



Instruction Manual

RM-804 & RM-805

D.C. Milli-Ohm Meter



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SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow when operating the RM-804/805 or when keeping it in storage. Read the following before any operation to insure your safety and to keep the RM-804/805 in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the RM-804/805.



WARNING

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



CAUTION

Caution: Identifies conditions or practices that could result in damage to the instrument or to other properties.



DANGER High Voltage



Attention Refer to the Manual



Protective Conductor Terminal



Earth (ground) Terminal



Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

Safety Guidelines

General

- Do not place any heavy objects on the instrument.

Guidelines

- Avoid severe impact or rough handling that leads to damaging the instrument.

 CAUTION

- Do not discharge static electricity to the instrument.
- Use only mating connectors, not bare wires, for the terminals.
- Do not disassemble the instrument unless you are qualified as service personnel.

(Measurement categories) EN 61010-1:2010 specifies the measurement categories and their requirements as follows. The RM-804/805 doesn't fall under category II, III or IV.

- Measurement category IV is for measurement performed at the source of low-voltage installation.
 - Measurement category III is for measurement performed in the building installation.
 - Measurement category II is for measurement performed on the circuits directly connected to the low voltage installation.
 - Measurement category I is for measurements performed on circuits not directly
-

connected to Mains.

Power Supply • AC Input voltage: 100 - 240 V AC, 50 - 60Hz, 25VA

**WARNING**

- The power supply voltage should not fluctuate more than 10%.
 - Connect the protective grounding conductor of the AC power cord to an earth ground, to avoid electrical shock.
-

Cleaning the • Disconnect the power cord before cleaning.

RM-804/805

- Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid into the instrument.
 - Do not use chemicals or cleaners containing harsh products such as benzene, toluene, xylene, and acetone.
-

Operation

Environment

- Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below)
 - Temperature Range: 0~35°C, Relative Humidity: <80%RH; >35°C, Relative Humidity: <70%RH
 - Altitude: < 2000m
 - Operating Environment: 0°C to 40°C (operation)
 - Pollution Degree 2
-

(Note) EN 61010-1:2010 specifies the pollution degrees and their requirements as follows. The RM-804/805 falls under degree 2.

Pollution refers to “addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity”.

- Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
- Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.
- Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled.

Storage environment

- Location: Indoor
- Storage Conditions: -10°C to 70°C
- Temperature Range: 0~35°C, Relative Humidity: <90%RH; >35°C, Relative Humidity: < 80%RH

Disposal



Do not dispose this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

Power cord for the United Kingdom

When using the oscilloscope in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead/appliance must only be wired by competent persons



WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT: The wires in this lead are coloured in accordance with the following code:

Green/ Yellow: Earth

Blue: Neutral

Brown: Live (Phase)



As the colours of the wires in main leads may not correspond with the coloured marking identified in your plug/appliance, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with either the letter E, the earth symbol (⊕) or coloured Green/Green & Yellow.

The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black.

The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, a cable of 0.75mm^2 should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any exposed wiring from a cable, plug or connection that is engaged in a live socket is extremely hazardous. If a cable or plug is deemed hazardous, turn off the mains power and remove the cable, any fuses and fuse assemblies. All hazardous wiring must be immediately destroyed and replaced in accordance to the above standard.

GETTING STARTED

This chapter describes the RM-804/805 in a nutshell, including its main features as well as its front and rear panels. After going through the panel overview, follow the Power-up sequence before attempting to use the instrument.

Please note the information in this manual was correct at the time of printing. However as RS PRO continues to improve its products, changes can occur at any time without notice. Please see the RS PRO website for the latest information and content.



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RM-804/805 Characteristics

RM-804 and RM-805 are modern high precision programmable DC Milli-ohm meters suitable for low resistance measurements of switches, relays, connectors, PCB tracks and a variety of other devices. The meters feature a color TFT-LCD screen with easy-to-read measurement results. With the easy-to-use features, superior performance and automatic test interfaces, these meters are dependable instruments for resistance measurements.

Easy to Use Features Each test function on the RM-804/805 can be easily activated by pressing a single front panel key. All the settings and measurement results are displayed and set on the TFT-LCD panel at the same time making each function naturally intuitive to use.

Each primary and secondary measurement result is displayed prominently on the display along with any corresponding settings. For sequential measurement results, such as those from the scan or binning function, are tabulated in an intuitive and easy-to-read format.

In addition, the meters can recall previously used settings upon startup, allowing the meter to be ready the next time it used in a matter of moments. The meters can also save or recall up to 20 sets of function settings.

Performance The RM-804/805 has nine selectable measurement ranges from 50mΩ to 5MΩ, a constant current source of 1uA to 1A, an

accuracy of up to 0.05%, a $1\mu\Omega$ resolution and performs measurements using four wire Kelvin connections for accurate, consistent measurements.

The ability to choose between high accuracy measurements at 10 samples/sec (full scale at 50000 counts) or high speed measurements at 60 samples/sec (full scale at 50000 counts), allows the RM-804/805 the flexibility to fulfill a number of different measurement roles.

Advanced Temperature Measurements The RM-804/805 has a number of advanced temperature functions that can be used with the optional temperature probe, PT-100.

The temperature compensation function can extrapolate what the resistance of a DUT will be at a desired temperature, if the temperature coefficient of the DUT and the resistance of the DUT at ambient temperature are known.

The temperature conversion function can be used to extrapolate what the temperature rise of a DUT will be at specified resistance if the initial resistance, initial temperature and the constant for the DUT are known.

Drive Signals The RM-805 can select a number of different drive signals to suit a number of different measurement scenarios, for example the Pulse setting can be used to cancel the effects of thermoelectric EMF on the measurement results.

Dry Circuit Dry circuit testing allows the RM-805 to measure the contact

Testing	<p>resistance of switches and connectors according to the DIN IEC 512 and ASTM B539 standards. The open circuit voltage will not exceed 20mV in this mode to prevent the oxidization layer on metal switches and connector points from breakdown. RM-805 only.</p>
Automatic Testing	<p>For automatic testing The RM-804/805 has a handler interface designed for automatic testing. The handler interface outputs the status of PASS, FAIL, HI, LO, READY and EOT signals and inputs a trigger control signal. Automatic testing is used with the binning, compare and scan functions.</p> <p>For computer control applications, RS-232 and USB are standard remote interfaces, with GPIB as standard only for the RM-805 and RM-804G.</p>
Applications	<ul style="list-style-type: none"> • Production testing for contact resistance of switches, relays, connectors, cables and printed circuit boards and other low resistance devices. • Component testing of resistors, motors, fuses and heating elements. • Incoming inspection and quality assurance testing. • Conductivity evaluation for product design.

Key Features

- Performance
- 50,000 counts
 - Measurement Range: 50m Ω ~5M Ω
 - Accuracy of up to 0.05%
 - Compare function
 - Binning function
 - Manual or Auto-ranging
 - Continuous or Triggered measurement modes
 - Temperature measurement, temperature compensation and temperature conversion
 - Four-wire Kelvin measurement method
 - Selectable power-on settings
 - Diode test
 - Alarm settings for function-specific PASS/FAIL test results
 - Sampling rate: 10 or 60 sampling/sec
 - Standard interfaces: USB/RS232/Scan/Handler/GPIB(RM-805, RM-804G)
 - Save/Recall settings: 20 memory sets
 - External I/O logic function
-

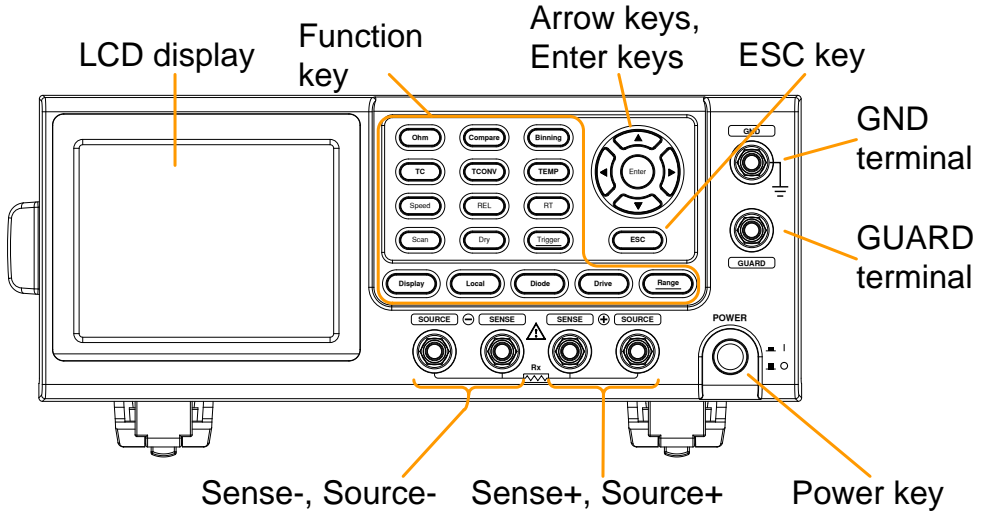


Model Lineup

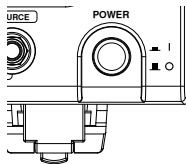
Feature / Model	RM-804	RM-804G*	RM-805
Ohm Measurement	✓	✓	✓
Compare Function	✓	✓	✓
Diode Measurement	✓	✓	✓
Temp. Compensation	✓	✓	✓
Temp. Conversion	✓	✓	✓
Temp Measurement	✓	✓	✓
Dry Circuit	✗	✗	✓
Drive Selection	✗	✗	✓
Binning Function	✗	✗	✓
Interface			
GPIB Interface	✗	✓	✓
RS-232 Interface	✓	✓	✓
USB Device Interface	✓	✓	✓
Handler/EXT IO/Scan Interface	✓	✓	✓
Temperature Sensor Interface	✓	✓	✓

* The RM-804G is simply the RM-804 with the factory-installed GPIB option. Please note that the GPIB option cannot be user-installed on the RM-804. The option must be ordered prior to purchase.

Front Panel Overview



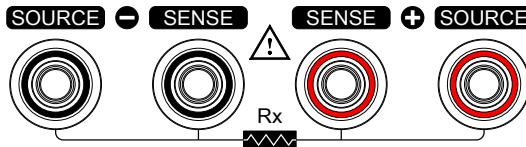
Power Switch



Turns On or Off the main power.

Measurement Terminals

Source, Sense Terminals



Sense + and Sense - terminals.

Current source terminals: Source + and Source -.



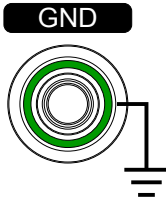
When measuring components with polarity, connect Source+ to the positive potential and connect Source- to the negative potential of the component.



Discharge any DUT before measurement to avoid damaging the RM-804/805.

Connect the GND (ground) terminal to the earth ground.

GND Terminal



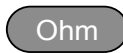
GUARD Terminal



The GUARD terminal has the same potential as earth, but cannot be substituted for it.

Connect the GUARD terminal to the cable shield layer of the test leads to help reduce noise.

Function Keys



The Ohm key activates the resistance measurement function.



The Compare key activates the comparator function.



The Binning key activates the binning function to grade the DUTs into eight bins according to the tolerance settings. RM-805 only.

TC

The TC key activates the TC (temperature compensation) function which calculates the resistance of a DUT at a specified temperature given the resistance of the DUT at the ambient temperature and the temperature coefficient of the DUT is known.

TCONV

The TCONV (Temperature Conversion) function calculates the temperature of a DUT given an initial temperature, initial resistance, measured resistance and a constant (inferred zero resistance temperature) for the DUT.

TEMP

The TEMP key activates the temperature measurement function.

Speed

The Speed key toggles between 10 samples per second and 60 samples per second (Slow rate and Fast rate).

REL

The REL key is used to perform a zero adjustment to the test leads or a DUT.

RT

The RT key is used to display the real-time (not averaged) measured resistance value.

Scan

The Scan key is used to turn on the Scan function.

Dry

The Dry key is used to turn on the dry circuit measurement mode which allows the RM-805 to measure the contact resistance of switches and connectors according to DIN IEC 512 and ASTM B539 standards. RM-805 only.

Trigger

When in the internal trigger mode, pressing the Trigger key will turn on the external trigger mode. When in the external trigger mode, pressing the Trigger key will perform a manual trigger.

A long press of the Trigger key when in external trigger mode will reset the trigger mode back to the internal trigger mode.

Display

The Display key toggles between the standard display mode and the simplified display mode (sans menus and display icons).

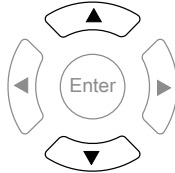
Local

The LOCAL key will switch the milliohm meter between local and remote mode.

Diode

The Diode key is used to turn on the Diode measurement function.

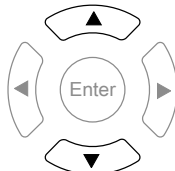
Drive



+

The Drive key in conjunction with the up/down arrow keys is used to select the measuring signal: DC+, DC-, Pulse, PWM, Zero. In particular, the Zero setting can be used as a +/-10mV DC voltmeter to measure the EMF of passive components. RM-805 only. The drive signal is fixed to DC+ on the RM-804.

Range



+

Long pressing the Range key will activate the auto ranging mode.

Range

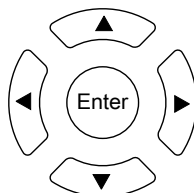
The Range key in conjunction with the up/down arrow keys is used to select the resistance measurement range.

When in auto ranging mode, pressing the Range key will activate the manual ranging mode.

ESC

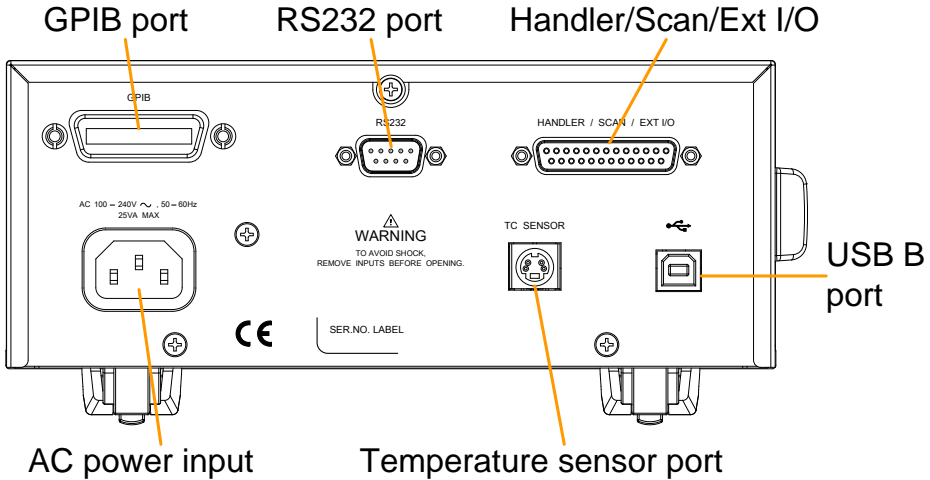
The ESC key cancels the current setting and returns the cursor to its default location or returns to the previous menu, depending on the circumstances.

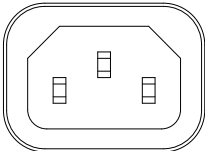
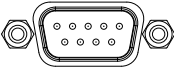
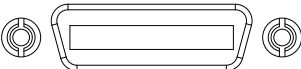
Arrow Keys, Enter Key



The arrow keys and Enter key are used to edit parameters, to navigate the menu system and to select parameter ranges.

Rear Panel Overview

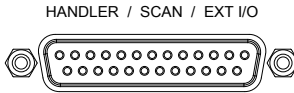


AC Input	<p>AC 100 - 240V ~, 50 - 60Hz 25VA MAX</p> 	Accepts the power cord. AC 100 - 240Vac; 50 - 60Hz.
RS-232 Port	<p>RS232</p> 	Accepts an RS-232C cable for remote control; DB-9 male connector.
GPIB Port	<p>GPIB</p> 	Accepts a GPIB cable for remote control.



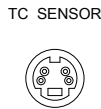
USB device port for remote control.

Handler / Scan /
EXT I/O Port



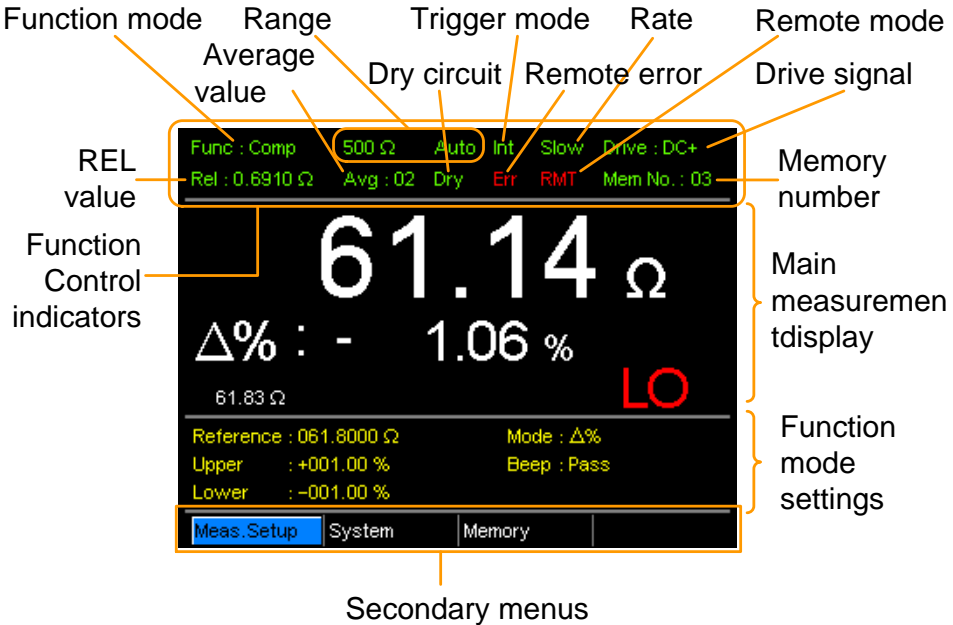
The Handler / Scan / EXT I/O port is used to output pass/fail/high/low comparison results. This port is also used for the user-programmable EXT I/O pins.

Temperature
Sensor Port



The temperature sensor input is for the optional PT-100 temperature probe.

TFT-LCD Overview



Function Control Indicators The function control indicators show all the currently active settings for the selected function mode:

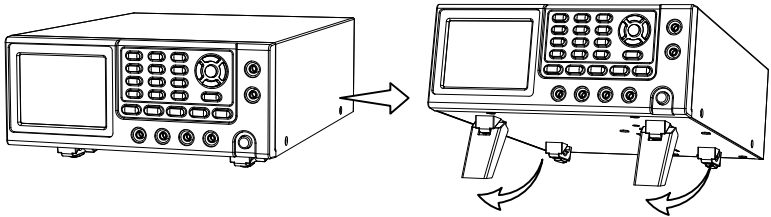
Func	Currently selected function mode
Range	The measurement range. Auto indicates that auto ranging is active
Trigger mode	Int/Ext
Rate	Slow/Fast
Drive:	DC+, DC-, Pulse, PWM, Zero

	Rel	Shows the relative (nominal) reference value
	Avg	Number of samples used for the Average function.
	Dry	Indicates that the dry circuit function is active
	Err	Indicates a remote command error
	RMT	Indicates that the unit is in remote control mode
	Mem No.	Indicates which memory setting has been recalled
Main Measurement Display	Shows all measurement results for the selected function mode.	
Function Mode Settings	Shows any function mode-specific settings.	
Secondary Menus	The secondary menus show global menus (Meas. Setup), System, Memory) as well as function-specific secondary menus.	
	Meas. Setup	Goes to the global Measurement Setup menu.
	System	Goes to the global System menu
	Memory	Allows you to save, recall and clear memory settings.
	View	Shows the all results for all the channels when a scan has finished.
	Clear	Clears the measurement results in the Binning function when the display mode is set to Count.

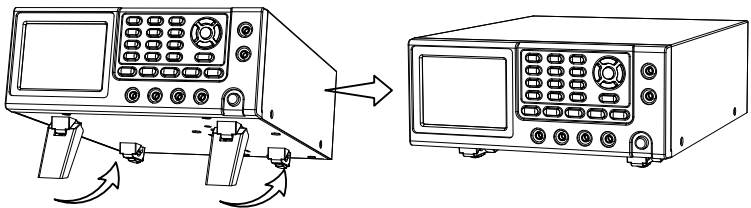
Set Up

Tilt Stand

Tilt To tilt, pull the legs forward, as shown below.



Stand Upright To stand the scope upright, push the legs back under the casing as shown below.

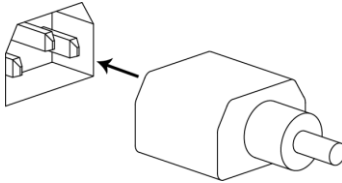


Power Up

1. Connection

Ensure that the input AC power voltage is within the range of 100~240 V.

Connect the power cord to the AC Voltage input.

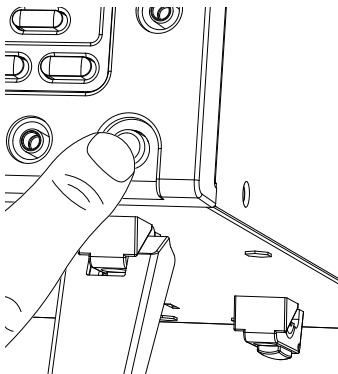


CAUTION

Ensure the ground connector of the power cord is connected to a safety ground. This will affect the measurement accuracy.

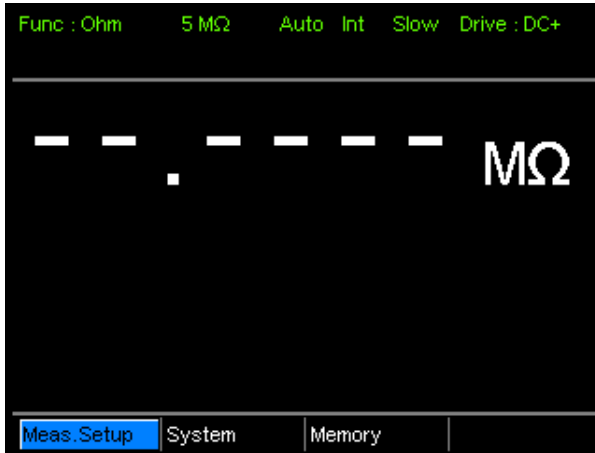
1. Power up

Press the main power switch on the front panel.



The display will light up and show the last setting used before the last shut down.

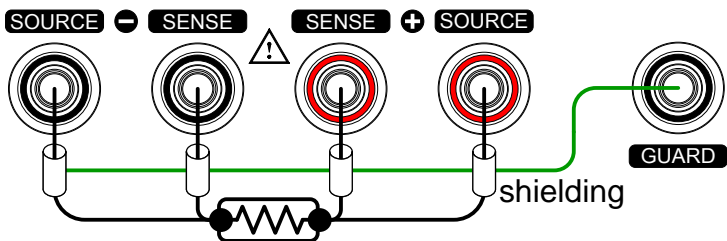
Example:
Resistance
measurement
mode

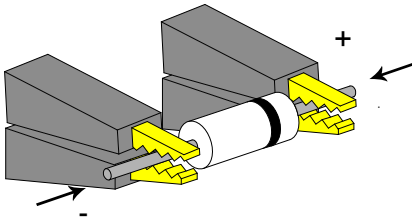


4 Wire Kelvin Connection

Background The RM-804/805 uses 4 wire Kelvin connections for accurate measurements.

