6363/6364/6365/6366/6367

Precision LCR Meter

User Manual

1.02

May 2020

+ Safety Precautions

To ensure safety, please follow safety precautions when operating and repairing the device. It is seriously against the safety standard of design, manufacturing, and operation of the device if the user fails to follow precautions and warnings in this manual.

+ Precautions for Repair

DO NOT remove the protective housing. Only a qualified member of the maintenance staff can conduct jobs like component replacement or internal commissioning.DO NOT replace any component when the device is plugged in. Under certain special circumstances, dangerous voltage may still exist even when the device is unplugged.To ensure personal safety, please turn off the power and follow the essential discharging method before accessing the inside.

+ Instrument Grounding

Please ground the power cable to avoid the danger of electric shock.

+ DO NOT Conduct Jobs Like Maintenance or Internal Commissioning Alone

DO NOT conduct jobs like internal maintenance or commissioning alone.

+ DO NOT Replace Any Component or Modify Device Function and Structure Without Permission

Without authorization from our Company, do not install replacement components or perform any modifications to this machine on your own in order to avoid increasing the danger of the machine or causing damage to the machine. When the instrument malfunctions, please send the machine back to Microtest Corporation to have professionals repair it for you in order to ensure safety.

+ Warranty Period

Microtest Corporation provides a one-year quality guarantee from the purchase day. However, the warranty period of certain special components should be based on the specifications and this one-year period is not applicable. Within the warranty period, Microtest Corporation is responsible for repair or replacing the proven defective products (a good/defective product shall be judged by Microtest Corporation). Microtest Corporation guarantees that as long as the complementary software/hardware specified by Microtest is properly installed on the instrument, the software/hardware is capable of running the commands. Microtest Corporation does not guarantee no interruption or error during software/hardware operation.

+ Product Guarantee Limits

The above guarantee is not applicable to the incorrect or improper use of the product or any modification, repair, component replacement, or misuse of the product without authorization. This guarantee shall not be applied to the case when the product is not installed or repaired under the specified environment conditions.

Table of Content

Chapter 1. Precautions

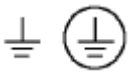
This instrument is not suitable for outdoor use, especially in humid or highly dusty locations. Improper use of this instrument may result in electric shocks. Please read the safety descriptions carefully before using this tester in order to avoid improper or wrong use causing accidents.

1.1 Safety Signs

The following safety signs may appear in this manual and on this instrument.

 : Note, please read this Manual carefully for these contents.

 : High Voltage Danger Symbol; the output terminal may output lethal voltages. Please read this Safety Precautions chapter carefully.

 : Protective Ground Terminal: Please ground this terminal properly before using this tester in order to avoid electrical shock accidents from coming in contact with a case with power leakages.

CAUTION: Warning Sign: When the product is used improperly, it may cause improper results to this instrument or other DUTs.

WARNING: Warning Sign: When the product is used improperly, it may cause injuries or even death.

1.2 Electrification and Electric Shock

In order to prevent electric shocks, the wearing of insulating plastic gloves is recommended before using this tester to perform testing related tasks.

1.3 Static Electricity

This instrument uses components that are very sensitive to static.

- The desktop of the work table must be a conductive material that is grounded.
- When the soldering iron and tools are not in use, their contact ends must be in contact with grounded conductors.
- The maintenance staff must wear static bracelets with leakage resistance less than 1M.
- The components or assembly base board must be placed in cases with protection against static.

1.4 Ground

This is a safety ground terminal on the rear panel case of this tester. Please ground this terminal properly in order to prevent electrical shock accidents from occurring when touching the case.

1.5 Power

Power cables that comply with the local country specifications must be used, and connectors applicable to IEC320 connectors must be used for the connection of this instrument. Users must ensure that the ground cable is properly grounded. If a fuse is included in the power plug, use fuses that comply with 0.8 ampere safety regulations. Ensure that AC power is used before use and adjust the 115V/230V power selection switch on the rear panel so that the machine matches the local power voltage.

1.6 Warm Up

The tester can operate normally once the power is turned on; however, in order to achieve accuracy within specifications, please turn on the machine in advance and let it warm up for 15 minutes or more before use.

1.7 Machine Malfunction

When tester malfunction occurs, such as the voltage displayed on the voltmeter differs greatly from the set one or the high voltage output warning light remains on when there is no high voltage output, please stop the operation immediately and contact Microtest or an authorized dealer for repair.

1.8 Test End

Please turn off the power switch when this tester is not in use.

1.9 Placement and Storage

The normal operating temperature and humidity range of this machine is 5^{o}C~ 40^{o}C, 80% RH; the machine may malfunction if it exceeds this range. The storage temperature and humidity range of this machine is -20^{o}C ~ 70^{o}C, 80% RH. In order to achieve accurate testing and for safety considerations, do not place this machine in environments with direct sunlight exposure, high temperature, high humidity, frequent vibrations, or excessive dust.

1.10 Emergency Handling

When there is an electric shock or if the DUT or machine catches on fire, please switch off the power and unplug the power cable.

Chapter 2. Begin

2.1 Characteristics

- Test Frequency:

10Hz~20kHz	(6363)	／	10Hz~100kHz	(6364)
10Hz~200kHz	(6365)	／	0.1Hz~200kHz	(6365A)
10Hz~500kHz	(6366)	／	0.1Hz~500kHz	(6366A)
10Hz~1MHz	(6367)	／	0.1Hz~1MHz	(6367A)

- Test Voltage: 10mV~2V.
- Basic Measurement Accuracy: 0.05%.

2.2 Introduction

- Multi-step Measurement: Measure up to eight steps.
- Measured using the absolute value (ΔAbs) or percentage difference (Δ%) relative to the nominal value.
- High precision measurement fixture with four-wire connection and grounding.
- Fixture reset (open circuit/short circuit).
- Bar display makes it easy to determine variable components.
- Seven-inch LCD color monitor, 800x480 screen resolution.
- Intuitive user interface with complete measurement functions.

2.3 Communication Interface

- RS-232 Serial Communication Port(9600/19200/38400/56000/115200 bps).
- GPIB.
- LAN.
- Handler interface

2.4 Package Contents

- LCR meter.
- LCR User Manual.
- Power cable.
- Test report.
- LCR fixture.

2.5 Frequency Range and Test Frequency Point

Frequency Range	Test Frequency Point	Resolution
10Hz≦ Freq ≦ 999.95Hz	10.00Hz, 10.05Hz … 999.95Hz	0.05Hz
1kHz≦ Freq ≦ 9.9999kHz	1.0000kHz, 1.0001Hz … 9.9999kHz	0.1Hz
10kHz ≦ Freq ≦ 20.000kHz	10.000kHz, 10.001Hz … 20.000kHz	1Hz

Table 2-5-1 Frequency Range and Test Points (6363)

Frequency Range	Test Frequency Point	Resolution
10Hz≦ Freq ≦ 999.95Hz	10.00Hz, 10.05Hz … 999.95Hz	0.05Hz
1kHz≦ Freq ≦ 9.9999kHz	1.0000kHz, 1.0001Hz … 9.9999kHz	0.1Hz
10kHz ≦ Freq ≦ 99.999kHz	10.000kHz, 10.001Hz … 99.999kHz	1Hz
100kHz≦ Freq ≦ 100kHz	100.00kHz, 100.01kHz … 100.00kHz	10Hz

Table 2-5-2 Frequency Range and Test Points (6364)

Frequency Range	Test Frequency Point	Resolution
10Hz≦ Freq ≦ 999.95Hz	10.00Hz, 10.05Hz … 999.95Hz	0.05Hz
1kHz≦ Freq ≦ 9.9999kHz	1.0000kHz, 1.0001Hz … 9.9999kHz	0.1Hz
10kHz ≦ Freq ≦ 99.999kHz	10.000kHz, 10.001Hz … 99.999kHz	1Hz
100kHz≦ Freq ≦ 200kHz	100.00kHz, 100.01kHz … 200.00kHz	10Hz

Table 2-5-3 Frequency Range and Test Points (6365)

Frequency Range	Test Frequency Point	Resolution
0.1Hz≦ Freq ≦ 999.95Hz	0.10Hz, 0.15Hz … 999.95Hz	0.05Hz
1kHz≦ Freq ≦ 9.9999kHz	1.0000kHz, 1.0001Hz … 9.9999kHz	0.1Hz
10kHz ≦ Freq ≦ 99.999kHz	10.000kHz, 10.001Hz … 99.999kHz	1Hz
100kHz≦ Freq ≦ 200kHz	100.00kHz, 100.01kHz … 200.00kHz	10Hz

Table 2-5-4 Frequency Range and Test Points (6365A)

Frequency Range	Test Frequency Point	Resolution
10Hz≦ Freq ≦ 999.95Hz	10.00Hz, 10.05Hz … 999.95Hz	0.05Hz
1kHz≦ Freq ≦ 9.9999kHz	1.0000kHz, 1.0001Hz … 9.9999kHz	0.1Hz
10kHz ≦ Freq ≦ 99.999kHz	10.000kHz, 10.001Hz … 99.999kHz	1Hz
100kHz≦ Freq ≦ 500kHz	100.00kHz, 100.01kHz … 500.00kHz	10Hz

Table 2-5-5 Frequency Range and Test Points (6366)

Frequency Range	Test Frequency Point	Resolution
0.1Hz≦ Freq ≦ 999.95Hz	0.10Hz, 0.15Hz … 999.95Hz	0.05Hz
1kHz≦ Freq ≦ 9.9999kHz	1.0000kHz, 1.0001Hz … 9.9999kHz	0.1Hz
10kHz ≦ Freq ≦ 99.999kHz	10.000kHz, 10.001Hz … 99.999kHz	1Hz
100kHz≦ Freq ≦ 500kHz	100.00kHz, 100.01kHz … 500.00kHz	10Hz

Table 2-5-6 Frequency Range and Test Points (6366A)

Frequency Range	Test Frequency Point	Resolution
10Hz≦ Freq ≦ 999.95Hz	10.00Hz、10.05Hz … 999.95Hz	0.05Hz
1kHz≦ Freq ≦ 9.9999kHz	1.0000kHz、1.0001Hz … 9.9999kHz	0.1Hz
10kHz ≦ Freq ≦ 99.999kHz	10.000kHz、10.001Hz … 99.999kHz	1Hz
100kHz≦ Freq ≦ 1MHz	100.00kHz、100.01kHz … 1MHz	10Hz

Table 2-5-7 Frequency Range and Test Points (6367)

Frequency Range	Test Frequency Point	Resolution
0.1Hz≦ Freq ≦ 999.95Hz	0.10Hz, 0.15Hz … 999.95Hz	0.05Hz
1kHz≦ Freq ≦ 9.9999kHz	1.0000kHz, 1.0001Hz … 9.9999kHz	0.1Hz
10kHz ≦ Freq ≦ 99.999kHz	10.000kHz, 10.001Hz … 99.999kHz	1Hz
100kHz≦ Freq ≦ 1MHz	100.00kHz, 100.01kHz … 1MHz	10Hz

Table 2-5-8 Frequency Range and Test Points (6367A)

2.6 Test Voltage and Resolution

Test Voltage (Volt)	Resolution
0.001V≦ Volt ≦ 2.000mV	1mV

2.7 Measurement Type

- Serial Inductance (Ls) Parallel Inductance (Lp)
- Serial Capacitance (Cs) Parallel Capacitance (Cp)
- Serial Resistance (Rs) Parallel Resistance (Rp)
- Reactance (X) Susceptance (B)(=1/X)
- Impedance (Z) Admittance (Y)(=1/Z)
- Dissipation Factor (D) Quality Factor (Q)(=1/D)
- Phase Angle (θ)
- Conductance (G)
- Direct Current Resistance (Rdc)

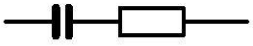
2.8 Introduction to Basic Measurement Functions

- **Serial and Parallel Modes:**

Serial and parallel circuit models can be used to measure AC resistance, capacitance, inductance, reactance, and susceptance.

◆ **C:** Capacitance

Serial Mode:

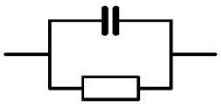


Serial Mode Related Formula:

$$C_s = C_p(1+D^2)$$

D = dissipation factor

Parallel Mode:



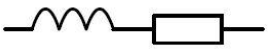
Parallel Mode Related Formula:

$$C_p = \frac{C_s}{(1+D^2)}$$

D = dissipation factor

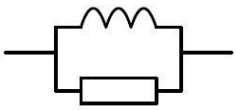
◆ **L:** Inductance

Serial Mode:



Serial Mode Related Formula:

Parallel Mode:



Parallel Mode Related Formula:

$$L_s = \frac{L_p}{\left(1+\frac{1}{Q^2}\right)}$$

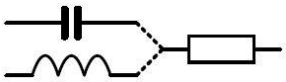
Q = Quality Factor

$$L_p = L_s\left(1+\frac{1}{Q^2}\right)$$

Q = Quality Factor

- **X:** Reactance

Serial Mode:

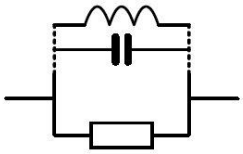


Serial Mode Related Formula:

$$R_s = \frac{R_p}{\left(1+Q^2\right)}$$

Q = Quality Factor

Parallel Mode:



Parallel Mode Related Formula:

$$R_p = R_s\left(1+Q^2\right)$$

Q = Quality Factor

- **Resistance (R) and Conductance (G):**

Resistance(R)refers to the physical quantity that hinders charge flow in substances, which is the resistance value; its unit is “ohm” (Ω).

Conductance(G) refers to the measurement value of the ability to transmit current from a certain point to another point in an object or circuit; its unit is Siemens (S). It is the reciprocal of resistance (G=1/R).

- Resistance(R)

Measurement Type:

1. Serial Mode→Rs
2. Parallel Mode→Rp
3. Direct Current Resistance→Rdc

Related Formula:

$$R = \frac{V}{I} = \frac{1}{G} = Z_s - jX = Z_s - j\omega L = Z_s + \frac{j}{\omega C}$$

$$\left|Z_s\right| = \sqrt{\left(R^2 + X^2\right)}$$

$$\left|Z_p\right| = \frac{RX}{\sqrt{\left(R^2 + X^2\right)}}$$

$$R_s = |Z|\cos\theta$$

- Conductance(G)

Measurement Type:

Parallel Mode→Gp

*Conductance is only applicable to parallel equivalent circuit models.

Related Formula:

$$G_p = \frac{I}{V} = \frac{1}{R} = Y_p - jB = Y_p - j\omega C = Y_p + \frac{j}{\omega L}$$

$$\left|Y_s\right| = \frac{GB}{\sqrt{\left(G^2 + B^2\right)}}$$

$$\left|Y_p\right| = \sqrt{\left(G^2 + B^2\right)}$$

$$G_p = |Y| \cos\theta$$

- **Capacitance (C):**

Capacitance (C), refers to the charge reserve at a given potential difference. Capacitance is usually represented with the letter “C” and its international unit is Farad (F).

Measurement Type:

1. Serial Mode→Cs
2. Parallel Mode→Cp

Related Formula:

$$Z_s = R + jX = R + j\omega L = R - \frac{j}{\omega C}$$

$$Y_p = G + jB = G + j\omega C = G - \frac{j}{\omega L}$$

$$Q = \frac{\omega L_S}{R_S} = \frac{1}{\omega C_S R_S} \qquad (\text{series R, L, C values})$$

$$Q = \frac{R_P}{\omega L_P} = \omega C_P R_P \qquad (\text{parallel R, L, C values})$$

$$D = \frac{R_S}{\omega L_S} = \omega C_S R_S \qquad (\text{series R, L, C values})$$

$$D = \frac{G_P}{\omega C_P} = \omega L_P G_P \qquad (\text{parallel G, L, C values})$$

- **Inductance (L):**

Inductance is one of the properties of an electronic circuit or device; it refers to the electromotive force (EMF) generated that resists current change due to electromagnetic induction when current changes. Its unit is Henry and is abbreviated as (H).

Measurement Type:

1. Serial Mode→Ls
2. Parallel Mode→Lp

Related Formula:

$$Z_s = R + jX = R + j\omega L = R - \frac{j}{\omega C}$$

$$Y_p = G + jB = G + j\omega C = G - \frac{j}{\omega L}$$

$$Q = \frac{\omega L_S}{R_S} = \frac{1}{\omega C_S R_S} \qquad (\text{series R, L, C values})$$

$$Q = \frac{R_P}{\omega L_P} = \omega C_P R_P \qquad (\text{parallel R, L, C values})$$

$$D = \frac{R_S}{\omega L_S} = \omega C_S R_S \qquad (\text{series R, L, C values})$$

$$D = \frac{G_P}{\omega C_P} = \omega L_P G_P \qquad (\text{parallel G, L, C values})$$

- **Reactance (X) and Susceptance (B):**

  Reactance(X), in the analysis of AC circuits, reactance is represented with"X"; it is the imaginary part of complex impedance used to represent the obstruction of inductance and capacitance to current. It is similar to the obstruction of resistance to current in a DC circuit; in AC circuits (such as serial RLC circuits), capacitance and inductance will also cause obstruction to current, and this effect is called resistance. Its unit is ohm (Ω).

