D.C. Milli-Ohm Meter

GOM-802

USER MANUAL

GW INSTEK PART NO. 82OM-80200MD1

ISO-9001 CERTIFIED MANUFACTURER

The information in this manual was correct at the time of printing. However, Good Will continues to improve products and reserves the right to change specifications, equipment, and maintenance procedures at any time without notice.

Good Will Instrument Co., Ltd.

No. 7-1, Jhongsing Rd., Tucheng Dist., New Taipei City 236, Taiwan.

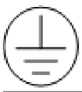
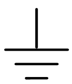
Table of Contents

SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow when operating the GOM-802 or when keeping it in storage. Read the following before any operation to insure your safety and to keep the GOM-802 in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the GOM-802.

	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 GOM-802 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 Guideline

CAUTION

- Do not place any heavy objects on the GOM-802.
- Avoid severe impact or rough handling that leads to damaging the GOM-802.
- Do not discharge static electricity to the GOM-802.
- Use only mating connectors, not bare wires, for the terminals.
- Do not disassemble the GOM-802 unless you are qualified as service personnel.

(Note) EN 61010-1:2001 specifies the measurement categories and their requirements as follows. The GOM-802 falls under category I.

- 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

WARNING

- AC Input voltage: 100V/ 120V/ 220V/230 V AC, 50/60Hz, 27VA, 22W
- 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.

Fuse

WARNING

- Fuse type:

Line Voltage	Rating	Fuse
100V	90-110V	T0.3A 250V
120V	108-132V	T0.3A 250V
220V	198-242V	T0.25A 250V
230V	216-250V	T0.25A 250V

- Make sure the correct type of fuse is installed before power up.
- To avoid fire, only replace the fuse with the specified type and rating.
- Disconnect the power cord before fuse replacement.
- Make sure the cause of a fuse blowout is fixed before fuse replacement.

Cleaning the GOM-802	• Disconnect the power cord before cleaning. • Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid into the GOM-802. • Do not use chemicals or cleaners containing harsh material such as benzene, toluene, xylene, and acetone.
Operation Environment	• Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below) • Relative Humidity: < 80% • Altitude: < 2000m • Temperature: 0°C to 40°C (operation)
	(Note) EN 61010-1:2001 specifies the pollution degrees and their requirements as follows. The GOM-802 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 • Temperature: −10°C to 70°C
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

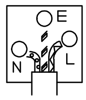
When using the GOM-802 in the United Kingdom, make sure the power cord meets the following safety instructions.

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 GOM-802 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 GW Instek continues to improve its products, changes can occur at any time without notice. Please see the GW Instek website for the latest information and content.

GOM-802 Characteristics

GOM-802 is a high precision programmable DC Milli-ohm meter suitable for low resistance measurements of switches, relays, connectors, PCB tracks and a variety of other devices. With the easy-to-use features, superior performance, and automatic test interfaces, the GOM-802 is a dependable instrument for resistance measurements.

Easy to Use Features

The GOM-802 includes an easy to use comparator function (HI-LO-GO) that is able to easily set upper and lower limits for pass/fail testing. The alarm buzzer can be used with the comparator function. The flexible handler interface can be used to monitor the status of the pass/fail testing.

The relative feature enables the GOM-802 to easily compensate for any stray resistance. Up to 20 different sets of HI-LO-GO settings can be stored to satisfy a number of different testing conditions. The GOM-802 is also able to recall the last test setting that was used every time it is turned on.

Performance

The GOM-802 has nine selectable measurement ranges from 30mΩ to 3MΩ, a constant current source of 1uA to 1A, an accuracy of 0.05%, a 1uΩ resolution and performs measurements using four wire Kelvin connections for accurate, consistent measurements.

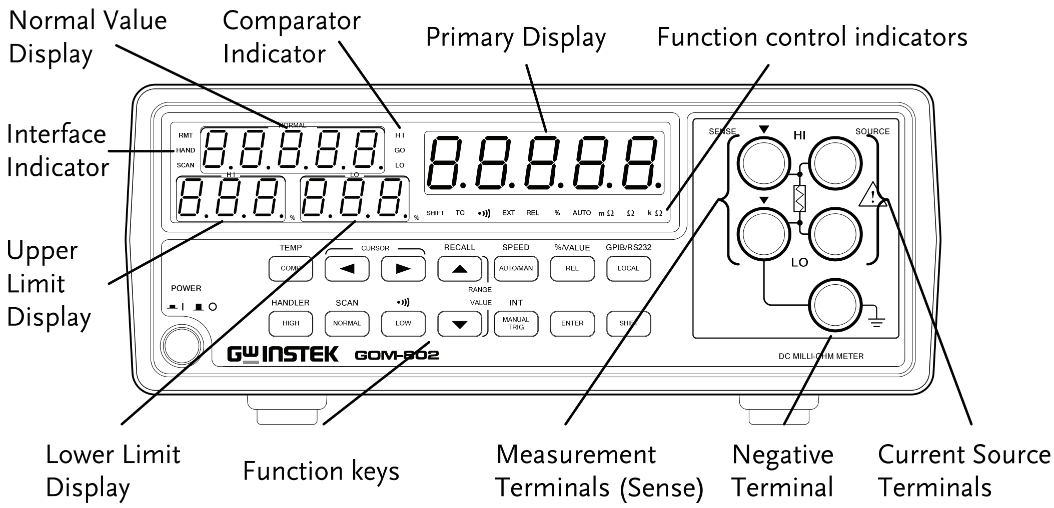
The ability to choose between high measurement accuracy with 7 samples/sec (full scale at 30000) or high speed measurements with 30 samples/sec (full scale at 3000) allows the GOM-802 the flexibility to fulfill a number of different measurement roles.

Temperature Compensation	Temperature Compensation (Optional): The optional temperature probe (PT-100) can be used to extrapolate the resistance of a DUT at a certain temperature. When the temperature coefficient and the required temperature (of the resistance measurement) is keyed in under TC mode, the GOM-802 will display the extrapolated measurement.
Automatic Testing	For automatic testing The GOM-802 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. An RS-232 and GPIB option is also available for computer control applications.
Applications	• 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.

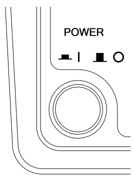
Key Features

- 30,000 counts.
- Measurement Range: 30mΩ~3MΩ.
- 0.05% accuracy.
- Hi/Lo comparator and limit percentage setting with 20 memory sets.
- REL, Actual and % value measurements.
- Manual or Auto-ranging.
- Continuous or Triggered measurement modes.
- Temperature compensation and measurement.
- Four-wire measurement method.
- Auto-recall last setting on power-up.
- Diode test.
- Alarm setting for PASS/FAIL test result.
- Sampling rate: 7 or 30 sampling/sec.
- Standard interface: Scan/Handler, optional interfaces: RS-232 + GPIB.

Front Panel Overview



Power Switch

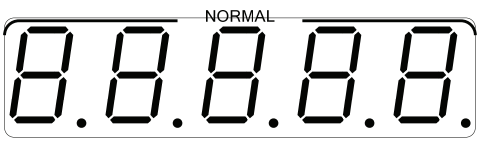


Turns On or Off the main power. For details about the power up sequence, see page 18.

Primary Value Display

Shows the primary measurement results.

Normal Display



Shows the Normal (nominal) value setting.

Comparator Indicators

HI

GO

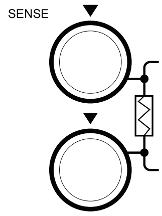
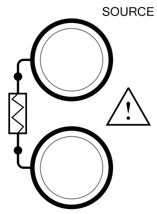
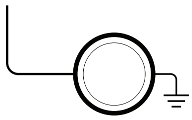
LO

The comparator indicators indicate the status of comparison judgments.

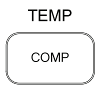
HI: measurement exceeds the HI limit

LO: measurement exceeds the LO limit

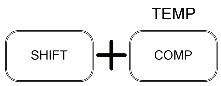
GO: measurement is within the HI and LO limits.