**Connection
Diagram**





Description	Source +	The Source + terminal carries the measuring current source. It is connected to the + side of the DUT.
	Source -	The Source - terminal accepts the signal return current and connects to the – side of the DUT.
	Sense +	Monitors the positive (+) potential.
	Sense -	Monitors the negative (-) potential.
	Guard	Grounds the shielding layer of the test lead cables to reduce noise.
	GND	Provides a reference ground for the RM-804/805.

Zeroing (Relative Function)

Background The Relative function is used to perform a zero adjustment on the test leads.

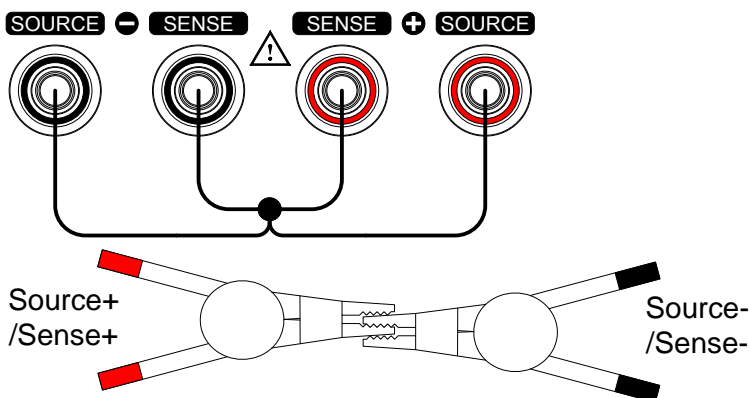
After the Relative value is pre-set, each measurement that is displayed is equal to the actual value minus the relative preset value.

Note

The Relative function cannot be used with the Scan or Diode functions.

1. Short the cables

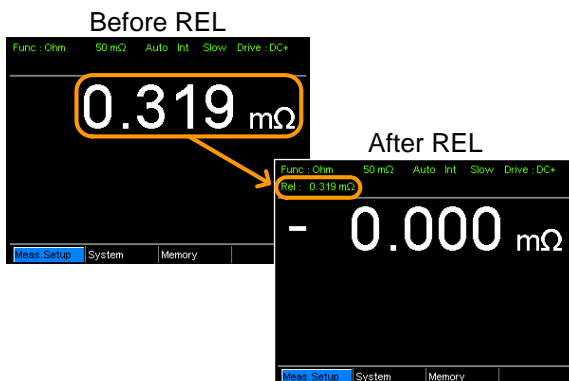
Short the test cables together as shown in the diagram below:



2. Set the Reference value

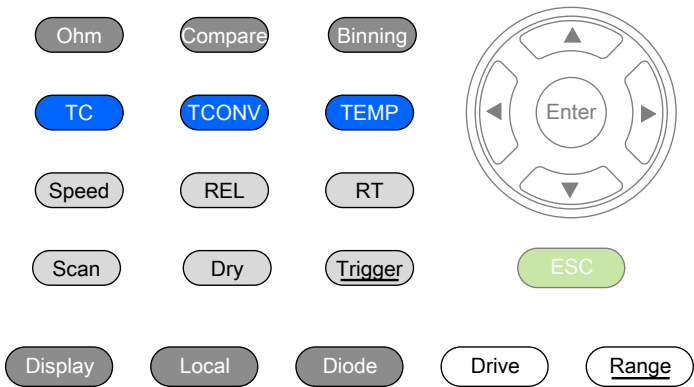
Press the key.

3. Relative mode display appears



Rel: Indicates the Relative function is active

MEASUREMENT



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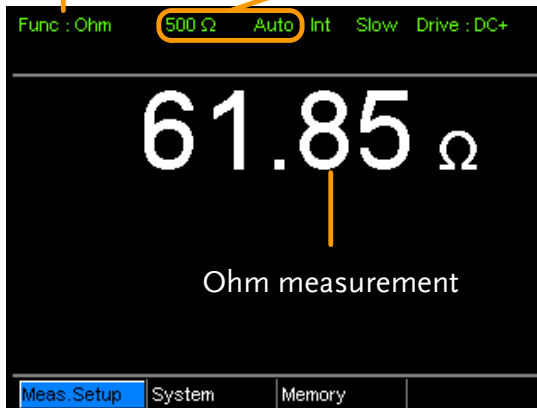


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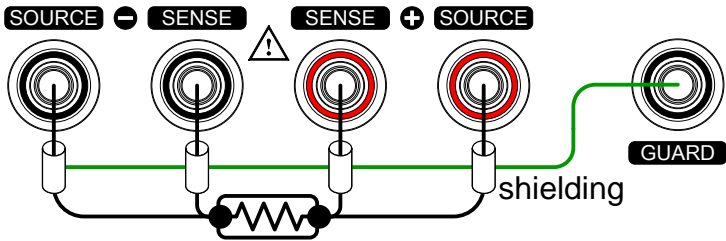
Resistance Measurement

1. Select the Resistance function.
Press **Ohm** to access the Resistance measurement mode.

2. Resistance mode display appears.
Ohm measurement function indicator Resistance range and mode



3. Connect the test lead and measure 4-wire resistance:
Use the SOURCE + and the SOURCE - terminal for measurement, and the SENSE +, and SENSE - terminal for sensing.



Note

When switching between measurement ranges, please allow a moment for the circuits to settle before measuring.

Select the Resistance Range

Background The resistance range can be used with normal resistance measurement as well as the temperature compensation function.

Manual Press the Range key and use the up and down arrow keys to manually select the resistance range.



Auto Range Long press the Range key to turn on automatic ranging.

Range, Auto range



Selection List

Range	Resolution
50mΩ	1uΩ
500mΩ	10uΩ
5Ω	100uΩ
50Ω	1mΩ
500Ω	10mΩ
5kΩ	100mΩ
50kΩ	1Ω
500kΩ	10Ω
5MΩ	100Ω

Measuring Signal (Drive) Overview

Background

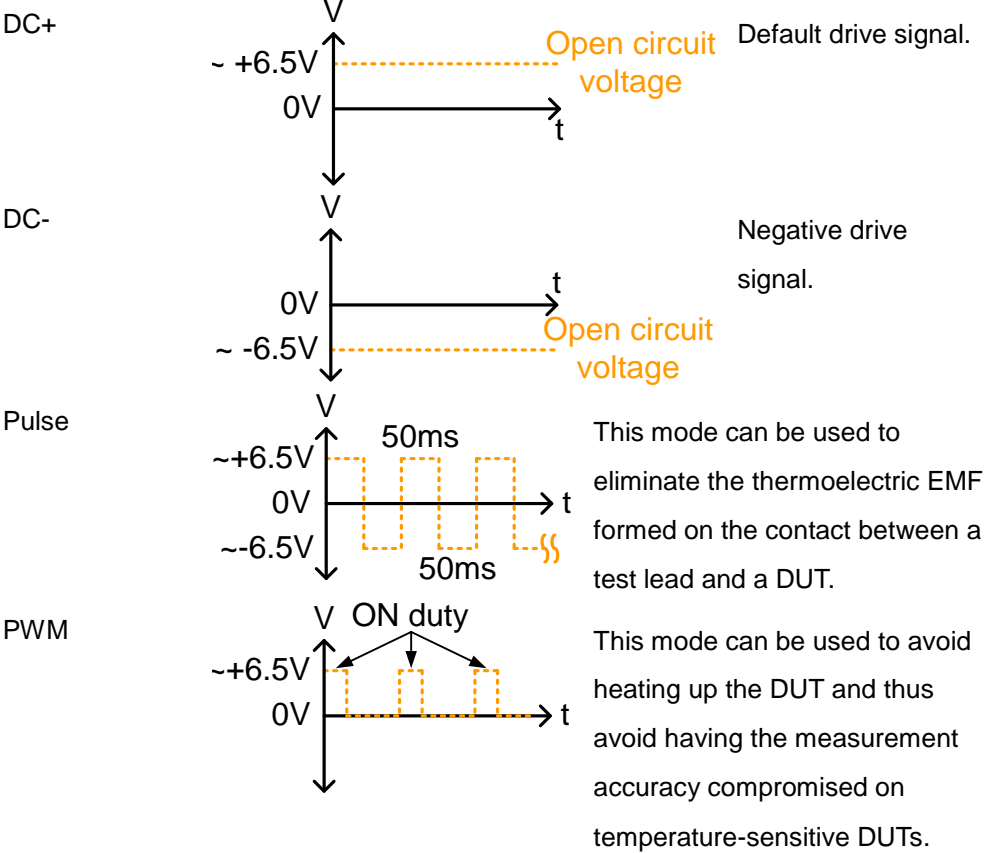
Resistance measurement has 5 different measuring signals that can be applied to obtain a resistance measurement: DC+, DC-, Pulse, PWM, Zero.

These 5 signals are described in below.

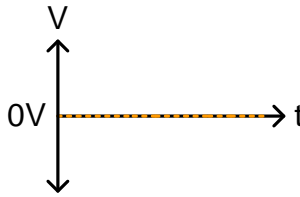


Note

. The Drive function is only applicable to the RM-805. The Drive signal for the RM-804 is fixed to DC+



Zero



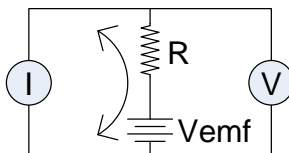
In this mode, RM-805 outputs no measuring signal on the Source loop; therefore, the Sense loop can be used as a voltage meter which can measure up to +/-10mV for thermoelectric EMF measurement. This function is useful for measuring the V_{emf} of thermocouple wires.

A note about Thermoelectric EMF

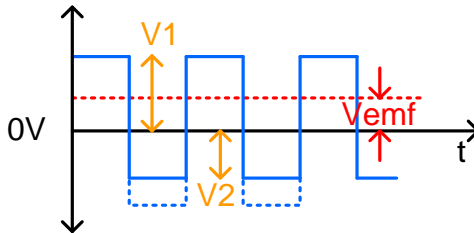
When making low resistance measurements, thermoelectric electromotive force (V_{emf}) can affect measurement accuracy. V_{emf} is created at the junction of two dissimilar metals, such as the contact point of a test lead and the pin of a DUT. V_{emf} adds a small but measurable voltage to the measurement.

There are primarily two different methods to compensate for V_{emf} in low resistance measurements: Offset Compensation and V_{emf} Cancelling. The RM-805 uses V_{emf} Cancelling with the pulse drive signal setting.

The Pulse drive mode supplies a positive and a negative measurement current source.



This produces a positive and negative measurement voltage across the DUT, which also includes the V_{emf} ($V1+V_{emf}$ & $V2+V_{emf}$).



To cancel the V_{emf} , $V2$ is deducted from $V1$ and divided by 2 to get the average measurement, as shown in the formula below:

$$V_x = \frac{(V1 + V_{emf}) - (V2 + V_{emf})}{2}$$

Where V_x = measured voltage sans V_{emf} .

Select Measuring Signal (Drive)

Background

Resistance measurement has 5 different measuring signals that can be applied to obtain a resistance measurement: DC+, DC-, Pulse, PWM, Zero.



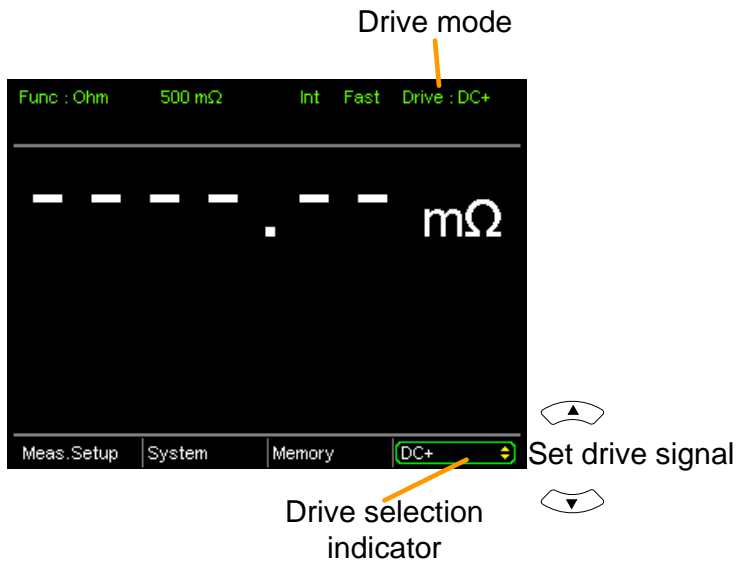
Note

The Drive function is only applicable to the RM-805. The drive signal for the RM-804 is fixed to DC+.

The Drive function cannot be used with the Scan or Diode functions. In addition, the “Zero” drive setting is only available with the Ohm measurement function.

1. Select Drive

Press the Drive key and use the up and down arrow keys to select a drive signal.



Drive Range DC+, DC-, Pulse, PWM, Zero


Select Measurement Rate

Background

The resistance measurement speed has 2 ranges: slow and fast. Slow speed is the most accurate with 10 measurements/second. Fast speed has 60 measurements/second. Both have the same measurement resolution.

The rate selection function is not applicable in Diode measurement mode. When the PWM drive signal is used or when the Scan function is activated, the only available rate setting is fast.

1. Select Rate

Press the  key to toggle between the Slow and Fast rates.

Measurement rate




Display Mode

Background

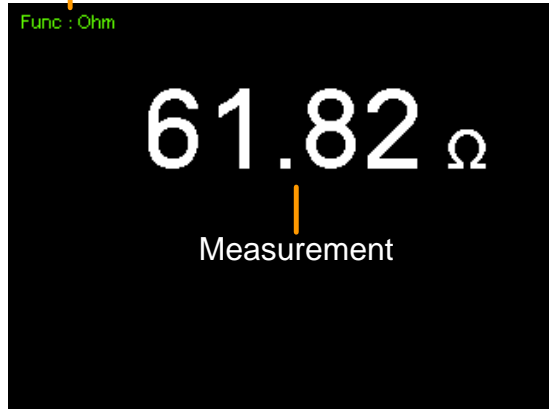
The Display key can be used to toggle between the normal and the simplified display mode. The simplified display mode clears all text, menus and function indicators from the screen except for the measurement and measurement mode indicators.

1. Toggle
Display mode

Press the  key to toggle the display between normal and simplified. The display will change accordingly.

Simplified
Display Mode
Example

Measurement mode




View Real-Time Measurement

Background

When measurements are smoothed using the averaging function, the RT key can be used to view the real-time results in addition to the averaged results.

1. Toggle Real-
Time display

Press the  key to toggle the real-time display on or off. The real-time measurement will appear in the bottom left-hand corner.



Real-time measurement

Dry-Circuit Measurement

Background

The Dry Circuit measurement function is used where the maximum open-circuit voltage must be kept to a minimum for applications such as measuring the contact resistance of switches, relays and connectors. The RM-805 provides a maximum of up to 20mV in this mode.



Note

Dry circuit testing is for switch and connector contact resistance. Switch and connector contact resistance measurement is in accordance with DIN IEC 512 and ASTM B539 which requires that the open circuit voltage of the measuring device should not exceed 20mV DC. Voltage at such low levels avoids the


breakdown of any oxides that may be present on the contacts. In this mode the open circuit measuring voltage is limited <20mV, while modes like DC+ or pulse mode can have an open circuit measuring voltage as high as 6.5V.

The Dry Circuit function cannot be used with the Scan or Diode functions. In addition, when the Dry Circuit function is turned on, only 3 drive settings are available: DC+, DC- and Pulse.

Dry Limitations

When the Dry Circuit measurement function is turned on, the measurement range is reduced. See the specifications for more details.

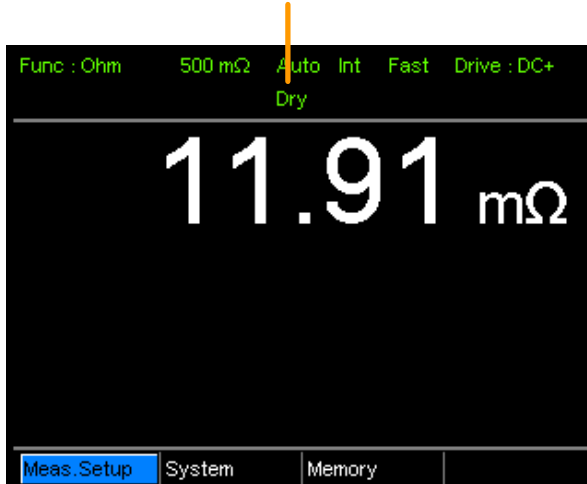
Range	Dry Mode	Rate
50mΩ	✗	
500mΩ	✓	Slow/Fast
5Ω	✓	Slow/Fast
50Ω	✓	Slow/Fast
500Ω	✗	
5kΩ	✗	
50kΩ	✗	
500kΩ	✗	
5MΩ	✗	

1. Toggle Dry Press the  key to toggle the dry circuit measurement mode on or off

The DRY function indicator will appear in the middle of the display

when active.

Dry Circuit measurement mode indicator




Using the Trigger Function

Background

The RM-804/805 can use internal or manual triggering for the Resistance, Temperature, Temperature Compensation, Temperature Conversion, Binning, Handler and Scan modes.

By default the RM-804/805 is set to internal triggering mode.

1. Select Manual Trigger Short press  to switch to manual triggering mode.

The Ext indicator will be shown on the display when the manual

trigger is active.

Trigger source



2. Manually Triggering Measurements
 Short press the **Trigger** key each time you want to start a single measurement (when in the manual mode).

3. Internal Triggering
 Long press **Trigger** to return the triggering mode back to internal mode.

The Int indicator will be shown on the display.

Internal trigger source

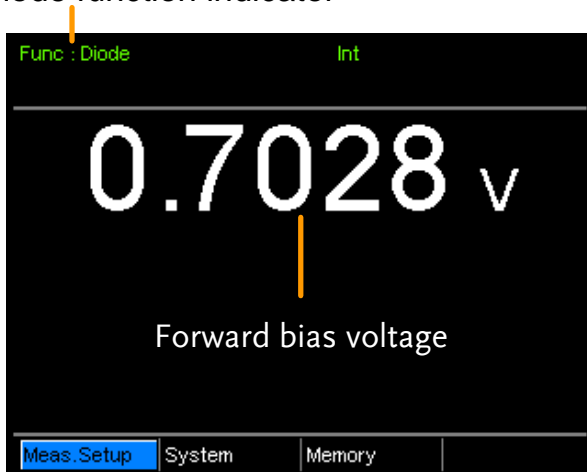


Diode Function

Background
 The Diode function can be used to measure the forward bias voltage of a diode under test.

1. Select the Diode function.
 Press **Diode** to access the Diode measurement mode.

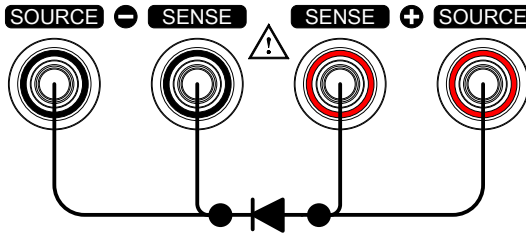
2. Diode mode Diode function indicator appears.



3. Connect the test lead and measure

Connect the Sense+, Source+ to the anode.

Connect the Sense-, Source- to the cathode.



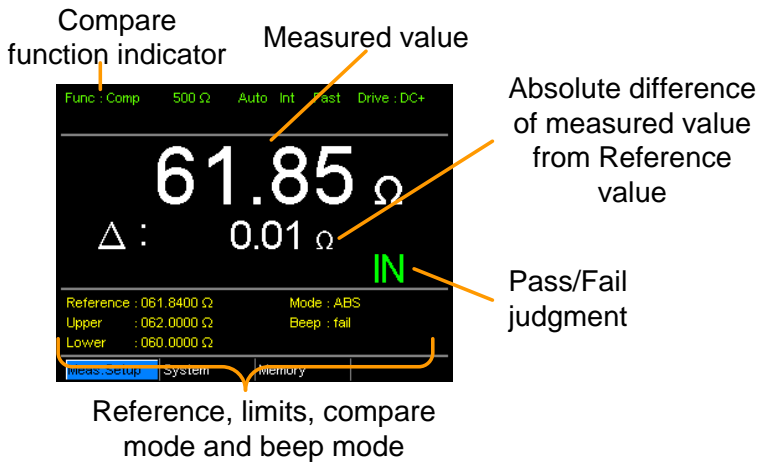
Compare Function

Background

The Diode function can be used to measure the forward bias voltage of a diode under test. The compare function compares a measured value to a “Reference” value that has an upper (HI) and lower (LO) limit. If the measured value is within the upper and lower limit, then the measured value is judged as IN.

There are three compare modes that can be used to make a judgment: ABS, $\Delta\%$ and % modes.

The ABS mode displays the absolute difference between the measured and the reference value (shown as Δ) and compares the measured value to the upper (HI) and lower (LO) limit. The upper and lower limits are set as absolute resistance values.



Compare function indicator

Measured value

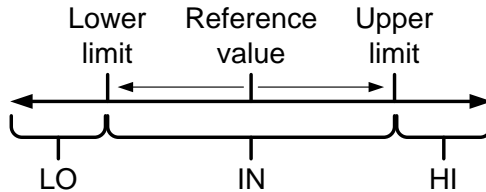
Absolute difference of measured value from Reference value

Pass/Fail judgment

Reference, limits, compare mode and beep mode

A measured value that falls within the upper and lower limits is

considered IN (pass), a value that falls below the lower limits is considered LO, and a value that falls over the upper limit is a HI.



[Note that the reference value in the ABS mode is only for reference purposes and is not used to make a judgment.]

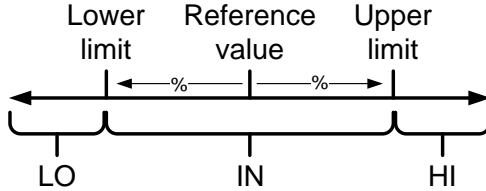
The $\Delta\%$ compare function displays the deviation of the measured value from the reference value as a percentage.

{ [(Measured Value-Reference)/Reference] % }.

Reference, limits, compare mode and beep mode

The upper (HI) and low (LO) limits are set as a percentage *from* the reference value. (Identical to the % compare mode)

A measured value that falls within the upper and lower limits is considered IN (pass), a value that falls below the lower limits is considered LO, and a value that falls over the upper limit is a HI.



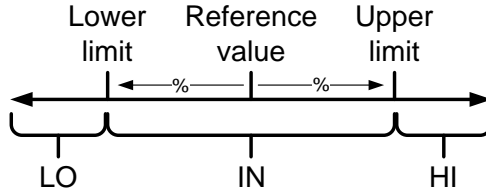
The % compare mode displays the measured value as a percentage of the reference value [(Measured Value/Reference Value)%].

The upper (HI) and low (LO) limits are set as a percentage *from* the reference value. (Identical to the Δ% compare mode)

Reference, limits, compare mode and beep mode

A measured value that falls within the upper and lower limits is

considered IN (pass), a value that falls below the lower limits is considered LO, and a value that falls over the upper limit is a HI.



