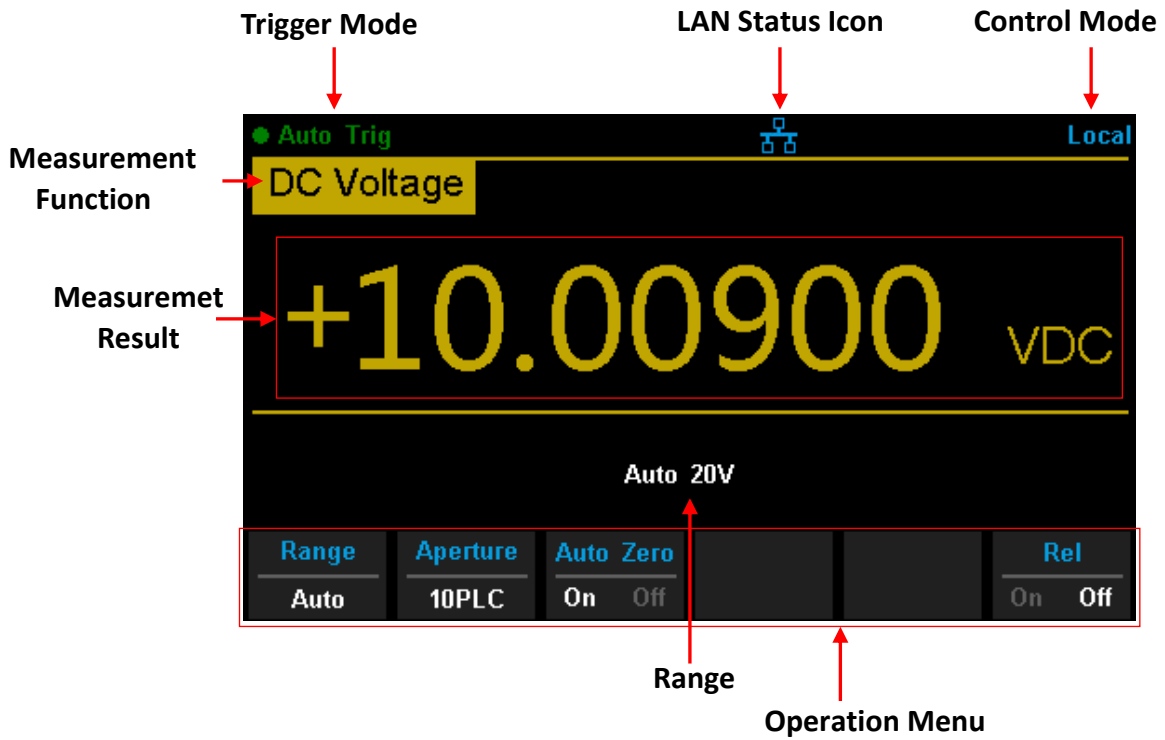


Connecting the Power Cord

Press the Power key on the front panel to turn on the multimeter. If the multimeter does not start normally, then try the following:

1. Make sure the power cord is in good connection and connected to the multimeter and the wall socket.
2. Ensure that the wall socket has power and is turned on.
3. Try to restart the multimeter, if it fails, check the power fuse and replace with a new one if necessary.
4. If the problem still remains, please contact the Teledyne LeCroy service department for help.

User Interface

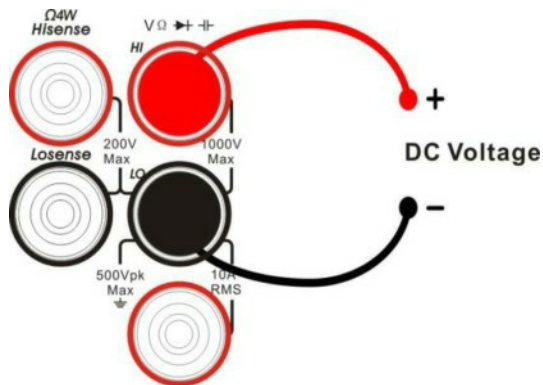


User Interface Display

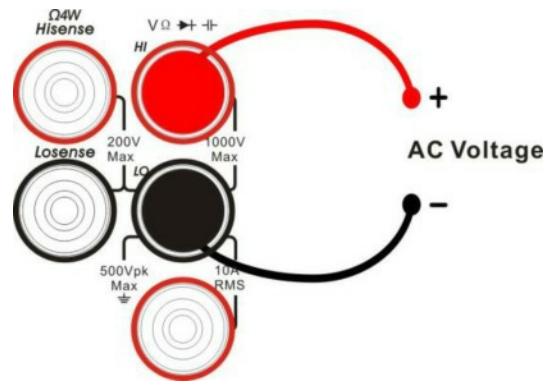
Measurement Connections

The Digital Multimeter is designed with many measurement functions. After selecting the desired measurement function, please connect the signal (device) under test to the multimeter according to the method below. **Do not switch the measurement function when measuring as it may cause damage to the multimeter.** For example, when the test leads are connected to the related current terminals, AC voltage measurement should not be used.