Function Control Indicators	SHIFT TC •))) EXT REL % AUTO mΩ Ω kΩ Indicates when a function key is active.	
Measurement Terminals		Sense HI and Sense LO terminals.
Current Source Terminals		Current Source Terminals, Source HI and Source LO.
Negative Terminal		Negative Terminal. This terminal has the same potential as earth, but cannot be substituted for it.

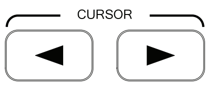
Function Keys



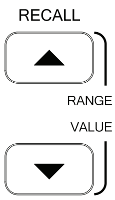
The COMP^{TEMP} key activates the comparator function. The secondary function turns on the temperature compensation function.



- Temperature compensation

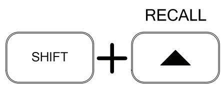


The Cursor keys are used to edit parameters and navigate the menu tree.

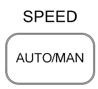


The Up/Down arrow keys are used to change the values and range of the different parameters.

The secondary function recalls previously saved settings.



- Recall settings



The AUTO/MAN^{SPEED} key toggles the range between automatic and manual and toggles between 7 samples per second and 30 samples per second.

SHIFT + SPEED AUTO/MAN

- Sample speed

%/VALUE REL

The REL%^{VALUE} key is used to perform a zero adjustment to the test leads or a DUT. Using the shift key will display the measured values as a percentage of the normal value.

SHIFT + %/VALUE REL

- Percentage values

GPIB/RS232 LOCAL

The LOCAL$^{GPIB/RS232}$ key will switch the milliohm meter between local and remote mode.

The secondary function will set the I/O interface to GPIB or RS-232.

SHIFT + GPIB/RS232 LOCAL

- GPIB/ RS232 mode

HANDLER HIGH

Sets the High limit % values. The secondary function activates the Handler function.

SHIFT + HANDLER HIGH

- Handler mode

SCAN NORMAL

Sets the normal (Nominal) value for the comparator function.

SHIFT + SCAN NORMAL

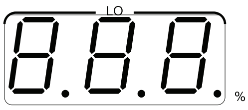
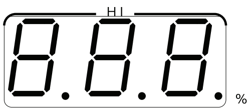
- Scan function

•))) LOW

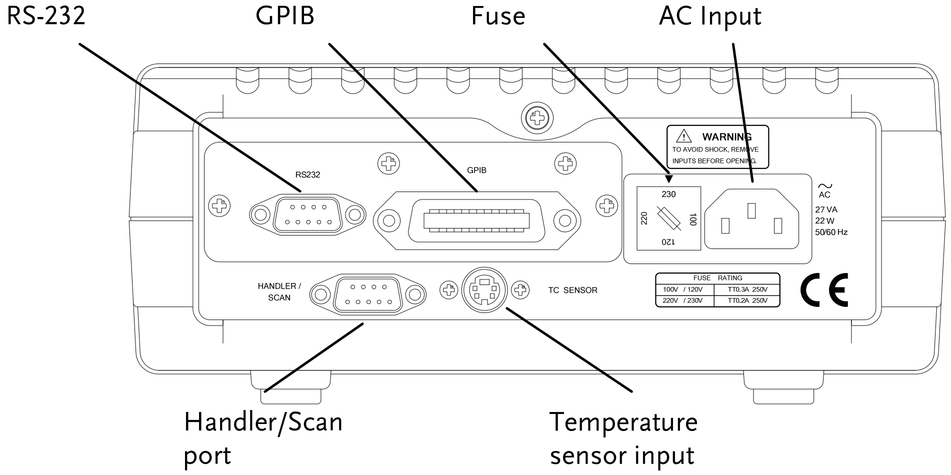
Sets the lower % limit for the comparator function and turns the buzzer on for either a PASS or FAIL judgment or turns the buzzer off.

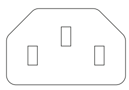
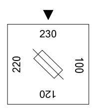
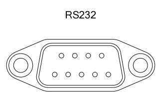
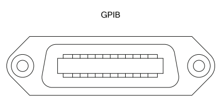
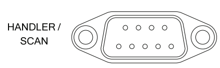
SHIFT + •))) LOW

- Buzzer ON/OFF

	INT MANUAL TRIG	Turns the external trigger on to allow the MANUAL TRIG TRIG key to be used as a manual trigger. The secondary function will set the trigger to internal. SHIFT + INT MANUAL TRIG — • Turns the internal trigger ON/OFF
	ENTER	Enter key.
	SHIFT	The SHIFT key is used to access the secondary functions.
Lower Limit Display (LO)		Displays the lower limit as as a percentage.
Upper Limit Display (HI)		Displays the upper limit as a percentage.
Interface Indicator	RMT HAND SCAN	The interface indicator shows the status mode of the GOM-802. Remote mode (RMT), Handler mode (HAND) or Scan mode.

Rear Panel Overview



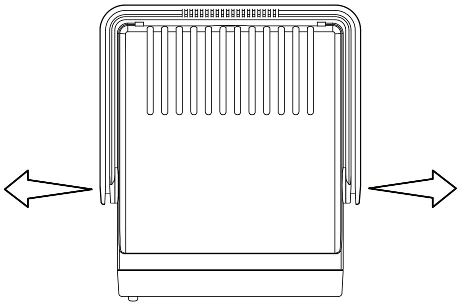
AC Input		Accepts the power cord. AC 100/120V or 220/230V; 50/60Hz. For the power on sequence, see page 18.
Fuse Socket		Holds the main fuse: 100/120V: T0.3A 250V; 220/230V: T0.25A 250V; For the fuse replacement details, see page 47.
RS-232C port		Accepts an RS-232C cable for remote control; DB-9 male connector. For remote control details, see page 43.
GPIB port		Accepts a GPIB cable for remote control (page 42).
Handler / Scan port		The Handler/Scan port is used to output pass/fail/high/low comparison results.
Temperature Sensor		The temperature sensor input for the optional PT-100 temperature probe.

Set Up

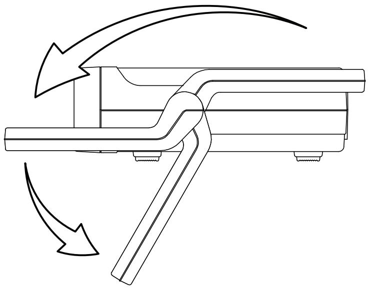
Tilt Stand

Steps

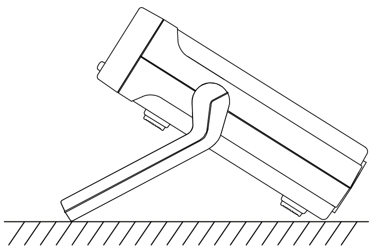
1. Pull handle base away from the casing.



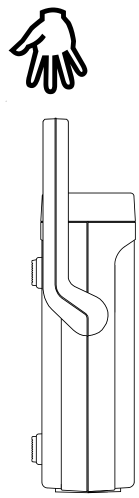
2. Turn handle into any of the preset positions.



Stand Position



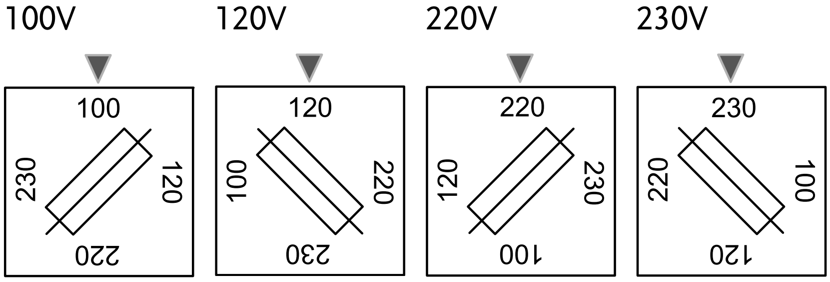
Carry Position



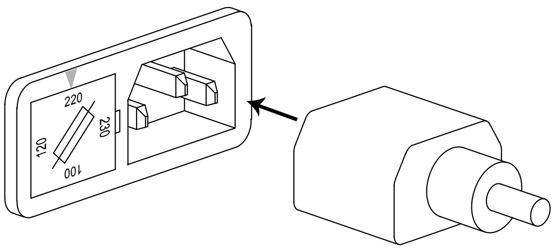
Power Up

Steps

1. Ensure that the correct voltage is lined up with the arrow on the fuse cover on the rear panel.



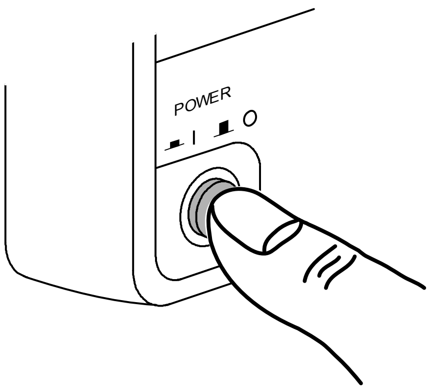
2. Connect the power cord to the AC Voltage input.