  Susceptance(B) is defined as the reciprocal of reactance in power electronics; it is the imaginary part of admittance and can be divided into inductive susceptance and capacitive susceptance. It is the reciprocal of reactance (B=1/X) and its unit is Siemens, abbreviated as (S).

  ◆ Reactance(X)

  Measurement Type:

  Serial Mode→Xs

  *Reactance is only applicable to serial equivalent circuit models.

  Related Formula:

  $$X = \frac{1}{B} = |Z| \sin\theta$$

  $$|Z_s| = \sqrt{(R^2 + X^2)}$$

  $$|Z_p| = \frac{RX}{\sqrt{(R^2 + X^2)}}$$

  $$X_s = |Z| \sin\theta$$

  ◆ Susceptance(B)

  Measurement Type:

  Parallel Mode→Bp

  *Susceptance is only applicable to parallel equivalent circuit models.

  Related Formula:

  $$B = \frac{1}{X} = |Y| \sin\theta$$

  $$|Y_s| = \frac{GB}{\sqrt{(G^2 + B^2)}}$$

  $$|Y_p| = \sqrt{(G^2 + B^2)}$$

  $$B_p = |Y| \sin\theta$$

- **Impedance (Z) and Admittance (Y):**

  Impedance is the general term of the obstructions of resistance, inductance, and capacitance to the AC circuit; its unit is ohm(Ω).

  Admittance is the general term of conductance and susceptance; admittance is defined as the reciprocal of impedance in power electronics. Its unit is Siemens and it is abbreviated as (S).

  - Impedance(Z)

    Related Formula:

$$Z = \frac{E}{I} = \frac{1}{Y}$$

$$Z_s = R + jX = R + j\omega L = R - \frac{j}{\omega C}$$

$$\left|Z_s\right| = \sqrt{\left(R^2 + X^2\right)}$$

$$\left|Z_p\right| = \frac{RX}{\sqrt{\left(R^2 + X^2\right)}}$$

$$R_s = |Z|\cos\theta$$

$$X_s = |Z|\sin\theta$$

  - Admittance(Y)

    Related Formula:

$$Y = \frac{I}{E} = \frac{1}{Z}$$

$$Y_p = G + jB = G + j\omega C = G - \frac{j}{\omega L}$$

$$\left|Y_s\right| = \frac{GB}{\sqrt{\left(G^2 + B^2\right)}}$$

$$\left|Y_p\right| = \sqrt{\left(G^2 + B^2\right)}$$

$$G_p = |Y|\cos\theta$$

$$B_p = |Y|\sin\theta$$

- **Quality Factor (Q) and Dissipation Factor (D):**

  Quality factor is used to measure the energy consumed for measuring relative frequency. Generally speaking, the higher the quality factor of a circuit the better the selectivity is.

  Dissipation factor is the reciprocal of quality factor. It refers to the signal angle loss between the capacitor (or inductor) and the operating frequency under a fixed temperature; the phase shift generated by the time lag between the external voltage and generated currentcauses loss current and energy dissipation, and the current has two compositions at this time. One is the charging current (Ic) that is 90°different from the voltage and the other is the loss current (I_R) that is the same as the voltage; the total current (I) is the sum of the two. The angle δ between the total current and the charging current is called the Loss Angle , and tanδ is called the Dissipation Factor "D", as shown in the figure below:

$$D = \tan\delta = \frac{I_R}{I_c}$$

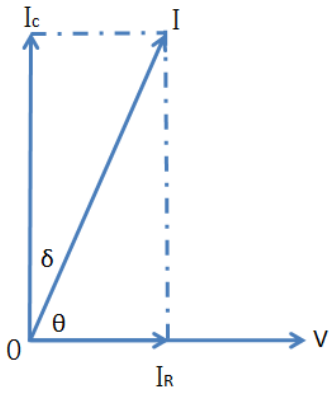


Figure 2-6-1 Actual Phase Change Figure of the Capacitor

◆ Quality Factor(Q)

Related Formula:

$$Q = \frac{R_P}{\omega L_P} = \omega C_P R_P \qquad \text{(parallel R, L, C values)}$$

$$Q = \frac{\omega L_S}{R_S} = \frac{1}{\omega C_S R_S} \qquad \text{(series R, L, C values)}$$

$$Q = \frac{1}{\tan(90-\theta)^\circ} = \frac{1}{D}$$

◆ Dissipation Factor(D)

Related Formula:

$$D = \frac{R_S}{\omega L_S} = \omega C_S R_S \qquad (\text{series R, L, C values})$$

$$D = \frac{G_P}{\omega C_P} = \omega L_P G_P \qquad (\text{parallel G, L, C values})$$

$$D = \tan(90-\theta)^\circ = \frac{1}{Q}$$

- **Angle (θ):**

Angle: The phase angle is measured when measuring impedance (Z), admittance (Y), quality factor (Q), and dissipation factor (D) items.

Related Formula:

$$Z_s = R + jX = R + j\omega L = R - \frac{j}{\omega C}$$

$$Y_p = G + jB = G + j\omega C = G - \frac{j}{\omega L}$$

$$Y_p = G + jB = G + j\omega C = G - \frac{j}{\omega L}$$

$$Q = \frac{1}{\tan(90-\theta)^\circ} = \frac{1}{D} \qquad D = \tan(90-\theta)^\circ = \frac{1}{Q}$$

$$R_s = |Z|\cos\theta \qquad X_s = |Z|\sin\theta$$

$$G_p = |Y|\cos\theta \qquad B_p = |Y|\sin\theta$$

2.9 Hardware Structure Settings

- **LCR-6365 Tester Main Structure**

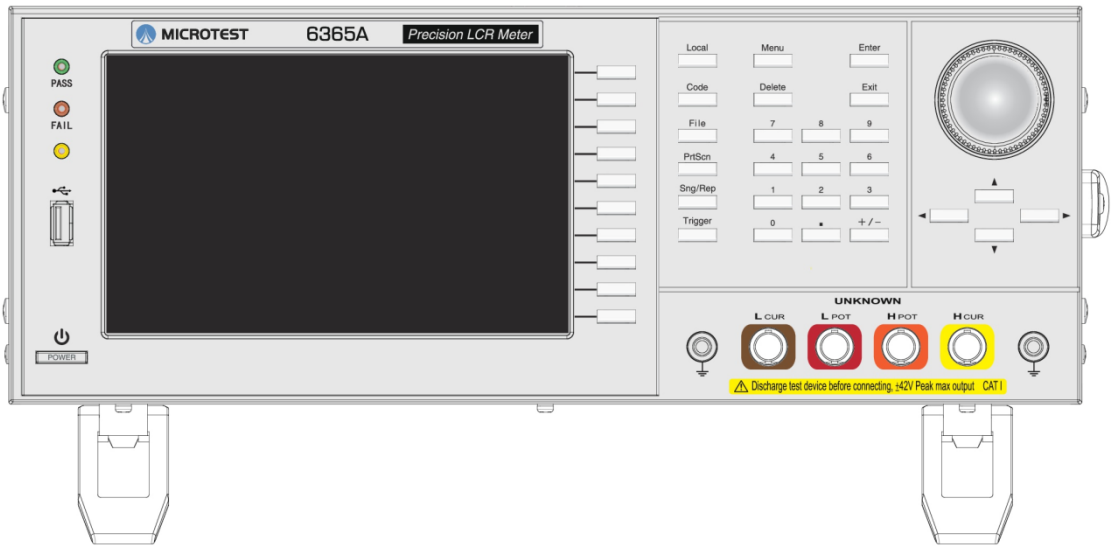


Figure 2-7-1 LCR-6365 Tester Front View

Front Panel Descriptions:

- **Monitor:** Resolution 800x480, LED backlight monitor.
- **PASS/FAIL:** Test indicators of good/bad parts. Display the test result when compare mode is on or under multi-step mode.
- **Function Key:** Selects the functions on the right of the screen.
- **Menu:** Switches the screen to the Main Menu page.
- **Local:** When the instrument is under remote control mode, this key can be pressed to release the key lock status. The RMT icon will be displayed on the top of the screen when the instrument is under remote control mode.
- **File:** Enters the File Management screen.
- **Sng/Rep:** Allows switching of the Meter Mode under Meter Mode; it can switch between Single Mode and Repeat Trigger Mode. The MAN icon will be displayed on the top of the screen when the Meter Mode is Single Mode.
- **Trigger:** Measurement trigger key.
  - When under Meter Mode, if the Meter Mode is Single Mode, this key is the measurement trigger key; if the Meter Mode is Repeat Trigger mode, then this key is the "Pause/Resume" measurement key. The HOLD icon will be displayed on the top of the screen when measurement stops.
  - Under multi-step test mode, this key is the test trigger. Press to activate the test.
- **PrtScn:** Press this key to save the screen image on a USB flash drive.

  Please insert a USB flash drive in advance when using this function; the image is in BMP format.

  The device supports a USB flash drive with FAT32 format and a capacity smaller

than 64GB.

The path where the 6363 saves the images is("\6363_LCR\Screen\").

The path where the 6364 saves the images is("\6364_LCR\Screen\").

The path where the 6365 saves the images is("\6365_LCR\Screen\").

The path where the 6366 saves the images is("\6366_LCR\Screen\").

The path where the 6367 saves the images is("\6367_LCR\Screen\").

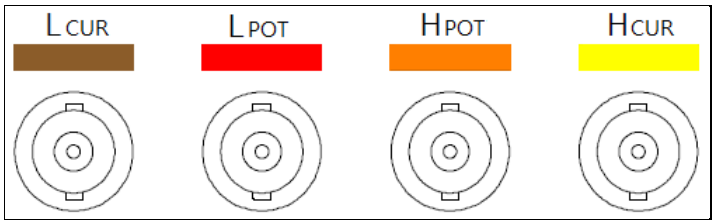
- **Code:** Reserved key; it has no functions for now.
- **Delete:** Edit delete key.
- **Exit:** Exit/Return key. Press this key to return to the previous page.
- **Enter:** Confirm key; it conforms edited values or selections.
- **Knob:** Fine tune the voltage/frequency in meter mode.Select the desired item and press Enter to enable knob fine-tuning.
- **Arrow Keys:** Selects a single item or parameter.
- **Number Keys:** Provided for entering numbers when editing.
- **Measurement Terminals:**

LCUR Receives the test current source; it is connected to thenegative pole (-) of the DUT.

LPOT Negative terminal for voltage measurement; it is connected to the negative pole (-) of the DUT.

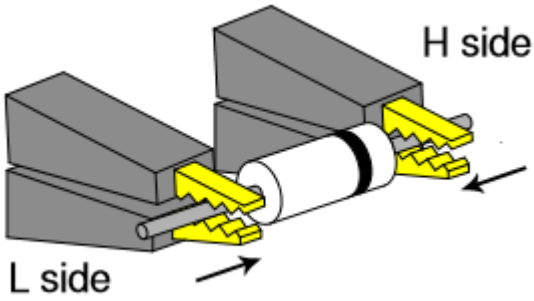
HPOT Positive terminal for voltage measurement; it is connected to the positive pole (+) of the DUT.

HCUR Receives the test current source; it is connected to the positive pole (+) of the DUT.

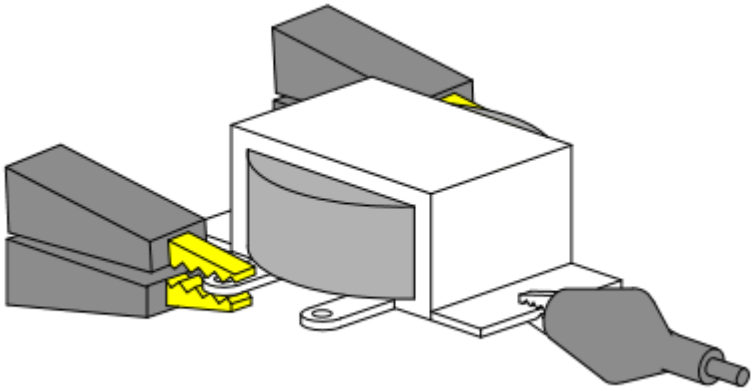


The figure above is a 6365 four-wire measurement connector; please connect the four-wire measurement fixture head at the end of the fixture test line here.

1. Please discharge the DUT properly before connecting the fixture.
2. Connect the fixture terminals to the BNC terminal on the front panel according to the different colors.
3. Connect the DUT to the fixture; if the DUT is directional, connect the H side of the fixture clip to the positive end of the DUT and the L side of the fixture clip to the negative end of the DUT. Please make sure that the position of the fixture clip is as close to the DUT itself as possible.



4. If the DUT is covered by an external casing and it isn't connected to any fixture clip, connect this external case to the ground in order to reduce noise interference.



- **LCR-6365 Tester Back View**

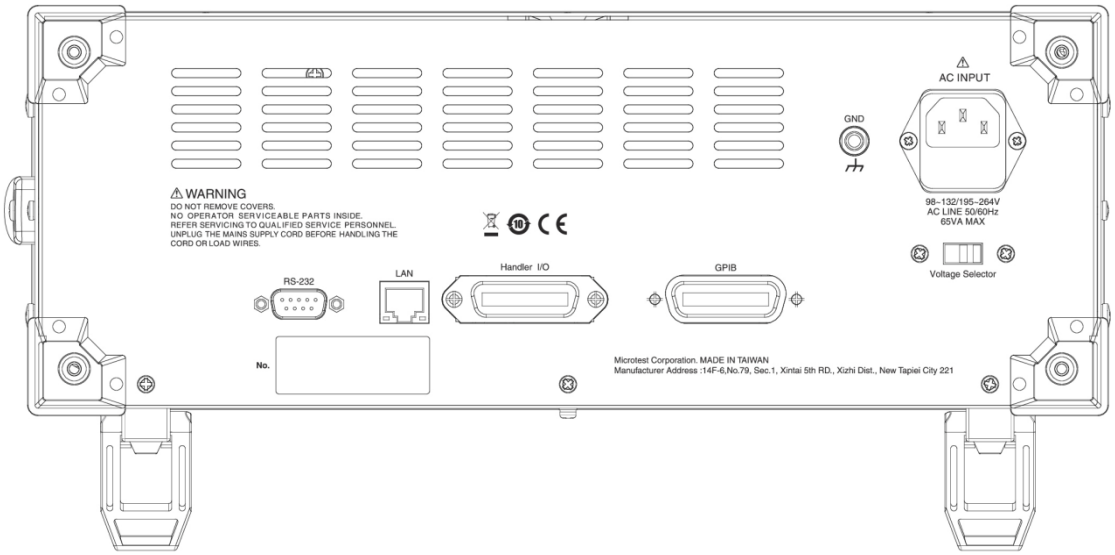


Figure 2-7-2 LCR-6365 Tester Back View

LCR-6365 Back Connection: (please refer to Figure 2-7-2)

1. **AC INPUT:** Input power jack. Please confirm whether the input voltage is 110V or 220V before connecting the plug, and flip the power switch with the **Voltage Selector** to the proper voltage position (110V/220V).
2. **RS-232:** RS-232 serial communication port interface.
3. **GPIB:** GPIB communication interface.
4. **LAN: LAN network** communication interface.
5. **Handler I/O:** Handler Interface.

2.10 Precautions Before Turning on the Device

Before starting to operate the LCR tester, you must first confirm there is sufficient and steady AC voltage available for use in each device in the automatic test system.

Chapter 3. Operations

3.1 Main Menu

Press the **Menu** control key and the screen will enter the Main Menu screen.