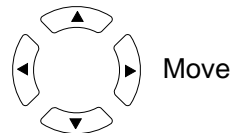
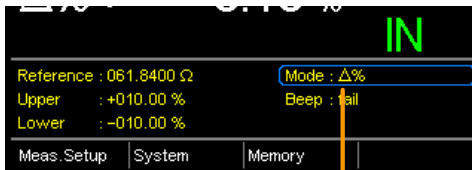
For all the compare modes, IN, HI or LO will be shown on the display for each judgment.

1. Select the compare function

Press **Compare** to access the compare mode, as shown above.

2. Select the compare mode

Use the arrow keys to navigate to the Mode setting. Press the Enter key to toggle the compare mode.



Mode

Range	Abs, Δ%, %
-------	------------

3. Reference value setting

Use the arrow keys to navigate to the Reference setting and press Enter.

Use the left and right arrow keys to select a digit. Use the up and down arrow keys to edit the value of the selected digit and the

unit. Press Enter to confirm the setting.

Move and edit

Enter Select and confirm

Reference

Range: 000.0001~ 999.9999 (mΩ/Ω/kΩ/MΩ)



Note

After setting the Reference value, the displayed Δ , % or $\Delta\%$ values will be changed to reflect the new Reference value setting.

4. Upper & lower limit setting Use the arrow keys to navigate to the Upper or Lower limit setting and press Enter.

Use the left and right arrow keys to select a digit. Use the up and down arrow keys to edit the value of the selected digit. Press Enter to confirm the setting.

Repeat for the other limit (Upper or Lower).

Move and edit

Enter Select and confirm

Upper, Lower reference

Setting Range: ABS mode: 000.0000~999.9999 (mΩ/Ω/kΩ/MΩ)
 $\Delta\%$ and % mode: -999.99 ~ +999.99



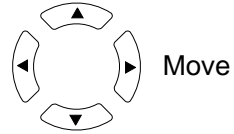
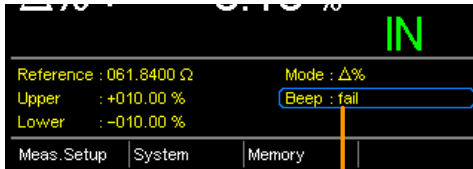
Note

The upper limit must be higher than the lower limit. Not setting the upper limit higher than the lower limit is not allowed. Likewise the lower limit cannot be set higher than the upper limit.

5. Beep setting

Use the arrow keys to navigate to the Beep setting.

Press Enter to toggle the beep setting.



Beep setting

Beep Setting: Off, Pass, Fail



Note

The Beep setting can also be set from the System>Utility>Beep>Compare menu.

Binning Function

Background The Binning function is used to grade DUTs into eight different bins according to 8 sets of upper and lower limits. Two compare modes can be used in this function, ABS and $\Delta\%$ modes.

Binning function indicator

Grading results

Bin	Upper	Lower	Bin	Upper	Lower
1	062.0000 Ω	061.9000 Ω	5	061.6000 Ω	061.5000 Ω
2	061.9000 Ω	061.8000 Ω	6	061.5000 Ω	061.4000 Ω
3	061.8000 Ω	061.7000 Ω	7	061.4000 Ω	061.3000 Ω
4	061.7000 Ω	061.6000 Ω	8	061.3000 Ω	061.0000 Ω

Upper and lower limits for the 8 bins

Reference, compare mode, beep mode and display mode

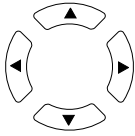
1. Select the Binning function Press the **Binning** key to access this function.


2. Select the compare mode Use the arrow keys to go to the Mode setting.
Press Enter to toggle between ABS or $\Delta\%$ compare modes.

2	061.9000 Ω	061.8000 Ω	6	061.5000 Ω	061.4000 Ω
3	061.8000 Ω	061.7000 Ω	7	061.4000 Ω	061.3000 Ω
4	061.7000 Ω	061.6000 Ω	8	061.3000 Ω	061.0000 Ω

Reference : 061.5000 Ω	Mode : ABS
Beep : Off	Disp : Comp

Meas. Setup	System	Memory
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Move


Toggle

Mode setting

ABS Mode The ABS mode allows you to set the upper and lower limits of each bin as absolute resistance values.

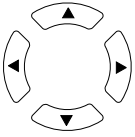
Δ% The Delta % mode allows you to set the upper and lower limits of each bin as percentage value from the reference value.


3. Reference value setting

Although the 8 bins have their own upper and lower limits, they still share a common reference value.

Use the arrow keys to go to the Reference setting and press Enter.

Use the left and right arrow keys to select a digit. Use the up and down arrow keys to edit the value of the selected digit and the unit. Press Enter to confirm the setting.


Move and edit


Select and confirm

2	061.9000 Ω	061.8000 Ω	6	061.5000 Ω	061.4000 Ω
3	061.8000 Ω	061.7000 Ω	7	061.4000 Ω	061.3000 Ω
4	061.7000 Ω	061.6000 Ω	8	061.3000 Ω	061.0000 Ω

Reference : 061.5000 Ω	Mode : ABS
Beep : Off	Disp : Comp

Meas. Setup	System	Memory
-------------	--------	--------

Reference

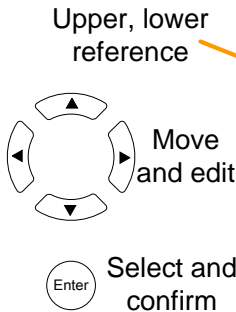
Range: 000.0001~ 999.9999 (mΩ/Ω/kΩ/MΩ)

4. Upper & lower limit settings Use the arrow keys to go to the upper limit of the first bin and press Enter.

Use the Left and Right arrow keys to select a digit. Use the Up and Down arrow keys to edit the value of the selected digit and unit. Press the Enter key to confirm the setting.

Repeat for the lower setting.

Repeat for the remaining bins.



Bin	Upper	Lower	Bin	Upper	Lower
1	062.0000 Ω	061.9000 Ω	5	061.6000 Ω	061.5000 Ω
2	061.9000 Ω	061.8000 Ω	6	061.5000 Ω	061.4000 Ω
3	061.8000 Ω	061.7000 Ω	7	061.4000 Ω	061.3000 Ω
4	061.7000 Ω	061.6000 Ω	8	061.3000 Ω	061.0000 Ω

Reference : 061.5000 Ω Mode : ABS
 Beep : Off Disp : Comp

Meas.Setup System Memory

Setting Range: ABS mode: 000.0000~999.9999 (mΩ/Ω/kΩ/MΩ)
 Δ% and % mode: -999.99 ~ +999.99

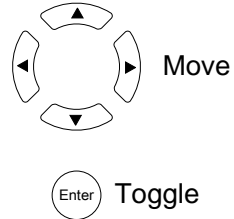
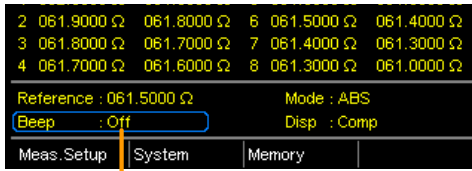


Note

The upper limit must be higher than the lower limit. Not setting the upper limit higher than the lower limit is not allowed. Likewise the lower limit cannot be set higher than the upper limit.

5. Beep setting Use the arrow keys to navigate to the Beep setting.

Press Enter to toggle the beep setting.



Beep setting

Beep Setting: Off, Pass, Fail




Note

The Beep setting can also be set from the System>Utility>Beep>Binning menu.

6. To start binning

The binning function starts automatically if you are in internal trigger mode.

If you are using the manual triggering mode, press the  button or apply a pulse on the trigger pin of the Handler interface to start binning.

7. Display the binning results

There are two different display modes to view results.

The Comp (Compare) display mode is the default display mode. This mode will display the currently measured value and displays which of the bins (if any) the measured value is graded as.

Grading results:

Green = IN

Red = OUT

Measurement → **61.84 Ω**

1	2	3	4
5	6	7	8

Func : Bin 500 Ω Auto Int Fast Drive : DC+

Bin	Upper	Lower	Bin	Upper	Lower
1	062.0000 Ω	061.9000 Ω	5	061.6000 Ω	061.5000 Ω
2	061.9000 Ω	061.8000 Ω	6	061.5000 Ω	061.4000 Ω
3	061.8000 Ω	061.7000 Ω	7	061.4000 Ω	061.3000 Ω
4	061.7000 Ω	061.6000 Ω	8	061.3000 Ω	061.0000 Ω

Reference : 061.5000 Ω Mode : ABS
 Beep : Off Disp : Comp

Meas.Setup System Memory

The Count display mode tabulates the results on the right-hand side of the display and shows the bin settings on the left.

Tabulated result of each bin

Func : Bin 500 Ω Auto Ext Fast Drive : DC+

Bin	Upper	Lower	In	Result
1	062.0000 Ω	061.9000 Ω	641	Out 793 Total 3263
2	061.9000 Ω	061.8000 Ω	1289	
3	061.8000 Ω	061.7000 Ω	228	
4	061.7000 Ω	061.6000 Ω	95	
5	061.6000 Ω	061.5000 Ω	74	
6	061.5000 Ω	061.4000 Ω	42	
7	061.4000 Ω	061.3000 Ω	48	
8	061.3000 Ω	061.0000 Ω	53	

Reference : 061.5000 Ω Mode : ABS
 Beep : Off Disp : Count

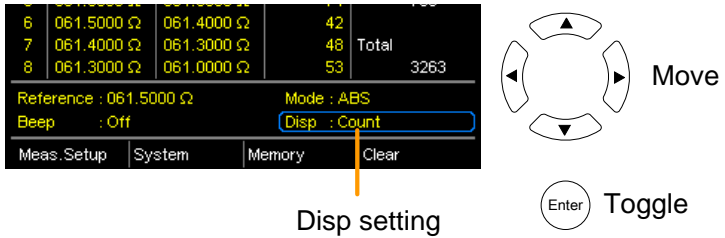
Meas.Setup System Memory Clear

Overall results

Clear results


Upper and lower bin limits of Bin 1~8

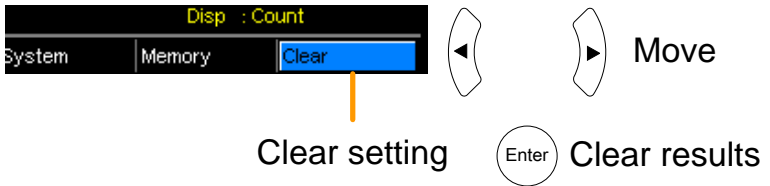
To toggle the display mode, go to the Disp setting and press Enter.



Disp setting

8. How to clear the result count

When in the Count display mode, press the  key. Go to the Clear setting and press Enter. The accumulated results will be cleared from the display.



Clear setting

Temperature Measurement

Background The temperature measurement function uses the optional PT-100 temperature probe. The measured temperature is displayed on the display. For more information on the optional PT-100 sensor, There is only one range for the temperature function. However the resistance measurement range can still be changed when in the temperature function.



Note

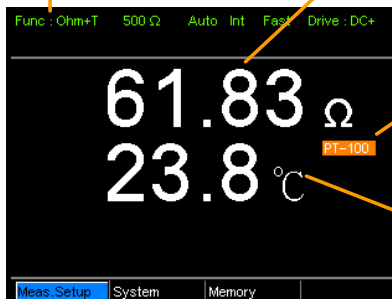
The temperature measurement function is used in conjunction with the Ohm measurement function. The two measurements share the same display, so the Ohm readings stay on the display even after the temperature measurement function is activated. Thus when the Temperature function is selected, “Ohm+T” is shown as the selected function.

1. Select the Temperature function

Press **TEMP** to enter the temperature measurement function.

Temperature + Ohm function indicator

Resistance measurement



(Ambient) temperature source

Ambient temperature

The temperature is displayed on the Ohm display.

2. Select the temperature units

From the bottom menu, go to Meas. Setup>Temperature Unit and select °C or °F.

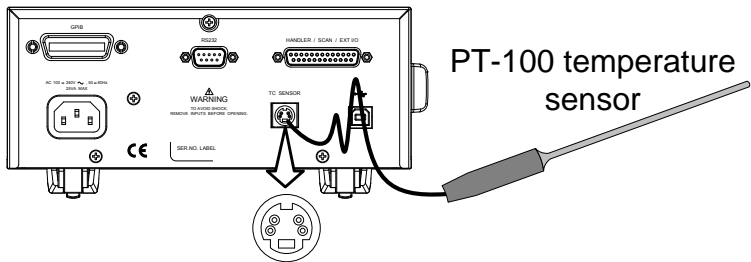
3. Ambient Temperature

The Ambient temperature setting should be turned off when using the temperature function.

From the bottom menu go to Meas. Setup > Ambient Temperature and turn the Ambient Temperature setting off.

4. Temperature mode connection

The temperature sensor uses the rear panel TC Sensor port for input.



Temperature Compensation

Background

If the resistance of a DUT at a particular temperature is needed, the compensation function can be used. This function can simulate the resistance of a DUT at a desired temperature. If the ambient temperature and the temperature coefficient of the DUT are known, it is possible to determine the resistance of a DUT at any temperature.

The Temperature Compensation works on the following formula:

$$R_{t0} = \frac{R_t}{1 + \alpha_{t0}(t - t_0)}$$

Where:

R_t = Measured resistance value (Ω)

R_{t0} = Corrected resistance value (Ω)

T_0 = Inferred absolute temperature


t_0 = Corrected temperature ($^{\circ}\text{C}$)

t = Current ambient temperature ($^{\circ}\text{C}$)

α_{t0} = Temperature coefficient of resistance at the correct

temperature. $\alpha_{t0} = \frac{1}{|T_0| + t_0}$

1. Select the Temperature Compensation

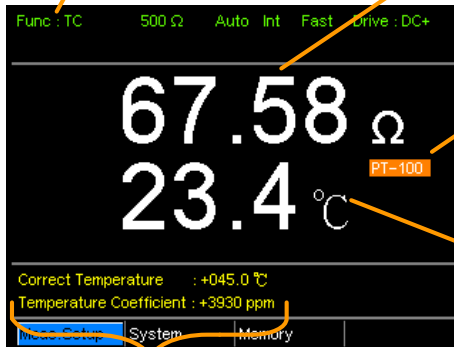
Press  to access the Temperature Compensation function.

mode

The temperature-compensated resistance measurement will appear on the display.

Temperature compensation function indicator

Extrapolated resistance measurement at the desired ("correct") temperature



Ambient temperature source

Ambient temperature

Correct Temperature, Temperature Coefficient settings

2. Ambient Temperature

The ambient temperature can be either measured with the PT-100 sensor or be set manually.

If using the PT-100 sensor the Ambient temperature setting should be turned off. If the PT-100 probe is not used, then the ambient temperature needs to be manually set.

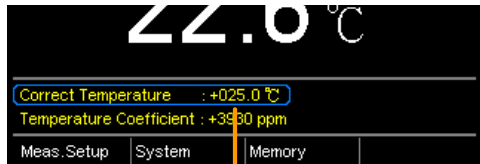
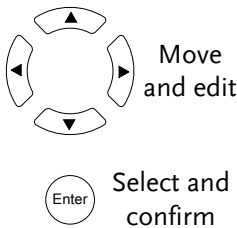
From the bottom menu, go to Meas. Setup > Ambient Temperature and set the ambient temperature.

Range Off, -50.0 °C ~ 399.9°C

3. Temperature compensation

Use arrow keys to go to Correct Temperature or to Temperature Coefficient and press Enter to select the setting.

To edit the setting values use the left and right arrow keys to select a digit and use the up and down arrow keys to edit the digit. Press Enter to confirm the setting.



Correct temperature, temperature coefficient settings

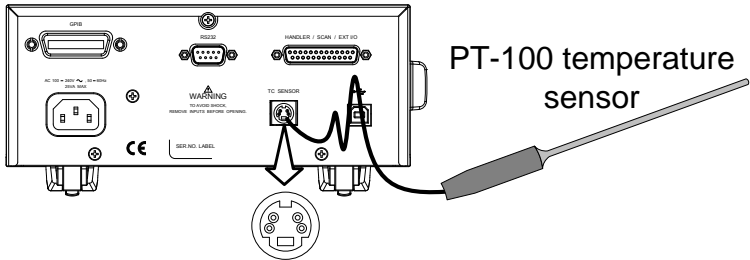
Desired Temperature range -50.0 ~ +399.9 °C

Temperature Coefficient range -9999 ~ +9999 ppm

Below are the inferred zero resistance temperatures of some common conductors:

Material	Inferred Absolute Temperatures
Silver	-243
Copper	-234.5
Gold	-274
Aluminium	-236
Tungsten	-204
Nickel	-147
Iron	-162

4. Temperature compensation connection

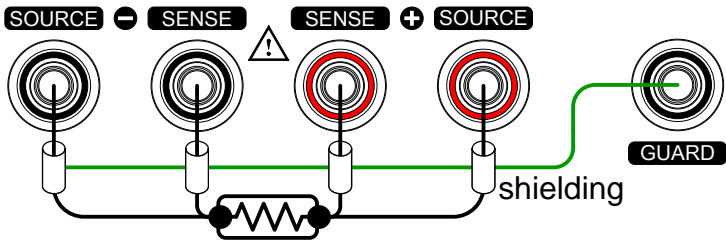


Note

If the sensor is not connected, then the Ambient temperature needs to be manually set.

DUT connection:

4 wire Kelvin



Temperature Conversion

Background

The Temperature Conversion function allows you to determine the temperature change of a DUT at any given resistance, if the initial temperature, the inferred zero resistance temperature for the DUT and the initial resistance of the DUT are known. The displayed result can also be extrapolated to calculate the final temperature (T) or the extrapolated temperature difference (ΔT)*.

Temperature Conversion function works on the following formula:

$$\frac{R_2}{R_1} = \frac{t_0 + t_2}{t_0 + t_1}$$

Where:

R_2 = resistance @ temperature t_2

R_1 = resistance @ temperature t_1

t_0 = inferred zero resistance temperature in °C**

t_1 = temperature at R_1

t_2 = temperature at R_2

The temperature conversion function is can be used to determine the temperature of transformer windings, electric motors, or other materials where it may not be practical to embed a temperature sensor.

* (T) Final temperature = $t_2 = \Delta T + T_A$

(T_A) Ambient temperature = Ambient temperature when R_2 is

measured. T_A can either be manually measured with the PT-100 sensor or it can be manually set.

$$(\Delta T) \text{ Extrapolated temperature difference} = T - T_A$$

***“Constant” setting on the panel display is equivalent to the absolute value of the inferred zero resistance temperature.

Common
inferred zero
resistance
temperatures

Metallic conductors show increased resistivity when temperature is increased, and likewise show reduced resistivity when temperature is reduced. Inferred zero resistance temperature is simply the inferred temperature at which the material will have no resistance. This value is derived from the temperature coefficient of the material.



Note

The inferred zero resistance temperature is an ideal value, and not a real-world value.

Material	Inferred Absolute Temperatures
Silver	-243
Copper	-234.5
Gold	-274
Aluminium	-236
Tungsten	-204
Nickel	-147
Iron	-162

1. Select the

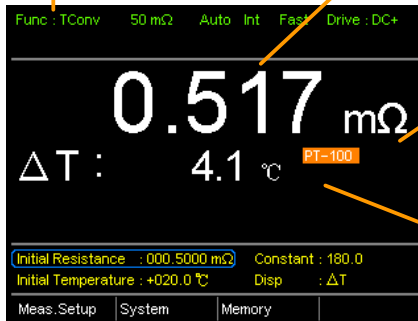
Press TCONV to access the temperature compensation function.

Temperature compensation mode

The temperature-converted measurement will appear on the display.

Temperature conversion function indicator

Resistance measurement



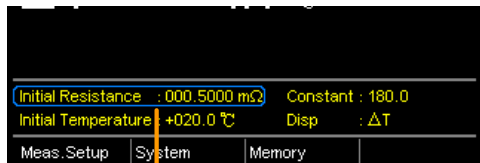
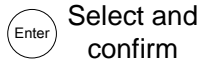
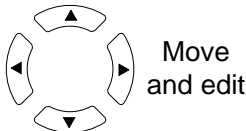
(Ambient) temperature source

Extrapolated temperature difference or final temperature

2. Initial Resistance, Initial Temperature and Constant settings

Use the arrows keys to go to Initial Resistance, Initial Temperature or Constant (inferred initial resistance temperature) and press Enter.

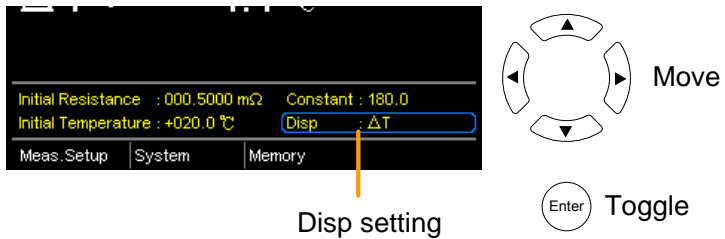
Use the left and right arrow keys to select a digit and use the up and down arrow keys to edit the digit. Press Enter to confirm the edit.



Initial Resistance, Initial Temperature and Constant settings

Initial Resistance	000.0001~999.9999 mΩ, Ω, kΩ, MΩ
Initial Temperature	-50.0 ~ +399.9 °C
Constant	000.0~999.9

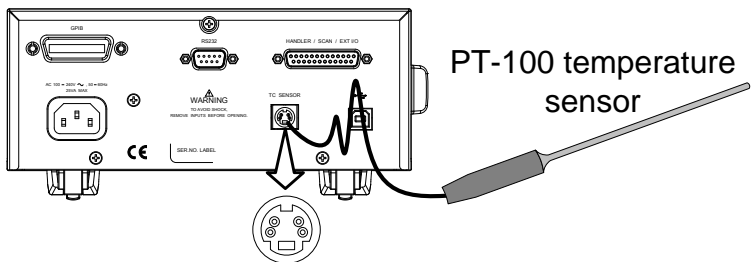
3. Display mode Use the arrow keys to go to Disp. Press Enter to toggle between the T and ΔT modes.



T displays the extrapolated temperature at the measured resistance of the DUT.

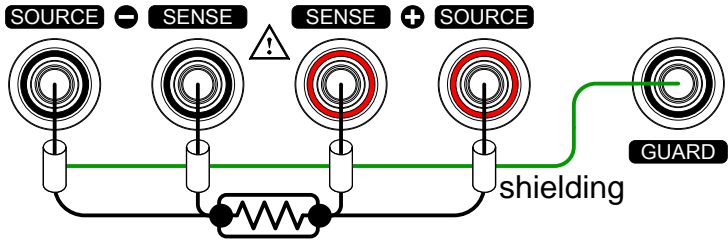
ΔT displays the difference from the extrapolated temperature at the measured resistance of the DUT and the ambient temperature.

4. Temperature compensation connection



DUT connection:

4 wire Kelvin




Measurement Settings

Background The following measurement settings are used to configure the various measurement modes.

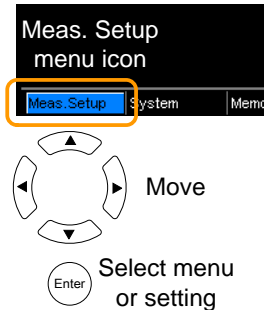
Average Function

Background The average function smoothes measurements using a moving average. The average function sets the number of samples used for the moving average; a higher number results in smoother measurement results. The average function is turned off by default.