CAUTION

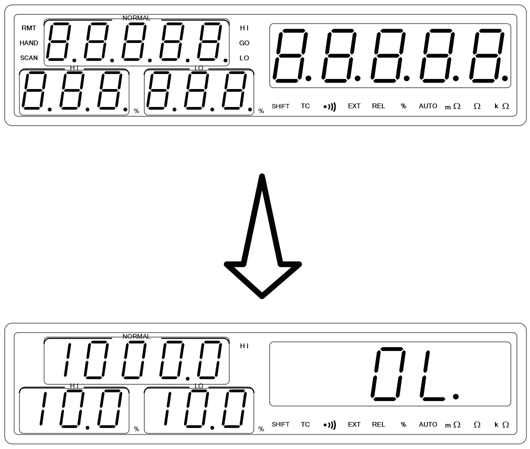
Ensure the ground connector of the power cord is connected to a safety ground. This will affect the measurement accuracy.

3. Press the main power switch on the front panel.

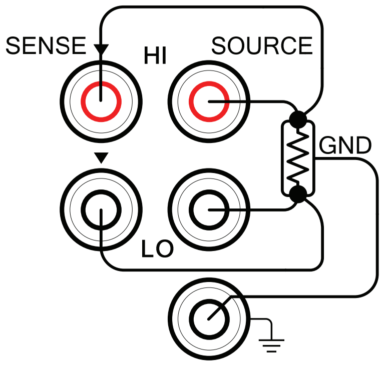
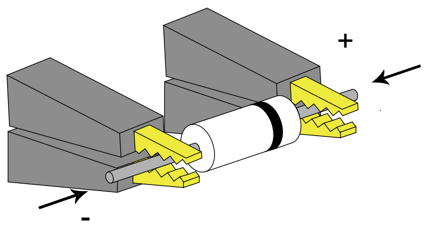


4. The display will light up and show the last setting used before the last shut down.

Example: Resistance measurement mode

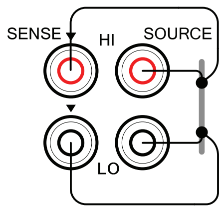
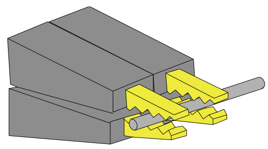
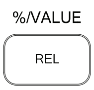
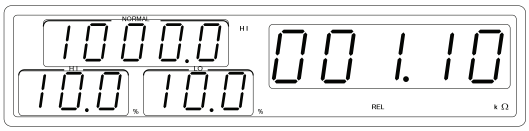


4 Wire Kelvin Connection

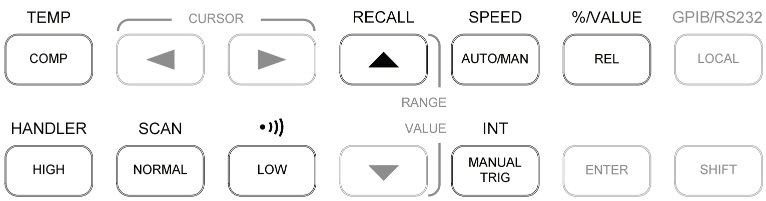
Background	The GOM-802 uses 4 wire Kelvin connections for accurate measurements.
Diagram	 

Description	Source HI	The Source HI carries the measuring current source. It is connected to the + side of the DUT.
	Source LO	The Source LO terminal accepts the signal return current. Connects to the – side of the DUT.
	Sense HI	Monitors the positive (+) potential.
	Sense LO	Monitors the negative (-) potential.
	GND	If the component has a large metallic area not connected to either terminal, connect it to ground to reduce noise.

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 – relative preset value. If the measured value minus the relative value is a negative, a minus sign is shown on the MSB (most significant bit). At low measurement speeds the minus sign will alternate with the displayed measurement.
1. Short the cables	Short the test cables together using a short thick copper wire if necessary.  
1. Set the Reference value	Press the REL %VALUE key. 
2. Relative mode display appears	
	REL: Indicates the Relative function is active
Note	The Auto-range function will be disabled when using compare mode with the relative function.

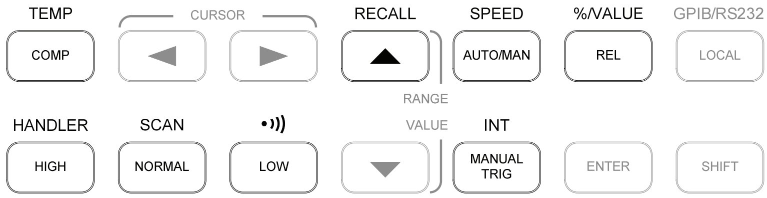
MEASUREMENT



Measurement Overview

Background

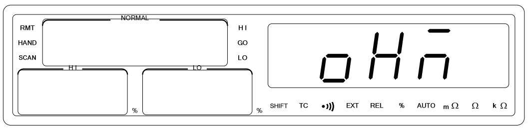
The Measurement chapter refers to the measurements listed below. For measurements using the Handler or Scan interfaces, see page 36.



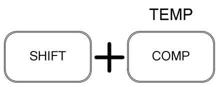
Measurement type	COMP TEMP	Comparison function
	SHIFT + COMP TEMP	Temperature sensor function
	AUTO/MAN SPEED	Auto-range ←→Manual range
	SHIFT + AUTO/MAN SPEED	Measurement speed function
	REL %/VALUE	Relative function selector
	SHIFT + REL %/VALUE	Toggle Relative % or Value
	HIGH HANDLER	High comparison limit
	SHIFT + HIGH HANDLER	Handler function
	NORMAL SCAN	Normal (nominal) value
	SHIFT + NORMAL SCAN	Scan mode
	LOW	Low comparison limit
	SHIFT + LOW	Buzzer on/off
	MANUAL TRIG INT	Trigger settings
	SHIFT + MANUAL TRIG INT	Internal trigger setting

Resistance Measurement

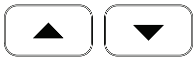
1. Select the Resistance function.



Press SHIFT + COMP[TEMP] to access the main function mode.

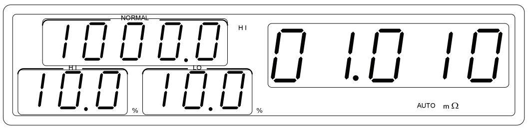


Press the Up and Down arrow keys to select resistance measurement mode (shown above).
There are three different modes: oHm (resistance), oC (temperature) and tC (temperature compensation) mode.



Press ENTER to confirm

2. Resistance mode display appears.

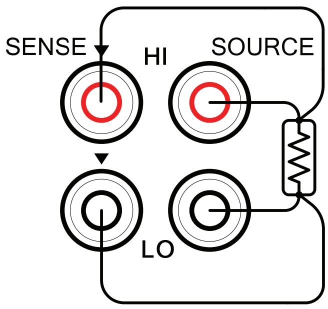


Auto	Indicates automatic ranging
mΩ	Milliohms
Ω	Ohms
kΩ	Kilo ohms

3. Connect the test lead and measure

4-wire resistance:

Use the SOURCE HI and the SOURCE LO port for measurement, and the SENSE HI, and SENSE LO port for sensing.



