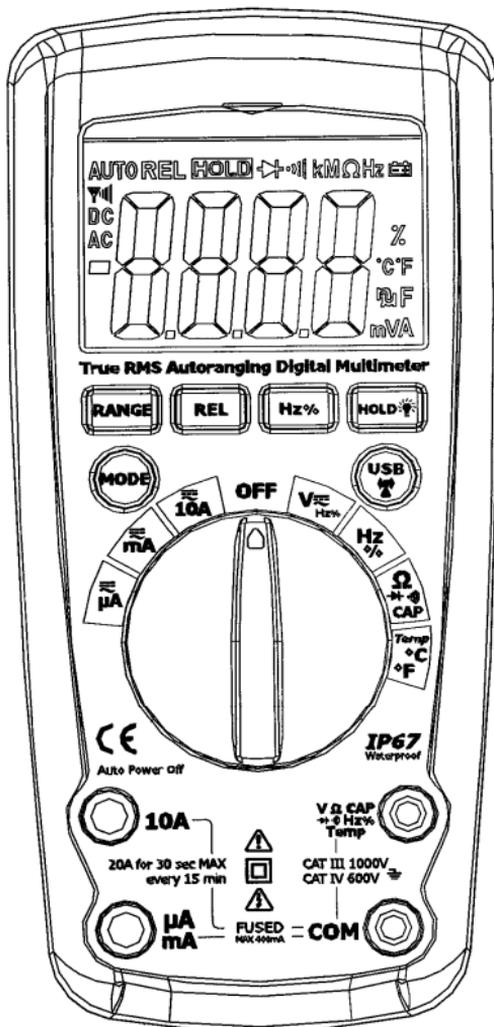


QM1571 OPERATING INSTRUCTIONS

TRUE RMS AUTORANGING DIGITAL MULTIMETER



SAFETY WARNINGS

The following safety information must be observed to insure maximum personal safety during the operation at this meter:

- ◆ Measurements beyond the maximum selected range must not be attempted.
- ◆ Extreme care must be taken when measuring above 30 VAC or 60VDC, especially on live bus-bars.
- ◆ To measure voltage, the instrument must not be switched to a current or resistance range, or to the diode check or buzzer position.
- ◆ Circuits must be de-energised and isolated before carrying out resistance tests.
- ◆ The rotary function switch must only be turned after removing test connections.
- ◆ All external voltages must be disconnected from the instrument before removing the battery.
- ◆ Test leads and probes must be in good order, clean, and with no broken or cracked insulation.
- ◆ UK Safety Authorities recommend the use of fused test leads when measuring high energy systems.
- ◆ Replacement fuses must be of the correct type and rating.
- ◆ The instrument must not be used if any part of it is damaged.

- ◆ Warnings and precautions must be read and understood before the instrument is used. They must always be observed during the operation of this instrument.

Symbols used on this instrument are:



Caution: refer to accompanying notes

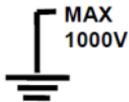
This symbol indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.



Caution: risk of electric shock

This WARNING symbol indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

This CAUTION symbol indicates a potentially hazardous situation, which if not avoided, may result in damage to the product.



This symbol advises the user that the terminal(s) so marked must not be connected to a circuit which the voltage with respect to earth or ground exceeds (in this case) 1000 VAC or VDC.



Equipment protected throughout by Double Insulation (Class III).



Equipment complies with current EU directives.

SYMBOLS AND ANNUNCIATORS



Continuity



Low Battery



Wireless transmit mode



Diode test

HOLD

Data Hold

AUTO

Auto Ranging

AC

Alternating Current or Voltage

DC	Direct Current or Voltage
V	Volts
A, mA, μ A	Amps, milli-Amps, micro-Amps

OPERATION

To turn on the meter rotate the function switch from the OFF position to any measurement position.