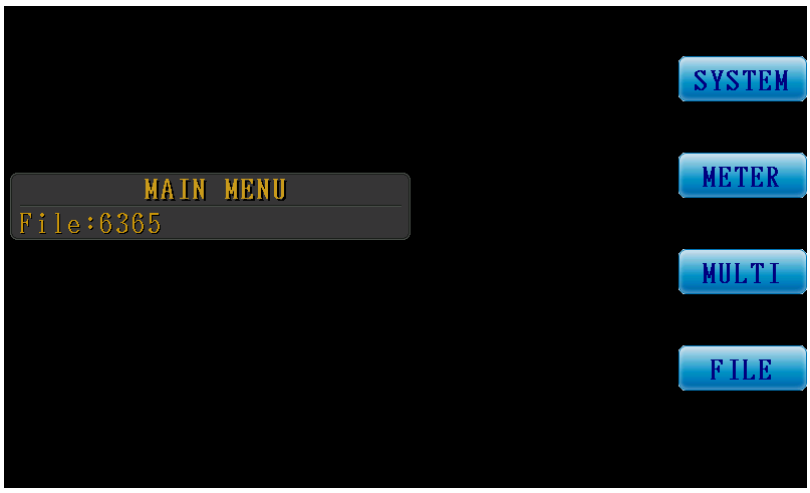


Figure 3-1-1 Main Menu Screen

- SYSTEM: Enters the System Setup screen.
- METER: Enters the MeterMode.
- MULTI: Enters the function page of Multi-Step Mode screen.
- FILE: Enters the File Management screen.

3.2 System Settings

Press the **Menu** control key to enter the Main Menu screen, and then select **SYSTEM** to enter the system setting screen.

Figure 3-2-1 System Setup Screen (1/2)

1. **Trigger Delay (mS):** Set the trigger delay time; the setting range is 0-5000 and the unit is mS.

2. **Compare Mode Beep:** Set the time for the buzzer to prompt when the compare function is enabled in Meter Mode. The Select function key can be used to make selections.
   a. **OFF:** Disable prompt.
   b. NG: Prompt when any one item exceeds the setting range (FAIL).
   c. OK: Prompt only when all items with compare enabled are within the setting range (PASS).

3. **Multi-Step Mode Beep**: Test result prompt setting when in Multi-Step Test Mode; the Select function key can be used to make selections.
   a. **ON:** Enable prompt.
   b. **OFF:** Disable prompt.

4. **Handler Interface**: Set Handler Interface function ON/OFF; the Select function key can be used to make selections.
   a. **ON:** Enable the Handler Interface function.
   b. **OFF:** Disable the Handler Interface function.

5. **GPIB Address**: Set the GPIB communication address; setting range: 1-30.

6. **RS-232 Baud Rate:**Set the baud rate of the serial communication port; the Select function key can be used to make selections. The following baud rates are available: 115200/56000/384000/19200/9600 bps.

7. **Communication Interface**: Communication interface setting; selects the communication interface to use GPIB/RS-232/LAN.

8. **Language/語言/语言:** Language setting; the Select function key can be used to make selections. Three options are available for selection, including English, Traditional Chinese, and Simplified Chinese.

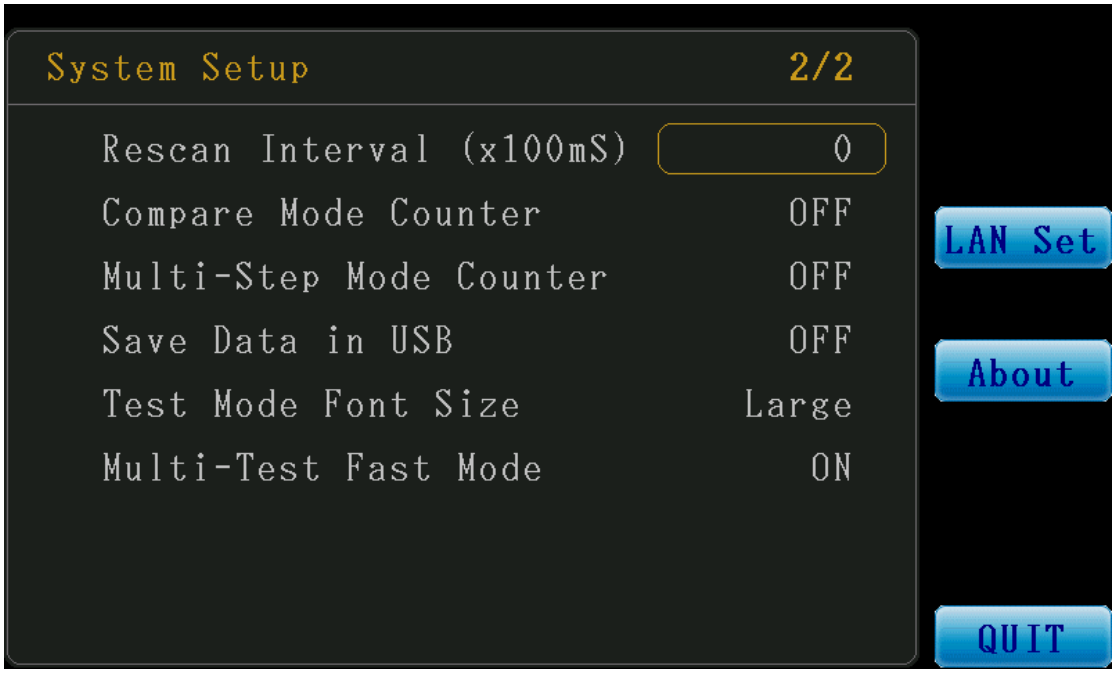


Figure 3-2-1 System Setup Screen (2/2)

9. **Rescan Interval (x100mS)**: Set the time for continual test and continual test intervals in Multi-Step Test Mode; the setting range is between 0-100.
   - ➢ When the value is set as 0, the continual test function is disabled.
   - ➢ When the value is set between 1-100, the continual test function is enabled and the time for continual test intervals is the value set x100mS.

   Example:

   When the value is set as 5, the time for the continual test interval is 500mS. (5x100mS=500mS)

10. **Compare Mode Counter**: Set ON/OFF of the compare mode counter. The Select function key can be used to make selections.
    a. **ON:** Enable the Compare Mode Counter.
    b. **OFF:** Disable the Compare Mode Counter.

    ※ After enabling this function, the total PASS/FAIL quantity will be displayed at the

top right corner of meter mode. Maximum quantity of PASS/FAIL parts is 999,999,999 respectively. The counting will return to 1 and continue to accumulate when exceeding this value.

11. **Multi-Step Mode Counter**: Set ON/OFF of multi-step mode counter. The Select function key can be used to make selections.
    a. **ON:** Enable the Multi-Step Mode Counter.
    b. **OFF:** Disable the Multi-Step Mode Counter.
    ※ After enabling this function, the total PASS/FAIL quantity will be displayed at the top right corner of multi-step test mode. Maximum quantity of PASS/FAIL parts is 999,999,999 respectively. The counting will return to 1 and continue to accumulate when exceeding this value.

12. **Save Data in USB**: Set whether to turn the save test data to USB flash drive function ON/OFF under multi-step test mode.
    a. **OFF:** Disable save test data to USB flash drive function.
    b. **ON:** Enable save test data to USB flash drive function. The test data will be saved on a USB flash drive after the test is completed.
    ※ **When this function is enabled, please ensure that the USB flash drive is securely connected to the machine.**

13. **Test Mode Font Size**: Sets the test value font size in Multi-Step Test Mode. Use the Select button to make the selection.
    a. **Large:** Sets the font size as large.
    b. **Small:** Sets the font size as small.

14. **Multi-Test Fast Mode**: Sets the testing method for Multi-Step Test Mode and whether to start the fast test function. Use the Select button to make the selection.

    - **OFF:** Disables the fast test function for Multi-Step Test Mode.
    - **ON:** Enables the fast test function for Multi-Step Test Mode.

※ Multi-Test Fast Mode is only applicable to the same DUT with the same testing conditions (voltage and frequency).

15. About: Display the version information and serial number of the machine.

16. LAN Set: Local area network (LAN) communication interface setting.

※ To allow the instrument to communicate through the local area network (LAN), the network cable must be connected and its IP address must be configured.

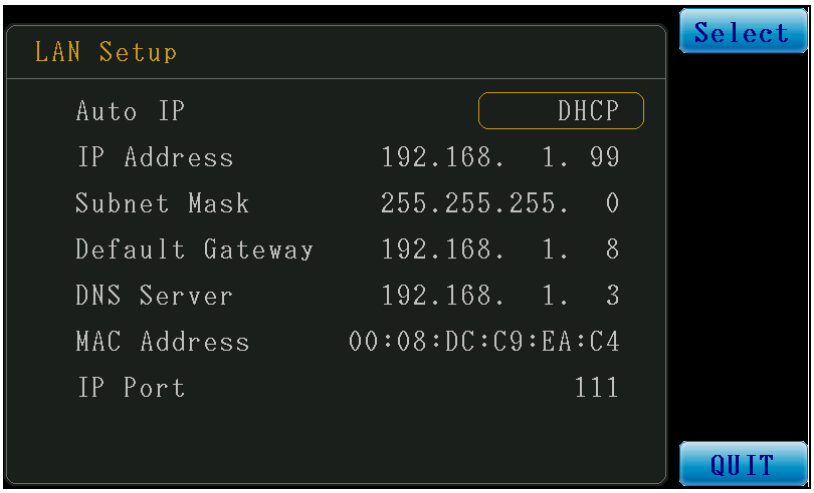


Figure 3-2-3 LAN Setup

- Auto IP: Set whether to acquire the IP automatically or configure manually.
  - DHCP: Acquire the available IP address automatically though the DHCP server.

※ When this setting is used, no other fields need to be set, and therefore the cursor cannot move down.

  - OFF: Configure the IP Address, Subnet Mask, and Default Gateway, etc. manually.
- IP Address: IP address setting field.
- Subnet Mask: Subnet mask setting field.
- Default Gateway: Default gateway setting field.
- DNS Server: DNS server setting field.
- MAC Address: MAC address display.
- IP Port: Communication port fixed at 111.

3.3 MeterMode

Press the **Menu** control key to display the main menu on screen. Press **METER** to enter the main screen(MeterMode).

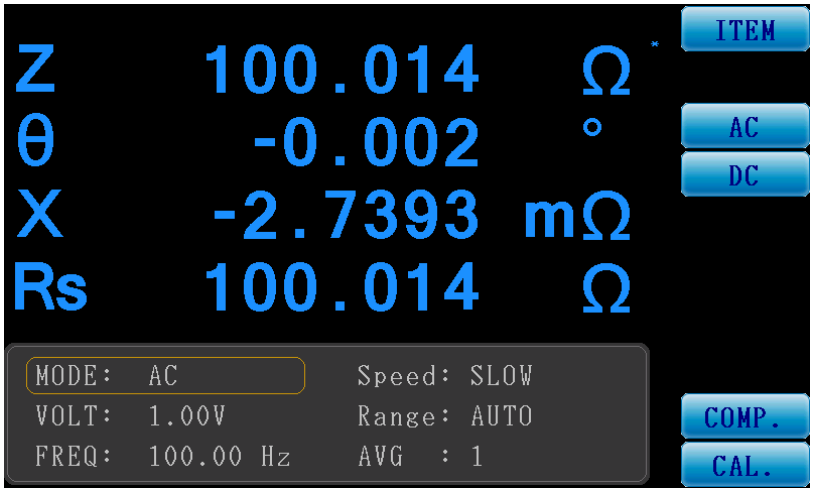


Figure 3-3-1 Meter Mode Screen

- **Measurement Settings:**
  - **MODE:**Meter Mode, AC (Alternating Current Mode)/DC (Direct Current Mode).

    ※ **DC mode is only available for Rdc (direct current resistance) measurement.**

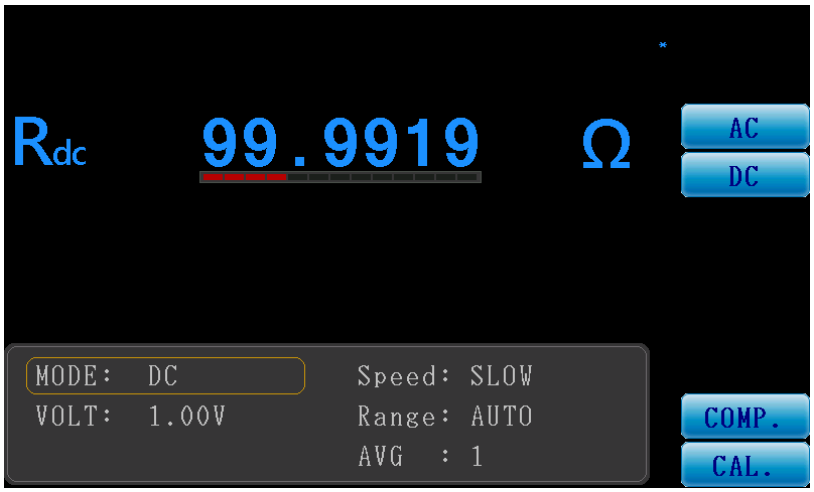


Figure 3-3-2 DC MODE Screen (for Rdc measurement only)

  - **VOLT:** Measure voltage. The setting range is 10mV-2.0V.
  - **FREQ:** Measure frequency; this item can only be set under AC mode.

    Setting Range:

    10Hz~20kHz (6363) ／ 10Hz~100kHz (6364)

    10Hz~200kHz (6365) ／ 0.1Hz~200kHz (6365A)

    10Hz~500KHz (6366) ／ 0.1Hz~500kHz (6366A)

    10Hz~1MHz (6367) ／ 0.1Hz~1MHz (6367A)

  - **Speed:** Measure speed; there are four options available: MAX (fastest)/FAST (fast)/MED

(medium speed)/SLOW (slow).

Measurement Time (not including display update):

MAX: 5mS

FAST: 25mS

MED: 100mS

SLOW: 250mS

- **Range:** Measure gear position; available options include: AUTO (automatic)/HOLD (hold current gear position)/1 (gear 1)/2 (gear 2)/3 (gear 3).
- **AVG:** Average number of times; the setting range is between 1-64.

- **ITEM:** (Measurement Parameter Settings)

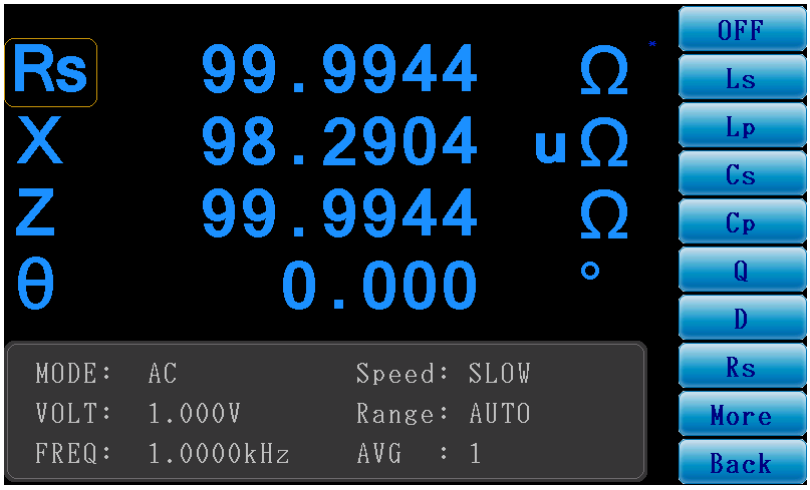


Figure 3-3-3 Parameter Selection Screen-1

Figure 3-3-4 Parameter Selection Screen-2

- **Up, Down Direction Keys:** Used to move the yellow frame; used to select the test parameter item to change.
- **Left, Right Direction Keys:** Used to change the measurement parameter selected with the

yellow frame; available selections include OFF/Ls/Lp/Cs/Cp/Q/D/Rs/Rp/Z/θ/X/Y/G/B..

- **Function Menu:**
  - **OFF** **:** Disable this measurement function. (Cannot be set as all four items disabled)
  - **Ls** **:** Set this item as measure Ls (Serial Inductance).
  - **Lp** **:** Set this item as measure Lp (Parallel Inductance).
  - **Cs** **:** Set this item as measure Cs (Serial Capacitance).
  - **Cp** **:** Set this item as measure Cp (Parallel Capacitance).
  - **Q** **:** Set this item as measure Q (Quality Factor).
  - **D** **:** Set this item as measure D (Dissipation Factor).
  - **Rs** **:** Set this item as measure Rs (Serial Resistance).
  - **Rp** **:** Set this item as measure Rp (Parallel Resistance).
  - **Z** **:** Set this item as measure Z (Impedance).
  - **θ** **:** Set this item as measure θ (Phase Angle).
  - **X** **:** Set this item as measure X (Reactance).
  - **Y** **:** Set this item as measure Y (Admittance).
  - **G** **:** Set this item as measure G (Conductance).
  - **B** **:** Set this item as measure B (Susceptance).
  - **More** **:** Switch to the next page of the menu.
  - **Back** **:** Return to the measuring screen.