Note

When switching from a high range to a low range, 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.
Auto Range	Press the Up and Down arrow keys to manually select the resistance range.
Manual	Press the AUTO/MAN key to use automatic ranging. AUTO/MAN

Selection List

Range	Resolution(7 meas./s)
30mΩ	1uΩ
300mΩ	10uΩ
3Ω	100uΩ
30Ω	1mΩ
300Ω	10mΩ
3kΩ	100mΩ
30kΩ	1Ω
300kΩ	10Ω
3MΩ	100Ω

Note: For detailed specifications, please see the specifications on page 51.

Select Measurement Rate

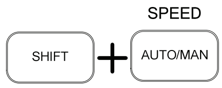
Background

The resistance measurement speed has 2 ranges: low and high. Low speed is the most accurate with 7 measurements/second and a full scale of 30,000 counts. High speed has 30 measurements/second with a full scale 3,000 counts.

The rate function is applicable to the resistance, temperature and temperature compensation measurements.

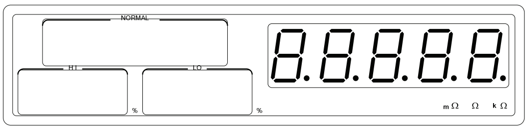
1. Select Rate

Press the SHIFT + AUTO/MAN SPEED keys to switch between the LO and HI rates.



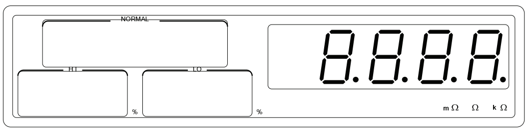
LO rate

The low rate is shown with a full scale of 5 digits in the resistance measurement mode.



HI rate

The high rate is shown with a full scale of 4 digits.



Note

For detailed specifications, please see the specifications on page 49.

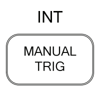
Using the Trigger Function

Background

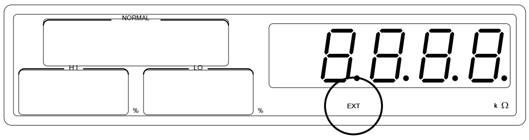
The GOM-802 can use internal or manual triggering for the resistance, temperature and temperature compensation measurement modes.
External triggering is only supported with the Handler and Scan modes.
By default the GOM-802 is in internal triggering mode.

1. Select Manual Trigger

Press MANUAL TRIG INT to switch to manual triggering mode.

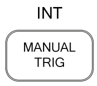


The EXT indicator will be lit when the manual trigger is active.

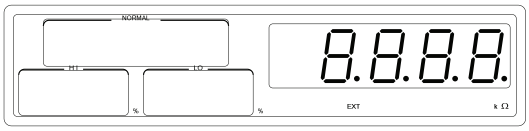


2. Manually Triggering Measurements

Press the MANUAL TRIG^INT key each time you want to start a single measurement.

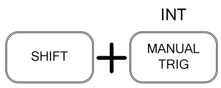


The EXT indicator will be lit when the manual trigger is active.

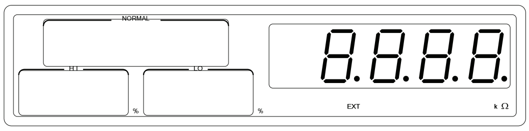


Internal Triggering

Press SHIFT + MANUAL TRIG^INT to return the triggering mode back to internal mode.



The EXT indicator will become cleared from the display.

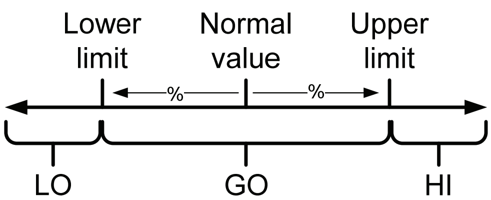


Compare Function

Background

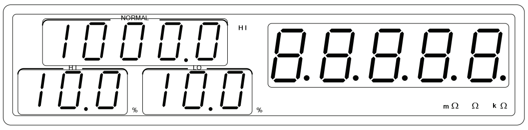
The compare function compares a measured value to a "Normal" value that has an upper (HI) and lower (LO) limit. The upper and lower limit is set as a percentage of the Normal value.

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



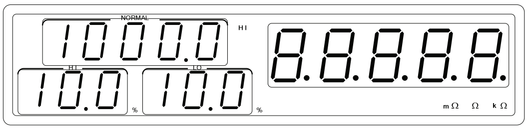
The GO, HI or LO indicators will light up for each measured value that is compared to the upper and lower limits.

1. Select the compare function



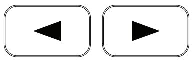
Press COMP[TEMP] to access the compare mode, as shown above.

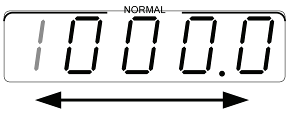
2. Normal value setting



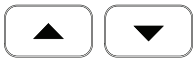
Press NORMAL[SCAN] to set NORMAL value setting.

Use the Left and Right arrow keys to select a digit. The selected digit will flash.





Use the Up and Down arrow keys to edit the value of the selected digit.



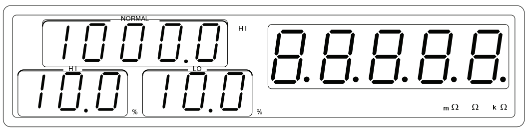
Range	33000~00000

Press ENTER to confirm the setting.

Note

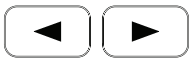
After setting the Normal value, the HI and LO limits will be changed to reflect the new Normal value setting.

3. HI limit setting

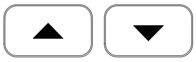


Press HIGH[SCAN] to set the HI percentage limit.

Use the Left and Right arrow keys to select a digit. The selected digit will flash.



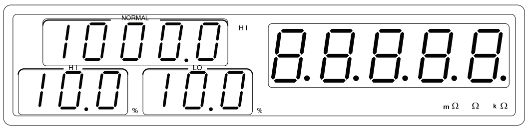
Use the Up and Down arrow keys to edit the value of the selected digit.



Range 000~999

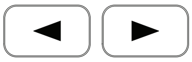
Press ENTER to confirm the setting.

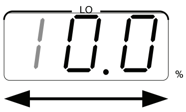
4. LO limit setting



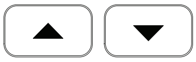
Press LOW •)) to set the LO percentage limit.

Use the Left and Right arrow keys to select a digit. The selected digit will flash.





Use the Up and Down arrow keys to edit the value of the selected digit.



Range 000~999

Press ENTER to confirm the setting.

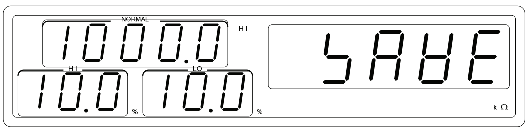
Save Compare Settings

Background

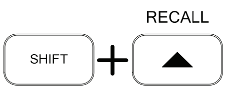
The save function saves the Normal, High and Low limit settings in memory. If these values are not saved, the settings will be lost after exiting Compare mode.

Up to 20 Normal, High, Low settings can be saved on the GOM-802.

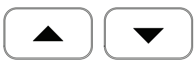
1. Select Save mode



Press SHIFT + RECALL to access the RECALL/SAVE mode.

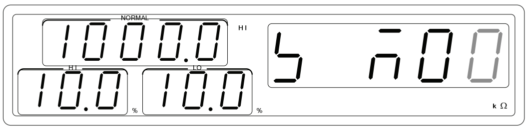


Press the Up and Down arrow key to show "SAVE" in the main display, as shown above.

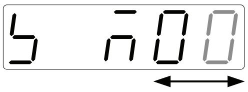


Press enter to confirm.

2. Select memory location



Use the Left and Right arrow keys to select a digit. The selected digit will flash.



Use the Up and Down arrow keys to edit the value of the selected digit.

Range 00~19

Press ENTER to confirm the setting.

After saving the settings, the meter will return to the compare mode function.