For best battery life, ALWAYS turn the function switch to the OFF position when the meter is not in use. This meter has an Auto OFF capability that automatically shuts the meter OFF after 30 minutes.

NOTE: On some low AC and DC voltage ranges, with the test leads not connected, the display may show a random, changing reading. This is normal and is caused by the high-input impedance and the input sensitivity. The reading will stabilize when connected to a circuit.

MODE button

Selects AC or DC measurement when in Voltage or Current modes, also selects resistance, diode, continuity or capacitance modes and °C or °F display modes.

HOLD/BACKLIGHT button

The HOLD button holds the current display reading until momentarily pressed again. Press and hold this button for more than 2 seconds to turn the backlight on. Press again for more than 2 seconds to turn off the backlight.

RANGE button

When the function switch is operated, the meter automatically starts operating in Auto Ranging mode. This selects the best range for the measurement being made and is generally the best mode for most manual measurements. For data logging measurements or when required, the range may be manually selected, as follows:

1. Press the RANGE button. The "**AUTO**" indicator on the display will turn off.
2. Press the RANGE button to step through the available ranges until the required range is selected.
3. Press and hold the RANGE button for more than 2 seconds to revert back to "**AUTO**" operation.

REL button

The REL button performs a relative measurement. Except for Hz, %, Diode and Continuity, all other functions will operate in the relative mode.

Hz% button

Hz% is the Frequency/Duty Cycle select button. In the frequency measurement mode (function switch set to Hz%), pressing the button can select frequency or duty cycle measurements; in AC/DC Voltage or Current modes, pressing the key will switch to Frequency/Duty Cycle measurement mode and then back to voltage or current mode.

DC/AC VOLTAGE MEASUREMENT

- 1) Insert the black test lead into the negative **COM** jack and the red test lead into the positive **V** jack.
- 2) Set the function switch to the Voltage **V** position.
- 3) Use the MODE button to select AC or DC Voltage.
- 4) Connect the test leads to two points in the circuit to measure the voltage difference.
- 5) Read the voltage measurement on the display.

DC CURRENT MEASUREMENT

- 1) Insert the black test lead into the negative **COM** jack.
- 2) For current measurements up to 4000 μ A DC, set the function switch to the μ **A** position and insert the red test lead banana plug into the μ **A** jack.
- 3) For current measurements up to 400mA DC, set the function switch to the **mA** position and insert the red test lead banana plug into the **mA** jack.
- 4) For current measurements up to 10A DC, set the function switch to the **10A** position and insert the red test lead banana plug into the **10A** jack.
- 5) Use the MODE button to select AC or DC Current. "**DC**" must appear on the display.
- 6) Remove power from the circuit under test, then open the point in the circuit where you wish to measure current.
- 7) Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
- 8) Apply power to the circuit.
- 9) Read the DC current measurement on the display.

AC CURRENT MEASUREMENT

- 1) Insert the black test lead into the negative **COM** jack.
- 2) For current measurements up to 4000 μ A AC, set the function switch to the μ **A** position and insert the red test lead banana plug into the μ **A** jack.
- 3) For current measurements up to 400mA, set the function switch to the **mA** position and insert the red test lead banana plug into the **mA** jack.
- 4) For current measurements up to 10A AC, set the function switch to the **10A** position and insert the red test lead banana plug into the **10A** jack.
- 5) Use the MODE button to select AC or DC Current. "**AC**" must appear on the display.
- 6) Remove power from the circuit under test, then open the point in the circuit where you wish to measure current.
- 7) Touch the black test probe tip to the negative side of the circuit. And touch the red test probe tip to the positive side of the circuit.
- 8) Apply power to the circuit.
- 9) Read the AC current measurement on the display.

RESISTANCE [Ω] MEASUREMENT

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements.

- 1) Set the function switch to the Ω position.
- 2) Insert the black test lead into the negative **COM** jack and the red test lead plug into the positive Ω jack. Press the MODE button until " $M\Omega$ " appears on the display.
- 3) Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the reading.
- 4) Read the resistance measurement on the display.