1. Select
Average setting From one of the main screens, press the  key so that the menu system at the bottom of the display has focus.

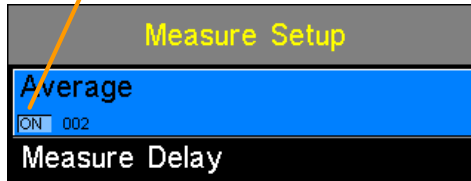
Go to Meas. Setup and press Enter.

Go to Average and press Enter



2. Average
setting appears Use the arrow keys to turn Average on and set the average number. Press Enter to confirm the setting.

Average settings



Average OFF, ON: 2~100

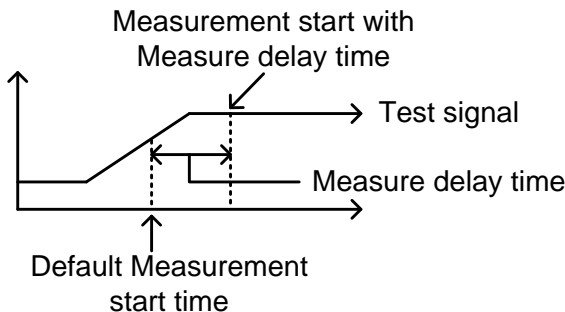


Note

Pressing ESC before pressing ENTER will exit the Average function settings.

Measure Delay

Background The Measure Delay setting inserts a delay time between each measurement. Measure delay is turned off by default.



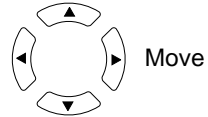
The measure delay setting is useful for measuring components that need some time to charge if the default measurement start time is not adequate. An adequate delay time allows the meter to

avoid the effects of transient disturbances that are usually seen when measuring reactive DUTs with a current source.

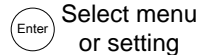
1. Select Measure setting From one of the main screens, press the **ESC** key so that the menu system at the bottom of the display has focus.



Go to Meas. Setup and press Enter.



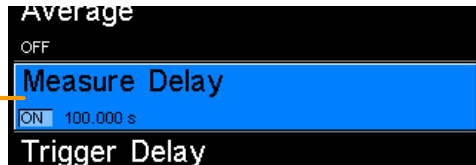
Go to Measure Delay and press Enter.



2. Measure Delay setting appears

Use the arrow keys to turn Measure Delay on and set the delay time. Press Enter to confirm the setting.

Measure delay setting



Measure Delay* OFF, ON: 000.000 ~ 100.000s

* When the set value is > 0.1s, the resolution is 0.1s. When the set value is < 0.1S, the resolution is 1mS.

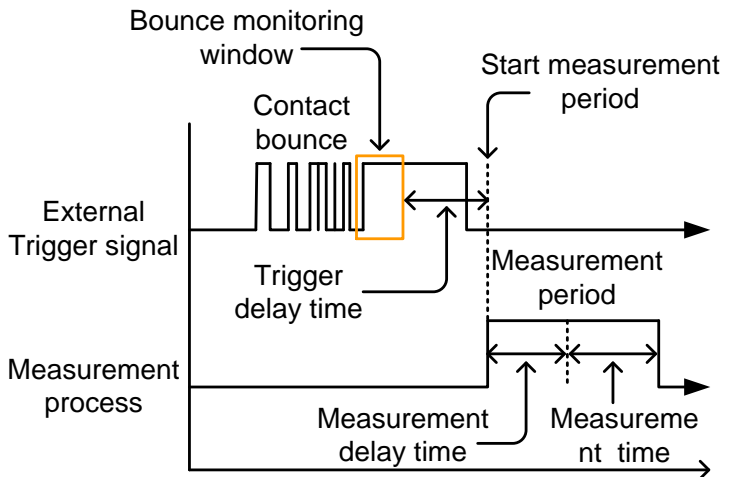


Note

Pressing ESC before pressing ENTER will exit the Measure Delay settings.

Trigger Delay

Background The Trigger Delay setting adds a delay to when an external trigger signal is recognized. Normally the external trigger is recognized when there is no contact bounce in the signal for a fixed length of time, this time is known as the bounce monitoring window. This ensures that the external trigger signal is stable before it is recognized. The Trigger Delay time starts right after the bounce monitoring window ends.



The Trigger Delay setting is turned off by default.

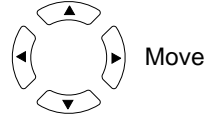


Pin 2 of the Handler/Scan/Ext I/O interface is used for external triggering,

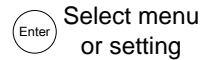
1. Select Trigger Delay setting From one of the main screens, press the **ESC** key so that the menu system at the bottom of the display has focus.



Go to Meas. Setup and press Enter.



Go to Trigger Delay and press Enter.



2. Trigger Delay setting appears Use the arrow keys to turn Trigger Delay on and set the delay time. Press Enter to confirm the settings.

Trigger Delay setting



Trigger Delay OFF, ON: 0 ~ 1000ms

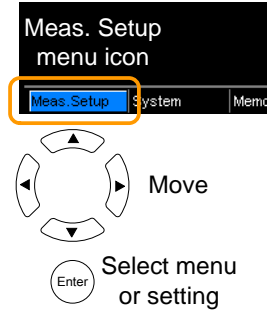


Pressing ESC before pressing ENTER will exit the Trigger Delay settings.

Trigger Edge

Background The Trigger Edge setting sets the external trigger edge as rising or falling. By default the trigger edge is set to rising.

1. Select Trigger Edge setting From one of the main screens, press the **ESC** key so that the menu system at the bottom of the display has focus.
- Go to Meas. Setup and press Enter.
- Go to Trigger Edge and press Enter.



2. Trigger Edge setting appears Use the arrow keys to set the Trigger Edge. Press Enter to confirm the setting.



Trigger Edge Rising, Falling




Note

Pressing ESC before pressing ENTER will exit the Trigger Edge settings.

Temperature Unit

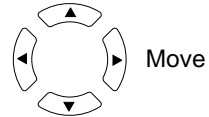
Background Temperature units can be set to Fahrenheit or Celsius for all temperature measurements.

1. Select Temperature Unit setting

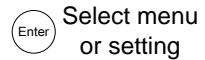
From one of the main screens, press the  key so that the menu system at the bottom of the display has focus.



Go to Meas. Setup and press Enter.

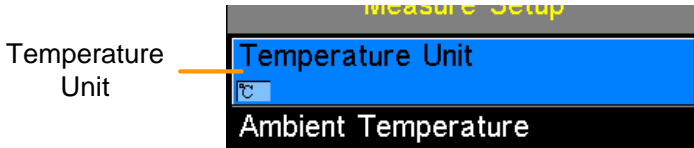


Go to Temperature Unit and press Enter.



2. Temperature Unit setting appears

Use the arrow keys to set the Temperature Unit. Press Enter to confirm the setting



Temperature Unit Fahrenheit, Celsius



Note

Pressing ESC before pressing ENTER will exit the Temperature Unit settings.

Ambient Temperature

Background

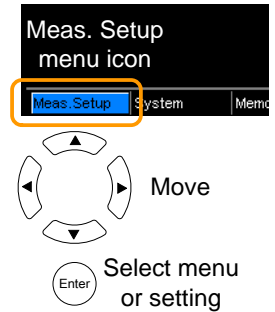
Ambient Temperature setting is used to set the ambient (room temperature) for the Temperature Compensation or Temperature Conversion function in the absence of the PT-100 temperature sensor.

1. Select Ambient Temperature setting

From one of the main screens, press the **ESC** key so that the menu system at the bottom of the display has focus.

Go to Meas. Setup and press Enter.

Go to Ambient Temperature and press Enter.



2. Ambient Temperature setting appears

Use the arrow keys to set the Ambient Temperature. Press Enter to confirm the setting.

Ambient Temperature



Ambient Temperature Off, On: -50°C ~ 399.9°C



Note

Pressing ESC before pressing ENTER will exit the Ambient Temperature settings.

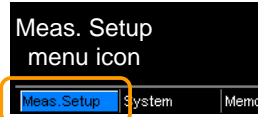
Line Frequency

Background

The Line Frequency setting selects the appropriate line filter to reduce the influence of the AC line frequency on the milliohm measurements. This setting is set to AUTO by default

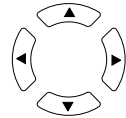
1. Select Line Frequency setting

From one of the main screens, press the **ESC** key so that the menu system at the bottom of the display has focus.



Go to Meas. Setup and press Enter.

Go to Line Frequency and press Enter.



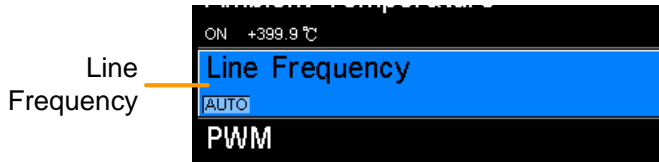
Move



Select menu or setting

2. Line Frequency setting appears

Use the arrow keys to set the Line Frequency. Press Enter to confirm the setting.



Line Frequency Auto, 50Hz, 60Hz

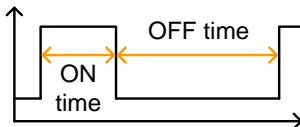


Note

Pressing ESC before pressing ENTER will exit the Line Frequency settings.

PWM Setting

Background The PWM setting will set the duty of the PWM Drive setting. The duty is set with ON and OFF times for the waveform.

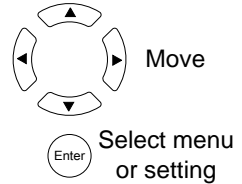


1. Select PWM setting
 From one of the main screens, press the **ESC** key so that the menu system at the bottom of the display has focus.

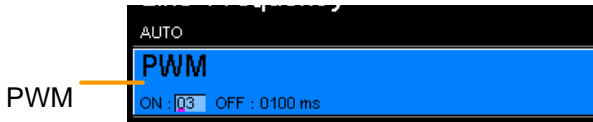


Go to Meas. Setup and press Enter.

Go to PWM and press Enter.



2. PWM setting appears
 Use the arrow keys to set the ON and OFF time for the duty.
 Press Enter to confirm the setting.



Line Frequency	Auto, 50Hz, 60Hz
ON	03 ~ 99 time units*
OFF	0100 ~ 9999 ms

*The ON time setting is set in “time units”, not milliseconds. The amount of time in a time unit depends on the line frequency settings

Line frequency	1 Time Unit
60Hz	16.6mS
50Hz	20mS



Note


Pressing ESC before pressing ENTER will exit the PWM settings.

System Settings

Background The System settings are used to view the system information, set the power on state, the remote interface, screen brightness, external interface and beep settings as well as access the calibration menu.

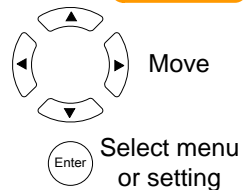
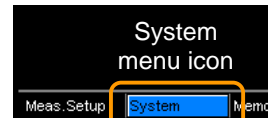
System Information

Background The System Information will show the manufacturer, model, software version and serial number of the unit. The system information is the equivalent of the return string from the *idn? query.

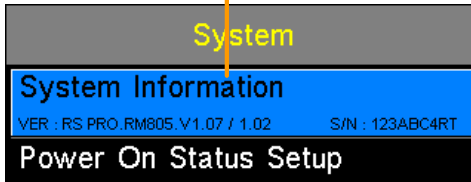
1. View System Information From one of the main screens, press the  key so that the menu system at the bottom of the display has focus.

Go to System and press Enter.

System information will be displayed at the top of the System menu.



System Information




Note

Pressing ESC will exit from the System menu.

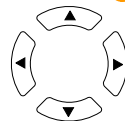
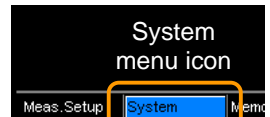
Power On Status Setup

Background The Power On Status Setup allows you to either load the previous settings or the default settings on startup.

1. Select Power On Status setting From one of the main screens, press the  key so that the menu system at the bottom of the display has focus.

Go to System and press Enter.

Go to Power On Status Setup and press Enter.



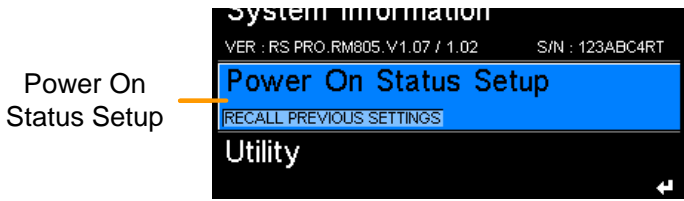
Move



Select menu or setting

2. Power On Status Setup Use the arrow keys to set Power ON Status Setup. Press Enter to confirm the setting.

appears



Power On Status Recall Previous Settings,
Load Default



Note

Pressing ESC before pressing ENTER will exit the Power On Status Setup.


Interface

Background The remote interface can be set to RS232, GPIB or USB.



Note

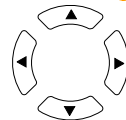
The GPIB interface is only available on the RM-804G and the RM-805.

1. Select Interface setting From one of the main screens, press the  key so that the menu system at the bottom of the display has focus.

Go to System and press Enter.

Go to Utility and press Enter.

Go to Interface and press Enter.



Move



Select menu or setting

2. Interface setting appears Use the arrow keys to choose an interface and to set the baud rate (RS232) or primary address (GPIB). The EOL (end of line) character can also be set. Press Enter to confirm the settings.



Power On Status	GPIB, Primary Address (1 ~ 30)
	RS232, Baud Rate (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200)
	USB
EOL	LF, CR, CR+LF, LF+CR (default = LF)



Pressing ESC before pressing ENTER will exit from the Interface settings.

Brightness

Background The Brightness setting sets the backlight brightness of the TFT-LCD panel.

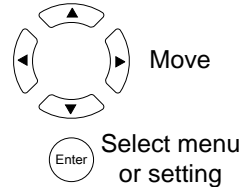
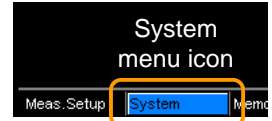
1. Select Brightness setting

From one of the main screens, press the **ESC** key so that the menu system at the bottom of the display has focus.

Go to System and press Enter.

Go to Utility and press Enter.

Go to Brightness and press Enter.



2. Brightness setting appears

Use the arrow keys to set the brightness level. Press Enter to confirm the setting.



Brightness 01 (dim) ~ 05 (bright)



Note

Pressing ESC before pressing ENTER will exit from the Brightness settings.


User Define Pins

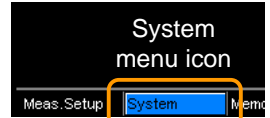
Background

The External I/O User Define Pin settings set the logic and the active level for the Define 1 and Define 2 pins on the Handler/Scan/EXT I/O port on the rear panel. The External I/O pins are used with the compare or bin functions. The logic

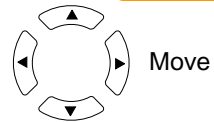
settings can be based on the pass, fail, high, low or bin grade results of the selected function.

1. Select External I/O Setting

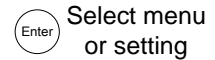
From one of the main screens, press the  key so that the menu system at the bottom of the display has focus.



Go to System and press Enter.



Go to Utility and press Enter.



Go to External I/O and press Enter.

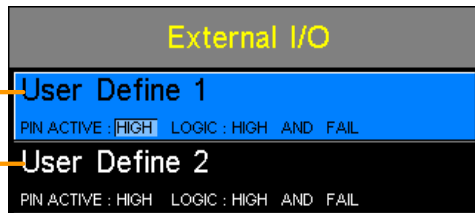
2. External I/O Menu Appears

Use the arrow keys to choose either User Define 1 or User Define 2 and press Enter.

Use the arrow keys to set the active level of the pin when the logic conditions are true and to set the logic settings. Press Enter to confirm the settings.

User Define 1

User Define 2



User Define 1/2:

Pin Active:

Logic:

	Operand1	Operator	Operand2
	Fail	Logical OR,	Fail
	Pass	Logical AND, OFF*	Pass
	Low		Low
	High		High
	Bin O**		Bin O**
	Bin 1 ~ 8		Bin 1 ~ 8

*The OFF operator sets the Logic as true when Operand1 is true.

** Bin O is defined as outside bin 1~ 8.



Note

The Bin logic settings are not available for the RM-804.

Pressing ESC before pressing ENTER will exit from the selected External I/O setting.

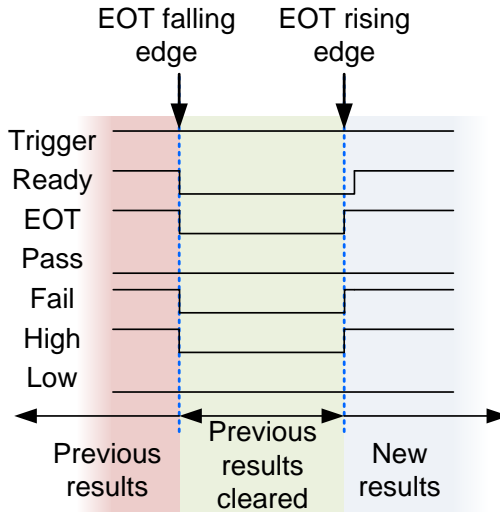
Handler Mode

Background

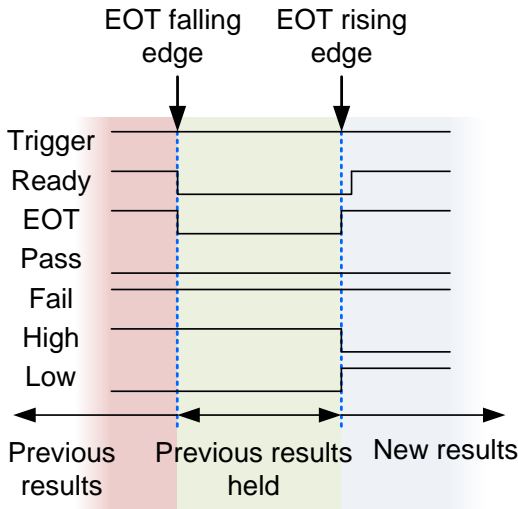
The Handler Mode setting determines the behavior of the result signals from the handler interface. There are two settings, Clear and Hold. The Clear setting will clear the results of the previous test before starting the succeeding one and the Hold setting will keep the test result of the previous test until the succeeding test has completed.

The timing diagrams below are used as examples. All the result signals in the examples are active high.

Clear example Clear: All result signals (PASS, Fail, High and Low) are cleared at the falling edge of EOT and the results from the current test are output at the rising edge of the EOT signal.

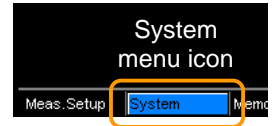


Hold example Hold: The results of the previous tests are held until the current test has completed.



1. Select External I/O setting

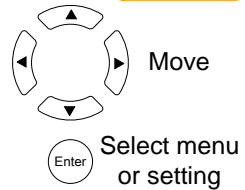
From one of the main screens, press the **ESC** key so that the menu system at the bottom of the display has focus.



Go to System and press Enter.

Go to Utility and press Enter.

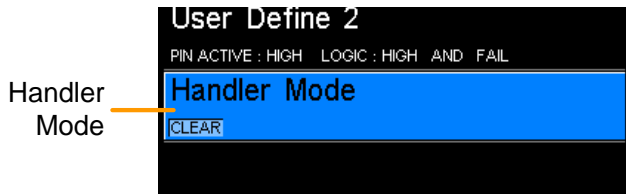
Go to External I/O and press Enter.



2. External I/O menu appears

Use the arrow keys to choose Handler Mode and press Enter.

Use the arrow keys to set the handler mode. Press Enter to confirm the setting.



Handler Mode HOLD, CLEAR




Note

Pressing ESC before pressing ENTER will exit from the Handler Mode setting.

Beep

Background The Beep setting will configure the beeper sound for the key presses, the Compare function and the Binning function.

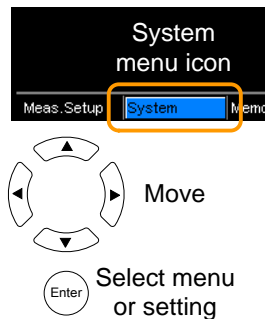
For the Compare and Binning function the beep can be configured to beep on a pass or fail judgment.

1. Select Beep setting From one of the main screens, press the  key so that the menu system at the bottom of the display has focus.

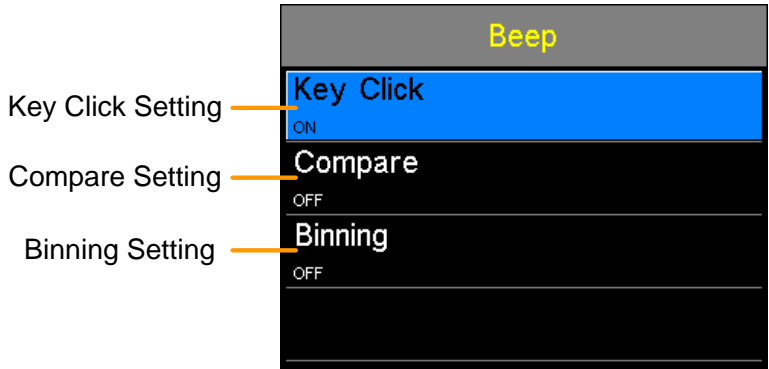
Go to System and press Enter.

Go to Utility and press Enter.

Go to Beep and press Enter.



2. Beep menu appears
- Use the arrow keys to choose a beep setting and press Enter.
- Use the arrow keys to set the selected setting and press Enter to confirm.



Beep Settings:	Key Click	On, Off
	Compare	Off. Pass, Fail
	Binning	Off. Pass, Fail



Note

Pressing ESC before pressing ENTER will exit from the selected Beep setting.

HANDLER/SCAN INTERFACE

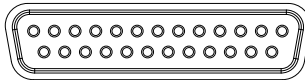
Handler Overview	90
Pin Definitions for the Handler Interface	91
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Scan Setup.....	96
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Configure Interface	105
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Install USB Driver.....	106
Configure RS-232 Interface	107
Configure GPIB Interface.....	109
RS232/USB Function Check.....	109
Using Realterm to Establish a Remote Connection.....	110
GPIB Function.....	114

Handler Overview

Background The Handler interface is used to help grade components based on the Compare or Binning function test results. The appropriate pins on the handler interface are active when the Compare or Binning function is used.

There are 17 TTL outputs and 1 TTL inputs. The Handler interface is only applicable with the Binning function or Compare measurement modes.

Interface and pin assignment 25-Pin D-SUB (Female) **HANDLER / SCAN / EXT I/O**



Pin assignment	TRIGGER	Starts the trigger for a single measurement.
	READY	High when the measurement has finished. The instrument is ready for the next trigger.
	EOT	High when the AD conversion has completed. The DUT is ready to be changed.
	BIN 1~8	High when the sorting result is in one of the eight bin grades. Bin1~8 (pass).
	BIN OUT	High when the sorting result is out of all the eight bin grades (Bin1~8). The status of this pin reflects either a HI or LO result (fail).

LOW	High when the compare result is deemed LO.
HIGH	High when the compare result is deemed HI.
FAIL	High when the compare result is either HI or LO (fail).
PASS	High when the compare result is IN (pass).

For the full pin definition, please refer to the table listed below.