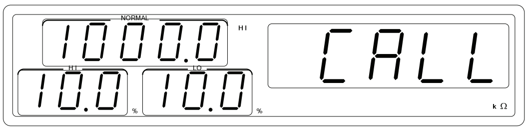
Note Pressing SHIFT before pressing ENTER will exit the Save mode.

Recall Compare Settings

Background The Recall function retrieves the Normal, High and Low limit settings from one of 20 memory locations. If these values are not saved, the settings will be lost after exiting Compare mode.

Up to 20 Normal, High, Low settings can be saved on the GOM-802.

1. Select Recall mode

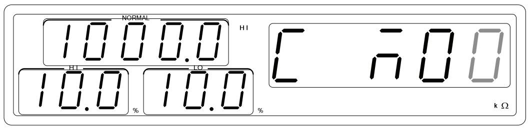


Press SHIFT + RECALL to access the RECALL/SAVE mode.

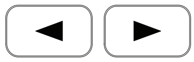
Press the Up and Down arrow key to show “CALL” in the main display, as shown above.

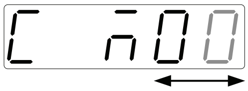
Press ENTER to confirm.

2. Select memory location



Use the Left and Right arrow keys to select a digit. The selected digit will flash.





Use the Up and Down arrow keys to edit the value of the selected digit.

Range 00~19

Press ENTER to confirm the setting.

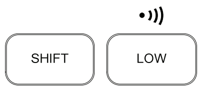
After saving the settings, the meter will return to the compare mode function.

Note Pressing SHIFT before pressing ENTER will exit the Recall mode.

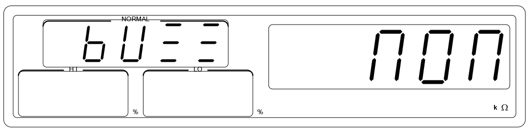
Buzzer Function

Background The buzzer function can make the buzzer sound when the compare test has passed (GO) or failed (NOGO). The buzzer settings are only applicable in Compare mode.

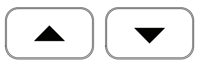
1. Select Buzzer Function Press the SHIFT key and then press LOW •))) key.



2. Buzzer function display appears



Press the Up and Down arrow key to choose the buzzer mode.

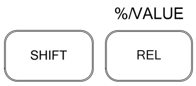
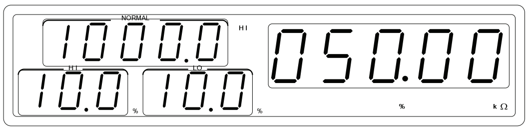
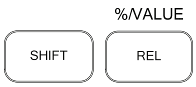


NON	Buzzer function off
bF	Buzz on Fail (No Go)
bP	Buzz on Pass (Go)

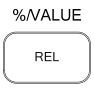
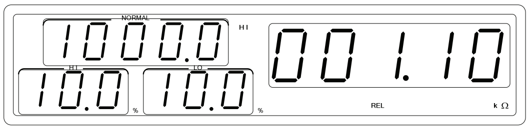
Press ENTER to confirm the selection.

Note	Pressing SHIFT before pressing ENTER will exit the Buzzer function settings.

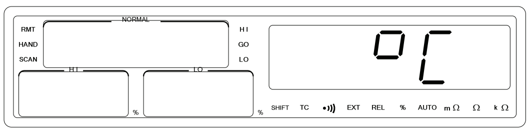
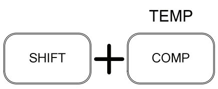
Display as Percentage

Background	In the compare function, the measured value can be displayed as a percentage of the Normal value rather than the actual value. For example, if the Normal value is 20.000, and the actual value is 10.000, then as a percentage it would be displayed as 50.00%.
1. Select Buzzer Function	Press the SHIFT key and then press the REL %VALUE. 
2. Percentage display appears	
3. Return to normal display	Press the SHIFT key and then press the REL %VALUE. 
Note	The Auto-range function will be disabled when using the percentage display.

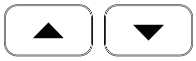
Relative Function

Background	The Relative function is used to perform a zero adjustment on the test leads or the resistance of the DUT. After the Reference value is pre-set, each measurement that is displayed is equal to the actual value – relative preset value. If the measured value minus the relative value is a negative, a minus sign is shown on the MSB (most significant bit). At low measurement speeds the minus sign will alternate with the displayed measurement.
1. Set the Reference value	Press the REL %VALUE key. 
2. Relative mode display appears	
	REL — Indicates the Relative function is active
Note	The Auto-range function will be disabled when using compare mode with the relative function.

Temperature Measurement

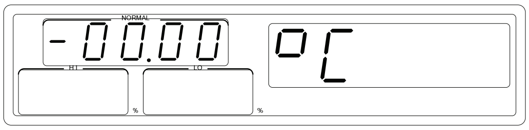
Background	The temperature measurement function uses the optional PT-100 temperature probe. The measured temperature is displayed on the NORMAL display. For more information on the optional PT-100 sensor, see the appendix on page 48. There is only one range in when using the temperature function.
1. Select the Temperature function.	
	Press SHIFT + COMP TEMP to access the main function mode. 

Press the Up and Down arrow keys to select the °C measurement mode (shown above).
There are three different modes: oHm (resistance), oC (temperature) and tC (temperature compensation) mode.



Press ENTER to confirm

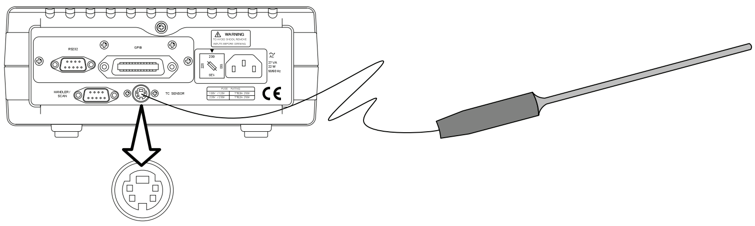
2. Temperature mode display appears.



The temperature is displayed on the NORMAL display.

3. Temperature mode connection.

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



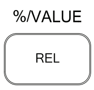
Relative Function

Background

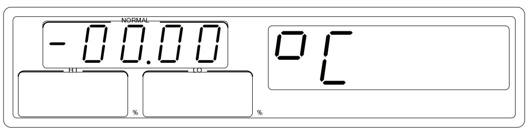
The Relative function can also be used with the temperature function. The temperature displayed is the temperature of the sensor minus the temperature of the sensor when the REL %VALUE key was pressed.

1. Set the Reference value

Press the REL %VALUE key.



2. Relative mode display appears



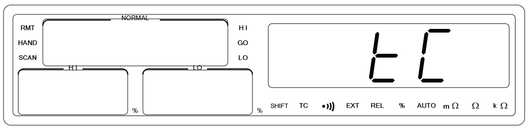
REL	Indicates the Relative function is active

Temperature Compensation

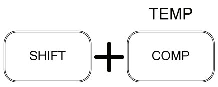
Background

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.

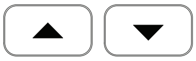
1. Select the Temperature compensation mode.



Press SHIFT + COMP[TEMP] to access the main function mode.

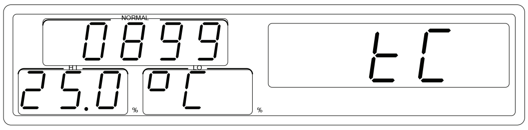


Press the Up and Down arrow keys to select the TC measurement mode (shown above).
There are three different modes:
oHm (resistance), oC(temperature) and tC(temperature compensation) mode.

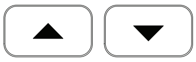


Press ENTER to confirm.

2. Temperature compensation mode appears.

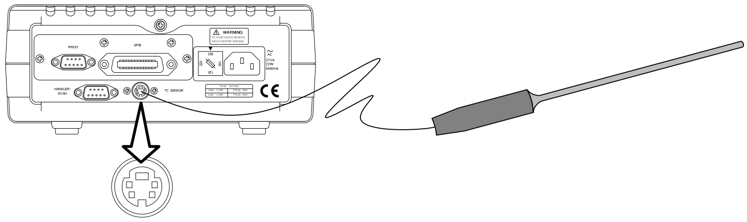
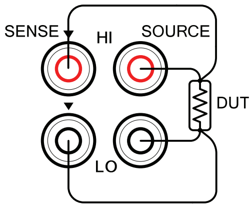


Edit the desired temperature and the temperature coefficient of the DUT. Use the Left and Right arrow keys to select a digit and use the Up and Down arrow keys to edit the digit.