CONTINUITY CHECK

WARNING: To avoid electric shock, disconnect power to the circuit under test and discharge all capacitors before taking any continuity measurements.

- 1) Set the function switch to the  position.
- 2) Insert the black lead plug into the COM jack and the red test lead plug into the positive  jack.
- 3) Press the MODE button until " " appears on the display.
- 4) Touch the test probe tips to the circuit or wire you wish to check.
- 5) If the resistance is less than 50Ω , an audible signal will sound. The display will also show the actual resistance measured between 0Ω and 399.9Ω

DIODE TEST

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any diode measurements.

- 1) Set the function switch to the  position.
- 2) Insert the black test lead into the **COM** jack and the red test lead into the  jack.
- 3) Press the MODE button until " " appears on the display.
- 4) Touch the test probe tips to the diode or

semiconductor junction you wish to test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the readings.

- 5) Reverse the probe polarity by switching probe positions. Note both readings.
- 6) The diode or junction can be evaluated as follows:
 - A. If one reading shows a value and the other reading shows OL, the diode is good.
 - B. If both readings show OL, the device is open.
 - C. If both readings are very small or zero, the device is shorted.

NOTE: The value indicated on the display during the diode test is the forward voltage of the device.

CAPACITANCE MEASUREMENT

WARNING: To avoid electric shock, discharge the capacitor under test before making measurements.

- 1) Set the function switch to the **CAP** capacitance position. Press the MODE button until "nF" appears on the display.
- 2) Insert the black test lead into the negative **COM** jack and the red test lead into the positive **CAP** jack.

- 3) Touch the test probes across the part under test.
- 4) Read the capacitance value on the display.

FREQUENCY MEASUREMENT

- 1) Set the function switch to the **Hz%** position.
- 2) Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **Hz%** jack.
- 3) Touch the test probe tips to the circuit under test.
- 4) Read the frequency on the display.

TEMPERATURE MEASUREMENT

- 1) Set the function switch to the **Temp °C °F** position.
- 2) Insert the Temperature Probe into the input jacks, making sure to observe the correct polarity.
- 3) Press the MODE button to select "**°C**" or "**°F**" on the display.
- 4) Touch the head of the thermocouple to the item whose temperature you wish to measure. Leave the thermocouple head touching the part until the reading stabilizes (about 30 seconds).
- 5) Read the temperature on the display.

Note: The temperature probe is fitted with a type K mini connector. A mini connector to banana connector adaptor is supplied for connection to the input jacks.

PC WIRELESS COMMUNICATION:

- 1) Install the USB wireless adapter, and launch the software supplied.
- 2) Press **USB** to enter the RF wireless transmit mode.
- 3) The RF icon "  " will appear on the display.
- 4) When communication is established, the led indicator on the receiver will blink. If not, "initialize" the USB wireless receiver from the software menu selection.
- 5) Up to 3 times per second, the data will be displayed on the PC screen, plotted and inserted into a list.
- 6) Press **USB** to exit the RF wireless transmit mode.

SPECIFICATIONS

Technical Specifications:

Insulation: Class2, Double insulation.

Overvoltage category: CATIV 600V, CAT III 1000V

NOTE: This meter meets CAT III and CAT IV IEC 61010 standards. The IEC 61010 safety standard defines four overvoltage categories (CAT I to IV) based on the magnitude of danger from transient impulses. CAT III meters are designed to protect against transients in fixed-equipment installations at the distribution level; CAT IV meters are designed to protect against transients from the primary supply level (overhead or underground utility service).

Maximum voltage between any terminal and earth ground:

1000V DC/AC RMS

Display: 4000 counts LCD display

Polarity: Automatic, (-) negative polarity indication.

Over-range: "OL" indication.

AC Response: True RMS

Low battery indication: A battery "  " symbol is displayed when the battery voltage drops below the operating level.