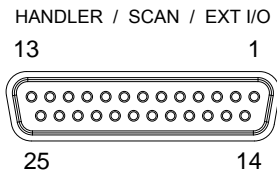


Note

The output current from all the pins and the VINT(+5V) pin cannot exceed 60mA.

Pin Definitions for the Handler Interface

As this interface is used for the handler and scan functions, the interface pinout depends on the function mode. The following pinout is only applicable when using the Binning or Compare function.



Handler Interface for Binning and Compare Functions

Pin	Name	Description	Active modes	In/ Out
-----	------	-------------	--------------	---------

1, 17		Reserved		
2	Trigger	Trigger for a single measurement.	All	In
3, 14, 18	GND	Ground.		
4	Fail	High when the compare result is either HI or LO (fail).	Compare	Out
5	High	High when the compare result is deemed HI.	Compare	Out
6	Pass	High when the compare result is IN (pass).	Compare	Out
7	EOT	High when the AD conversion has completed. The DUT is ready to be changed.	Ext trigger mode	Out
8	VINT	Internal DC Voltage +5V.		Out
9	Bin1	High when the binning sorting result is within the bin1 setting range.	Binning	Out
10	Bin2	High when the binning sorting result is within the bin2 setting range.	Binning	Out
11	Bin3	High when the binning sorting result is within the bin3 setting range.	Binning	Out
12	Bin4	High when the binning sorting result is within the bin4 setting range.	Binning	Out
13	Bin5	High when the binning sorting result is within the bin5 setting range.	Binning	Out
15	Userdefine2	High or low when the user define2 logic conditions are met.	Compare, Binning	Out
16	Userdefine1	High or low when the user define1 logic conditions are met.	Compare, Binning	Out
19	VEXT	External DC Voltage, acceptable range is +5V.		In



20	Ready	High when the measurement has finished. The instrument is ready for the next trigger.	Ext trigger mode	Out
21	Bin6	High when the binning sorting result is within the bin6 setting range.	Binning	Out
22	Low	High when the compare result is deemed LO.	Compare	Out
23	Bin7	High when the binning sorting result is within the bin7 setting range.	Binning	Out
24	Bin8	High when the binning sorting result is within the bin8 setting range.	Binning	Out
25	Bin Out	High when the binning sorting result is out of all the bin setting ranges.	Binning	Out

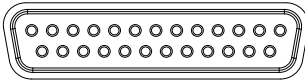
For backwards compatibility with the RM-802 handler interface.

Scan Overview

Background The Scan function is used to automatically bin groups of up to 100 components. The associated pins in the handler interface are active when the Scan function is activated.

There are a total of 6 outputs, 3 inputs as well as a GND and power (+5V) pin.

Interface and pin assignment 25-Pin D-SUB (Female) HANLER / SCAN / EXT I/O



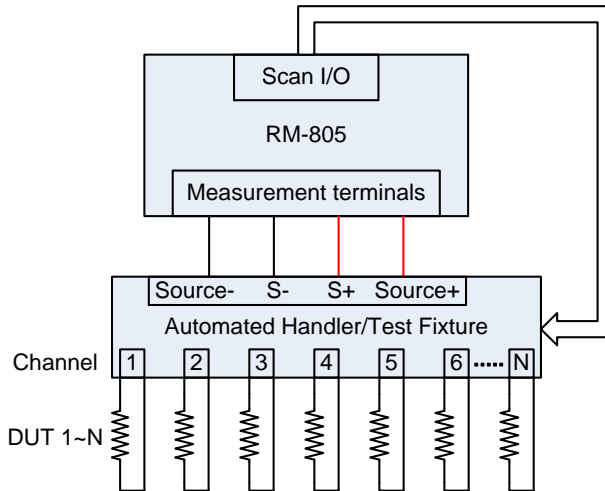
Pin assignment	Relay	Controls the relay output.
	Pass	Pass signal. Indicates the compare result is IN(pass).
	Low	Low signal. Indicates a LO compare result.
	High	High signal. Indicates a HI compare result.
	Clock	The clock signal will pulse high when each group of output signals (Relay, Pass, Low, High) are ready. There are up to 100 groups of output signals
	STRB	After all (100) output groups are ready, the STRB signal will pulse high.

20	Relay	Controls the relay output.	Out
22	STRB	After all (up to 100) output groups are ready, the STRB signal will pulse high.	Out

Scan Setup

Background

The Scan function sequentially scans up to 100 channels and grades the resistance of the DUT on each channel to a reference value. An automated handler or test fixture is required to interface the DUTs to the measurement terminals and the scan interface that controls the timing of each scan.



The automated handler/test fixture is user-supplied. Please see your distributor for support and technical details.

Grading of each DUT is essentially the same as the compare function, the difference being the Scan function will compare up to 100 DUTs sequentially, whereas the Compare function will compare only one DUT at a time.

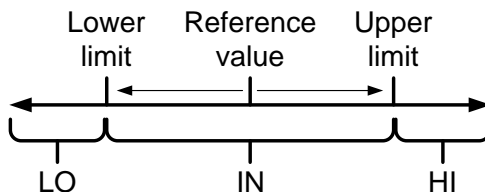
The scan function compares a measured value to a “Reference” value that has an upper (HI) and lower (LO) limit. If the measured value is within the upper and lower limit, then the measured value is judged as IN.

There are two modes that can be used to make a judgment: ABS and $\Delta\%$ modes.

The ABS mode compares the measured value to the upper (HI) and lower (LO) limits. The upper and lower limits are set as absolute resistance values.

The $\Delta\%$ compare function compares the deviation of the measured value from the reference value as a percentage.
 $\{ [(Measured\ Value - Reference) / Reference] \% \}$.

A measured value that falls within the upper and lower limits is considered IN (pass), a value that falls below the lower limits is considered LO, and a value that falls over the upper limit is a HI.

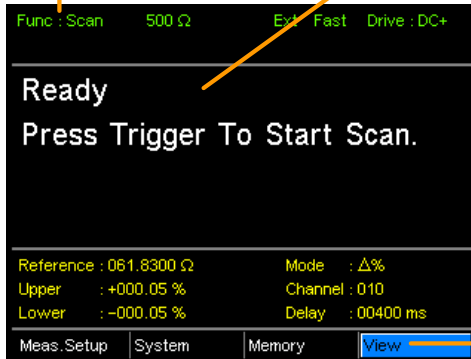


For both scan modes, the IN, HI or LO will be shown on the display for each judgment (if the time between each judgment is not too fast).

Display
Overview

Scan function
indicator


Ready to start scan
message



Change
display view

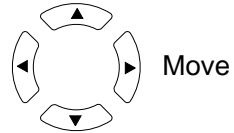
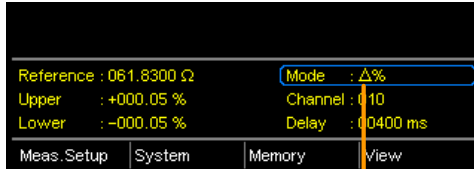
Reference, limits, scan mode, current
channel, measurement delay

1. Select the
Scan function

Press  Scan to access the scan mode, as shown above.

2. Select the compare mode

Use the arrow keys to navigate to the Mode setting. Press the Enter key to toggle the compare mode.



Mode

Range

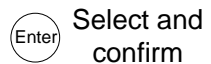
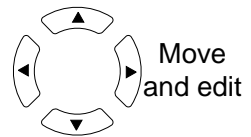
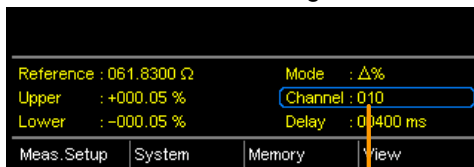
Abs, Δ%

3. Channel setting

The Channel setting sets the number of DUT channels that are used.

Use the arrow keys to navigate to the Channel setting and press Enter.

Use the left and right arrow keys to select a digit. Use the up and down arrow keys to edit the value of the selected digit. Press Enter to confirm the setting:



Channel setting

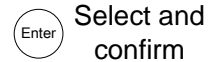
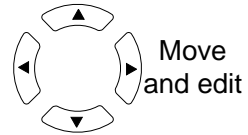
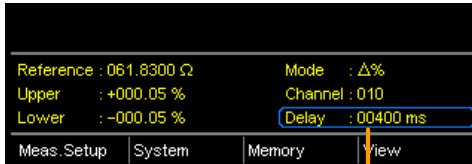
Channel Range:

01 ~100

4. Delay setting The Delay setting adds a pause between each channel measurement.

The Use the arrow keys to navigate to the Delay setting and press Enter.

Use the left and right arrow keys to select a digit. Use the up and down arrow keys to edit the value of the selected digit. Press Enter to confirm the setting.

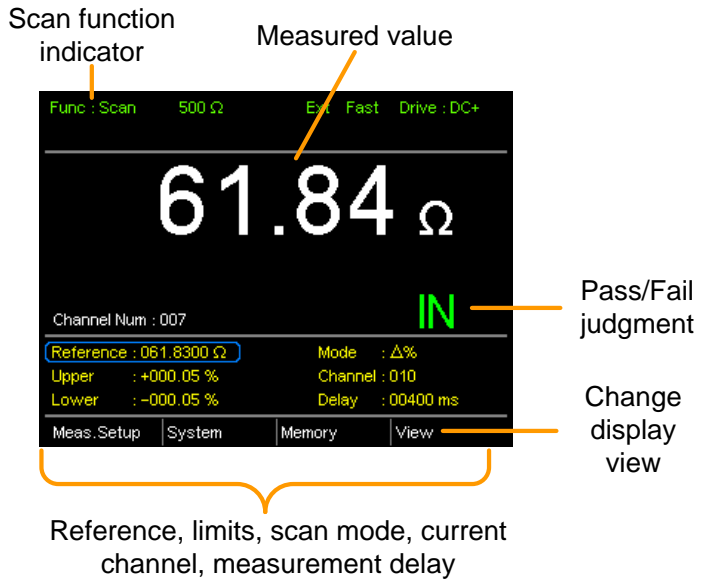


Delay setting

Delay Range: 400ms ~ 30000ms

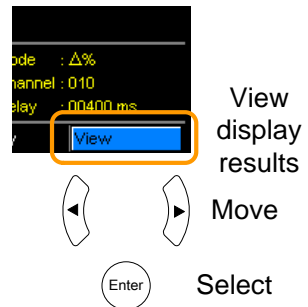
5. Start the scan Press the **Trigger** key or input a pulse signal on the Trigger pin of the SCAN interface port to start a scan test.

The results will be displayed on the screen as each test is performed. The results will also be output through the scan port until the scan has finished.



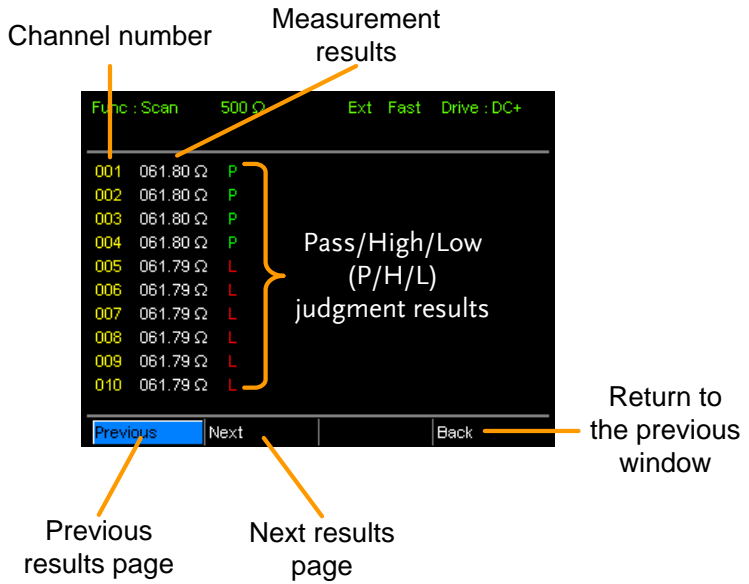
6. View Results After the last SCAN test has finished, press the **ESC** key so that the menu system at the bottom of the display has focus.

Go to View and press Enter to view the results of each channel..



Use the Previous and Next soft-keys to view each page.

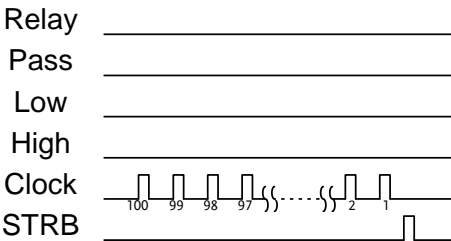
Use the Back soft-key to return to the previous window..



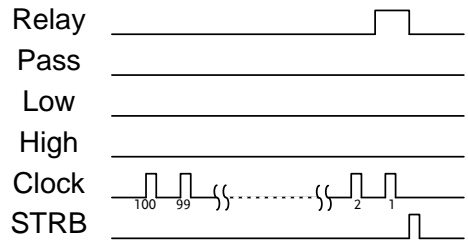
Scan Output

Background The timing diagrams for the scan output under different conditions are shown below. .

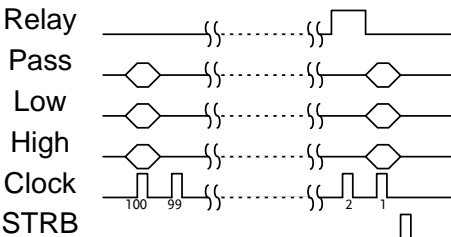
Ready message displayed...



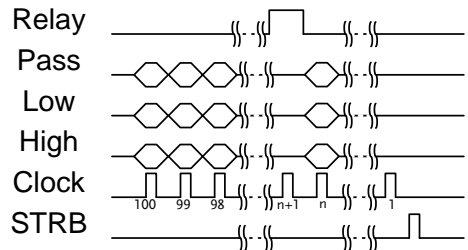
After the manual trigger key is pressed....



Scan channel 1. Delay time has elapsed.

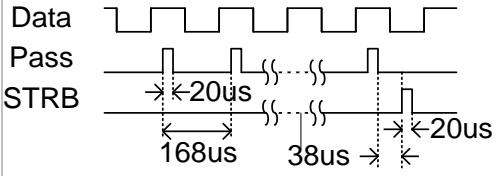
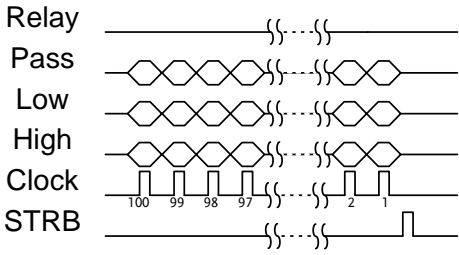


Scan channel n. Delay time has elapsed.



Scan Channel 100. Delay time has elapsed.

Scan output signal timing.



Configure Interface

Overview The RS-232 and USB interfaces are standard for all models, however the GPIB interface is only applicable for the RM-804G and RM-805. The remote control interfaces allow the RM-804/805 to be programmed for automatic testing.

Interface	USB	USB Device
	RS-232	DB-9 male port
	GPIB	24 pin female GPIB port (RM-804G, RM-805 only)

Configure USB Interface

Background The Type B USB port on the rear panel is used for remote control. This interface creates a virtual COM port when connected to a PC.



Note

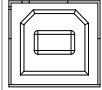
The USB interface requires the USB driver to be installed.

1. Connect and configure to Configure the interface to USB in System>Utility>Interface menu.
-

USB.

Connect the Type A-B USB cable to the rear panel USB B port on the RM-804/805.

Connect the other end to the Type A port on the PC.



Install USB Driver

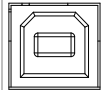
Background

The USB driver needs to be installed when using the USB port for remote control. The USB interface creates a virtual COM port when connected to a PC.

1. Select the USB driver

Configure the interface to USB in System>Utility>Interface menu.

Connect the Type A-B USB cable to the rear panel USB B port on the RM-804/805. Connect the other end to the Type A port on the PC.

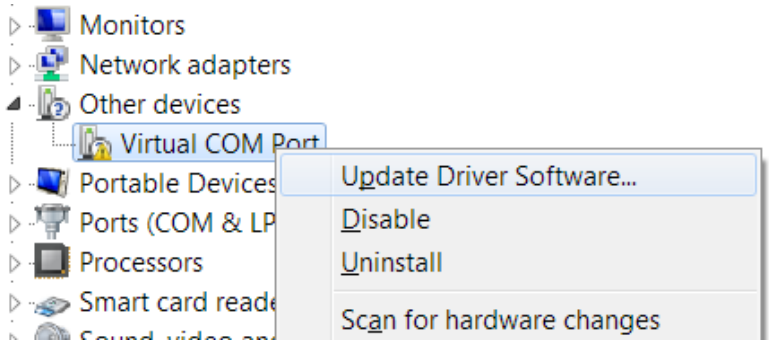


Go to the Windows Device Manager.

For Windows 7 go to:

Start Menu > Control Panel > Hardware and Sound > Device Manager.

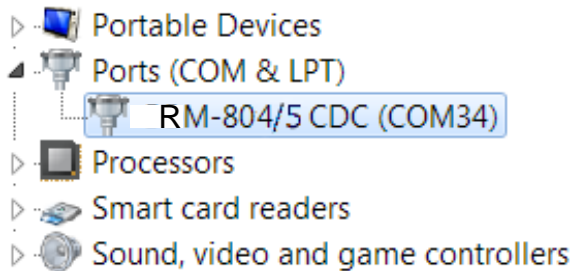
The RM-804/805 will appear as an unknown Virtual Com Port under "Other Devices".



Right-click Other Devices and select “Update Driver Software”.

Select “Browse my computer for driver software” and select the driver on the User Manual CD.

The RM-805 and the COM port that it is assigned to will now appear in under the Ports (COM & LPT) node.



Configure RS-232 Interface

Background The RM-804/805 can also use an RS-232C connection for remote control. When connecting to a PC ensure the correct baud rate,

parity, data bits, stop bit and data control settings are used.

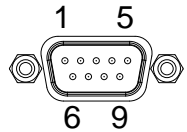
Settings	Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
	Parity	None
	Data bits	8
	Stop bit	1
	Data flow control	None

1. Select the RS-232 baud rate

Configure the interface to RS232 and set the baud rate in System>Utility>Interface menu.

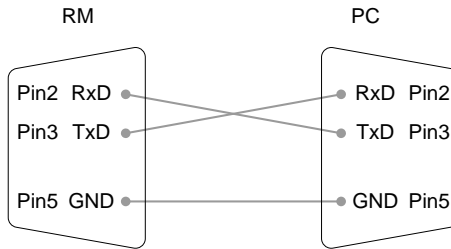
Connect the RS-232C cable to the rear panel RS232 port.

RS-232 pin assignment	Pin 2: RxD
	Pin 3: TxD
	Pin 5: GND
	Pin 1, 4, 6 ~ 9: No Connection



PC – RM RS-232C connection transmit (TxD) and receive (RxD) lines are cross-linked.

The RS232C connection uses a Null-modem connection, in which



Configure GPIB Interface

Background The GPIB interface is SCPI-1994, IEEE488.1 and IEEE488.2 compliant.



Note

The GPIB interface is only available on the RM-804G and RM-805.

1. Select the GPIB address Configure the interface to GPIB and set the GPIB address in System>Utility>Interface menu.

Connect one end of the GPIB cable to the computer and the other end to the GPIB port on the RM-805.



RS232/USB Function Check

Operation Invoke a terminal application such as Realterm.
For RS-232, set the COM port, baud rate, stop bit, data bit and

parity accordingly.

To check the COM settings in Windows, see the Device Manager.

For example, in WinXP go to the Control panel → System → Hardware tab.

Run this query from the terminal.

```
*idn?
```

This should return the Manufacturer, Model number, and Firmware version.

```
RS PRO, RM805, GXXXXXXXX, V1.00
```



Note

If you are not familiar with using a terminal application to send/receive remote commands from the serial port or via a USB connection,

Using Realterm to Establish a Remote Connection

Background

Realterm is a terminal program that can be used to communicate with a device attached to the serial port of a PC or via an emulated serial port via USB.

The following instructions apply to version 2.0.0.70. Even though Realterm is used as an example to establish a remote connection, any terminal program can be used that has similar functionality.



Note

Realterm can be downloaded on Sourceforge.net free of charge.

For more information please see <http://realterm.sourceforge.net/>

1. Install
Realterm

Download Realterm and install according to the instructions on the Realterm website.

2. Configure
connection

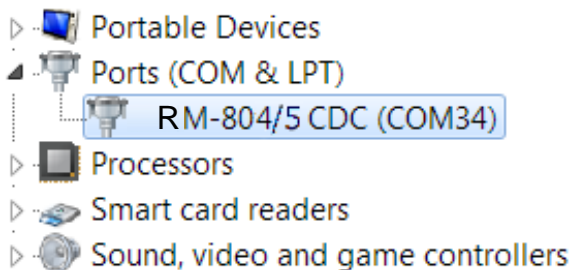
Connect the RM-804/805 via USB or via RS232.

If using RS232, make note of the configured baud rate.

Go to the Windows device manager and find the COM port number for the connection.

For example in Windows 7, go to the Start menu > Control Panel > Hardware and Sound > Device Manager

Double click the Ports icon to reveal the connected serial port devices and the COM port for each connected device.



If using USB, the baud rate, stop bit and parity settings can be viewed by right-clicking connected device and selecting the Properties option.

3. Run Realterm Start Realterm on the PC as an administrator.

Click:

Start menu>All Programs>RealTerm>realterm

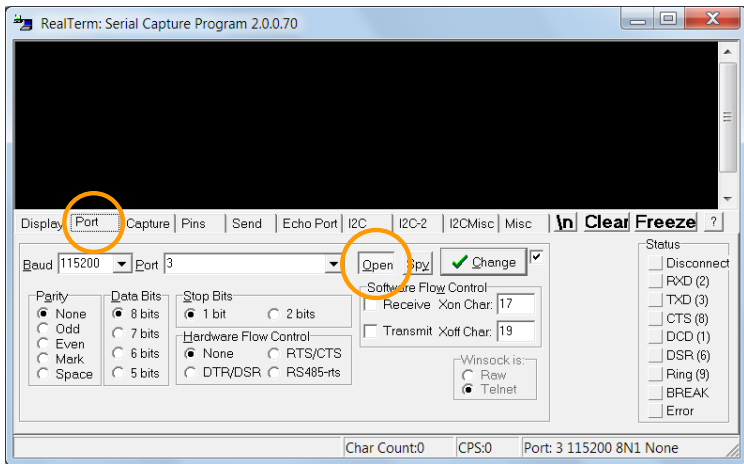
Tip: to run as an administrator, you can right click the Realterm icon in the Windows Start menu and select the Run as Administrator option.

After Realterm has started, click on the Port tab.

Enter the Baud, Parity, Data bits, Stop bits and Port number configuration for the connection.

The Hardware Flow Control and Software Flow Control options can be left at the default settings.

Press Open to connect to the RM-804/805.