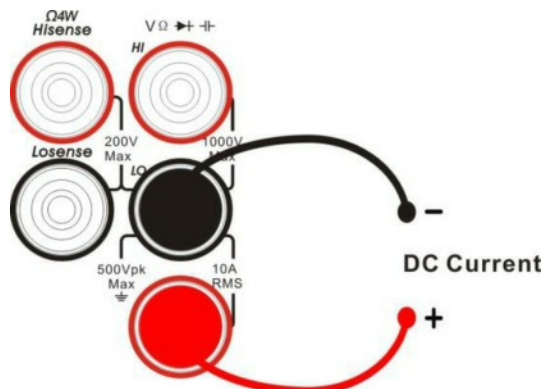
DCV Measurement



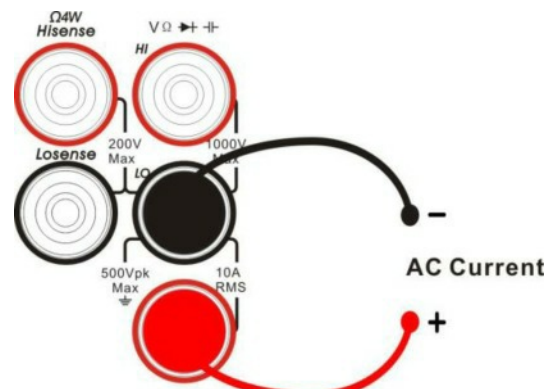
ACV Measurement



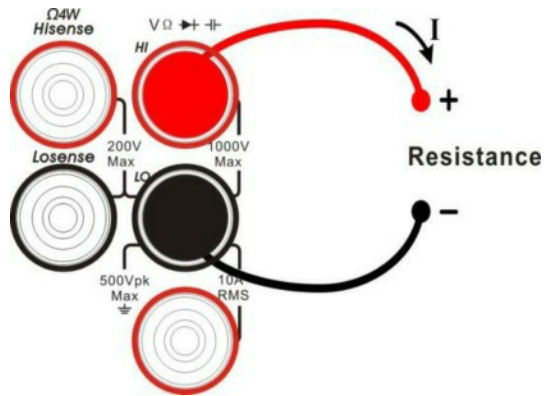
DCI Measurement



ACI Measurement



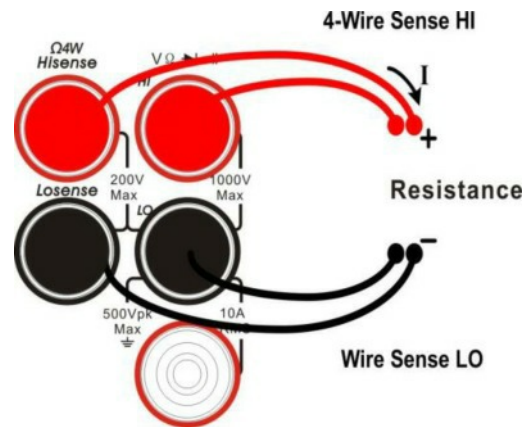
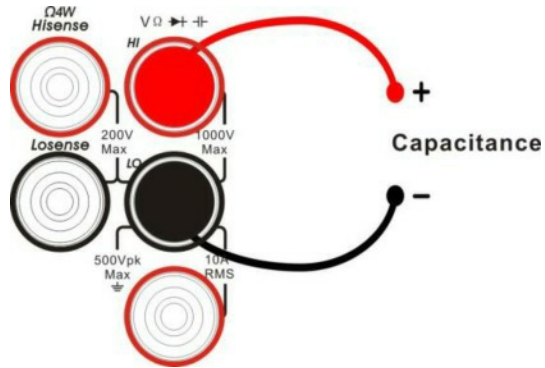
Resistance Measurement (2-wire)



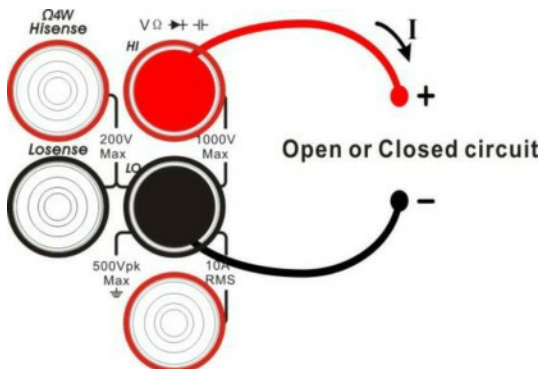
Resistance Measurement (4-wire)

Connect the test leads and tested circuit as in the diagram below. The HI terminal and HI Sense should be connected to one end of the DUT. The LO terminal and LO Sense should be connected to the other end of the DUT.