Auto power off: Meter automatically shuts down after approx. 30 minutes of inactivity unless in wireless mode.

Operating environment: -10°C to 50°C (14°F to 122°F)
at <70% relative humidity.

Storage temperature: -30°C to 60°C (-4°F to 140°F)
at <80% relative humidity

Relative humidity: 90% (0°C to 30°C); 75% (30°C to 40°C); 45% (40°C to 50°C)

Maximum altitude: Operating: 3000m
Storage: 10,000m

Pollution degree: 2

Safety: The instrument complies with IEC/EN 61010-1:2001
and IEC/EN 61010-031:2002

Power: 9V battery, NEDA 1604, IEC 6F22

Dimensions: 182 (H) x 82 (W) x55 (D) mm

Weight: Approx. 380g.

Enclosure: Double moulded, waterproof (IP67)

Accuracy is given at 18°C to 28°C (65°F to 83°F), < 70% RH

DC Voltage (Auto-ranging)

Range	Resolution	Accuracy
400.0mV	0.1mV	±0.8% of reading ±2 digits
4.000V	1mV	
40.00V	10mV	
400.0V	100mV	
1000V	1V	±1% of rdg ±2 digits

Input Impedance: 10M Ω

Maximum Input: 1000V DC or 1000V AC RMS

AC Voltage (Auto-ranging)

Range	Resolution	Accuracy
400.0mV	0.1mV	$\pm 1.0\%$ of reading ± 3 digits
4.000V	1mV	
40.00V	10mV	
400.0V	100mV	
1000V	1V	$\pm 1.2\%$ of rdg ± 5 digits
	All AC voltage ranges are specified from 5% of range to 100% of range	

Input Impedance: 10M Ω

AC Response: 50Hz to 400Hz

Maximum Input: 1000V DC or 1000V AC RMS

DC Current (Auto-ranging)

Range	Resolution	Accuracy
400.0 μ A	0.1 μ A	$\pm 1.2\%$ of reading ± 3 digits
4000 μ A	1 μ A	
40.00mA	10 μ A	
400.0mA	100 μ A	
10A	10mA	$\pm 2.5\%$ of reading ± 3 digits

Overload Protection: FF500mA/1000V and F10A/1000V

Maximum Input: 400 μ A DC on μ A range

400mA DC on mA range

10A DC on 10A range

AC Current (Auto-ranging)

Range	Resolution	Accuracy
400.0 μ A	0.1 μ A	$\pm 1.5\%$ of rdg ± 5 digits
4000 μ A	1 μ A	
40.00mA	10 μ A	
400.0mA	100 μ A	
10A	10mA	$\pm 3.0\%$ of rdg ± 5 digits
	All AC Current ranges are specified from 5% of range to 100% of range	

Overload Protection: FF500mA/1000V and F10A/1000V

AC Response: 50Hz to 400Hz

Maximum Input: 400 μ A AC RMS on μ A

400mA AC RMS on mA

10A AC RMS on 10A range

Resistance [Ω] (Auto-ranging)

Range	Resolution	Accuracy
400.00 Ω	0.1 Ω	$\pm 0.8\%$ of rdg ± 5 digits
4.000k Ω	1 Ω	$\pm 0.8\%$ of rdg ± 2 digits
40.00k Ω	10 Ω	
400.0k Ω	100 Ω	
4.000M Ω	1k Ω	$\pm 2.5\%$ of rdg ± 8 digits
40.00M Ω	10k Ω	

Input Protection: 1000V DC or 1000V AC RMS

Capacitance (Auto-ranging)

Range	Resolution	Accuracy
40.00nF	10pF	$\pm 5.0\%$ of rdg ± 7 dgts
400.0nF	0.1nF	$\pm 3.0\%$ of rdg ± 5 dgts
4.000 μ F	1nF	
40.00 μ F	10nF	
100.0 μ F	0.1 μ F	$\pm 5.0\%$ of rdg ± 7 dgts