4. Test remote Click on the Send tab.

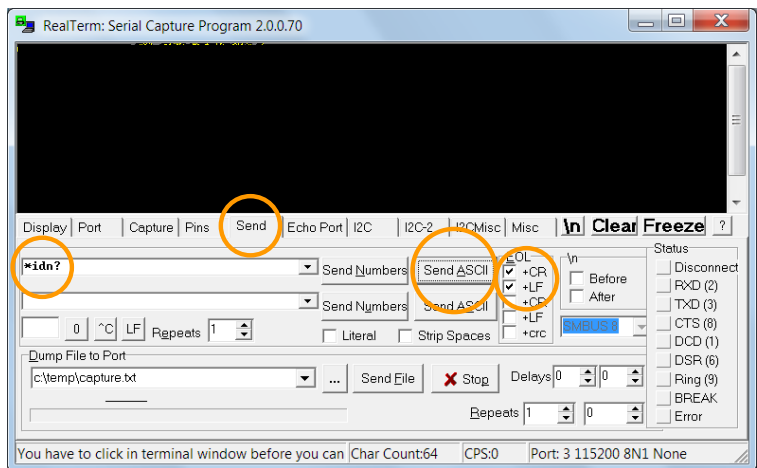
command

In the EOL configuration, check on the +CR and +LF check boxes.

Enter the query:

*idn?

Click on Send ASCII.



The terminal display will return the following:

RS PRO, RMXXXX,V1.00

(manufacturer, model, serial number, version)

5. Errors or Problems

If Realterm fails to connect to the RM-804/805, please check all the cables and settings and try again.

GPIB Function

Background

Please use the National Instruments Measurement & Automation Controller software to confirm GPIB/LAN functionality.

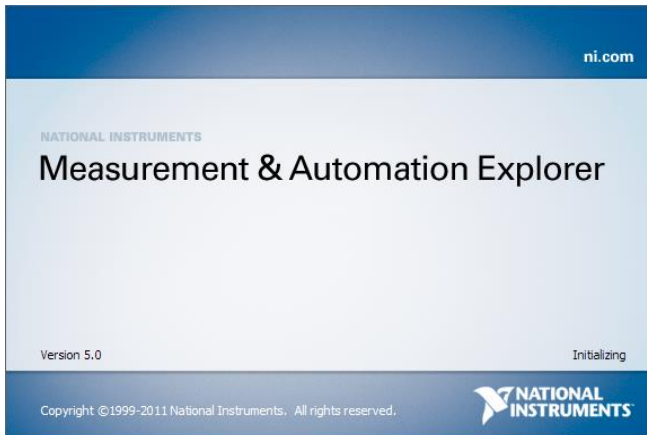
See the National Instrument website, <http://www.ni.com> for details.

1. Operation

Start the NI Measurement and Automation Explorer (MAX) program. Using Windows, press:



Start>All Programs>National Instruments>Measurement & Automation

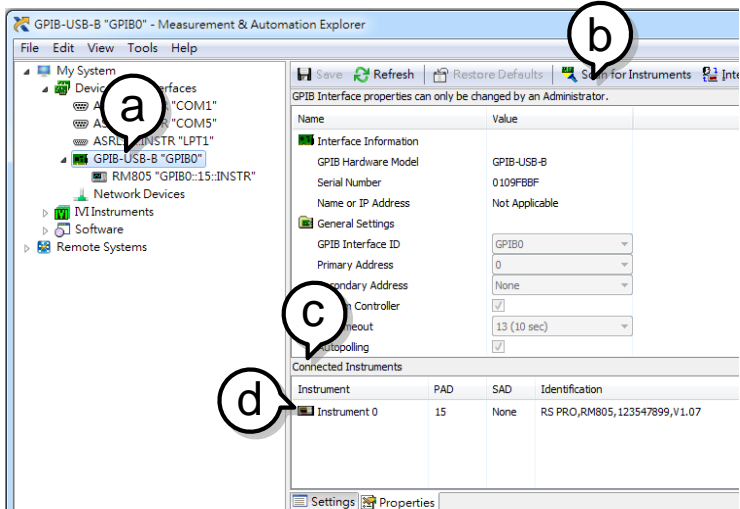


Step a.

From the Configuration panel access;

My System>Devices and Interfaces>GPIBO

- Step b. Press the Scan for Instruments button.
- Step c. In the Connected Instruments panel the RM-804/805 should be detected as Instrument 0 with the address the same as that configured on the unit.
- Step d. Double click the Instrument 0 icon.

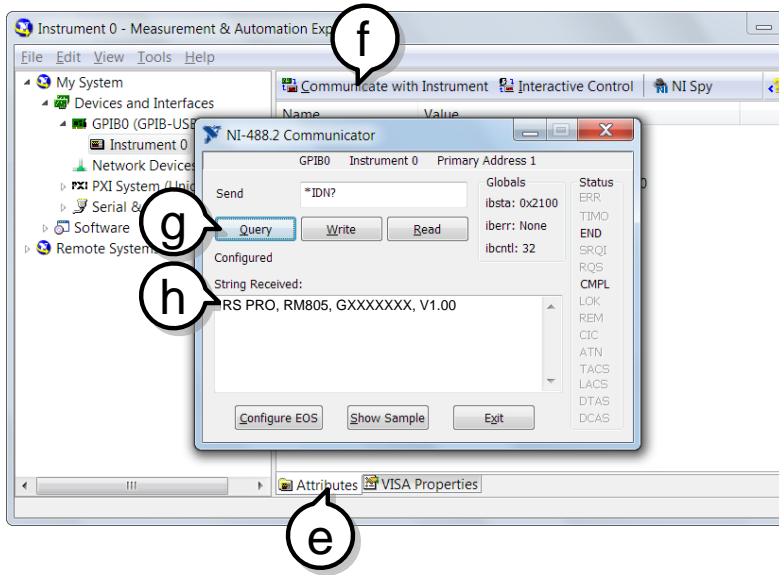


- Step e. Click on the Attributes tab at the bottom.
- Step f. Click on Communicate with Instrument.
- Step g. In the NI-488.2 Communicator window, ensure *IND? is written in the Send String: text box.
Click on the Query button to send the *IDN? query to the instrument.

Step h. The String Received text box will display the query return:

RS PRO, RM805, GXXXXXXXX, V1.00

(manufacturer, model, serial number, version)



The function check is complete.

SAVE/RECALL

The settings for all the major functions can be saved and recalled from 20 memory slots.


Settings can saved/recalled for the following functions:

Ohm, Compare, Binning, TC, TCONV, TEMP, Scan, Diode.

Save/Recall Settings

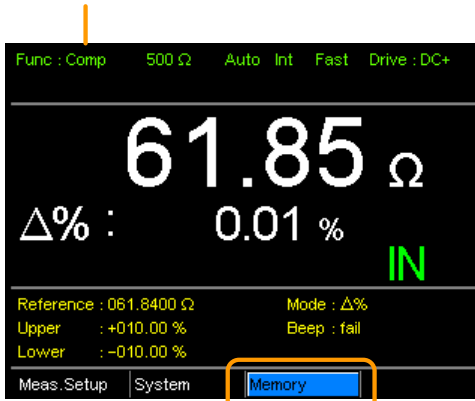
Background The save function saves the current function as well the settings related to that function.

There are 20 memory slots that can be used to save and recall settings on the RM-804/805

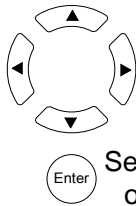
1. Enter the Memory menu When you are in the desired function mode, press the  key (if necessary) to so that the menu system at the bottom of the display has focus.

Use the arrow keys to navigate to the Memory setting and press Enter.

Function mode



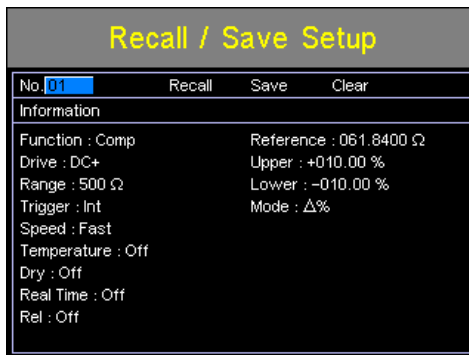
Memory setting



Move

Select menu
or setting

The Recall/Save Setup menu will appear.



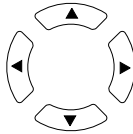
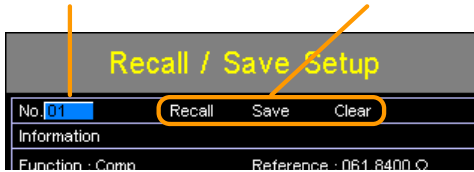
2. Save/
Recall/Clear

The No. setting should be already highlighted when entering the Recall/Save Setup menu. If not, use the Left/Right arrow keys to

Memory

highlight the No. setting.

No. setting Recall, Save, Clear settings



Move
and edit



Select and
confirm

Use the up and down arrow keys to select a memory space.

Range 01~20

*If a memory space has been used before, the settings for that memory slot will also be shown on the display.

To Save:

Use the arrow keys to go to Save and press Enter.



To Recall:

Use the arrow keys to go to Recall and press Enter.



To Clear:

Use the arrow keys to go to Clear and press Enter.



Press Enter again when asked to confirm the selected operation.

After saving the settings, press ESC to return to the current function mode.

After recalling settings, the unit will automatically go to the recalled setting function.



Note

Pressing ESC before pressing Enter will exit the Save/Recall/Clear operation.

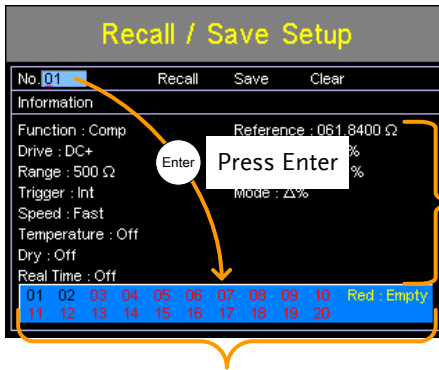
View memory slot availability

Press the Enter key when the No. setting is highlighted to see which memory slots are empty.

The status of memory slots 01 ~ 20 are shown at the bottom of the display.

Memory slots in red are empty slots while those in black have already been used.

Press Enter again to exit from this view.



Settings in selected memory slot

Available memory slots in red.
Used memory slots in black.



The memory number can also be selected when in the above view using the arrow keys.



COMMAND OVERVIEW

The Command overview chapter lists all the programming commands in alphabetical order. The command syntax section shows you the basic syntax rules you have to apply when using commands.

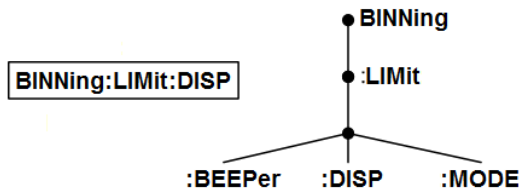
Command Syntax	123
Command List	126
BINNING Commands	130
Calculate Commands.....	139
Memory Commands.....	151
Sense Commands	153
Source Commands	158
Status Commands	160
System Commands.....	162
Temperature Commands	170
Trigger Commands	177
Userdefine Commands	181
IEEE 488.2 Common Commands	184
Status system	189

Command Syntax

Compatible standard IEEE488.2, 1992 (fully compatible)
 standard SCPI, 1994 (partially compatible)

Command Structure SCPI (Standard Commands for Programmable Instruments) commands follow a tree-like structure, organized into nodes. Each level of the command tree is a node. Each keyword in an SCPI command represents each node in the command tree. Each keyword (node) of an SCPI command is separated by a colon (:).

For example, the diagram below shows an SCPI sub-structure and a command example.



Command types There are a number of different instrument commands and queries. A command sends instructions or data to the unit and a query receives data or status information from the unit.

Simple A single command with/without a parameter

Example SENSE:FUNCTION OHM



Query A query is a simple or compound command followed by a question mark (?). A parameter (data) is returned.

Example SENSE:RANGe?

Command forms Commands and queries have two different forms, long and short. The command syntax is written with the short form of the command in capitals and the remainder (long form) in lower case.

The commands can be written either in capitals or lower-case, just so long as the short or long forms are complete. An incomplete command will not be recognized.

Below are examples of correctly written commands.

Long form CALCulate:COMPare:BEEPer
 CACLULATE:COMPARE:BEEPER
 calculate:compare:beeper

Short form CALC:COMP:BEEP
 calc:comp:beep

Command Format **CALCulate:SCAN:DElay 500**

1: command header

2: single space

3: parameter

Common Input Parameters	Type	Description	Example
	<Boolean>	Boolean logic	0,1
	<NR1>	integers	0,1,2,3
	<NR2>	decimal numbers	0.1,3.14,8.5
	<NR3>	floating point with exponent	4.5e-1,8.25e+1
	<NRf>	Any of NR1,2,3	1,1.5,4.5e-1
	<string>	ASCII text string	TEST_NAME

Message Terminator (EOL) Marks the end of a command line. The following messages are in accordance with IEEE488.2 standard.

Remote Command	LF, CR, CR+LF,	The most common EOL character is CR+LF
Return Message	LF	User configurable (excluding GPIB)

Message Separator EOL or ; Command separator.



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BINning Commands

Binning commands are only applicable to RM-805 .

BINning:COUNT:CLEar

Set →

Description	Clear all bin sorting function test result counts.
Syntax	BINning:COUNT:CLEar
Parameter	<None>

BINning:COUNT:TOTal

→ Query

Description	Returns the total number (count total) of test bin results.
Query Syntax	BINning:COUNT:TOTal?
Return Parameter	<None> 0~999999999
Example	<p>BINN:COUN:TOT?</p> <p>>150</p> <p>Indicates that the total number (count total) of test results (pass and fail) is 150.</p>

BINNING:COUNT:OUT

→ Query

Description Returns the number of failed (judged OUT) test results for the bin sorting function test.

Query Syntax BINNING:COUNT:OUT?

Return Parameter <None> 0~999999999

Example BINN:COUN:OUT?
>50

Indicates that the number of failed test results is 50.

BINNING<X>:COUNT:RESult

→ Query

Description Returns the number of passed (judged IN) test results for the selected bin.

Query Syntax BINNING<X>:COUNT:RESult?

Parameter <X> 1~8

Return parameter <NR1> 0~999999999

Example BINN1:COUN:RES?
>100

Indicates that bin1 has a pass count of 100.

Set →
 → Query

BINNING<X>:LIMit:LOWer

Description Sets or returns the lower limit value (absolute value) for the selected bin.

Syntax BINNING<X>:LIMit:LOWer {<NRf>[,<String>]}

Query Syntax BINNING<X>:LIMit:LOWer?

Parameter	<X>	1~8
	<NRf>	000.0000~999.9999
	<String>	mohm/ohm/kohm/maohm,unit
		If the unit is not set, the unit will be automatically set by the present range.

Return parameter **<NR3>** 000.0000~999.9999E±X

Example

BINN1:LIM:LOW 23.8,kohm

Sets the bin1 lower limit value to 23.8kΩ.

BINN1:LIM:LOW?

>23.8000E+3

Returns the lower limit as 23.8kΩ.

Set →
 → Query

BINNING<X>:LIMit:UPPer

Description Sets or returns the upper limit value (absolute value) for the selected bin.

Syntax BINNing<X>:LIMit:UPPer {<NRf>[,<String>]}

Query Syntax BINNing<X>:LIMit:UPPer?

Parameter	<X>	1~8
	<NRf>	000.0000~999.9999
	<String>	mohm/ohm/kohm/maohm,unit If the unit is not set, the unit will be automatically set by the present range.
Return parameter	<NR3>	000.0000~999.9999E±X

Example BINN1:LIM:UPP 0.95,maohm
Sets bin1 upper limit value to 0.95MΩ.
BINN1:LIM:UPP?
>0.9500E+6
Returns the upper limit as 0.95MΩ.

(Set) →

→ (Query)

BINNing<X>:PERCent:LOWer

Description Sets or returns the lower value percentage value for the selected bin. The value is a percentage offset from the reference value.

Syntax BINNing<X>:PERCent:LOWer <NRf>

Query Syntax BINNing<X>:PERCent:LOWer?

Parameter	<X>	1~8
-----------	-----	-----

	<NRf>	000.00~999.99
Return parameter	<NR2>	000.00~999.99

Example BINN1:PERC:LOW 10.15

Sets the bin1 lower limit percent value to -10.15%.

BINN1:PERC:LOW?

>10.15

Returns the lower limit percentage value as -10.15%.

BINNing<X>:PERCent:UPPer

Set →

→ Query

Description Sets or returns the upper value percentage value for the selected bin. The value is a percentage offset from the reference value.

Syntax BINNing<X>:PERCent:UPPer <NRf>

Query Syntax BINNing<X>:PERCent:UPPer?

Parameter	<X>	1~8
	<NRf>	000.00~999.99
Return parameter	<NR2>	000.00~999.99

Example BINN1:PERC:UPP 150.95

 Sets the bin1 upper limit percent value to +150.95%.

 BINN1:PERC:UPP?

 >150.95

 Returns the upper limit percentage value as +150.95%.

BINNING:LIMit:BEEPer  

Description	Sets or returns beeper mode for the bin sorting function.	
Syntax	BINNING:LIMit:BEEPer {OFF PASS FAIL}	
Query Syntax	BINNING:LIMit:BEEPer?	
Parameter/	OFF	Turns the beeper off.
Return parameter	PASS	The beeper will sound on a pass test result.
	FAIL	The beeper will sound on a fail test result.

Example BINN:LIM:BEEP OFF

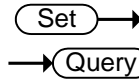
 Turns the beeper off.

BINNING:LIMit:DISP  

Description	Sets or returns the bin sorting function display mode.	
Syntax	BINNING:LIMit:DISP {COMP COUNT}	
Query Syntax	BINNING:LIMit:DISP?	

Parameter/	COMP	The display is set to compare mode.
Return parameter	COUNT	The display is set to count mode.
Example	BINN:LIM:DISP COMP	
	Sets the bin sorting function display mode to compare.	

BINNING:LIMit:MODE



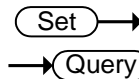
Description	Sets or returns the setting mode for upper and lower limits (absolute or $\Delta\%$).	
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Syntax BINNING:LIMit:MODE {ABS|DPER}

Query Syntax BINNING:LIMit:MODE?

Parameter/	ABS	The test results are judged from absolute values.
Return parameter	DPER	The test results are judged from a reference value \pm a percentage offset. (delta percent)

Example	BINN:LIM:MODE DPER	
	Sets the mode to $\Delta\%$.	



BINNING:LIMit:REFerence

Description	Sets or returns the limit reference value for the bin sorting function.	
-------------	---	--

Syntax	BINNing:LIMit:REference {<NRf>[,<String>]}	
Query Syntax	BINNing:LIMit:REference?	
Parameter	<NRf>	000.0001~999.9999
	<String>	mohm/ohm/kohm/maohm,unit If the unit is not set, the unit will be automatically set by the present range.
Return parameter	<NR3>	000.0001~999.9999E±X
Example	BINN:LIM:REF 100	
	Sets the limit reference value to 100Ω.	
	BINN:LIM:REF?	
	>100.0000E+0	
	Returns the reference as 100Ω.	

BINNing:LIMit:RESult



Description	Returns the bin sorting function test result.	
Query Syntax	BINNing:LIMit:RESult?	
Return parameter	<NR1>	1~8: Bin1~Bin8
		9: Bin Out



Example

BINN:LIM:RES?

>1

Indicates a pass for bin1.

Calculate Commands

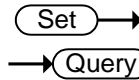
		Set →
		→ Query
CALCulate:COMPare:BEEPer		
Description	Sets or returns the compare function beeper mode.	
Syntax	CALCulate:COMPare:BEEPer {OFF PASS FAIL}	
Query Syntax	CALCulate:COMPare:BEEPer?	
Parameter/ Return parameter	OFF	Turns the beeper off.
	PASS	The beeper will sound on a pass test result.
	FAIL	The beeper will sound on a fail test result.
Example	CALC:COMP:BEEP FAIL Sets the beeper on when the test result is a fail.	
		Set →
		→ Query
CALCulate:COMPare:LIMit:LOWer		

Description	Sets or returns the lower limit value for the compare function.	
Syntax	CALCulate:COMPare:LIMit:LOWer {<NRf>[,<String>]}	
Query Syntax	CALCulate:COMPare:LIMit:LOWer?	
Parameter	<NRf>	000.0000~999.9999



	<String>	mohm/ohm/kohm/maohm,unit If the unit is not set, the unit will be automatically set by the present range.
Return parameter	<NR3>	000.0000~999.9999E±X
Example	<p>CALC:COMP:LIM:LOW 0.123,maohm</p> <p>Sets the lower limit value to 0.123MΩ.</p> <p>CALC:COMP:LIM:LOW?</p> <p>>0.1230E+6</p> <p>Returns the lower limit as 0.123MΩ.</p>	

CALCulate:COMPare:LIMit:MODE



Description	Sets or returns the compare mode for the compare function.	
Syntax	CALCulate :COMPare:LIMit:MODE {ABS DPER PER}	
Query Syntax	CALCulate:COMPare:LIMit:MODE?	
Parameter/ Return parameter	ABS	The test results are judged from absolute values.
	DPER	The test results are judged from a reference value ± a percentage offset. (delta percentage)
	PER	The test results are displayed as a percentage of the reference value.

CALCulate:COMPare:LIMit:RESult → (Query)

Description Returns the compare function test result.

Query Syntax CALCulate:COMPare:LIMit:RESult?

Return parameter <NR1> 0: LO
 1: IN
 2: HI

Example CALC:COMP:LIM:RES?
 >2
 Indicates that the test result is HI.

(Set) →

CALCulate:COMPare:LIMit:UPPer → (Query)

Description Sets or returns the upper limit value for the compare function.

Syntax CALCulate:COMPare:LIMit:UPPer {<NRf>[,<String>]}

Query Syntax CALCulate:COMPare:LIMit:UPPer?

Return parameter <NRf> 000.0000~999.9999
 <String> mohm/ohm/kohm/maohm,unit
 If unit is not set, the unit will be automatically set by the present range.

Return parameter <NR3> 000.0000~999.9999E±X

Example CALC:COMP:LIM:UPP 0.95,kohm

 Sets the upper limit value to 0.95kΩ.

 CALC:COMP:LIM:UPP?

 >0.9500E+3

 Returns the upper limit as 0.95kΩ.

CALCulate:COMPare:MATH:DATA → Query

Description Returns the deviation value for the compare function.

Query Syntax CALCulate:COMPare:MATH:DATA?

Return parameter <NR3> ±0.0000~9.9999E±X.

Example CALC:COMP:MATH:DAT?

 >+0.3658E+2

 Returns the deviation as 36.58%.

Set →

CALCulate:COMPare:PERCent:LOWer → Query

Description Sets or returns the lower limit percent value for the compare function.

Syntax CALCulate:COMPare:PERCent:LOWer <NRf>

Query Syntax CALCulate:COMPare:PERCent:LOWer?

Parameter <NRf> 000.00~999.99



Return parameter <NR2> 000.00~999.99

Example CALC:COMP:PERC:LOW 10.00

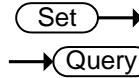
Sets the lower limit percent value to -10.00%.

CALC:COMP:PERC:LOW?

>10.00

Returns the lower limit as -10.00%.

CALCulate:COMPare:PERCent:UPPer



Description Sets or returns the upper limit percent value for the compare function.

Syntax CALCulate:COMPare:PERCent:UPPer <NRf>

Query Syntax CALCulate:COMPare:PERCent:UPPer?

Parameter <NRf> 000.00~999.99

Return parameter <NR2> 000.00~999.99

Example CALC:COMP:PERC:UPP 90.00

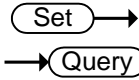
Sets the upper limit percent value to +90.00%.