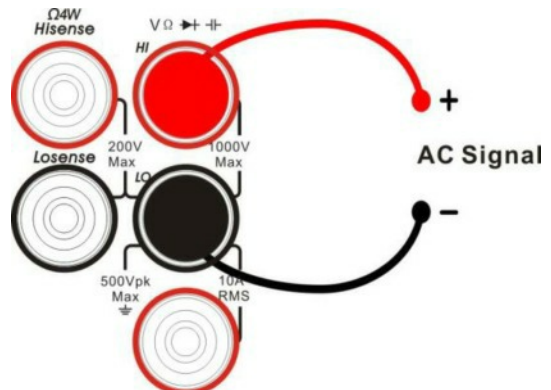
Capacitance Measurement



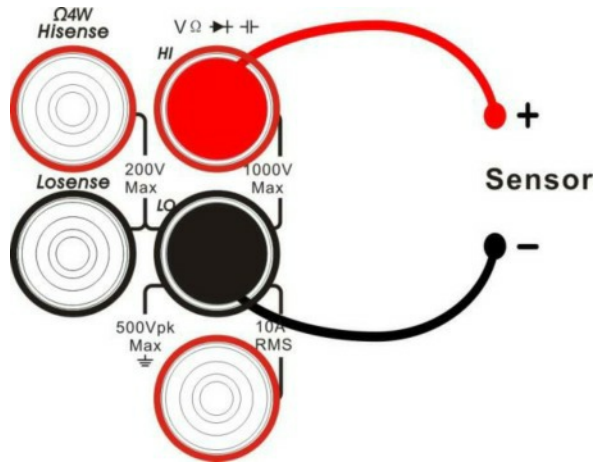
Continuity Measurement



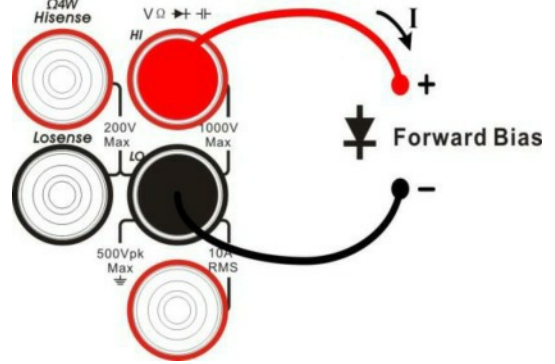
Frequency/Period Measurement



Temperature Measurement
(For RTD and thermcouple sensors)