- **COMP.: (Compare Function)**

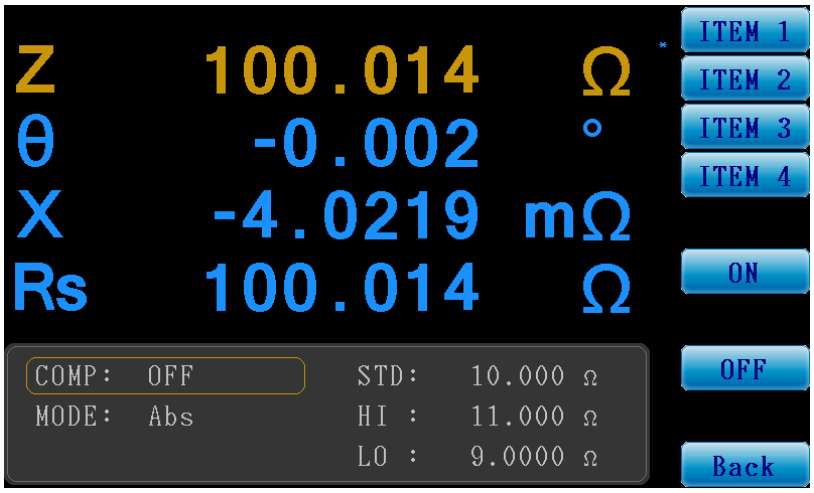


Figure 3-3-5 Compare Function Setting Screen

- **Compare Condition Setting:**
  - **COMP:** Set whether to turn the compare function ON/OFF.
  - **MODE:** Set the compare mode.
    - ✓ **Abs:** Its upper and lower limits are determined by the value entered in the HI/LO fields.
    - ✓ **ΔAbs:** Its upper limit is STD+HI; lower limit is STD+LO..
    - ✓ **Δ%:** Its upper limit is STD+(STD x HI%); lower limit is STD+(STD x LO%)..
  - **STD:** Set the standard value.
  - **HI:** Set the upper limit.
  - **LO:** Set the lower limit.

- **Function Menu:**
  - **ITEM 1:** Select to edit measurement item 1.
  - **ITEM 2:** Select to edit measurement item 2.
  - **ITEM 3:** Select to edit measurement item 3.
  - **ITEM 4:** Select to edit measurement item 4.
  - **Back:** Return to the measurement screen.

The figure below is the screen when the compare function is enabled; the bars under the various Set of measured values will change according to the values.

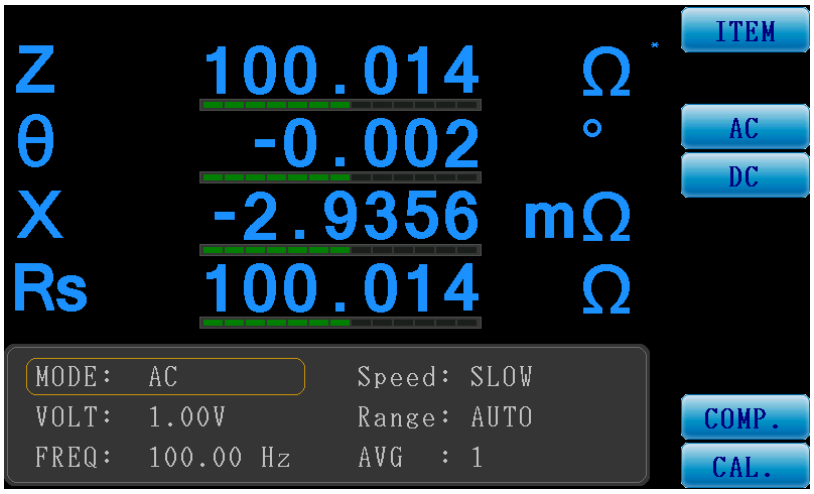


Figure 3-3-6 Measurement Screen When Compare Function is ON

The bar graph of the compare function is displayed as follows:

LO : When the measured value is lower than the lower limit, the bar will be displayed in red, and fall within the "LO" range.

PASS : When the measured value is within the upper and lower limits, the bar will be displayed in green, and fall within the "PASS" range.

HI : When the measured value is lower than the lower limit, the bar will be displayed in red, and fall within the "HI" range.

- **CAL.:**

  The calibration function provides OPEN/SHORT calibration.

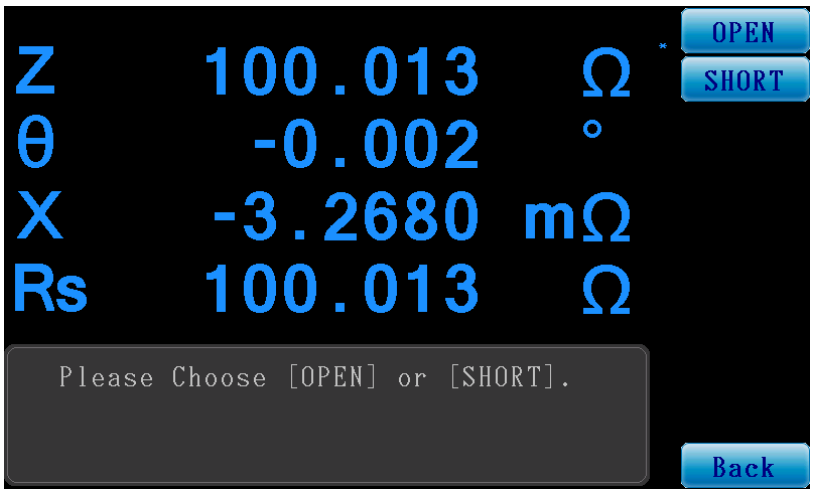


Figure 3-3-7 Meter Mode Calibration Function Screen

- **OPEN:** Enter the open circuit calibration menu.
  - **DC:** Start direct current open circuit calibration.
  - **Spot:** Start the open circuit calibration for the current “alternating current” setting configuration.
  - **All Freq:** Start open circuit calibration for all frequencies.

- **SHORT:** Enter the short circuit calibration menu.
  - **DC:** Start direct current short circuit calibration.
  - **Spot:** Start the short circuit calibration for the current “alternating current” setting configuration.
  - **All Freq:** Start short circuit calibration for all frequencies.

※ **It is recommended to perform OPEN/SHORT calibration once before performing measurement for the first time or after changing the measurement fixture/cramp.**

3.4 Multi-Step Mode

Press the **Menu** control key to display the main menu on the screen. Press **MULTI** to enter (Multi-Step Mode).

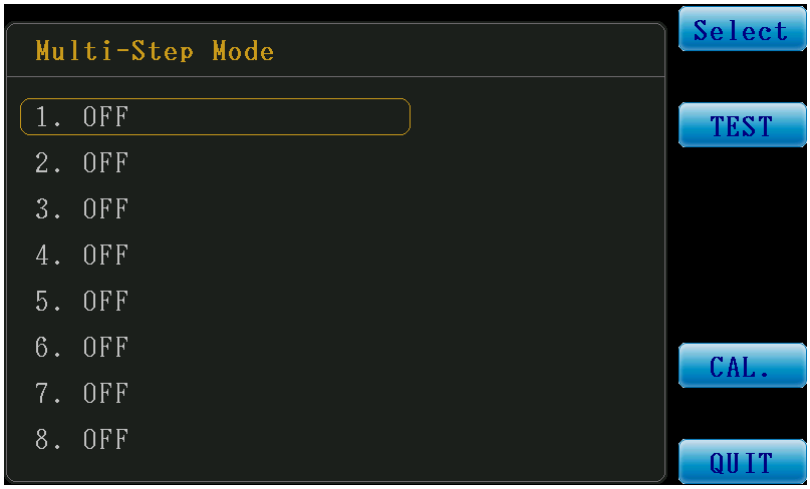


Figure 3-4-1 Multi-Step Mode Screen

The above figure is the multi-step list briefly showing the test configuration of each group.

- **Multi-Step Mode List:**
  - **1-8:** Eight groups of multi-step setting. The user can use the up and down direction keys to move to the desired edit item.
  - **Select:** Click to enter the yellow frame item and conduct test item edit.
  - **TEST:** Enter Multi-Step Test Mode.
  - **CAL.:** Run open/short circuit calibration of multi-step function.
  - **QUIT:** Exit multi-step mode and return to the main menu.

The following figure shows the screen with the established test item:

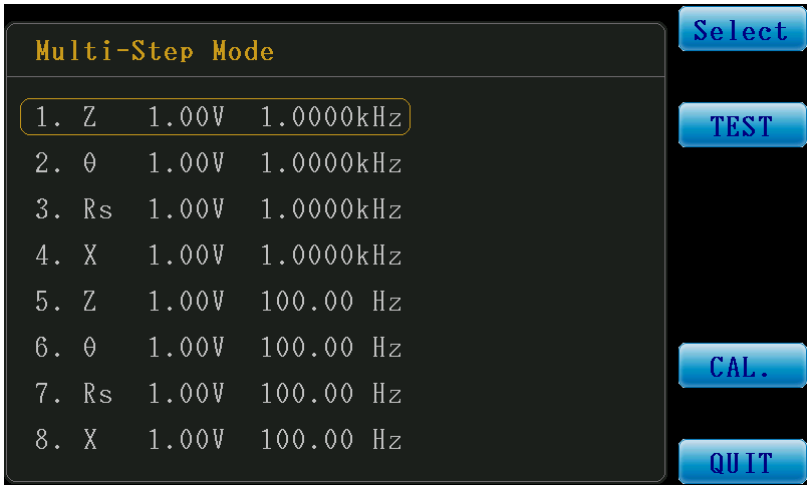


Figure 3-4-2 Screen With the Established Test Item

- **Multi-Step Mode Edit:**

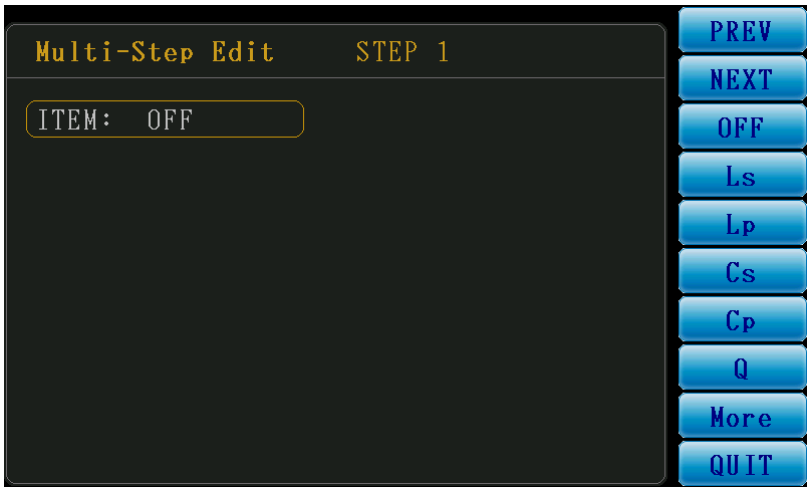


Figure 3-4-3 Multi-Step Mode Edit Screen

The area marked “Multi-Step Edit” is the edit area. STEP 1 on the left means currently, the user is about to edit the first test item. Then the user can use direction keys (i.e. function keys on the right) to edit the desired test items and conditions.

In this screen, ITEM is OFF. The user can select the test parameter from the right to enable this test item, as shown in the following figure.

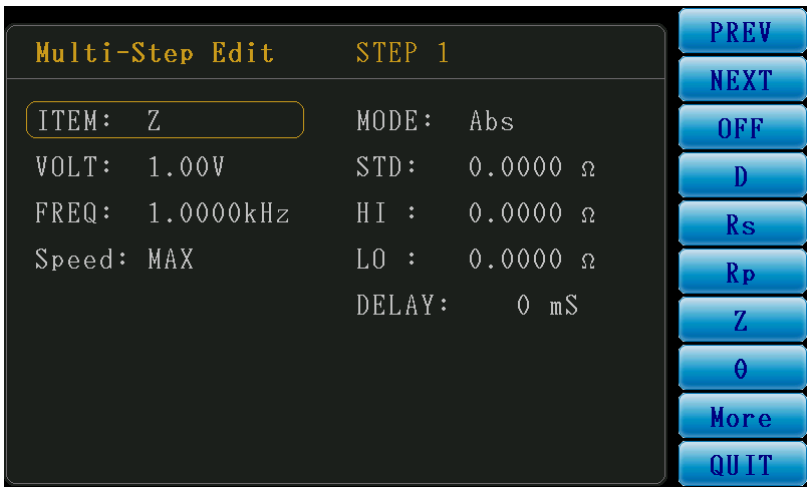


Figure 3-4-4 Multi-Step Mode Edit Screen

- **Quick Menu:**
  - **PREV:** Switch the page to the previous test step.
  - **NEXT:** Switch the page to the next test step.
  - **QUIT:** Exit edit and return to the Multi-Step Mode list.

◆ **Item Edit:**

- **ITEM:** Set the test item. The following parameters are available at the right side:
  - **OFF :** Disable this measurement function.
  - **Ls :** Set this item as measure Ls (Serial Inductance).
  - **Lp :** Set this item as measure Lp (Parallel Inductance).
  - **Cs :** Set this item as measure Cs (Serial Capacitance).
  - **Cp :** Set this item as measure Cp (Parallel Capacitance).
  - **Q :** Set this item as measure Q (Quality Factor).
  - **D :** Set this item as measure D (Dissipation Factor).
  - **Rs :** Set this item as measure Rs (Serial Resistance).
  - **Rp :** Set this item as measure Rp (Parallel Resistance).
  - **Z :** Set this item as measure Z (Impedance).
  - **θ :** Set this item as measure θ (Phase Angle).
  - **X :** Set this item as measure X (Reactance).
  - **Y :** Set this item as measure Y (Admittance).
  - **G :** Set this item as measure G (Conductance).
  - **B :** Set this item as measure B (Susceptance).
  - **Rdc :** Set this item as measure Rdc (Direct Current Resistance).

- **VOLT:** Set measurement voltage. The setting range is 10mV-2.0V.
- **FREQ:** Set theMeasure frequency; this item can only be set under AC mode.

  Setting Range:

  10Hz~20KHz (6363)／10Hz~100KHz (6364)

  10Hz~200KHz (6365)／0.1Hz~200KHz (6365A)

  10Hz~500KHz (6366)／0.1Hz~500KHz (6366A)

  10Hz~1MHz (6367)／0.1Hz~1MHz (6367A)

- **SPEED:** Set theMeasure speed; there are four options available: MAX (fastest)/FAST (fast)/MED (medium speed)/SLOW (slow).
- **MODE:** Set the compare mode.
  - ✓ **Abs:** Its upper and lower limits are determined by the value entered in the HI/LO fields.
  - ✓ **ΔAbs:** Its upper limit is STD+HI; lower limit is STD+LO.
  - ✓ **Δ%:** Its upper limit is STD + (STD x HI%); lower limit is STD + (STD x LO%).

- **STD:** Set the standard value. The setting range is -999G - +999G.

- **HI:** Set the maximum. The setting range is -999G - +999G.
- **LO:** Set the minimum. The setting range is -999G - +999G.
- **DELAY:** Set delay time. The setting range is 0-5000(mS).

◆ Multi-Step Mode Calibration Functions

After editing test items, please select “CAL” first to run OPEN/SHORT calibration and start the test function.

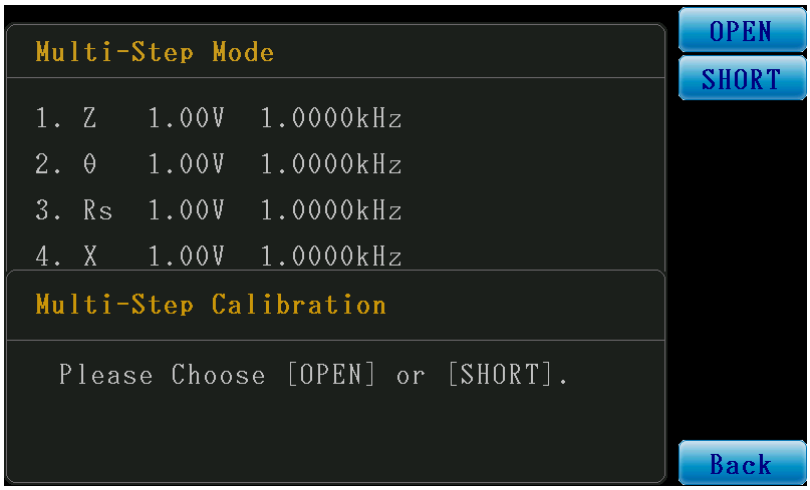


Figure 3-4-5 Multi-Step Mode Calibration Screen

- **OPEN:** Enable open circuit calibration.
- **SHORT:** Enable short circuit calibration.

- **Multi-Step Test Mode:**

  The following figure shows the multi-step test screen. Test results will be displayed under the yellow frame {READY}. The system will display {PASS} or {FAIL} when the test is completed. Test data will be displayed behind each test item; the green one means PASS and red one means FAIL.