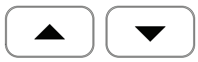


Desired Temperature	0~99.9
Temperature Coefficient	0000~9999

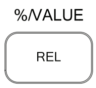
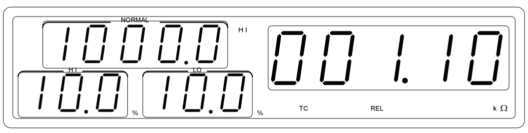
Press ENTER to confirm the selection and start measurement.

3. Temperature compensation connection.	Sensor Connection: 
	DUT connection 4 Wire: 

Select the Resistance Range

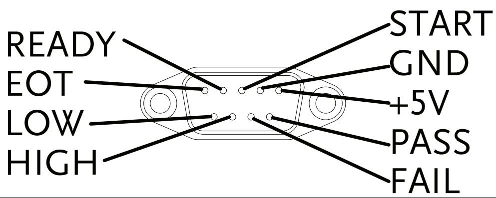
Background	The resistance range can be selected when using the temperature compensation function.	
Auto Range	Press the Up and Down arrow keys to manually select the resistance range	
Manual	Press the AUTO/MAN key to use automatic ranging.	

Relative Function

Background	The Relative function can also be used with the temperature compensation function.	
1. Set the Reference value	Press the REL %VALUE key.	
2. Relative mode display appears		
	REL	Indicates the Relative function is active

HANDLER/SCAN/ INTERFACE

Handler Overview

Background	The Handler Interface is used to help bin components based on the Go-NoGo comparator function test. There are 6 TTL outputs and one TTL input. The Handler interface can only be used with the resistance measurement and compare measurement modes.	
Interface and pin assignment	9 Pin D-SUB (Female)	
Pin Assignment	START	Start the trigger for a single measurement. Negative edge trigger.
	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.
	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 GO (pass).

Note: The output current from all the terminals and the +5V terminal cannot exceed 60mA.

Scan Overview

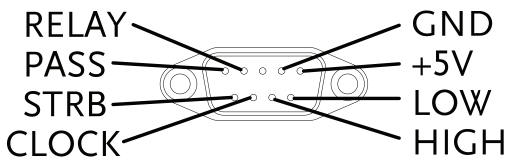
Background

The Scan function is used to automatically bin groups of up to 100 components. The scan function, unlike the handler interface must first be activated using the panel keys.

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

Interface and pin assignment

9 Pin D-SHELL (Female)



Pin Assignment

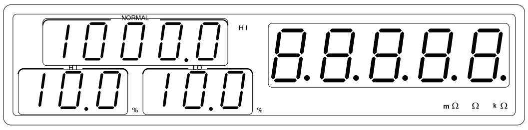
Relay	Controls the relay output.
Pass	Pass signal. Indicates a GO compare result is GO (pass).
Low	Low signal. Indicates a LO compare result.
High	High signal. Indicates a HI compare result.
Clock	The clock signal will pulse high when each group of output signals (Ready, Pass, Low, High) are ready. There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

Scan Setup

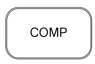
Background

The scan function is accessed via the compare mode.

1. Select the compare function

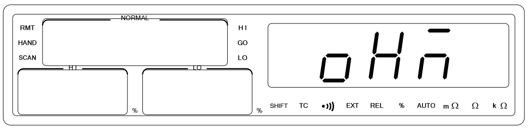


Press COMP^TEMP to access the compare mode, as shown above.

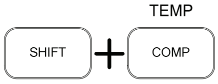


page 26

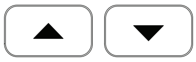
2. Select the resistance function.



Press SHIFT + COMP[TEMP] to access the main function mode.

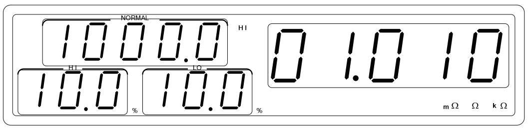


Press the Up and Down arrow keys to select the resistance measurement mode (shown above).
There are three different modes: oHm (resistance), oC (temperature) and tC (temperature compensation) mode.



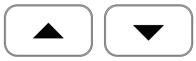
Press ENTER to confirm.

3. Resistance mode and Compare display appears.

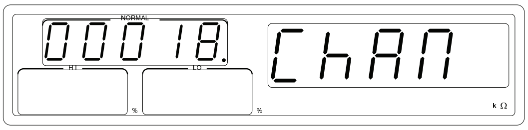


4. Resistance Range

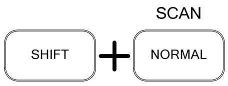
Press the Up and Down arrow keys to manually select the resistance range.



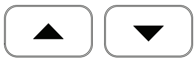
5. Select the Scan mode.



Press SHIFT + NORMAL[SCAN] to access the scan mode.



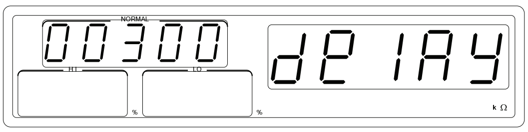
Press the Up and Down or Left and right arrow keys to select the number of counts.



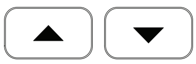
Count range	0~100

Press ENTER to confirm.

6. Select the Delay time.



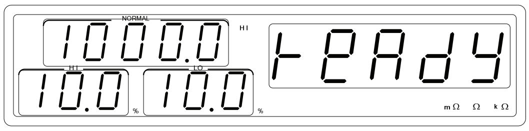
Press the Up and Down or Left and Right arrow keys to set the sweep delay time. Each count unit has a delay time of 16.2 ms.



Count units	30~30,000

Press ENTER to confirm.

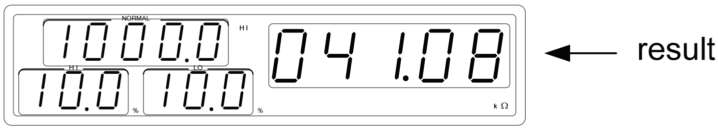
7. The Ready Display appears



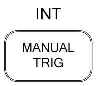
Note

After the Ready indicator is shown it is not possible to make any changes to the compare function or range.

8. Start the scan.

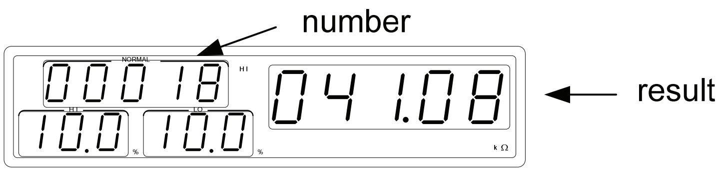


Press the MANUAL TRIG^INT key to start the sweep measurements.

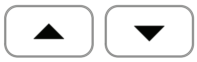


The results will be displayed on screen and output through the scan port until finished.

9. View Results

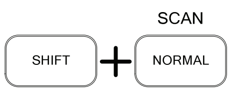


Press the Up and Down arrow keys to cycle through each result. The measurement number will be displayed on the Normal display and the measurement on the main screen.



10. Exit Scan mode

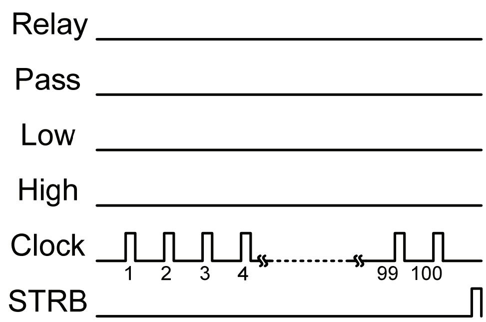
Press SHIFT + NORMAL^SCAN at any time to exit the scan mode.