CALC:COMP:PERC:UPP?

>90.00

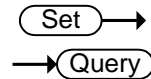
Returns the upper limit as +90.00%.

CALCulate:SCAN:CHANnel



Description	Sets or returns the channel for the scan function.	
Syntax	CALCulate:SCAN:CHANnel <NR1>	
Query Syntax	CALCulate:SCAN:CHANnel?	
Parameter/	<NR1>	1~100
Return parameter		
Example	CALC:SCAN:CHAN 5 Sets the channel to 5.	

CALCulate:SCAN:DELay



Description	Sets or returns the interval delay for the scan function.	
Syntax	CALCulate:SCAN:DELay <NR1>	
Query Syntax	CALCulate:SCAN:DELay?	
Parameter/	<NR1>	400~30000
Return parameter		Unit:ms
Example	CALC:SCAN:DEL 500 Sets interval delay of the scan to 500ms.	

Set →
 → Query

CALCulate:SCAN:LIMit:LOWer

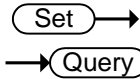
Description	Sets or returns the lower limit value for the scan function.	
Syntax	CALCulate:SCAN:LIMit:LOWer {<NRf>[,<String>]}	
Query Syntax	CALCulate:SCAN:LIMit:LOWer?	
Parameter	<NRf>	000.0000~999.9999
	<String>	mohm/ohm/kohm/maohm,unit If unit is not set, the unit will be automatically set by the present range.
Return parameter	<NR3>	000.0000~999.9999E±X
Example	CALC:SCAN:LIM:LOW 0.123,maohm	
	Sets the lower limit value to 0.123MΩ.	
	CALC:SCAN:LIM:LOW?	
	>0.1230E+6	
	Returns the lower limit as 0.123MΩ.	

Set →
 → Query

CALCulate:SCAN:LIMit:MODE

Description	Sets or returns the scan function compare mode.	
Syntax	CALCulate:SCAN:LIMit:MODE {ABS DPER}	
Query Syntax	CALCulate:SCAN:LIMit:MODE?	

Parameter/	ABS	The test results are judged from absolute values.
Return parameter	DPER	The test results are judged from a reference value \pm a percentage offset. (delta percent)
Example	<p>CALC:SCAN:LIM:MODE ABS</p> <p>Sets compare mode to absolute values.</p>	



CALCulate:SCAN:LIMit:REFerence

Description	Sets or returns the reference limit for the scan function.	
Syntax	CALCulate:SCAN:LIMit:REFerence {<NRf>[,<String>]}	
Query Syntax	CALCulate:SCAN:LIMit:REFerence?	
Parameter	<NRf>	000.0001~999.9999
	<String>	mohm/ohm/kohm/maohm,unit
		If unit is not set,the unit will be automatically set by the present range.
Return parameter	<NR3>	000.0001~999.9999E \pm X

Example CALC:SCAN:LIM:REF 10.00,mohm

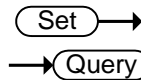
 Sets the reference limit to 10.00mΩ.

 CALC:SCAN:LIM:REF?

 >10.0000E-3

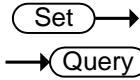
 Returns the reference limit as 10.00mΩ.

CALCulate:SCAN:LIMit:UPPer



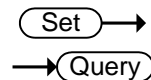
Description	Sets or returns upper limit of the scan function.	
Syntax	CALCulate:SCAN:LIMit:UPPer {<NRf>[,<String>]}	
Query Syntax	CALCulate:SCAN:LIMit:UPPer?	
Parameter	<NRf>	000.0000~999.9999
	<String>	mohm/ohm/kohm/maohm,unit
		If unit is not set, the unit will be automatically set by the present range.
Return parameter	<NR3>	000.0000~999.9999E±X
Example	CALC:SCAN:LIM:UPP 1.37,kohm	
	Sets the upper limit to 1.37kΩ.	
	CALC:SCAN:LIM:UPP?	
	>1.3700E+3	
	Returns the upper limit as 1.37kΩ.	

CALCulate:SCAN:PERCent:LOWer



Description	Sets or returns lower limit percent value for the scan function.	
Syntax	CALCulate:SCAN:PERCent:LOWer <NRf>	
Query Syntax	CALCulate:SCAN:PERCent:LOWer?	
Parameter	<NRf>	000.00~999.99
Return parameter	<NR2>	000.00~999.99
Example	CALC:SCAN:PERC:LOW 10.00 Sets the lower limit percent value to -10.00%. CALC:SCAN:PERC:LOW? >10.00 Returns the lower limit as -10.00%.	

CALCulate:SCAN:PERCent:UPPer



Description	Sets or returns the upper limit percent value for the scan function.	
Syntax	CALCulate:SCAN:PERCent:UPPer <NRf>	
Query Syntax	CALCulate:SCAN:PERCent:UPPer?	
Parameter	<NRf>	000.00~999.99
Return parameter	<NR2>	000.00~999.99

Example

CALC:SCAN:PERC:UPP 90.00

Sets the upper limit percent value to +90.00%.

CALC:SCAN:PERC:UPP?

>90.00

Returns the upper limit as +90.00%.

Memory Commands

MEMory:CLEar



Description Clears the data from the selected memory slot.

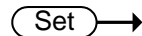
Syntax MEMory:CLEar <NR1>

Parameter <NR1> 1~20

Example MEM:CLE 1

Clear data from memory slot 1.

MEMory:RECall



Description Recalls the settings from the selected memory slot.

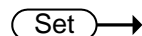
Syntax MEMory:RECall <NR1>

Parameter <NR1> 1~20

Example MEM:REC 1

Recall the settings from memory slot 1.

MEMory:SAVe



Description Saves the settings to the selected memory slot.

Syntax MEMory:SAVe <NR1>



Parameter <NR1> 1~20

Example MEM:SAV 1

Saves the settings to memory slot 1.

MEMory:STATe → Query

Description Returns the status of all the memory slots.

Syntax MEMory:STATe?

Return parameter <String> 23 Characters composed of “N” or “F”, where “N” indicates “Not used” and “F” indicates “Full”.

Example MEM:STAT?

> NFFNN-NNNNN-NNNNN-NNNNN

Indicates that memory slots 2 and 3 have data and that all other memory slots are empty.

Sense Commands

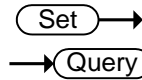
		Set →
		→ Query
<hr/>		
SENSe:AUTO		
<hr/>		
Description	Sets or returns the auto-range state.	
<hr/>		
Syntax	SENSe:AUTO <NR1> {OFF ON}	
Query Syntax	SENSe:AUTO?	
<hr/>		
Parameter/ Return parameter	<NR1>	0:OFF. 1:ON.
	OFF	Auto-Range is off.
	ON	Auto-Range is on.
Example	SENS:AUT ON	
	Sets auto-range mode on.	

		Set →
		→ Query
<hr/>		
SENSe:DISPlay		
<hr/>		
Description	Sets or returns the display mode. There are two display modes, normal and simple.	
<hr/>		
Syntax	SENSe:DISPlay <NR1> {OFF ON}	
Query Syntax	SENSe:DISPlay?	
<hr/>		

Parameter/ Return parameter	<NR1>	0:OFF.
		1:ON.
	OFF	Display mode is normal.
	ON	Display mode is simple.

Example SENS:DISP OFF

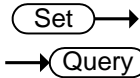
 Sets the display mode to normal.



SENSe:FUNcTion

Description	Sets or returns the function mode.	
Syntax	SENSe:FUNcTion {OHM COMP BIN TC TCONV SCAN DIODE}	
Query Syntax	SENSe:FUNcTion?	
Parameter/ Return parameter	OHM	OHM MODE
	COMP	COMP MODE
	BIN	BIN MODE
	TC	TC MODE
	TCONV	TCONV MODE
	SCAN	SCAN MODE
	DIODE	DIODE MODE

Example SENS:FUNC OHM
 Sets ohm mode on.



SENSe:RANGe

Description Sets or returns the range of the present function.

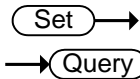
Syntax SENS:RANGe <NRf>

Query Syntax SENS:RANGe?

Parameter <NRf> 5E-2 ~ 5E+6

Return parameter <NR3> 5E-2 ~ 5E+6

Example SENS:RANG 0.05
 Sets range to 50mΩ.
 SENS:RANG?
 >5.0000E-2
 Returns the range as 50mΩ.



SENSe:SPEEd

Description Sets or returns the measurement speed.

Syntax SENS:SPEEd {SLOW|FAST}

Query Syntax SENS:SPEEd?

SLOW Measurement speed is slow.

FAST Measurement speed is fast.

Example SENS:SPE FAST

Sets measurement speed to the fast rate.

Set →

→ Query

SENSE:REL:DATA

Description Sets or returns the relative value for the relative function.

Syntax SENSE:REL:DATA <NRf>

Query Syntax SENSE:REL:DATA?

Parameter <NRf> 0.0000~500.00
 The unit will be auto set by the present range.

Return parameter <NR3> ±0.0000~5.1000E±X

Example SENS:REL:DAT 490.32

Sets the relative function value to 490.32Ω.

SENS:REL:DAT?

>4.9032E+2

Returns the relative value (490.32Ω).

Set →

→ Query

SENSE:REL:STATE

Description Sets or returns the relative function state

Syntax	SENSe:REL:STATe <NR1> {OFF ON}	
Query Syntax	SENSe:REL:STATe?	
Parameter/	<NR1>	0:OFF.
Return parameter		1:ON.
	OFF	Turn the relative function off.
	ON	Turn the relative function on.
Example	SENS:REL:STAT OFF	
	Sets the relative function off.	


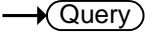
Set →


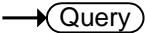
→ Query

SENSe:REALtime:STATe

Description	Sets or returns the real time function state.	
Syntax	SENSe:REALtime:STATe <NR1> {OFF ON}	
Query Syntax	SENSe:REALtime:STATe?	
Parameter/	<NR1>	0:OFF.
Return parameter		1:ON.
	OFF	Turn the real time function off.
	ON	Turn the real time function on.
Example	SENS:REAL:STAT ON	
	Turns the real time function on.	

Source Commands

									
									
SOURce:DRY									
Description	Sets or returns the dry circuit test mode. Only applicable to the RM-805.								
Syntax	SOURce:DRY {<NR1> {OFF ON}}								
Query Syntax	SOURce:DRY?								
Parameter/ Return parameter	<table border="0"> <tr> <td style="padding-right: 20px;"><NR1></td> <td>0:OFF.</td> </tr> <tr> <td></td> <td>1:ON.</td> </tr> <tr> <td>OFF</td> <td>Turn dry circuit test mode off.</td> </tr> <tr> <td>ON</td> <td>Turn dry circuit test mode on.</td> </tr> </table>	<NR1>	0:OFF.		1:ON.	OFF	Turn dry circuit test mode off.	ON	Turn dry circuit test mode on.
<NR1>	0:OFF.								
	1:ON.								
OFF	Turn dry circuit test mode off.								
ON	Turn dry circuit test mode on.								
Example	<p>SOUR:DRY On</p> <p>Turns the dry circuit test mode on.</p>								

	
	
SOURce:DRIVE	
Description	Sets or returns the drive mode.
Syntax	SOURce:DRIVE <NR1>
Query Syntax	SOURce:DRIVE?

Parameter/ Return parameter	<NR1>	1: the DC+ mode. 2: the DC- mode. 3: the PULSE mode. 4: the PWM mode. 5: the ZERO mode.
-----------------------------	-------	---

Example	SOUR:DRIV 3	Sets the drive mode to pulse.
---------	-------------	-------------------------------

Status Commands

STATus:PRESet

Set →

Description Sets the QUESTionable enable register to zero.

Syntax STATus:PRESet <NONE>

Parameter <None>

Set →

STATus:QUESTionable:ENABLE

→ Query

Description Sets or returns the Questionable Data Enable register.

Syntax STATus:QUESTionable:ENABLE <NR1>

Query Syntax STATus:QUESTionable:ENABLE?

Parameter/ Return <NR1> 0~32767
parameter

Example STAT:QUES:ENAB 2560

Sets the Questionable Data Enable register to
000101000000000.

STATus:QUESTionable:EVENT

→ Query

Description Returns the contents of the Questionable Data Event register.



Query Syntax STATus:QUEStionable:EVENT?


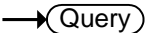
Return parameter <NR1> 0~32767


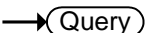
Example STAT:QUES:EVEN?

>512

512 indicates that the Questionable Data Event
register=0000001000000000.

System Commands

		
		
<hr/>		
SYSTem:AVERage:DATa		
<hr/>		
Description	Sets or returns the number of measurements used for the average function.	
<hr/>		
Syntax	SYSTem:AVERage:DATa <NR1>	
Query Syntax	SYSTem:AVERage:DATa?	
<hr/>		
Parameter/ Return parameter	<NR1>	2~100
Example	SYST:AVER:DAT 5	
	5 measurements are used to perform the average function.	

		
		
<hr/>		
SYSTem:AVERage:STATe		
<hr/>		
Description	Sets or returns the average function state.	
<hr/>		
Syntax	SYSTem:AVERage:STATe <NR1> {OFF ON}	
Query Syntax	SYSTem:AVERage:STATe?	
<hr/>		
Parameter/ Return parameter	<NR1>	0:OFF. 1:ON.
	OFF	Turn the average function off.

ON Turn the average function on.

Example SYST:AVER:STAT OFF
Turns the average function off.

SYSTem:BRIGhtness

Set →

→ Query

Description Sets or returns the brightness level.

Syntax SYSTem:BRIGhtness <NR1>

Query Syntax SYSTem:BRIGhtness?

Parameter/ Return <NR1> 1(dim)~5(bright)
parameter

Example SYST:BRIG 4
Turns the brightness level to 4.

SYSTem:ERRor


→ Query

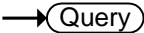
Description Returns the current system error, if any.

Query Syntax SYSTem:ERRor?


Return parameter <String> Error number,"Error message"

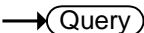
Example SYST:ERR?
>0,"No error".
Indicates that there is no error message.





SYSTem:HANDler					
Description	Sets or returns the handler state.				
Syntax	SYSTem:HANDler {CLEAR HOLD}				
Query Syntax	SYSTem:HANDler?				
Parameter/ Return parameter	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 5px;">Clear</td> <td style="padding: 5px;">It clears the last result before executing measurement.</td> </tr> <tr> <td style="padding: 5px;">HOLD</td> <td style="padding: 5px;">It holds the test result and changes when a different result appears.</td> </tr> </table>	Clear	It clears the last result before executing measurement.	HOLD	It holds the test result and changes when a different result appears.
Clear	It clears the last result before executing measurement.				
HOLD	It holds the test result and changes when a different result appears.				
Example	<p>SYST:HAND HOLD</p> <p>Sets the test result to the hold state.</p>				





SYSTem:KEYClick:BEEPer									
Description	Sets or returns the keyclick beeper state.								
Syntax	SYSTem:KEYClick:BEEPer <NR1> {OFF ON}								
Query Syntax	SYSTem:KEYClick:BEEPer?								
Parameter/ Return parameter	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 5px;"><NR1></td> <td style="padding: 5px;">0:OFF.</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px;">1:ON.</td> </tr> <tr> <td style="padding: 5px;">OFF</td> <td style="padding: 5px;">Turn the keyclick beeper off.</td> </tr> <tr> <td style="padding: 5px;">ON</td> <td style="padding: 5px;">Turn the keyclick beeper on.</td> </tr> </table>	<NR1>	0:OFF.		1:ON.	OFF	Turn the keyclick beeper off.	ON	Turn the keyclick beeper on.
<NR1>	0:OFF.								
	1:ON.								
OFF	Turn the keyclick beeper off.								
ON	Turn the keyclick beeper on.								

Example SYST:KEYC:BEEP OFF

 Sets the keyclick beeper off.

SYSTem:LFRrequency (Set) →
→ (Query)

Description Sets or returns the frequency setting for the line filter.

Syntax SYSTem:LFRrequency {AUTO | 50 | 60}

Query Syntax SYSTem:LFRrequency?

Parameter/ Return parameter	AUTO	The frequency setting for the line filter is automatically detected.
	50	The frequency is 50Hz.
	60	The frequency is 60Hz.

Example SYST:LFR 60

 Sets the line frequency to 60Hz.

 SYST:LFR?

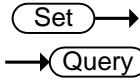
 >60Hz

 Returns the line frequency as 60Hz.

SYSTem:LOCAl (Set) →

Description Enables local control (front panel control) and disables remote control.

SYSTem:MDElay:STATe



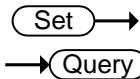
Description Sets or returns the measurement delay function state.

Syntax SYSTem:MDElay:STATe <NR1> | {OFF|ON}

Query Syntax SYSTem:MDElay:STATe?

Parameter/ Return parameter	<NR1>	0:OFF.
		1:ON.
	OFF	Turn the measurement delay off.
	ON	Turn the measurement delay on.

Example SYST:MDEL:STAT OFF
Turns the measurement delay function off.



SYSTem:PWM:ON

Description Sets or returns the duty ON period for the PWM drive mode.

PWM drive mode is only available for the RM-805.

Syntax SYSTem:PWM:ON <NR1>

Query Syntax SYSTem:PWM:ON?



Parameter/ Return parameter	<code><NR1></code>	3~99 Unit: time units. For 60Hz LF, each unit is equal 16.6ms. For 50Hz LF, each unit is equal to 20.0ms.
-----------------------------	--------------------------	--

Example SYST:PWM:ON 5

 Sets the duty ON time to 5 adc units.

Set →
 → Query

SYSTem:PWM:OFF

Description	Sets or returns the duty OFF period for the PWM drive mode.	
-------------	---	--

Syntax	SYSTem:PWM:OFF <NR1>	
--------	----------------------	--

Query Syntax	SYSTem:PWM:OFF?	
--------------	-----------------	--

Parameter/ Return parameter	<code><NR1></code>	100~9999 Unit:ms
-----------------------------	--------------------------	-------------------------

Example SYST:PWM:OFF 200

 Sets the duty OFF period to 200 ms.

SYSTem:SERial → Query

Description	Returns the serial number.	
-------------	----------------------------	--

Query Syntax	SYSTem:SERial?	
--------------	----------------	--

Return parameter	<code><String></code>	9 characters
------------------	-----------------------------	--------------

Example SYST:SER?
 > GXXXXXXXX

SYSTem:VERSion → Query


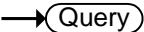
Description Returns the SCPI version of the device.

Query Syntax SYSTem:VERSion?

Return parameter <String> 10 characters

Example SYST:VERS?
 >SCPI1994.0.
 SCPI version: 1994

Temperature Commands

		
		
<hr/>		
TEMPerature:AMBient:DATA		
<hr/>		
Description	Sets or returns the user-set ambient temperature value for the temperature compensation and the temperature conversion function.	
<hr/>		
Syntax	TEMPerature:AMBient:DATA <NRf>	
Query Syntax	TEMPerature:AMBient:DATA?	
<hr/>		
Parameter/ Return parameter	<NRf>	-50.0~399.9 (Unit: °C)
	<NR2>	-50.0~399.9 (Unit: °C)
Example	TEMP:AMB:DAT 25.6 Sets the user ambient temperature value to +25.6°C. TEMP:AMB:DAT? >25.6 Returns the set ambient temperature as 25.6°C.	

		
		
<hr/>		
TEMPerature:AMBient:STATE		
<hr/>		

Description	Sets or returns the state of the user-set ambient temperature.	
<hr/>		

Syntax TEMPerature:AMBient:STATe <NR1> | {OFF|ON}

Query Syntax TEMPerature:AMBient:STATe?

Parameter/ Return parameter	<NR1>	0:OFF.
		1:ON.
	OFF	Disables the user-set ambient temperature.
	ON	Enables the user-set ambient temperature.

Example TEMP:AMB:STAT OFF

Disables the user-set ambient temperature.

Set →

TEMPerature:COMPensate:COEFficient

→ Query

Description Sets or returns the temperature coefficient for temperature compensation function.

Syntax TEMPerature:COMPensate:COEFficient <NR1>

Query Syntax TEMPerature:COMPensate:COEFficient?

Parameter/ Return parameter	< NR1>	-9999~+9999

Example TEMP:COMP:COEF 3930

Sets the temperature coefficient to 3930ppm.

Set →
 → Query

TEMPerature:COMPensate:CORRect		
Description	Sets or returns the reference temperature for the temperature compensation function.	
Syntax	TEMPerature:COMPensate:CORRect <NRf>	
Query Syntax	TEMPerature:COMPensate:CORRect?	
Parameter/ Return parameter	<NRf>	-50.0~399.9 (Unit: °C)
	<NR2>	-50.0~399.9 (Unit: °C)
Example	TEMP:COMP:CORR 25.5	
	Sets the reference temperature to 25.5°C.	

Set →
 → Query

TEMPerature:CONVersion:CONStant		
Description	Sets or returns the temperature constant for the temperature conversion function.	
Syntax	TEMPerature:CONVersion:CONStant <NRf>	
Query Syntax	TEMPerature:CONVersion:CONStant?	
Parameter/ Return parameter	<NRf>	0.0~999.9
	<NR2>	0.0~999.9
Example	TEMP:CONV:CONS 235	
	Sets the temperature constant to 235.	

TEMPerature:CONVersion:DISP

Set →


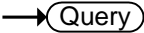
→ Query


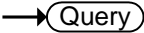
Description	Sets or returns the temperature display mode for the temperature conversion function.	
Syntax	TEMPerature:CONVersion:DISP <NR1>	
Query Syntax	TEMPerature:CONVersion:DISP?	
Parameter/ Return parameter	<NR1>	1:ΔT 2:T
Example	TEMP:CONV:DISP 1 Sets the temperature display mode for the temperature conversion function is ΔT.	

TEMPerature:CONVersion:MATH:DATA

→ Query

Description	Returns conversion function deviation value.	
Query Syntax	TEMPerature:CONVersion:MATH:DATA?	
Parameter	<NR3>	±0.000~9.999E±X
Example	TEMP:CONV:MATH:DAT? Returns 1.250E+2.	

TEMPerature:CONVersion:RESistance		 → → 									
Description	Sets or returns the initial resistance for the temperature conversion function.										
Syntax	TEMPerature:CONVersion:RESistance {<NRf>[,<String>]}										
Query Syntax	TEMPerature:CONVersion:RESistance?										
Parameter	<table border="0" style="width: 100%;"> <tr> <td style="width: 15%;"><NRf></td> <td style="width: 35%;">000.0001~999.9999</td> <td></td> </tr> <tr> <td><String></td> <td>mohm/ohm/kohm/maohm,unit</td> <td></td> </tr> <tr> <td></td> <td colspan="2">If the unit is not set, the unit will be automatically set by the present range.</td> </tr> </table>		<NRf>	000.0001~999.9999		<String>	mohm/ohm/kohm/maohm,unit			If the unit is not set, the unit will be automatically set by the present range.	
<NRf>	000.0001~999.9999										
<String>	mohm/ohm/kohm/maohm,unit										
	If the unit is not set, the unit will be automatically set by the present range.										
Return parameter	<NR3> 000.0001~999.9999E±X										
Example	<p>TEMP:CONV:RES 10.00,maohm</p> <p>Sets initial resistance value to 10.00MΩ.</p> <p>TEMP:CONV:RES?</p> <p>>10.0000E+6</p> <p>Returns the initial resistance as 10.00MΩ.</p>										

TEMPerature:CONVersion:TEMPerature		 → → 
Description	Sets or returns the initial temperature for the temperature conversion function.	