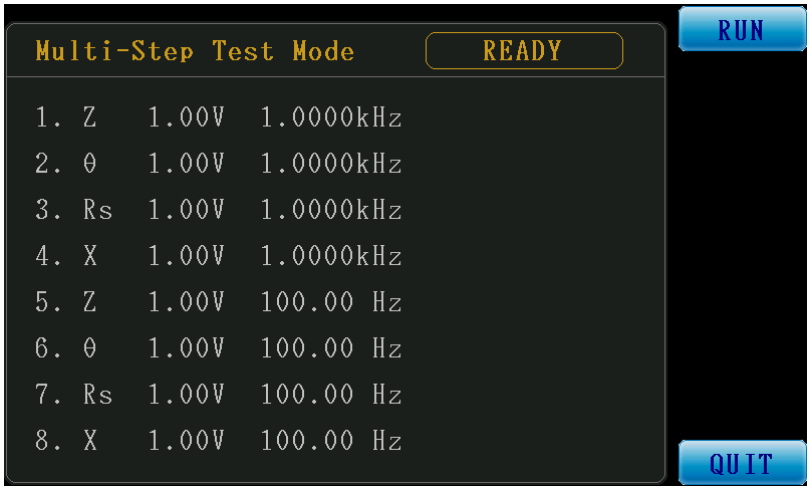


Figure 3-4-6 Multi-Step Test Screen

- **RUN:** Enable multi-step test.
- **QUIT:** Return to the Multi-Step Mode test item list screen.

The test result is shown as the following figure:

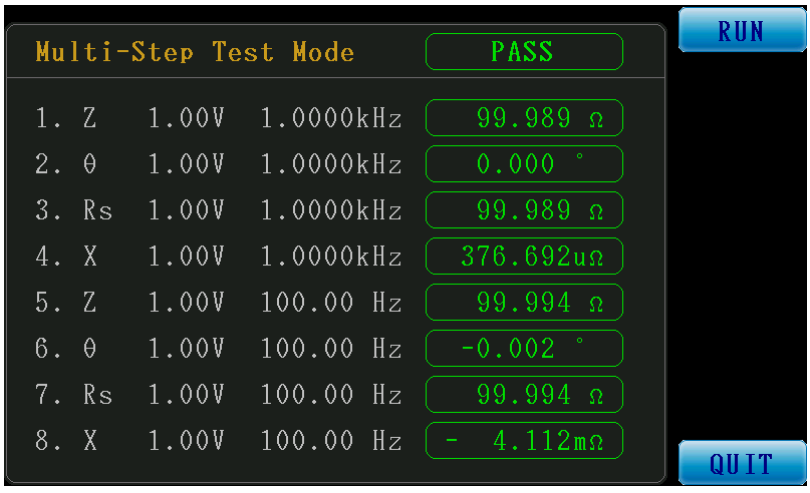


Figure 3-4-7 Multi-Step Test Complete Screen

3.5 File Management

Press the Menu **File** control key and the file management main menu will be displayed on the screen.

Figure 3-5-1 File Management Screen

- **File Management:**
  - **LOAD: Load file.**
  - **SAVE AS: Save as a new file.**
  - **NEW: Create a new file.**
  - **Delete: Delete the file.**
  - **QUIT: Return to main menu**

- **LOAD FILE:**

The figure below is the RAM FILE (internal file list) screen; the direction keys can be used to select the file to load. For example file{6365} is displayed in green, meaning it is the currently selected file. The function key {LOAD} on the right can be used to load a file. A file beginning with an {@} symbol means it is the file currently in use.

Figure 3-5-2 Internal File List Screen

- **LOAD**: Load the currently selected file.
- **USB File**: Switch to the USB flash drive file list screen as shown in the following screen.

Figure 3-5-3 USB Flash Drive File List Screen

- **RAM File**: Return to the internal file list screen.
- **Copy to RAM**: Copy the currently selected file from the USB flash drive to the internal storage of the machine.
- **PgDn:** Jump to the next page.
- **PgUp:** Jump to the previous page.
- **QUIT:** Return to the file management page.

- **Copy to USB:** Copythe currently selected file to the USB flash drive.

  The path where the **6363** saves the files is(USB:\6363_LCR\SetFile)..

  The path where the **6364** saves the files is(USB:\6364_LCR\SetFile)..

  The path where the **6365** saves the files is(USB:\6365_LCR\SetFile)..

  The path where the **6366** saves the files is(USB:\6366_LCR\SetFile)..

  The path where the **6367** saves the files is(USB:\6367_LCR\SetFile)..

- **PgDn:** Jump to the next page.
- **PgUp:** Jump to the previous page.
- **QUIT:** Return to the file management page.

◆ **SAVE AS:**

The figure below is the SAVE AS (save as new file) operation interface. The directional keys can be used to select the English letters and numbers on the screen to form the file name. For example {A} is displayed in green, which means it is the currently selected letter. The function key {Select} to the right can be pressed to enter the character {A}. Once input is completed, select {OK} to complete the SAVE AS function.

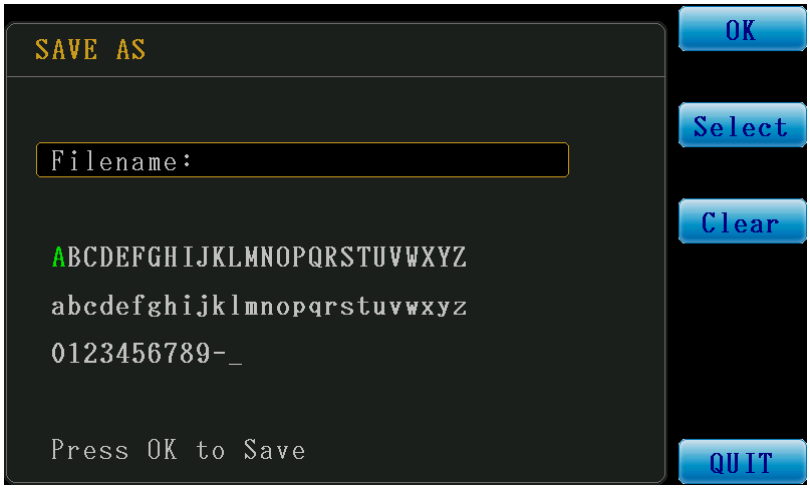


Figure 3-5-3 SAVE AS Screen

- **Filename:** File name input area.
- **OK:** Save file confirm key.
- **Select:** File name text selection confirm key.
- **Clear:** File name deletion key; the letter at the end will be cleared each time when it is pressed.
- **QUIT:** Return to the file management page.

◆ **NEW:**

The figure below is the NEW FILE (create new file) operation interface. The directional keys can be used to select English letters and numbers on the screen to form the file name. For example {A} is displayed in green, which means it is the currently selected letter. The function key {Select} to the right can be pressed to enter the character {A}. Once input is completed, select {OK} to complete the NEW FILE function.

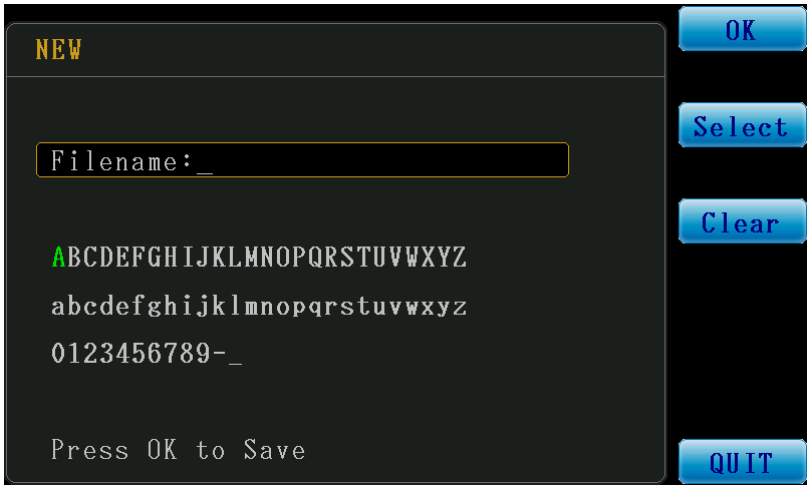


Figure 3-5-4 NEW FILE Screen

- **Filename:** File name input area.
- **OK:** Save file confirm key.
- **Select:** File name text selection confirm key.
- **Clear:** File name deletion key; the letter at the end will be cleared each time when it is pressed.
- **QUIT:** Return to the file management page.

◆ **DELETE:**

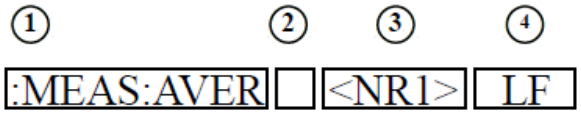
The figure below is the DELETE FILE (delete file) operation interface. The directional keys can be used to select the file to delete. For example, {6365} is displayed in green, which means it is the currently selected file. The function key {DELETE} to the right can be pressed to delete this file. The file name with the {@} symbol in front means it is a file currently being used and cannot be deleted. Another file must be loaded first in order to delete this file.

Figure 3-5-5 DELETE FILE Screen

- **DELETE:** Deletes the currently selected file.
- **PgDn:** Jump to the next page.
- **PgUp:** Jump to the previous page.
- **QUIT:** Return to the file management page.

3.6 Instruction Set

- **Instruction Structure**



1. Instruction
2. Space
3. Parameter
4. End Character

- **Parameter Types**

<NR1>	Integers	Such As: 0, 1, 2, 3
<NR2>	Decimal Number	Such As: 0.1, 1.23, 2.0
<NR3>	Float	Such As: 2.5E-1, 6.25E+1
<disc>	Discrete Data	Such As: ON, OFF, MAX

- **End Character**

\n (0xa) Line feed code.(LF)

- **Remarks**

Instructions are not case sensitive.

This machine accepts The International System of Units (SI) Instructions are as follows:

"G" (Giga) (10^9)
"MA" (Mega) (10^6)
"K" (Kilo) (10^3)
"m" (Milli) (10^{-3})
"u" (Micro) (10^{-6})
"n" (Nano) (10^{-9})
"p" (Pico) (10^{-12})
"f" (Femto) (10^{-15})

The following instruction Set involving frequency related settings uses 6365 as an example. The frequency range of each model is as follows:

6363 (10Hz~20KHz) ／ 6364 (10Hz~100KHz)

6365 (10Hz~200KHz) ／ 6365A (0.1Hz~200KHz)

6366 (10Hz~500KHz) ／ 6366A (0.1Hz~500KHz)

6367 (10Hz~1MHz) ／ 6367A (0.1Hz~1MHz)

*IDN?

Identification Query.

Responses: Manufacturer, machine model, serial number, information on the firmware version.

Example:

***IDN?**

Return

MICROTEST,6365,S00001,V1.607150

*TRG

(Triggers a direct measurement) Trigger one measurement without returning to the result.

※ **Can be used for Meter Mode and Multi-Step Test Mode.**

Example:

***TRG**

:CAL:OPEN:ALL?

Execute open circuit calibration between 10Hz-200kHz frequency and read the execution results.

Responses:

OK (Calibration successful)

NG (Calibration failed)

Example:

:CAL:OPEN:ALL? Return **OK**

:CAL:OPEN:DC?

Execute open circuit calibration for direct current (DC), and read the execution results.

Responses:

OK (Calibration successful)

NG (Calibration failed)

Example:

:CAL:OPEN:DC? Return **OK**

:CAL:OPEN:SPOT?

Executes open circuit correction for the alternating current (AC) of the current frequency, and reads the execution results.

Responses:

OK (Calibration successful)

NG (Calibration failed)

Example:

:CAL:OPEN:SPOT? Return**OK**

:CAL:SHORT:ALL?

Execute short circuit calibration between 10Hz-200kHz frequency and read the execution results.

Responses:

OK (Calibration successful)

NG (Calibration failed)

Example:

:CAL:SHORT:ALL? Return**OK**

:CAL:SHORT:DC?

Executes short circuit correction for direct current (DC), and reads the execution results.

Responses:

OK (Calibration successful)

NG (Calibration failed)

Example:

:CAL:SHORT:DC? Return **OK**

:CAL:SHORT:SPOT?

Executes short circuit correction for the alternating current (AC) of the current frequency, and reads the execution results.

Responses:

OK (Calibration successful)

NG (Calibration failed)

Example:

:CAL:SHORT:SPOT? Return**OK**

:DISP:PAGE <disc>

Select the page to display.

Parameters:

MEAS	Set the display page as Meter Mode (MEAS).
LSET	Set the display page as multi-step edit mode.
LRUN	Set the display page as multi-step test mode.

Example:

:DISP:PAGE MEAS

:DISP:PAGE?

Query currently displayed page.

Responses:

MEAS	The current displayed page is Meter Mode.
LSET	Current displayed page is multi-step edit mode.
LRUN	Current displayed page as multi-step test mode.
OTHER	The current page is not in the pages described above.

Example:

:DISP:PAGE?Return **MEAS**

:FETCH?(for Meter Mode)

Under Meter Mode, the measured data and comparison results can be returned according to the display order of the current measurement items.

※ Can be used for Meter Mode and Multi-Step Test Mode; here is the explanation when used in Meter Mode.

Responses:

<Data 1>,<Data 2>,<Data 3>,<Data 4>,<Comp 1>,<Comp 2>,

<Comp 3>,<Comp 4>

Return Parameter Description:

<Data>

Measurement data; <NR3> scientific notation format is used for the return format.

Data 1-4 represents the measurement data of four test items. There are only values for items with display enabled. For example, if only two test items were enabled, two data entries will be returned; or when under DC mode, only the Rdc item can be measured, so only one set of data will be returned.

<Comp>

Measurement data compare results; <NR1> is used for the return format. Its definitions are as follows:

0 Compare function disabled.

1 Comparison result is OK.

2 Comparison result is NG.

Comp 1-4 represents the individual test data comparison results of the four test items. Once the compare function is enabled for any one of the test items, the comparison results will be returned; its order is consistent with <Data>.

EX1:

Four test items with all compare function disabled, then the retuned result is

<Data 1>,<Data 2>,<Data 3>,<Data 4>

EX2:

Four test items, in which the compare function is enabled for one or all items, then the returned result is

<Data 1>,<Data 2>,<Data 3>,<Data 4>,<Comp 1>,<Comp 2>,

<Comp 3>,<Comp 4>

EX3:

Two test items with all compare function disabled, then the retuned result is

<Data 1>,<Data 2>

EX4:

Four test items, in which the compare function is enabled for one or all items, then the returned result is

<Data 1>,<Data 2>,<Comp 1>,<Comp 2>,

Example:

:FETCH?

Return

1.000060E+02,3.791240E-04,1.000060E+02,9.999395E-03,1,1,1,1

:FETCH?(for Multi-Step Test Mode)

Under Multi-Step Test Mode, the measured data and results can be returned according to the order of the test items.

※ Can be used for Meter Mode and Multi-Step Test Mode; here is the explanation when used in Multi-Step Test Mode.

Responses:

<Result>,<Step 1 Result>,<Step 1 Data>,<Step 2 Result>,

<Step 2 Data>…<Step n Result>,<Step n Data>

Return Parameter Description:

<Result>

Results of Multi-Step Mode; <NR1> is used for the return format. Its definitions are as follows:

0 Test interrupted and not completed.

1 Test steps were all OK.

2 There was NG during test steps.

<Step Result>

Test result judgement of each step. <NR1> is used for the return format. Its definitions are as follows:

0 Not tested.

1 Test result is OK.

2 Test result is NG.

<Step Data>

Test values of each step. <NR3> scientific notation format is used for the return format.

Example:

:FETCH?

Return

1,1,1.000060E+02,1,3.791240E-04,1,1.000060E+02,1,9.999395E-03

:MEAS:AVER <NR1>

Set the average number of measurements.

Parameters: Setting range is from 1-64.

Example:

:MEAS:AVER 4

:MEAS:AVER?

Query the average number of measurements.

Responses: Return the setting value (1-64) of the current average number of times.

Example:

:MEAS:AVER? Return**4**

:MEAS:BEEP <disc>

Buzzer prompt timing when setting compare mode.

Parameters:

OFF	Disable the buzzer prompt function.
NG	Enable the buzzer prompt function and will prompt when failed.
OK	Enable the buzzer prompt function and will prompt when passed.

Example:

:MEAS:BEEP OFF

:MEAS:BEEP?

Buzzer prompt timing when querying compare mode.

Responses:

OFF	Disable the buzzer prompt function.
NG	Enable the buzzer prompt function and will prompt when failed.
OK	Enable the buzzer prompt function and will prompt when passed.