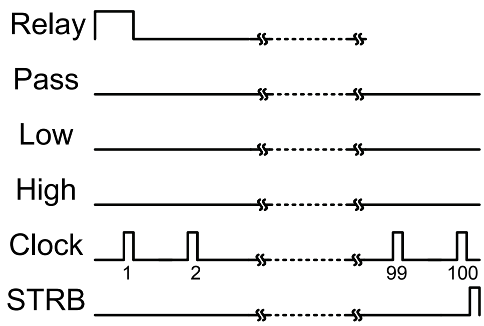
Scan Output

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

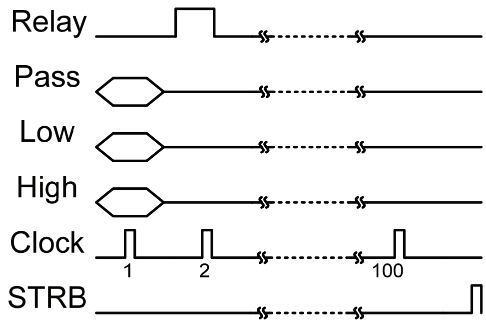
Ready message displayed…



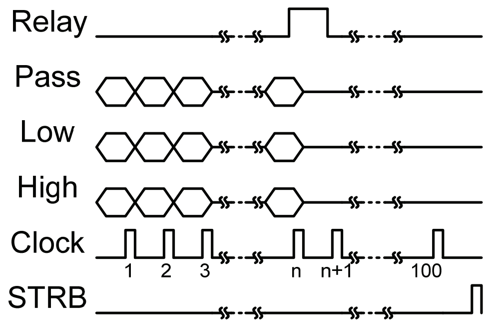
After the MANUAL TRIG INT key is pressed…



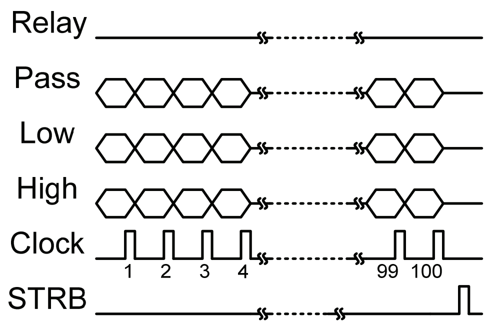
Scan channel 1. Delay time has elapsed.



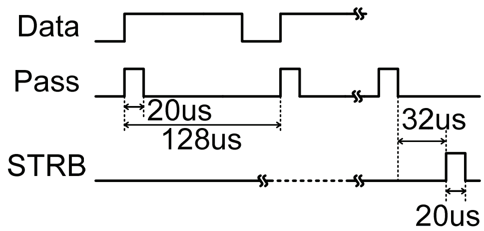
Scan channel n, delay time has elapsed.



Scan Channel 100. Delay time has elapsed.



Scan output signal timing.



Configure Interface

Overview

The RS-232 and GPIB interfaces are factory installed options for remote control of the GOM-802. The remote control interfaces allow the GOM-802 to be programmed for automatic testing.

For more information on the remote control programming, please see the GOM-802 programming manual.

Interface

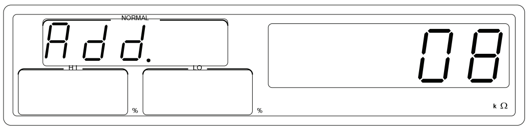
GPIB	24 pin female GPIB port
RS-232	DB-9 male port

Configure GPIB Interface

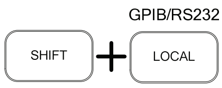
Background

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

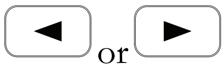
1. Select the GPIB address.



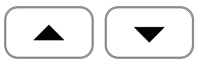
Press SHIFT + LOCAL GPIB/RS232 to access the GPIB/RS232 settings.



Press the Left or Right arrow key to enter the GPIB address settings.



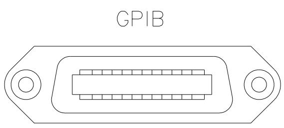
Press the Up and Down arrow keys to set the GPIB address.



GPIB Address 0~31

Press ENTER to confirm. The display returns to the main display.

Connect one end of the GPIB cable to the computer and the other end to the GPIB port on the GOM-802.



GPIB Constrains

- Maximum 15 devices altogether, 20m cable length, 2m between each device
- Unique address assigned to each device
- At least 2/3 of the devices turned on
- No loop or parallel connection

Configure RS-232 Interface

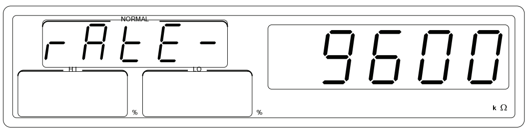
Background

The GOM-802 uses 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.

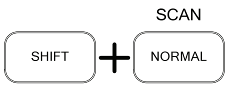
Settings

Baud rate	1200, 2400, 4800, 9600
Parity	None
Data bits	8
Stop bit	1
Data flow control	None

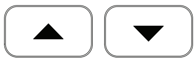
1. Select the RS-232 baud rate



Press SHIFT + LOCAL GPIB/RS232 to access the GPIB/RS232 settings.



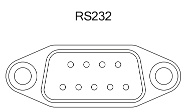
Press the Up and Down arrow keys to set the baud rate.



Baud rate	1200, 2400, 4800, 9600

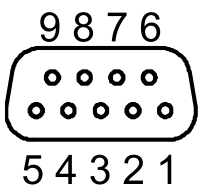
Press ENTER to confirm. The display goes back to the main display.

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



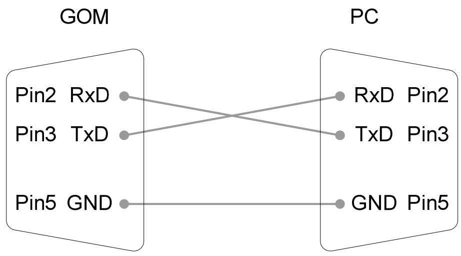
RS-232C pin assignment

Pin 2: RxD
Pin 3: TxD
Pin 5: GND
Pin 1, 4, 6 ~ 9: No Connection



PC – GOM RS-232C Connection

The RS232 connection uses a Null-modem connection, in which transmit (TxD) and receive (RxD) lines are cross-linked.



Interface Function Check

Operation

Run this query from the terminal.

*idn?

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

GW. Inc, GOM-802 , FW1.00

Function Check Errors

If you do not receive a proper response from the Meter, please check if the power is on, the GPIB address/RS232 baud rate is correct, and all cable connections are active.

FAQ

- What are the different measurement speeds?
- The GOM-802 performance does not match the specifications.

What are the different measurement speeds?

There are two measurement speeds for both resistance and temperature measurement. At 30,000 counts the measurement speed is 7 readings/s, at 3,000 counts the measurement speed is 30 readings/s.

The GOM-802 performance does not match the specifications.

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

If there is still a problem, please contact your local dealer or GWInstek at marketing@goodwill.com.tw.