Syntax TEMPerature:CONVersion:TEMPerature <NRf>

Query Syntax TEMPerature:CONVersion:TEMPerature?

Parameter <NRf> -50.0~399.9 (Unit: °C)

Return parameter <NR2> -50.0~399.9 (Unit: °C)

Example TEMP:CONV:TEMP 25.6

 Sets the initial temperature to +25.6°C.

TEMPerature:DATa

→ Query

Description Returns the PT-100 sensor temperature measurement in degrees Celsius.

Query Syntax TEMPerature:DATa?

Return parameter <NRf> -50.0~399.9 (Unit: °C)

Example TEMP:DAT?

>0.250E+2

 Returns the temperature as 25°C.

Set →

TEMPerature:STATe

→ Query

Description Sets or returns the temperature function state.

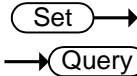
Syntax TEMPerature:STATe {<NR1>|OFF|ON}

Query Syntax TEMPerature:STATe?

Parameter/ Return parameter	<NR1>	0:OFF
		1:ON
	OFF	Turn the temp function off.
	ON	Turn the temp function on.

Example TEMP:STAT ON

 Sets the temp function on.



TEMPerature:UNIT

Description Sets or returns the temperature unit. (Only used for the display readback.)

Syntax TEMPerature:UNIT {DEGC|DEGF}

Query Syntax TEMPerature:UNIT?

Parameter/ Return parameter	DEGC	°C
	DEGF	°F

Example TEMP:UNIT DEGF

 Sets temperature unit to °F (Fahrenheit).

Trigger Commands

READ



Description Returns the measurement value.

Query Syntax READ?

Return parameter <NR3> ±0.0000~5.1000E±X

Example READ?
>+2.2012E+0

Returns the measurement.

MEASure<X>



Description Returns the PT-100 sensor temperature measurement in degrees Celsius.

Query Syntax MEASure<X>?

Parameter <X> Channel 1~100

Return parameter 0|1|2,<NR3> 0:LO
1:IN
2:HI
<NR3>: Measurement result.

Example MEAS1?
 >1,+0.9978E+1
 Returns channel 1 as 9.978Ω.

SHOW → Query

Description Returns the judgments of all (up to 100) channels in the scan mode.

Query Syntax SHOW?

Return parameter	<String>	100 characters 0:LO 1:IN 2:HI _:Channel not active
------------------	----------	--

Example SHOW?
 Returns 111111111_____

TRIGger:EDGE Set →
→ Query

Description Sets or returns the trigger edge (falling or rising edge).

Syntax TRIGger:EDGE {RISING|FALLING}

Query Syntax TRIGger:EDGE?

Parameter/ Return parameter	RISING	Select rising trigger.
	FALLING	Select falling trigger.

Example TRIG:EDGE FALLING

Sets the trigger to falling edge.

Set →

TRIGger:DELAy:DATA

→ Query

Description Sets or returns the trigger delay time.

Syntax TRIGger:DELAy:DATA <NR1>

Query Syntax TRIGger:DELAy:DATA?

Parameter/ Return parameter	<NR1>	0~1000
		Unit:ms

Example TRIG:DEL:DAT 100

Sets the trigger delay time to 100ms.

Set →

TRIGger:DELAy:STATE

→ Query

Description Sets or returns the trigger delay function state.

Syntax TRIGger:DELAy:STATE <NR1> | {OFF|ON}

Query Syntax TRIGger:DELAy:STATE?

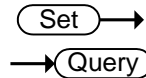


Parameter/ Return parameter	<NR1>	0:ON 1:OFF
	OFF	Turn the trigger delay function off.
	ON	Turn the trigger delay function on.

Example TRIG:DEL:STAT OFF

 Turns the trigger delay function off.

TRIGger:SOURce



Description Sets or returns current trigger source.

Syntax TRIGger:SOURce {INT|EXT}



Query Syntax TRIGger:SOURce?



Parameter/ Return parameter	INT	Internal trigger mode.
	EXT	External trigger mode.

Example TRIG:SOUR EXT

 Sets the current trigger source to external trigger.

Userdefine Commands

							
							
USERdefine<X>:ACTIVE							
Description	Sets or returns the active output state of the selected Userdefine pin.						
Syntax	USERdefine<X>:ACTIVE <NR1>						
Query Syntax	USERdefine<X>:ACTIVE?						
Parameter/ Return parameter	<table border="0"> <tr> <td style="background-color: #cccccc; padding: 2px;"><X></td> <td>Userdefine pin 1~2</td> </tr> <tr> <td style="background-color: #cccccc; padding: 2px;"><NR1></td> <td>1:active low state</td> </tr> <tr> <td style="background-color: #cccccc; padding: 2px;"></td> <td>2:active high state</td> </tr> </table>	<X>	Userdefine pin 1~2	<NR1>	1:active low state		2:active high state
<X>	Userdefine pin 1~2						
<NR1>	1:active low state						
	2:active high state						
Example	<p>USER1:ACT 1</p> <p>Sets the userdefine1 pin IO to active low state.</p>						

			
			
USERdefine<X>:FIRStdata			
Description	Sets or returns the first operand for the selected user define pin.		
Syntax	USERdefine<X>:FIRStdata <NR1>		
Query Syntax	USERdefine<X>:FIRStdata?		
Parameter/ Return	<table border="0"> <tr> <td style="background-color: #cccccc; padding: 2px;"><X></td> <td>Userdefine pin 1~2</td> </tr> </table>	<X>	Userdefine pin 1~2
<X>	Userdefine pin 1~2		

parameter	<NR1>	1~8:bin1~bin8 state 9:bin out state 10:hi state 11:low state 12:pass state 13:fail state
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Example USER1:FIRS 12

 Sets first operand of userdefine1 as pass state.

USERdefine<X>:LOGic





Description	Sets or returns operator for the selected user define pin.
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Syntax	USERdefine<X>:LOGic <NR1>
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Query Syntax	USERdefine<X>:LOGic?
--------------	----------------------

Parameter/ Return	<X>	Userdefine pin 1~2
parameter	<NR1>	1:off(only judge first data) 2:logical and. 3:logical or.

Example USER1:LOG 1

 Sets the operator of userdefine1 to off. (I.e., only the first operand determines the output of userdefine1.)

Set →

→ Query

USERdefine<X>:SEConddata

Description Sets or returns the second operand for the selected user define pin.

Syntax USERdefine<X>:SEConddata <NR1>

Query Syntax USERdefine<X>:SEConddata?

Parameter/ Return parameter	<X>	1~2
	<NR1>	1~8:bin1~bin8 state 9:bin out state 10:hi state 11:low state 12:pass state 13:fail state

Example USER1:SEC 3

Sets the last operand of userdefine1 as the state of the bin3 result.

IEEE 488.2 Common Commands

*CLS

Set →

Description Clears the Event Status register (Output Queue, Operation Event Status, Questionable Event Status, Standard Event Status).

Syntax *CLS

Parameter <None>

*ESE

Set →
→ Query

Description Sets or returns the ESER (Event Status Enable Register) contents.

Syntax *ESE <NR1>

Query Syntax *ESE?

Parameter/ Return parameter <NR1> 0~255

Example *ESE 65

 Sets the ESER to 01000001

 *ESE?

 >130

 ESER=10000010

***ESR** → Query

Description Returns SESR (Standard Event Status Register) contents.

Query Syntax *ESR?

Return parameter <NR1> 0~255

Example *ESR?

 >198

 SESR=11000110

***IDN** → Query

Description Returns the manufacturer, model No., serial number and system version number.

Query Syntax *IDN?

Return parameter <String> 31 characters

***SRE**

Set →

→ Query

Description Sets or returns the SRER (Service Request Enable Register) contents.

Syntax *SRE <NR1>

Query Syntax *SRE?

Parameter/ <NR1> 0~255

Return parameter

Example *SRE 7

Sets the SRER to 00000111

*SRE?

>3

SRER=00000011

***STB**

→ Query

Description Returns the SBR (Status Byte Register) contents.

Query Syntax *STB?

Return parameter <NR1> 0~255



Example *STB?
 >81
 SESR=01010001

***TRG**



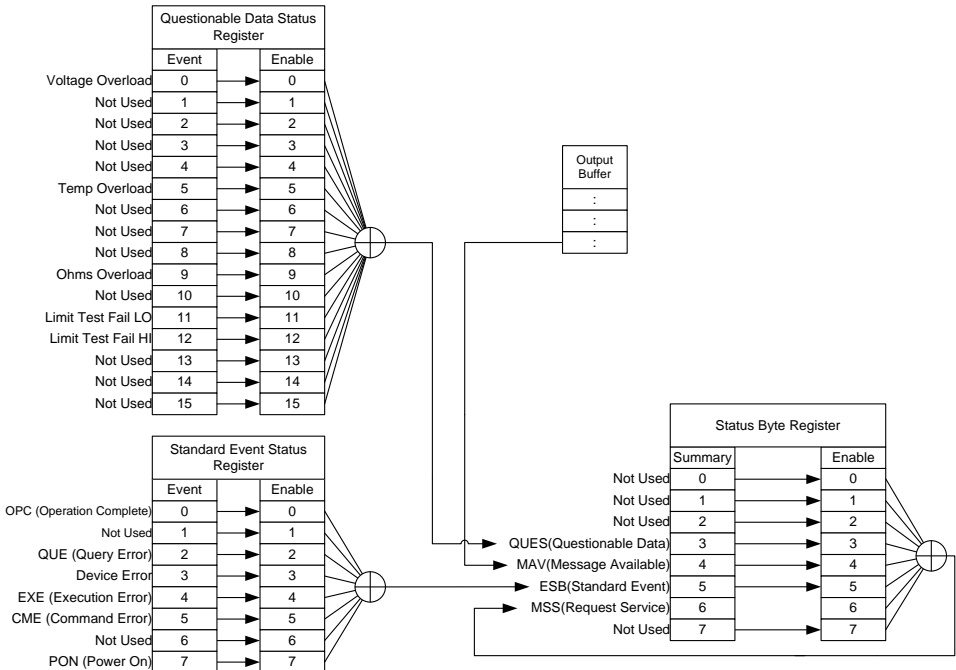
Description Manually triggers the instrument.

Syntax *TRG

Parameter <None>

Status system

The diagram below is a description of the status system.



For the following command sets, please refer to the diagram above:

STAT: QUES: EVEN?

STAT: QUES: ENAB

STAT: QUES: ENAB?

*ESR?

*ESE

*ESE?

*STB?

*SRE

*SRE?

F_{FAQ}

Q1. What are the different measurement speeds?

A1. There are two measurement speeds for both resistance and temperature measurement. At the slow measurement rate, the measurement speed is 10 samples/s and at the fast measurement rate the measurement speed is at 60 samples/s.

Q2. The RM-804/805 performance does not match the specifications

A2. Make sure the device is powered on for at least 30 minutes, is operated at the slow measurement rate and is within +18°C~+28°C with a humidity not exceeding 80%. This is necessary to stabilize the unit to match the specifications..

For more information, contact your local dealer or RS PRO at www.rs-components.com.

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Function Selection Combinations

Function Combination Table

The following table shows which functions can be used with the Relative, Drive and Dry Circuit functions.

Combinations

Function	Rel	Dry(*1)	Drive(*2)
Ohm	✓	✓	✓
Comp	✓	✓	✓
Bin	✓	✓	✓
TC	✓	✓	✓
Tconv	✓	✓	✓
Temp	✓	✓	✓
Scan	✗	✗	✗
Diode	✗	✗	✗

*1. When the Dry Circuit measurement function is turned on, only the DC+, DC- and Pulse signals can be selected.

*2. The “Zero” drive setting is only available for the Ohm measurement function.

Temperature Measurement

Reference Temperature Table

Overview The International Temperature Scale (ITS) is based on the
 Background following table. The table has 17 fixed calibration points as of
 1990.

Element		Type	Temperature	
			°K	°C
(H ₂)	Hydrogen	Triple point	13.8033	-259.3467
(Ne)	Neon	Triple point	24.5561	-248.5939
(O ₂)	Oxygen	Triple point	54.3584	-218.7916
(Ar)	Argon	Triple point	83.8058	-189.3442
(Hg)	Mercury	Triple point	234.325	-38.8344
(H ₂ O)	Water	Triple point	273.16	+0.01
(Ga)	Gallium	Melting point	302.9146	29.7646
(In)	Indium	Freezing point	429.7485	156.5985
(Sn)	Tin	Freezing point	505.078	231.928
(Zn)	Zinc	Freezing point	692.677	419.527
(Al)	Aluminum	Freezing point	933.473	660.323
(Ag)	Silver	Freezing point	1234.93	961.78
(Au)	Gold	Freezing point	1337.33	1064.18

RTD Sensors

Overview Resistive Thermal Devices (RTDs) are commonly used as temperature sensors. RTDs change resistance linearly over a specific range of temperature. The table below shows some of the inherent features of RTDs compared to thermocouples.

Feature	Description
Accuracy	Higher accuracy
Resolution	0.1~1.0°C, higher resolution
Speed of response	Slower
Self-heating	Yes
Long term stability	Good
Output characteristics	Approx. 0.4ohm/°C, near linear

Optional Platinum Sensor

Introduction The optional platinum sensor is a PT-100 sensor. The PT-100 sensor meets the German DIN43760: 1968 3 wire measurement specification.

These sensors are one of the most common temperature sensors used in industry. These sensors have a nominal resistance of 100Ω at 0°C.

The relationship between temperature and resistance for the PT-100 sensor can be described with the Gallendarvan Dusen

equation shown below:

$$R_{RTD} = R_0 [1 + AT + BT^2 + CT^3 (T - 100)]$$

Where: RRTD is the calculated resistance of the RTD.

R_0 is the known RTD resistance at 0°C.

T is the temperature in °C

$$A = \alpha [1 + (\delta/100)]$$

$$B = -1(\alpha)(\delta)(1e-4)$$

$$C = -1(\alpha)(\beta)(1e-8)$$

The Alpha (A), Beta (B), Delta (D) values for the PT-100 sensor are listed below:

Type	Standard	Alpha	Beta	Delta	$\Omega @ 0^\circ\text{C}$
PT-100	ITS90	0.003850	0.10863	1.49990	100 Ω

Temperature Calculation Example
 Example—Calculating the resistance of a PT-100 RTD at 100°C (T). The following R_0 (Ω at 0°C), alpha, beta, and delta values are used for the PT-100 RTD:

$$T = 100^\circ\text{C}$$

$$R_0 (\Omega \text{ at } 0^\circ\text{C}) = 100\Omega$$

$$\text{Alpha} = 0.003850$$

$$\text{Beta} = 0.10863$$

$$\text{Delta} = 1.49990$$

A, B, and C are calculated according to equations listed above:

$$A=0.00391$$

$$B=5.77e-7$$

$$C=4.18e-12$$

The resistance of the RTD at 100°C (R_{100}) is then calculated as follows:

$$\begin{aligned} R_{100} &= R_0[1+AT+BT^2+CT^3(T-100)] \\ &= 100\{1+[(0.00391)(100)]+[-5.77e-7)(100^2)+[-4.18E- \\ &\quad 12)(100^3)(100-100)]\} \\ &= 138.5\Omega \end{aligned}$$

Specifications

Conditions	The specifications are applicable under the following conditions:
Background	<ul style="list-style-type: none"> • A 1-year calibration cycle. • An operating temperature of 18 to 28 °C (64.4 to 82.4°F). • Relative humidity not exceeding 80%. • Accuracy is expressed as \pm(percentage of reading + percentage of range). • The instrument requires 30 minutes warm-up time and must be operated at the slow measurement rate to achieve rated accuracy. • The power cord protective grounding conductor must be connected to ground.

Resistance Measurement

50000 counts

Range	Resolution	Measuring Current	Accuracy	Open-Terminal Voltage
50m Ω	1 $\mu\Omega$	1A	$\pm(0.1\%+0.02\%)$	~6.5V
500m Ω	10 $\mu\Omega$	100mA	$\pm(0.05\%+0.02\%)$	~6.5V
5 Ω	100 $\mu\Omega$	100mA	$\pm(0.05\%+0.02\%)$	~6.5V
50 Ω	1m Ω	10mA	$\pm(0.05\%+0.02\%)$	~6.5V

500Ω	10mΩ	1mA	$\pm(0.05\%+0.008\%)$	~6.5V
5kΩ	100mΩ	100μA	$\pm(0.05\%+0.008\%)$	~6.5V
50kΩ	1Ω	100μA	$\pm(0.05\%+0.008\%)$	~6.5V
500kΩ	10Ω	10μA	$\pm(0.05\%+0.008\%)$	~6.5V
5MΩ	100Ω	1μA	$\pm(0.2\%+0.008\%)$	~6.5V

*When the instrument is set to 50mΩ or 500mΩ ranges, the resistance value will be changed while connecting or disconnecting the test lead to the panel due to the different temperature between internal and external parts of the instrument.

Therefore, please wait 1 minute in order to obtain an accurate value after the test leads have been connected or disconnected.

* When Kelvin clips are used to resume testing after a long period of time, please wait for a short time to stabilize the measurement.

*Fast and Slow measurement rates have the same specifications. However, the Slow rate is more accurate as it will correct for any errors associated with temperature drift that occurs from the difference between the measurement temperature and the calibration temperature.

Measurement	Four-terminal method.
Auto-ranging	Provided.
Over input range	“-----” indicates over range
Comparator	20 sets of comparator status can be selected.
Buzzer mode switchable	OFF, PASS, FAIL

Dry Resistance Measurement

Range	Measuring Current	Accuracy
500mΩ	100mA	±(0.3%+0.05%)
5Ω	10mA	±(0.3%+0.05%)
50Ω	1mA	±(0.3%+0.05%)

Temperature Measurement

Temperature sensor (option)	Platinum resistor. Lead length: 1.5m approx.
-10°C ~40°C	0.3%±0.5°C
Other	0.3%±1.0°C

Temperature Correction Function

Reference temperature range	-50.0°C~399.9°C
Thermal coefficient range	±9999 ppm
Temperature range	Accuracy of temperature compensation for 3930 ppm/Cu wire.*
-10°C~40.0°C	0.3%+resistance measurement accuracy.
Other	0.6%+resistance measurement accuracy.



*The temperature coefficient for the other settings must be calculated individually according to different conditions.

*If the temperature coefficient or the difference between the environmental temperature and the required temperature exceeds normal operation, after calculating the compensation, the variation to the reading value will be significant.

*When using the PT-100 temperature sensor for temperature measurements, the accuracy of the sensor (typical accuracy of $<\pm 0.5^{\circ}\text{C}$) should also be taken into account and calculated for.

Interface

Handler interface*	Signal: Trigger: TTL input Signal: LOW, HIGH, FAIL, PASS, EOT, READY, BIN 1~8, BIN OUT: total 15 TTL outputs.
Scan*	Signal: RELAY, PASS, LOW, HIGH, CLOCK, STRB total 6 TTL outputs.
Communication Interfaces	RM-804: USB/RS-232 RM-804G: USB/RS-232/GPIB RM-805: USB/RS-232/GPIB
*The Scan and Handler interface use the same connector.	

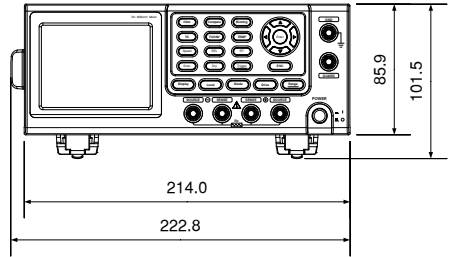
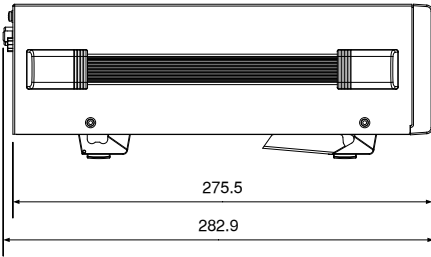
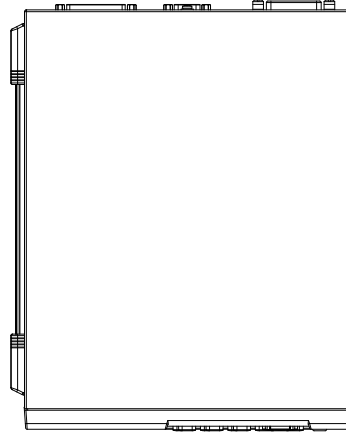
Environmental

Operation Environment	Indoor use, altitude up to 2000m. Operation Environment: 0°C to 40°C. Temperature Range: 0 ~ 35°C, Relative Humidity: <80%RH; >35°C, Relative Humidity: <70%RH. Pollution Degree 2
Thermal coefficient range	-10°C to 70°C. Temperature Range: 0 ~ 35°C, Relative Humidity: <90%RH; >35°C, Relative Humidity: <80%RH

General

Power source	AC 100-240V \pm 10%, 50-60Hz, 25VA
Accessories	Power cord x1 Test lead: GTL-308 x1 User manual x1 (CD) Safety instruction sheet x1 USB cable (option): GTL-246 Temperature sensor (option): PT-100
Dimension	223(W) \times 102(H) \times 283(D) mm
Weigh	Approx. 3 kg

Dimensions



Declaration of Conformity

We declare that the below mentioned product

Type of Product: **DC Milliohm Meter**

Model Number: **RM-804, RM-805**

satisfies all the technical relations application to the product within the scope of council:

Directive: 2014/30/EU; 2014/35/EU; 2011/65/EU; 2012/19/EU

The above product is in conformity with the following standards or other normative documents:

◎ EMC	
EN 61326-1: EN 61326-2-1:	Electrical equipment for measurement, control and laboratory use — EMC requirements (2013)
Conducted & Radiated Emission EN 55011: 2009+A1: 2010	Electrical Fast Transients EN 61000-4-4: 2012
Current Harmonics EN 61000-3-2: 2014	Surge Immunity EN 61000-4-5: 2006
Voltage Fluctuations EN 61000-3-3: 2013	Conducted Susceptibility EN 61000-4-6: 2014
Electrostatic Discharge EN 61000-4-2: 2009	Power Frequency Magnetic Field EN 61000-4-8: 2010
Radiated Immunity EN 61000-4-3: 2006+A1: 2008 +A2: 2010	Voltage Dip/ Interruption EN 61000-4-11: 2004

Low Voltage Equipment Directive 2014/35/EU	
Safety Requirements	EN 61010-1: 2010; EN 61010-2-030: 2010



Limited Warranty

This meter is warranted to the original purchaser against defects in material and workmanship for 3 years from the date of purchase. During this warranty period, RS Components will, at its option, replace or repair the defective unit, subject to verification of the defect or malfunction. This warranty does not cover fuses, disposable batteries, or damage from abuse, neglect, accident, unauthorized repair, alteration, contamination, or abnormal conditions of operation or handling. Any implied warranties arising out of the sale of this product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. RS Components shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expense or economic loss. Some states or countries laws vary, so the above limitations or exclusions may not apply to you. For full terms and conditions, refer to the RS PRO website.

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