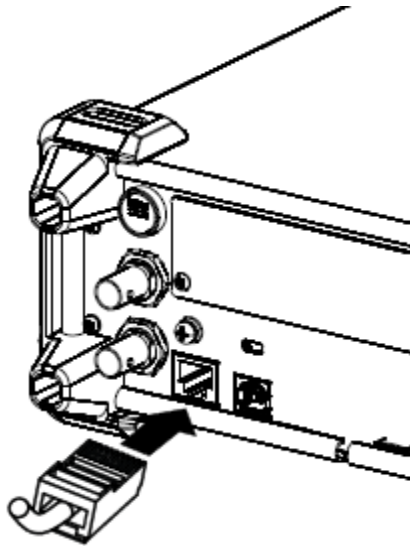


Diode Measurement

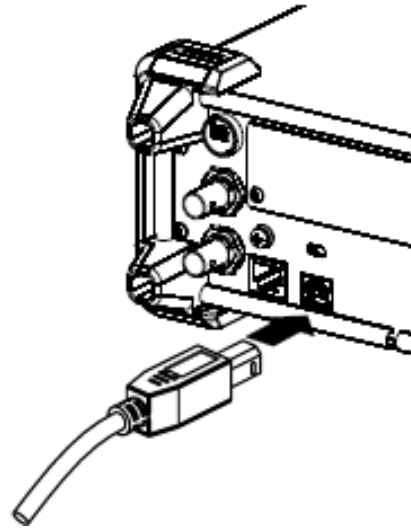


Connecting to USB and LAN Ports

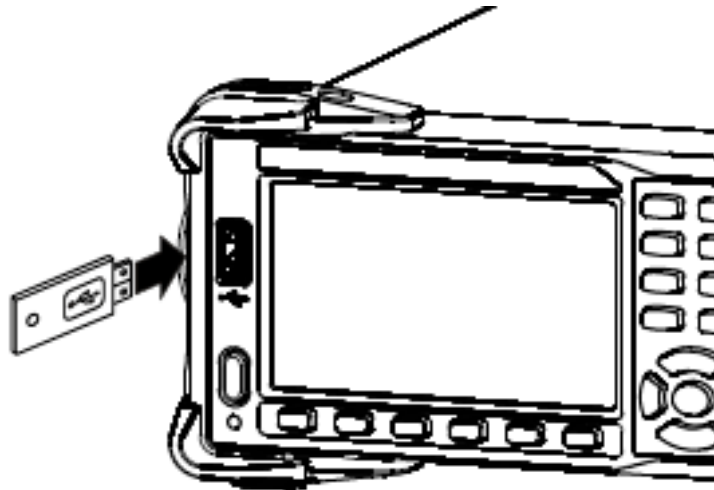
The Digital Multimeter has LAN and USB I/O ports. Connect to the ports as in the diagrams below:



Connect to LAN



Connect to USB Device Port



Connect to USB Host Port

Using the Built-in Help System

To access the built-in help system, press **[Shift] + [Acquire]**, then use the direction keys to choose the help item you want. Finally, press **[OK]** to obtain help.

The help listings are as follows:

1. Basic Measurements
2. Measuring Temperature
3. Measuring Capacitance
4. Math Function
5. Dual-display Function
6. Saving and Recalling Information
7. Optional Multiple Scan Card
8. The convention and Tips for Softkeys

Troubleshooting

The commonly encountered failures and their solutions are listed below. When you encounter those problems, please resolve them using the following steps. If the problem remains, please contact the Teledyne LeCroy service centre and provide your device Information including serial number.

The screen has no display after pressing the power key.

1. Check whether the power cord is fully connected.
2. Check whether the power fuse has blown or has failed. If the fuse needs to be changed, please use the specified fuse.
3. Restart the instrument after finishing the above checks.
4. If the instrument still doesn't start up properly, please contact the Teledyne LeCroy service center.

The reading doesn't change when a current signal is input.

1. Check whether the test lead is correctly inserted into the HI and LO terminals of current measurement.
2. Check whether the current fuse at the back panel has blown.
3. Check whether the DCI or ACI measurement function is enabled.
4. Check whether the DCI measurement function is used to measure AC current.

The reading is abnormal when a voltage signal is input.

1. Check whether the test lead is correctly inserted into the HI and LO terminals for voltage measurements.
2. Check whether the the DCV or ACV measurement function is enabled.
3. Check whether the DCV measurement function is used to measure AC voltage.

The USB storage device cannot be identified.

1. Check whether the USB storage device is in good condition.
2. Make sure the USB storage device you used is a flash storage device. This instrument does not support hardware storage types.
3. Check the capacity of your USB storage device. It is recommended that the capacity of the USB storage device is no larger than 8G bytes and FAT formatted.
4. Restart the instrument, then insert the USB storage device.
5. If the problem persists, please contact the Teledyne LeCroy service centre.



TELEDYNE TEST TOOLS
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ABOUT TELEDYNE TEST TOOLS

Company Profile

Teledyne LeCroy is a leading provider of oscilloscopes, protocol analyzers and related test and measurement solutions that enable companies across a wide range of industries to design and test electronic devices of all types. Since our founding in 1964, we have focused on creating products that improve productivity by helping engineers resolve design issues faster and more effectively. Oscilloscopes are tools used by designers and engineers to measure and analyze complex electronic signals in order to develop high-performance systems and to validate electronic designs in order to improve time to market.

The Teledyne Test Tools brand expands on the Teledyne LeCroy product portfolio by adding a comprehensive range of test equipment solutions for its customers. The new range of product solutions deliver engineers with a broad range of quality test solutions that enables speed to market product validation and design. More and more designers, engineers and lecturers are relying on Teledyne Test Tools to meet their testing, education and electronics validation needs with confidence and within budget.

Location and Facilities

Headquartered in Chestnut Ridge, New York, Teledyne Test Tools and Teledyne LeCroy have sales, service and development subsidiaries in the US and throughout Europe and Asia. Teledyne Test Tools and LeCroy products are employed across a wide variety of industries, including semiconductor, computer, consumer electronics, education, military/aerospace, automotive/industrial, and telecommunications.



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