Input Protection: 1000V DC or 1000V AC RMS

Frequency (Auto-ranging)

Range	Resolution	Accuracy
4.000Hz	0.001Hz	

40.00Hz	0.01Hz	±1.0% of rdg ±3 dgts
400.0Hz	0.1Hz	
4.000kHz	1Hz	
40.00kHz	10Hz	
400.0kHz	100Hz	
5.00MHz	1kHz	±1.2% of rdg ±4 dgts

Sensitivity: >0.5V RMS when ≤1MHz

Sensitivity: >3V RMS when >1MHz

Input Protection: 1000V DC or 1000V AC RMS

Duty Cycle

Range	Resolution	Accuracy
0.1%~99.9%	0.1%	±1.2% of rdg ±2 dgts

Pulse width: >100us, <100ms

Frequency: 5Hz to 150kHz

Sensitivity: <0.5V RMS

Overload protection: 1000V DC or AC RMS

Temperature

Range	Resolution	Accuracy
-20°C ~ +760°C	1°C	±3% of rdg ±5 dgts
-4°F ~ +1400°F	1°F	±3% of rdg ±8 dgts

Sensor: Type K Thermocouple

Overload protection: 1000V DC or AC RMS

Diode Test

Test current	Resolution	Accuracy
1mA typical	1mV	±10% of reading
Max. 1.5V open		±5 digits

Open circuit voltage: Max. 1.5V DC

Overload protection: 1000V DC or AC RMS

Audible continuity

Audible threshold: Less than 50Ω

Test current max. 1.5mA

Overload protection: 1000V DC or AC RMS

Accessories

Included accessories

- 1) Standard Red/Black lead set with test probes.
- 2) K type thermocouple with adaptor.
- 3) USB wireless receiver with software for data logging.
- 4) Carry pouch.

BATTERY and FUSE replacement

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover or opening the meter.

- 1) When the battery becomes exhausted or drops below the operating voltage, the battery warning "  " will appear on the LCD display. The battery should be replaced.
- 2) Follow the instructions for installing a new battery. See the Battery Installation instructions below.
- 3) Dispose of the old battery properly.

NOTE: Procon Technology has discovered that the battery warning indication does not work. The best way to detect a low battery is to turn on the backlight and when this becomes very dim then the battery should be replaced. Note: a low battery is detected using the software available from Procon Technology. This is indicated on-screen and in the logged data as "Batt".

BATTERY INSTALLATION

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover.

- 1) Disconnect the test leads from the meter.
- 2) Open the battery cover by removing the two central screws using a Phillips head screwdriver.
- 3) Remove the cover and insert the battery into battery compartment, observing the correct polarity.
- 4) Put the battery cover back in place. Secure with the two screws.

NOTE: If your meter does not work properly, check the fuses and the battery to ensure that they are still good and that they are properly inserted.

REPLACING THE FUSES

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover or opening the meter.

- 1) Disconnect the test leads from the meter and any item under test.
2. Remove the battery cover and battery by removing the

- two central screws using a Phillips head screwdriver.
- 3) Remove the pull-out stand and remove the six screws using a good-quality Phillips head screwdriver. Be careful not to lose the screws, washers and rubber seals.
 - 4) Remove the back of the meter with care.
 - 5) Remove the old fuse from its holder by gently pulling it out. If necessary, use a screwdriver as a lever.
 - 6) Install the new fuse into the holder.
 - 7) Always use a fuse of the proper size and value. (0.5A/1000V fast blow for the 400mA range [SIBA 70-172-40], 10A/1000V fast blow for the 10A range [SIBA 50-199-06]).
 - 8) Replace and secure the rear cover, battery and battery cover.

WARNING: To avoid electric shock, do not operate the meter until the rear cover and battery cover are in place and fastened securely.