Example:

:MEAS:BEEP? Return **OFF**

:MEAS:FREQ <NR3|disc>

Set measurement frequency.

Parameters:

10-200000	(Frequency setting range 10Hz-200kHz)
MAX	Set frequency as 200kHz.
MIN	Set the frequency to 10Hz (6365)/0.1Hz (6365A).

Example:

:MEAS:FREQ 1000

:MEAS:FREQ 1k

:MEAS:FREQ 1kHz

:MEAS:FREQ 1E3

:MEAS:FREQ MAX

:MEAS:FREQ MIN

:MEAS:FREQ?

Query current measurement frequency.

Responses:

<NR3> scientific notation format is used for the return format.

Example:

:MEAS:FREQ? Return **1.000000E+03**

:MEAS:MODE <disc>

SetMeter Mode.

Parameters:

AC	Set theMeter Mode as AC.
DC	Set theMeter Mode as DC.

Example:

:MEAS:MODE AC

:MEAS:MODE?

Query current Meter Mode.

Responses:

AC	Meter Mode is AC.
DC	Meter Mode is DC.

Example:

:MEAS:MODE? Return **AC**

:MEAS:PARA <disc-1>,<disc-2>,<disc-3>,<disc-4>

Set the measurement parameter; at least one of the four Set of AC measurement parameters that corresponds to Meter Mode must be set, they cannot all be set as OFF. A maximum of four Set of measurement parameters can be set.

Parameters:

Its <disc> parameter definitions are as follows:

OFF	Disable this measurement.
LS	Serial Inductance (Ls)
LP	Parallel Inductance (Lp)
CS	Serial Capacitance (Cs)
CP	Serial Capacitance (Cp)
RS	Serial Resistance (Rs)
RP	Serial Resistance (Rp)
X	Reactance (X)
B	Susceptance (B)
Z	Impedance (Z)
Y	Admittance (Y)
D	Dissipation Factor (D)
Q	Quality Factor (Q)
DEG	Phase Angle (θ)
G	Conductance (G)

Example:

:MEAS:PARA Z,DEG,X,RS

Set the first item as Z, second item as DEG (θ), third item as X, and fourth item as RS.

:MEAS:PARA Z,DEG,OFF,RS

Set the first item as Z, second item as DEG (θ), third item as OFF, and fourth item as RS.

:MEAS:PARA Z,DEG

Set the first item as Z, second item as DEG (θ); does not set items three and four, which is the same as OFF.

:MEAS:PARA?

Query current measurement parameter.

Responses:

<Para 1>,<Para 2>,<Para 3>,<Para 4>

Return parameter <Para> definitions are as follows:

OFF	Disable this measurement.
LS	Serial Inductance (Ls)
LP	Parallel Inductance (Lp)
CS	Serial Capacitance (Cs)
CP	Serial Capacitance (Cp)
RS	Serial Resistance (Rs)
RP	Serial Resistance (Rp)
X	Reactance (X)
B	Susceptance (B)
Z	Impedance (Z)
Y	Admittance (Y)
D	Dissipation Factor (D)
Q	Quality Factor (Q)
DEG	Phase Angle (θ)
G	Conductance (G)

Example:

:MEAS:PARA? Return Z,DEG,X,RS

The first item is Z, second item is DEG (θ), third item is X, and fourth item is RS

:MEAS:PARA? Return Z,DEG,OFF,OFF

The first item is Z, second item is DEG (θ), the third and fourth items are OFF.

:MEAS:RANG <NR1>

Set measurement gear.

Parameters:

Setting range is from 1-3.

Example:

:MEAS:RANG 1

:MEAS:RANG?

Query current measurement gear.

Responses:

Return gear 1-3.

Example:

:MEAS:RANG? Return **1**

:MEAS:RANG:AUTO

Set measurement gear as automatic gear change.

Example:

:MEAS:RANG:AUTO

:MEAS:RANG:HOLD

Set measurement gear as remain fixed with current gear.

Example:

:MEAS:RANG:HOLD

:MEAS:TIME <disc>

Set measurement speed.

Parameters:

One of the following speeds can be set:

MAX	Fastest
FAST	Fast
MEDI	Medium speed
SLOW	Slow

Example:

:MEAS:TIME SLOW

:MEAS:TIME?

Query current measurement speed.

Responses:

Return one of the following speeds:

MAX	Fastest
FAST	Fast
MEDI	Medium speed
SLOW	Slow

Example:

:MEAS:TIME? Return **SLOW**

:MEAS:TRIG:DEL <NR1>

Set trigger delay time.

Parameters:

Setting range is from 0-5000; its unit is mS.

Example:

:MEAS:TRIG:DEL 100

:MEAS:TRIG:DEL?

Query current trigger delay time.

Responses:

Return 0-5000; its unit is mS.

Example:

:MEAS:TRIG:DEL? Return **100**

:MEAS:TRIG:MODE <disc>

Set trigger mode.

Parameters:

REP	Repeat trigger mode.
SING	Single Mode.

Example:

:MEAS:TRIG:MODE REP

:MEAS:TRIG:MODE?

Query current trigger mode.

Responses:

REPEAT	Repeat trigger mode.
SINGLE	Single Mode.

Example:

:MEAS:TRIG:MODE? Return **REPEAT**

:MEAS:VOLT <NR3|disc>

Set measurement voltage.

Parameters:

0.01~2.0	(Voltage setting range 10mV-2.0V)
MAX	Set voltage as 2.0V.
MIN	Set voltage as 10mV.

Example:

:MEAS:VOLT 1

:MEAS:VOLT 1V

:MEAS:VOLT **100mV**

:MEAS:VOLT **1E-1**

:MEAS:VOLT **MAX**

:MEAS:VOLT **MIN**

:MEAS:VOLT?

Query current measurement voltage.

Responses:

<NR3> scientific notation format is used for the return format.

Example:

:MEAS:VOLT? Return **1.000000E+00**

:MEAS:COMP:LOW <NR3|disc>

Set the lower limit of the compare function.

Parameters:

<NR3>	(Setting range -999G - +999G)
MAX	Set as maximum value (+999G).
MIN	Set as minimum value (-999G).

Example:

:MEAS:COMP:LOW 1000

:MEAS:COMP:LOW 1k

:MEAS:COMP:LOW MAX

:MEAS:COMP:LOW?

Query lower limit of compare function.

Responses:

<NR3> scientific notation format is used for the return format.

Example:

:MEAS:COMP:LOW?

Return

1.000000E+03

:MEAS:COMP:MODE <disc>

Set the comparison mode of the compare function.

Parameters:

ABS	Measured Value
DEV	Deviation Value
PERC	Deviation Percentage

Example:

:MEAS:COMP:MODE ABS

:MEAS:COMP:MODE?

Query the comparison mode of the compare function.

Responses:

Return one of the following modes:

ABS	Measured Value
DEV	Deviation Value
PERC	Deviation Percentage

Example:

:MEAS:COMP:MODE? Return **ABS**

:MEAS:COMP:NOM <NR3|disc>

Set the standard value of the compare function.

Parameters:

<NR3>	(Setting range -999G - +999G)
MAX	Set as maximum value (+999G).
MIN	Set as minimum value (-999G).

Example:

: MEAS:COMP:NOM 1000

: MEAS:COMP:NOM 1k

: MEAS:COMP:NOM MAX

:MEAS:COMP:NOM?

Query the standard value of the compare function.

Responses:

<NR3> scientific notation format is used for the return format.

Example:

:MEAS:COMP:NOM? Return **1.000000E+03**

:MEAS:COMP:PARA <NR1>

Set the parameter items to be set with the compare function.

Parameters:

The <NR1> format is used for parameter settings; its definitions are as follows:

1	Set the first set of measurement parameters under AC mode.
2	Set the second set of measurement parameters under AC mode.
3	Set the third set of measurement parameters under AC mode.
4	Set the fourth set of measurement parameters under AC mode.
5	Set the measurement parameters under DC mode (RDC).

Example:

: MEAS:COMP:PARA 1

: MEAS:COMP:PARA 5

:MEAS:COMP:PARA?

Query which parameter item is currently being set by the compare function.

Responses:

The <NR1> format is used for return format; its definitions are as follows:

1	Currently the compare function Set the first set of measurement parameters under AC mode.
2	Currently the compare function Set the second set of measurement parameters under AC mode.
3	Currently the compare function Set the third set of measurement parameters under AC mode.
4	Currently the compare function Set the fourth set of measurement parameters under AC mode.
5	Currently the compare function Set the measurement parameters under DC mode (RDC).

Example:

:MEAS:COMP:PARA? Return **1**

:MEAS:COMP:STAT <disc|NR1>

Set whether to enable or disable the compare function.

Parameters:

OFF or 0.	Set the compare function for this set as disabled.
ONor 1.	Set the compare function for this set as enabled.

Example:

: MEAS:COMP:STAT 1

:MEAS:COMP:STAT?

Query whether the compare function is enabled or disabled.

Responses:

Return the following parameters:

OFF	The compare function for this set is disabled.
ON	The compare function for this set is enabled.

Example:

:MEAS:COMP:STAT? Return **ON**

:MEAS:COMP:UPP <NR3>

Set the upper limit of the compare function.

Parameters:

<NR3>	(Setting range -999G - +999G)
MAX	Set as maximum value (+999G).
MIN	Set as minimum value (-999G).

Example:

:MEAS:COMP:UPP 1000

:MEAS:COMP:UPP 1k

:MEAS:COMP:UPP MAX

:MEAS:COMP:UPP?

Query the upper limit of the compare function.

Responses:

<NR3> scientific notation format is used for the return format.

Example:

:MEAS:COMP:UPP? Return **1.000000E+03**

:MEAS:COUN <disc>

Set if the PASS/FAIL counter of compare function is enabled under Meter Mode.

Parameters:

ON Enable the Meter Mode Counter.

OFF Disable the Meter Mode Counter.

Example:

:MEAS:COUN ON

:MEAS:COUN?

Query if the PASS/FAIL counter of compare function is enabled/disabled under Meter Mode.

Responses:

Return one of the following modes:

ON Meter mode counter is enabled.

OFF Meter mode counter is disabled.

Example:

:MEAS:COUN? Return **ON**

:MEAS:COUN:RES

Set to reset the PASS/FAIL counter function of compare function under Meter Mode.

Example:

:MEAS:COUN:RES

:MEAS:COUN:VAL?

Query the current value of the PASS/FAIL counter of compare function under Meter Mode.

Responses:

The <NR1> format is used for return format.

<PASS Value>,<FAIL Value>

Example:

:MEAS:COUN:VAL? Return **1,0**

:LIST:BEEP <disc>

Set the buzzer prompt timing under multi-step test mode.

Parameters:

ON Enable the buzzer prompt.

OFF Disable the buzzer prompt.

Example:

:LIST:BEEP ON

:LIST:BEEP?

Query the buzzer prompt timing under multi-step test mode.

Responses:

ON Enable the buzzer prompt.

OFF Disable the buzzer prompt.

Example:

:LIST:BEEP? Return **ON**

:LIST:COMP:LOW <NR3>

Set the minimum of the multi-step list mode.

Parameters:

<NR3>	(Setting range -999G - +999G)
MAX	Set as maximum value (+999G).
MIN	Set as minimum value (-999G).

Example:

:LIST:COMP:LOW 1000

:LIST:COMP:LOW 1k

:LIST:COMP:LOW MAX

:LIST:COMP:LOW?

Query the minimum of the multi-step list mode.

Responses: <NR3> scientific notation format is used for the return format.

Example:

:LIST:COMP:LOW? Return **1.000000E+03**

:LIST:COMP:MODE <disc>

Set the compare mode of the multi-step list mode.

Parameters:

ABS	Measured Value
DEV	Deviation Value
PERC	Deviation Percentage

Example:

:LIST:COMP:MODE ABS

:LIST:COMP:MODE?

Query the compare mode of the multi-step list mode.

Responses:

Return one of the following modes:

ABS	Measured Value
DEV	Deviation Value
PERC	Deviation Percentage

Example:

:LIST:COMP:MODE? Return **ABS**

:LIST:COMP:NOM <NR3>

Set the standard value of the multi-step list mode.

Parameters:

<NR3>	(Setting range -999G - +999G)
MAX	Set as maximum value (+999G).
MIN	Set as minimum value (-999G).

Example:

:LIST:COMP:NOM 1000

:LIST:COMP:NOM 1k

:LIST:COMP:NOM MAX

:LIST:COMP:NOM?

Query the standard value of the multi-step list mode.

Responses: <NR3> scientific notation format is used for the return format.

Example:

:LIST:COMP:NOM? Return **1.000000E+03**

:LIST:COMP:UPP <NR3>

Set the maximum of the multi-step list mode.

Parameters:

<NR3>	(Setting range -999G - +999G)
MAX	Set as maximum value (+999G).
MIN	Set as minimum value (-999G).

Example:

:LIST:COMP:UPP 1000

:LIST:COMP:UPP 1k

:LIST:COMP:UPP MAX

:LIST:COMP:UPP?

Query the maximum of the multi-step list mode.

Responses: <NR3> scientific notation format is used for the return format.

Example:

:LIST:COMP:UPP? Return **1.000000E+03**

:LIST:COUN <disc>

Set if the PASS/FAIL counter function is enabled under the multi-step test mode.

Parameters:

ON	Enable the Multi-Step Test Mode Counter.
OFF	Disable the Multi-Step Test Mode Counter.

Example:

:LIST:COUN ON

:LIST:COUN?

Query if the PASS/FAIL counter function is enabled or disabled under the multi-step test mode.

Responses:

Return one of the following modes:

ON Multi-step test mode counter is enabled.

OFF Multi-step test mode counter is disabled.

Example:

:LIST:COUN? Return **ON**

:LIST:COUN:RES

Set to reset the PASS/FAIL counter function under the multi-step test mode.

Example:

:LIST:COUN:RES

:LIST:COUN:VAL?

Query the current value of the PASS/FAIL counter function under the multi-step test mode.

Responses:

The <NR1> format is used for return format.

<PASS Value>,<FAIL Value>

Example:

:LIST:COUN:VAL? Return **1,0**

:LIST:DEL <NR1>

Set the measuring delay time of the multi-step list mode.

Parameters:

Setting range is from 0-5000; its unit is mS.

Example:

:LIST:COMP:DEL 100

:LIST:DEL?

Query the measuring delay time of the multi-step list mode.

Responses:

Return 0-5000 with the unit of mS.

Example:

:LIST:COMP:DEL? Return **100**

:LIST:FAST <disc>Whether to enable the fast test function when setting Multi-Step Test Mode.

Parameters：ON Enables the fast test function for Multi-Step Test Mode

OFF Disables the fast test function for Multi-Step Test Mode

Example： **:LIST:FAST ON**

:LIST:FAST?Whether to enable the fast test function when prompted about Multi-Step Test Mode.

Responses：Returns one of the following modes

ON The fast test function for Multi-Step Test Mode is enabled

OFF The fast test function for Multi-Step Test Mode is disabled

Example：

:LIST:FAST? Returns **OFF**

:LIST:FREQ <NR3|disc>

Set the measurement frequency of the multi-step compare function.

Parameters:

10-200000	(Frequency setting range 10Hz-200kHz)
MAX	Set frequency as 200kHz.
MIN	Set the frequency to 10Hz (6365)/0.1Hz (6365A).

Example:

:LIST:FREQ 1000

:LIST:FREQ 1k

:LIST:FREQ 1kHz

:LIST:FREQ 1E3

:LIST:FREQ MAX

:LIST:FREQ MIN

:LIST:FREQ?

Query the measurement frequency of the multi-step compare function.

Responses:

<NR3> scientific notation format is used for the return format.

Example:

: LIST:FREQ? Return **1.000000E+03**

:LIST:PARA <disc>

Set the measurement parameters of the multi-step list mode.

Parameters:

Parameter definitions are as follows:

OFF	Disable this measurement.
LS	Serial Inductance (Ls)
LP	Parallel Inductance (Lp)
CS	Serial Capacitance (Cs)
CP	Serial Capacitance (Cp)
RS	Serial Resistance (Rs)
RP	Serial Resistance (Rp)
X	Reactance (X)
B	Susceptance (B)
Z	Impedance (Z)
Y	Admittance (Y)
D	Dissipation Factor (D)
Q	Quality Factor (Q)
DEG	Phase Angle (θ)
G	Conductance (G)
RDC	Direct Current Resistance (Rdc)

Example:

:LIST:PARA Z

Set the test item as Z.

:LIST:PARA OFF

Set the test item as OFF.

:LIST:PARA?

Query the measurement parameters of the multi-step list mode.