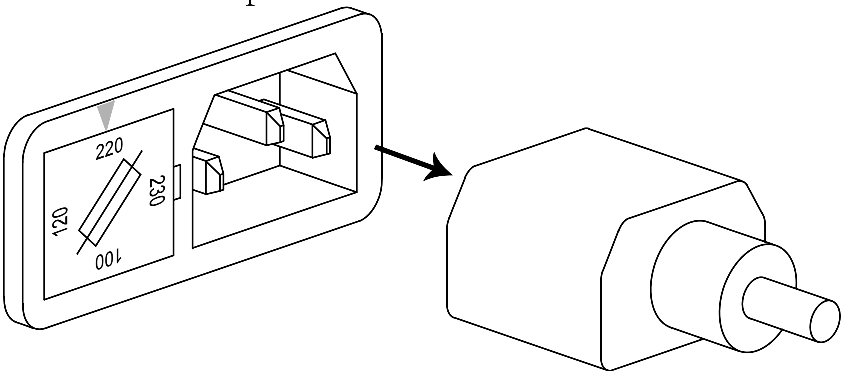
APPENDIX

Fuse Replacement

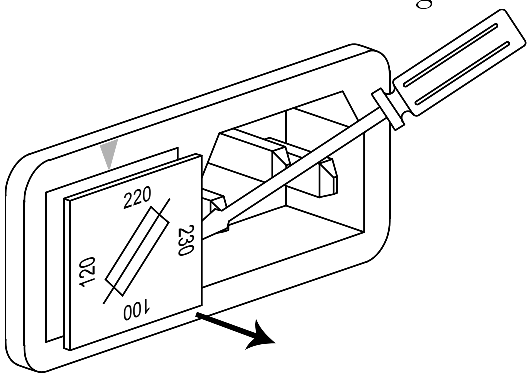
Replace the AC source fuse

Steps

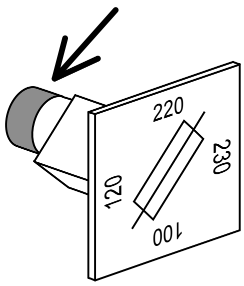
1. Remove the power cord.



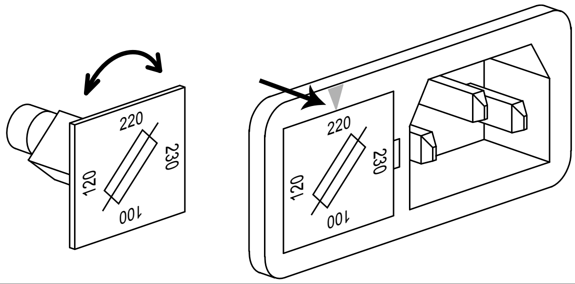
2. Remove the fuse socket using a flat screwdriver.



3. Replace the fuse in the holder.



4. Ensure the correct line voltage is lined up with the arrow on the fuse holder. Insert the fuse socket.



Rating	100V/120V	TT0.3A 250V
	220V/230V	T0.25A 250V

Temperature Measurement

Reference Temperature Table

Overview Background

The International Temperature Scale (ITS) is based on the following table. The table has 17fixed 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_2O)	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: R_{RTD} 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 [l+(delta/100)]

B=-l(alpha)(delta)(le-4)

C=-l(alpha)(beta)(le-8)

The Alpha (A), Beta (B), Delta (D) values for the

PT-100 sensor are listed below:

Type	Standard	Alpha	Beta	Delta	Ω @ 0˚C
PT-100	ITS90	0.003850	0.10863	1.49990	100Ω

Temperature Calculation Example

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

T=100˚C

R_0 (Ω at 0˚C) = 100Ω

Alpha=0.003850

Beta=0.10863

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:

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

$=100\{1+[(0.00391)(100)]+[(-5.77e-7)(100^2)+[(-4.18E-12)(100^3)(100-100)]]\}$

=138.5Ω

Specifications

Conditions Background

The specifications are applicable under the following conditions:

- 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 ±(percentage of reading + digits).
- The instrument requires 30 minutes warm-up time to achieve rated accuracy.
- The power cord protective grounding conductor must be connected to ground.

Resistance Measurement

30000 counts (speed : 7 readings/second)

Range	Resolution	Measuring Current	Accuracy	Open-Terminal Voltage
30mΩ	1μΩ	1A approx.	0.1%+6*	~1.772V
300mΩ	10μΩ	100mA	0.05%+6*	~1.772V
3Ω	100μΩ	100mA	0.05%+3	~1.772V
30Ω	1mΩ	10mA	0.05%+2	~1.772V
300Ω	10mΩ	1mA	0.05%+2	~1.772V
3kΩ	100mΩ	100μA	0.05%+2	~1.770V
30kΩ	1Ω	100μA	0.05%+2	~4.570V
300kΩ	10Ω	10μA	0.05%+2	~4.526V
3MΩ	100Ω	1μA	0.05%+2	~4.148V
3000 counts Accuracy	(speed: 30 readings/second)		±5 counts **	

*When the instrument is set to 30mΩ or 300mΩ 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 must 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.
** In high speed mode, first ensure that the instrument has been grounded through the power cord.

Measurement	Four-terminal method.
Auto-ranging	Provided.
Over input range	"OL" indication
Maximum Applied voltage	30m~3Ω range: 30VpDC Other range: 100VpDC
Comparator	20 sets of comparator status can be selected.
Buzzer mode switchable	NON, PASS, FAIL

Temperature Measurement

Temperature sensor (option)	Platinum resistor. Lead length: 1.5m approx.	
Range	Accuracy Speed: 7 readings/second	Accuracy Speed: 30 readings/second
-50.0˚C ~ -10.0˚C	0.3%+1.0˚C	0.3%+3˚C
-9.9˚C ~ 39.9˚C	0.3%+0.5˚C	0.3%+2˚C
40˚C ~ 100˚C	0.3%+1.0˚C	0.3%+3˚C

Temperature Correction Function

Temperature correction range	0.0˚C~39.9˚C
Reference temperature range	0˚C~99.9˚C
Thermal coefficient range	±9999 ppm
Temperature range	Accuracy of temperature compensation for 3930 ppm/Cu wire, speed: 7 readings/second.*
0˚C~39.9˚C	0.3%+resistance measurement accuracy.
40˚C~100˚C	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.

Interface

Handler interface*	Signal: START TTL input Signal: LOW, HIGH, FAIL, PASS, EOT, READY total 6 TTL outputs. (This function is valid only under the resistance measurement mode and the compare mode is enabled.)
Scan*	Signal: READY, PASS, LOW, HIGH, CLOCK, STRB total 6 TTL outputs. (This function is valid only under the resistance measurement mode and the compare mode is enabled.)
RS-232+ GPIB (option)	IEEE488.1-1987, IEEE488.2-1992 and SCPI-1994
	* The Scan and Handler interface use the same connector

Environmental

Operation Environment	Indoor use, altitude up to 2000m. Ambient Temperature 0˚C to 40˚C. Relative Humidity 80% (Maximum). Installation category II Pollution Degree 2
Storage temperature	-10˚C to 70˚C.

General

Power source	AC 100V/120V/220V/230V±10%, 50/60Hz, 27VA, 22W.
Accessories	Test Lead × 1, User manual × 1, Programmable manual × 1 (option), Temperature sensor (option) × 1
Dimension	251(W)×91(H)×291(D) mm
Weigh	Approx. 3 kg

Declaration of Conformity

We
GOOD WILL INSTRUMENT CO., LTD.
(1) No.7-1, Jhongsing Rd., Tucheng Dist., New Taipei City, Taiwan
(2) No. 69, Lu San Road, Suzhou City (Xin Qu), Jiangsu Sheng, China
declare, that the below mentioned product

Type of Product: **DC Milliohm Meter**
Model Number: **GOM-802**

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Law of Member States relating to Electromagnetic Compatibility (89/336/EEC, 92/31/EEC, 93/68/EEC). For the evaluation regarding the Electromagnetic Compatibility and Low Voltage Equipment Directive, the following standards were applied:

◎ EMC

EN 61326: Electrical equipment for measurement, control and laboratory use — EMC requirements **(1997+A1: 1998+A2: 2001)**	
Conducted and Radiated Emission EN 55011: 1998 class A	Electrostatic Discharge IEC 61000-4-2: 1995+A1: 1998
Current Harmonic IEC 61000-3-2: 2000	Radiated Immunity IEC 61000-4-3: 1996+A1: 1998
Voltage Fluctuation IEC 61000-3-3: 1995	Electrical Fast Transients IEC 61000-4-4: 1995
-------------------------	Surge Immunity IEC 61000-4-5: 1995
-------------------------	Conducted Susceptibility IEC 61000-4-6: 1996
-------------------------	Power Frequency Magnetic Field IEC 61000-4-8: 1993
-------------------------	Voltage Dips/ Interrupts IEC 61000-4-11: 1994

◎ Safety

Low Voltage Equipment Directive 73/23/EEC & amended by 93/68/EEC
IEC / EN 61010-1: 2001

INDEX