Responses:

Returned parameter definitions are as follows:

OFF	Disable this measurement.
LS	Serial Inductance (Ls)
LP	Parallel Inductance (Lp)
CS	Serial Capacitance (Cs)
CP	Serial Capacitance (Cp)
RS	Serial Resistance (Rs)
RP	Serial Resistance (Rp)
X	Reactance (X)
B	Susceptance (B)
Z	Impedance (Z)
Y	Admittance (Y)
D	Dissipation Factor (D)
Q	Quality Factor (Q)
DEG	Phase Angle (θ)
G	Conductance (G)
RDC	Direct Current Resistance (Rdc)

Example:

:LIST:PARA? Return **Z**

Set the returned test item as Z.

:LIST:PARA? Return **OFF**

Set the returned test item as OFF.

:LIST:RESCAN <NR1>

Set the time for continual test and continual test intervals in Multi-Step Test Mode.

- When the value is set as 0, the continual test function is disabled.
- When the value is set between 1-100, the continual test function is enabled and the time for continual test intervals is the value set x100mS.

Parameters: Setting range is from 0-100.

Example:

:TRAN:RESCAN 0

:LIST:RESCAN?

Query the time for continual test and continual test intervals in Multi-Step Test Mode.

- When the value is set as 0, the continual test function is disabled.
- When the value is set between 1-100, the continual test function is enabled and the time for continual test intervals is the value set x100mS.

Responses: Return current setting value (0-100).

Example:

:TRAN:RESCAN? Return **0**

:LIST:STEP <NR1>

Set the steps of multi-step list mode programming.

Parameters:

1-8 (Set current multi-step list mode programming to Steps 1-8)

Example:

:LIST:STEP 1

Current multi-step list mode programming is Step 1.

:LIST:STEP8

Current multi-step list mode programming is Step 8.

:LIST:STEP?

Query the step of multi-step list mode programming.

Responses:

Return 1-8, meaning the current multi-step list mode programming is step 1-8.

Example:

:LIST:STEP? Return **1**

:LIST:TIME <disc>

Set the measurement speed of the multi-step list mode.

Parameters:

One of the following speeds can be set:

MAX	Fastest
FAST	Fast
MED	Medium speed
SLOW	Slow

Example:

:LIST:TIME SLOW

:LIST:TIME?

Query the measurement speed of the current multi-step list mode.

Responses:

Return one of the following speeds:

MAX	Fastest
FAST	Fast
MEDI	Medium speed
SLOW	Slow

Example:

:LIST:TIME? Return **SLOW**

:LIST:VOLT <NR3 | disc>

Set the measurement voltage of the multi-step list mode.

Parameters:

0.01-2.0	(Voltage setting range 10mV-2.0V)
MAX	Set voltage as 2.0V.
MIN	Set voltage as 10mV.

Example: **:LIST:VOLT 1**

:LIST:VOLT 1V

:LIST:VOLT 100mV

:LIST:VOLT 1E-1

:LIST:VOLT MAX

:LIST:VOLT MIN

:LIST:VOLT?

Query the measurement voltage of the multi-step list mode.

Responses:

<NR3> scientific notation format is used for the return format.

Example:

:LIST:VOLT? Return **1.000000E+00**

:TRIG

(Triggers a direct measurement) Trigger one measurement without returning to the result.

※ Can be used for Meter Mode and Multi-Step Test Mode.

Example:

:TRIG

:TRIG?(for Meter Mode)

Under Meter Mode, single measurement can be triggered and the measured data and comparison results for that test can be returned according to the display order of the current measurement items. (Return time varies according to the settings of the measurement speed and measurement frequency.)

※ **Can be used for Meter Mode and Multi-Step Test Mode; here is the explanation when used in Meter Mode.**

Responses:

<Data 1>,<Data 2>,<Data 3>,<Data 4>,<Comp 1>,<Comp 2>,

<Comp 3>,<Comp 4>

Return Parameter Description:

<Data>

Measurement data; <NR3> scientific notation format is used for the return format.

Data 1-4 represents the measurement data of four test items. There are only values for items with display enabled. For example, if only two test items were enabled, two data entries will be returned; or when under DC mode, only the Rdc item can be measured, so only one set of data will be returned.

<Comp>

Measurement data compare results; <NR1> is used for the return format. Its definitions are as follows:

0 Compare function disabled.

1 Comparison result is OK.

2 Comparison result is NG.

Comp 1-4 represents the individual test data comparison results of the four test items. Once the compare function is enabled for any one of the test items, the comparison results will be returned; its order is consistent with <Data>.

EX1:

Four test items with all compare function disabled, then the retuned result is

<Data 1>,<Data 2>,<Data 3>,<Data 4>

EX2:

Four test items, in which the compare function is enabled for one or all items, then the returned result is

<Data 1>,<Data 2>,<Data 3>,<Data 4>,<Comp 1>,<Comp 2>,

<Comp 3>,<Comp 4>

EX3:

Two test items with all compare function disabled, then the retuned result is

<Data 1>,<Data 2>

EX4:

Four test items, in which the compare function is enabled for one or all items, then the returned result is

<Data 1>,<Data 2>,<Comp 1>,<Comp 2>,

Example:

:TRIG?

Return

1.000060E+02,3.791240E-04,1.000060E+02,9.999395E-03,1,1,1,1

:TRIG?(for Multi-Step Test Mode)

Under Multi-Step Test Mode, single measurement can be triggered and the measured data and comparison results for that test can be returned according to the display order of the current measurement items.

※ **Can be used for Meter Mode and Multi-Step Test Mode; here is the explanation when used in Multi-Step Test Mode.**

Responses:

<Result>,<Step 1 Result>,<Step 1 Data>,<Step 2 Result>,

<Step 2 Data>…<Step n Result>,<Step n Data>

Return Parameter Description:

<Result>

Results of Multi-Step Mode; <NR1> is used for the return format. Its definitions are as follows:

0 Test interrupted and not completed.

1 Test steps were all OK.

2 There was NG during test steps.

<Step Result>

Test result judgement of each step. <NR1> is used for the return format. Its definitions are as follows:

0 Not tested.

1 Test result is OK.

2 Test result is NG.

<Step Data>

Test values of each step. <NR3> scientific notation format is used for the return format.

Example:

:TRIG?

Return

1,1,1.000060E+02,1,3.791240E-04,1,1.000060E+02,1,9.999395E-03

3.7 Create LAN Communication Interface (NI VISA)

Once you have completed the LAN related configurations for the instrument terminal, you can communicate with the instrument using a computer through the network. The following is the introduction to establishing communication with the instrument through NI VISA.

First start the NI Measurement & Automation Explorer program on the computer; the screen is as shown in the figure below. Press Network Devices under Devices and Interface on the left and then select Add Network Device from the top-right of the screen to add the instrument. The screen is as shown in the figure below:

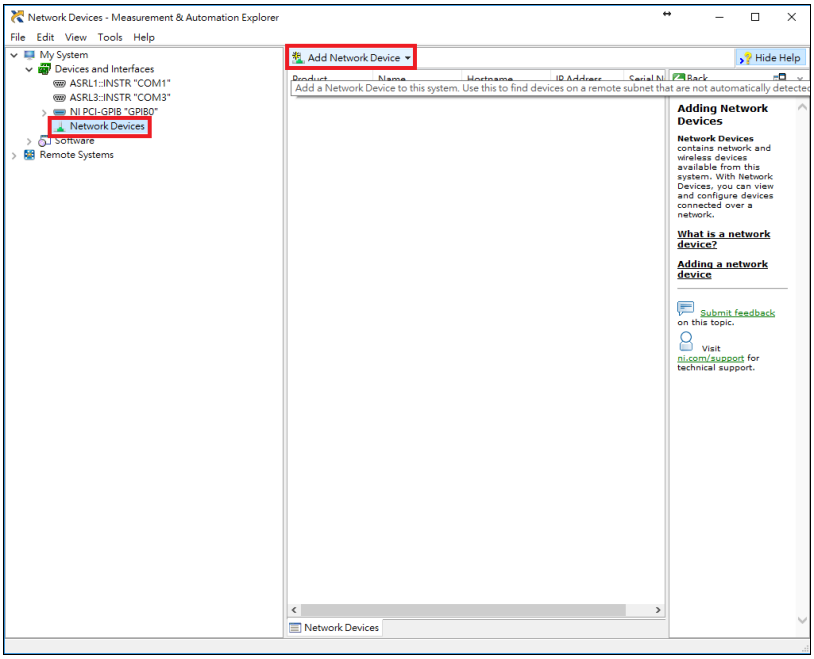


Figure 3-7-1 NI Measurement & Automation Explorer

After clicking Add Network Device, a pull-down window will appear; select the VISA TCP/IP Resource item. The screen is as shown in the figure below:

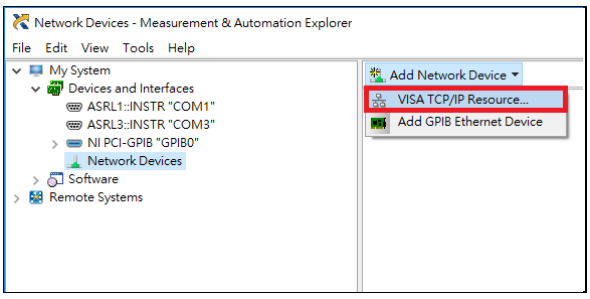


Figure 3-7-2 Add Network Device

After entering the Choose the Type of LAN Resource You Want to Add window, select the Manual Entry of Raw Socket item and then click Next to enter the next step; the screen is as shown in the figure below:

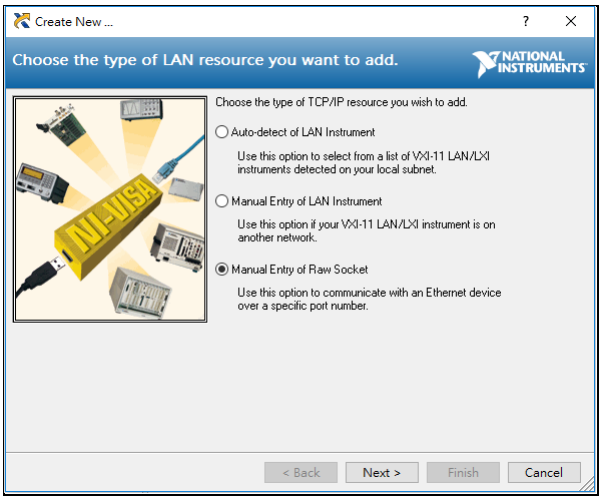


Figure 3-7-3 Choose the Type of LAN Resource

After entering the Enter the LAN Resource Details window, enter the IP address displayed on the instrument screen in the Hostname or IP address field, and enter the IP Port value in the Port Number field. The screen is as shown in the figure below:

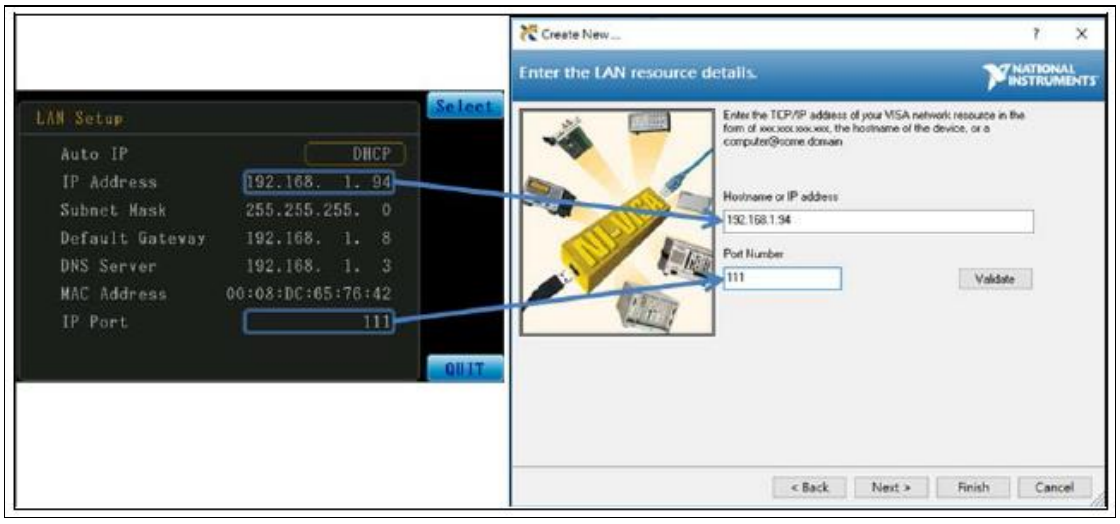


Figure 3-7-4 Enter the LAN Resource Details

After filling in the fields, click the Validate key to the right to check whether communication with the instrument was connected successfully. If the message displayed is Successfully Opened a VISA Session, it means that the instrument was connected successfully; its screen is as shown in the figure below:

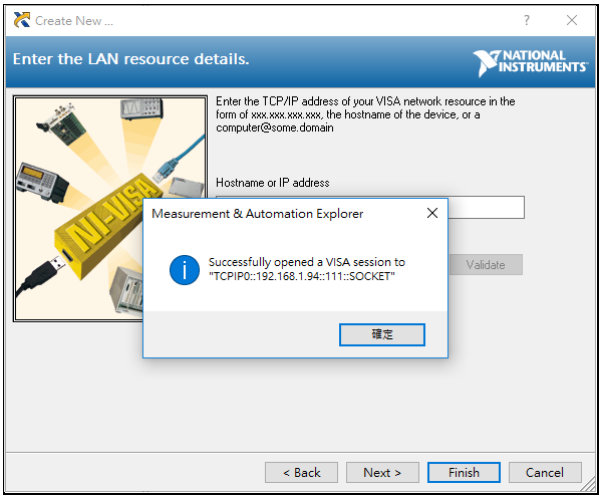


Figure 3-7-5 Validate

Once successfully connected, press Finish to return.

At this time, the device that was just added (TCPIP0::192.168.1.94::111::SOCKET) will be displayed under the Network Devices item; its screen is as shown in the figure below:

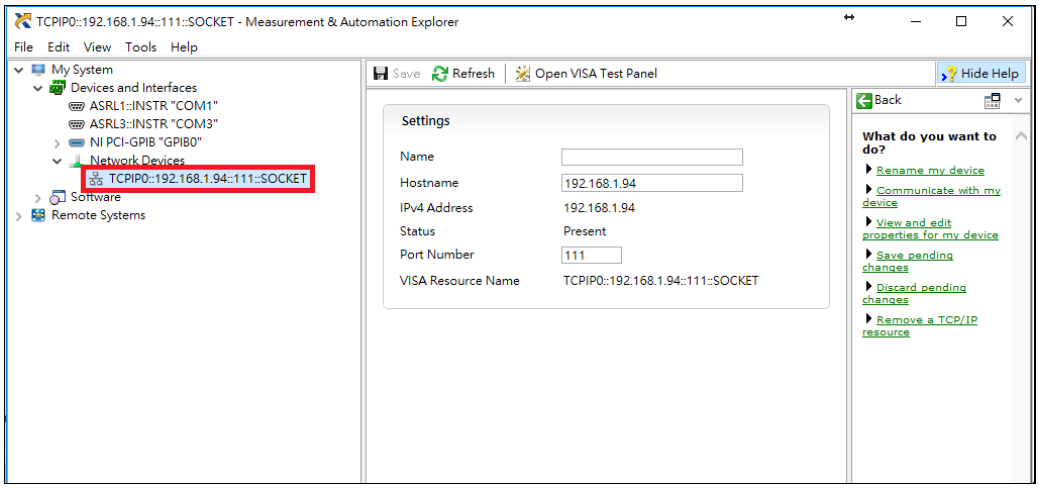


Figure 3-7-6 VISA TCP/IP Resource

Click the Open VISA Test Panel at the top-right of the window to open the communication interface; its screen is as shown in the figure below:

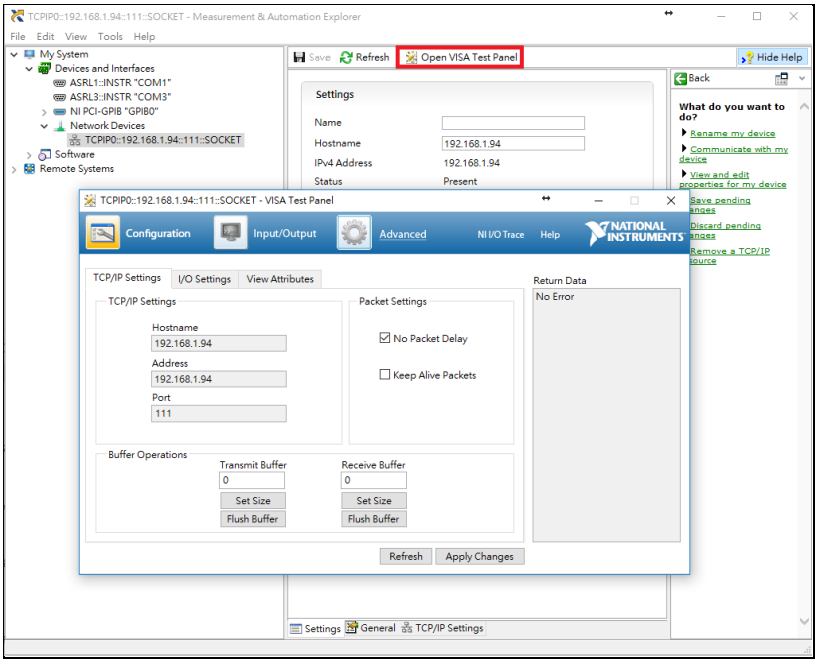


Figure 3-7-7 Open VISA Test Panel

In the VISA Test Panel window, select the I/O Settings tab and change the Termination Methods setting. Only check the Send End On Writes function and leave the remaining items unchecked. When completed, click Apply Changes to confirm the changes; its screen is as shown in the figure below:

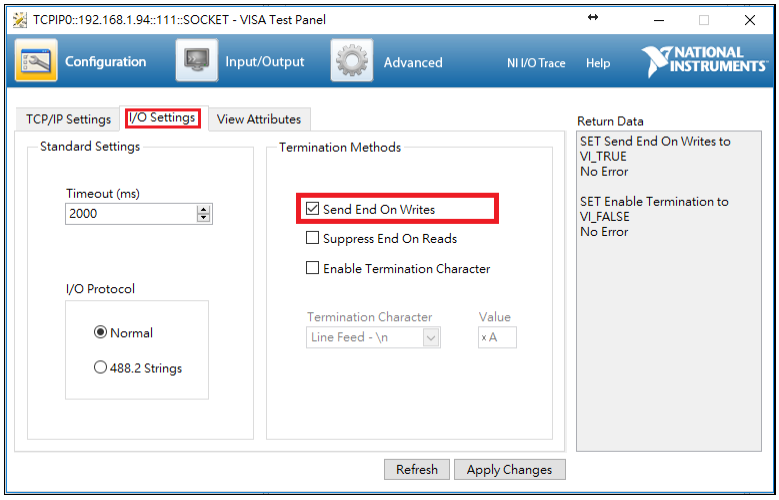


Figure 3-7-9 I/O Settings

After selecting the Input/Output function, press the Query key and the field below should display the message returned by the instrument (MICROTEST,6365,S00001,V1.803300\n) at this time; its screen is as shown in the figure below:

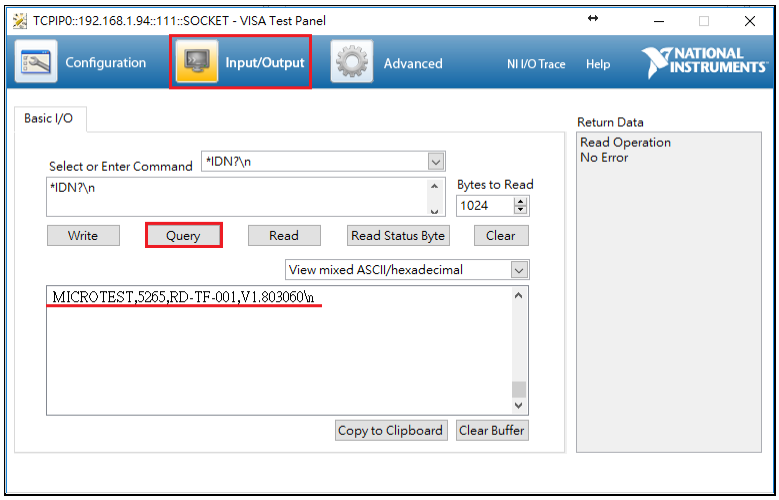


Figure 3-7-10 Input/Output

3.8 Handler Interface

Remote control interface (Handler Interface); use the Handler I/O communication port on the rear panel of the machine to use an external signal to control the tests of this machine.

To use this function, please go to SYSTEM and set the Handler Interface to ON to enable the remote control function.

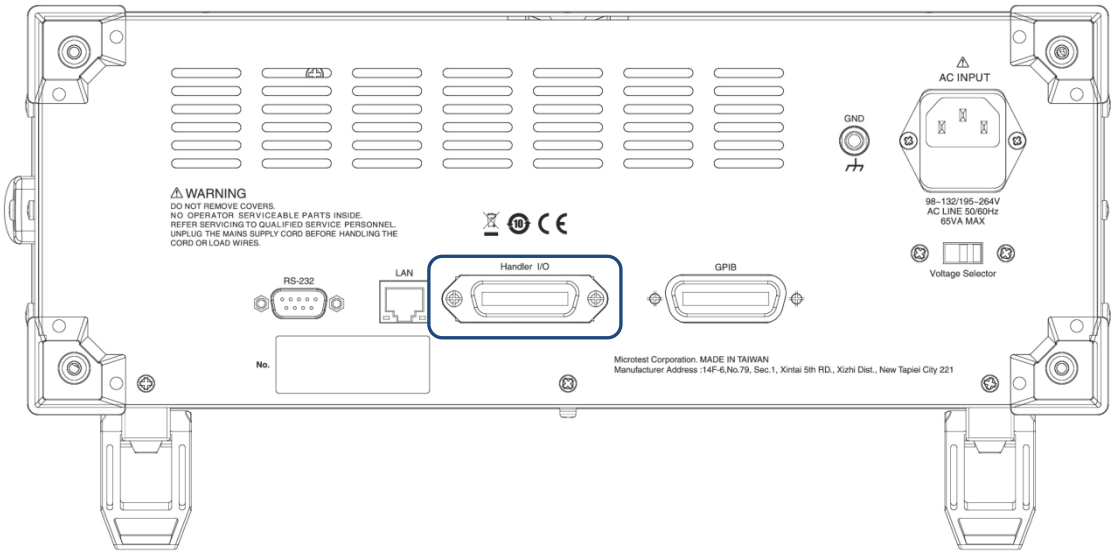


Figure 3-8-1 Handler I/O Communication Port at the Back of the Machine

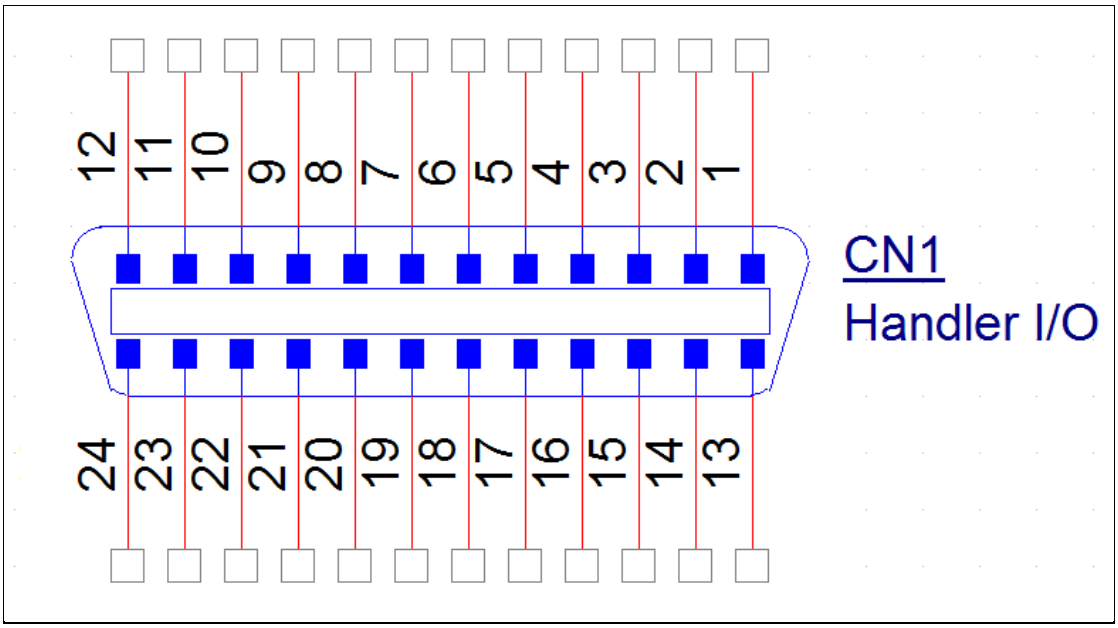


Figure 3-8-2 Handler I/O Port Pinout

- **Handler I/O Pin Description:**

Pin	Pin Name	I/O	Function
1	/START	I	Test Trigger
2	/ DAV	O	Test Program Ended
3	/PASS	O	Test Result is PASS
4	/FAIL	O	Test Result is FAIL
5	GND	-	Ground
6	GND	-	Ground
7	GND	-	Ground
8	NULL	-	Empty Pin
9	NULL	-	Empty Pin
10	+5V	-	DC +5V Output
11	NULL	-	Empty Pin
12	NULL	-	Empty Pin
13	/READY	O	Test preparation ready, which means it can receive trigger status. (When the measuring program is executing or when in modes other than Meter Mode and Multi-Step Test Mode, this signal will not be ready.)
14	/INDEX	O	Measuring program complete (only measurement is complete; the entire test program has not yet completed).
15	/OK1	O	When the compare function is enabled in Meter Mode, the 1st item has passed.
16	/OK2	O	When the compare function is enabled in Meter Mode, the 2nd item has passed.
17	/OK3	O	When the compare function is enabled in Meter Mode, the 3rd item has passed.
18	/OK4	O	When the compare function is enabled in Meter Mode, the 4th item has passed.
19	/NG1	O	When the compare function is enabled in Meter Mode, the 1st item has failed.
20	/NG2	O	When the compare function is enabled in Meter Mode, the 2nd item has failed.
21	/NG3	O	When the compare function is enabled in Meter Mode, the 3rd item has failed.
22	/NG4	O	When the compare function is enabled in Meter Mode, the 4th item has failed.
23	undefined	O	Reserved
24	undefined	O	Reserved

- **Handler I/O Timing Diagram:**

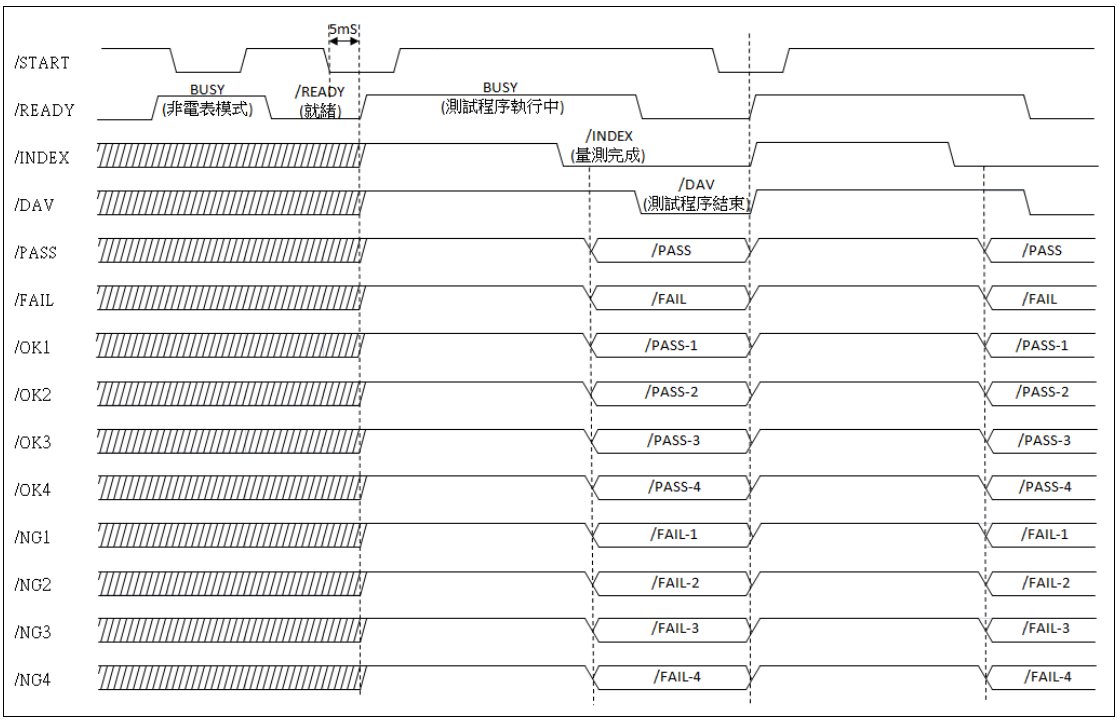


Figure 3-8-3 Handler I/O Timing Diagram

※ **Note: The Handler Interface is only applicable under Meter Mode and Multi-Step Test Mode.**

When test is triggered under Meter Mode, the Meter Mode will be automatically be set as Single Mode.

- **Instructions:**

All output pins have open collector output and no voltage or signals are output. The **current that passes each contact must not exceed 30mA** and the **voltage must not exceed DC 24V.**

- **Common Usage:**

1. **Trigger Signal:** Uses the normal open switch of the relay to control the machine to perform tests. **(Note: The trigger signal must last over 5mS.)**

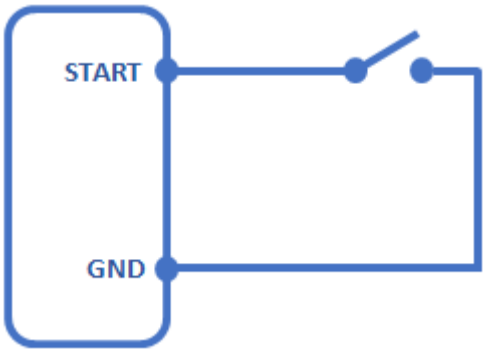


Figure 3-8-4 Illustration of Recommended Connection for the Trigger Signal

2. **Output Signal:** Uses the output signal to control the relay. For safer usage, please connect a Zener diode to the relay coil. **(Voltage used must be less than DC 24V.)**

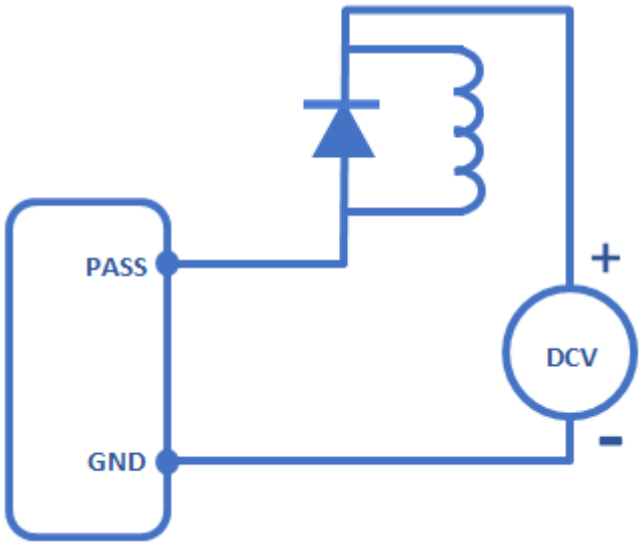


Figure 3-8-5 Illustration of Recommended Connection for the Output Signal

3.9 Save the test data to a USB flash drive.

Under the multi-step test mode, it is possible to save test data in CSV format through the USB port in the front of the machine. File paths are as follows:

The path where the **6363** saves the files is(USB:\6363_LCR\TestData)..

The path where the **6364** saves the files is(USB:\6364_LCR\TestData)..

The path where the **6365** saves the files is(USB:\6365_LCR\TestData)..

The path where the **6366** saves the files is(USB:\6366_LCR\TestData)..

The path where the **6367** saves the files is(USB:\6367_LCR\TestData)..

Before using this function, please make sure a USB flash drive is securely connected to the machine and "Save the test data to a USB flash drive" is enabled in the system.

File format is as follows:

<File Name>,<Result>,<Step 1 Result>,<Step 1 Data>,

<Step 2 Result>,<Step 2 Data>…<Step n Result>,<Step n Data>

Return Parameter Description:

<File Name>

File Name

<Result>

Results of Multi-Step Mode; <NR1> is used for the return format. Its definitions are as follows:

0 Test interrupted and not completed.

1 Test steps were all OK.

2 There was NG during test steps.

<Step Result>

Test result judgement of each step. <NR1> is used for the return format. Its definitions are as follows:

0 Not tested.

1 Test result is OK.

2 Test result is NG.

<Step Data>

Test values of each step. <NR3> scientific notation format is used for the return format.

3.10 Appendix

|Z| Accuracy Chart