

## User's Guide



### PM1A Insulation Tester

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PM1A

**PM1A****1 kV Digital Insulation Tester****Safety Warnings**

- Read and understand the User's guide and Safety warnings before using this equipment.
- Follow Safety procedures and rules for working near high voltage energized systems during the use of this equipment. The generated voltages may be dangerous.
- Do NOT connect or disconnect the test leads during the measurement.
- Be careful not to make short-circuit between the terminals while a measurement is running, because it could be dangerous for the operator. Be sure that there is not a voltage difference between the points to which the megohmmeter will be connected, nor between them and ground.
- The panel, terminals, and connectors of the equipment must stay dry and clean.

**Used Symbols**

- ⚠ Caution, risk of electric shock
- ⓘ Caution, refer to User Guide
- ⚡ AC or DC
- ⊕ Equipment complies with current EU Directives.
- ⊕ Earth
- ⌚ Timer
- 🔊 Sound alarm (beep)
- 🔌 On/Off
- 🔋 Battery

**WARNING**

***This equipment should be used only by a trained person, competent in high current, strictly applying suitable safety rules.***

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## Description

The **PM1A** is easy-to-use equipment that provides reliable, safe, and accurate measurements of insulation resistances up to **200 G $\Omega$** , with 3 test voltages: **250 V - 500 V - 1kV**.

Furthermore, it offers useful additional features: 200 mA continuity range, low resistance measurement, AC/DC voltage measurement up to 600 V, selectable timer, hold memory, and selectable resistance limits for pass-fail testing, with sound (beep) indication.

To guarantee operator safety, there are no accessible metallic parts. Output terminals are placed in the furthest and most protected area of the equipment, and a light indicator shows high-voltage presence. Due to its reduced dimensions, weight, and power supply autonomy, this equipment is suitable for fieldwork. It is easy to carry, simple to operate.

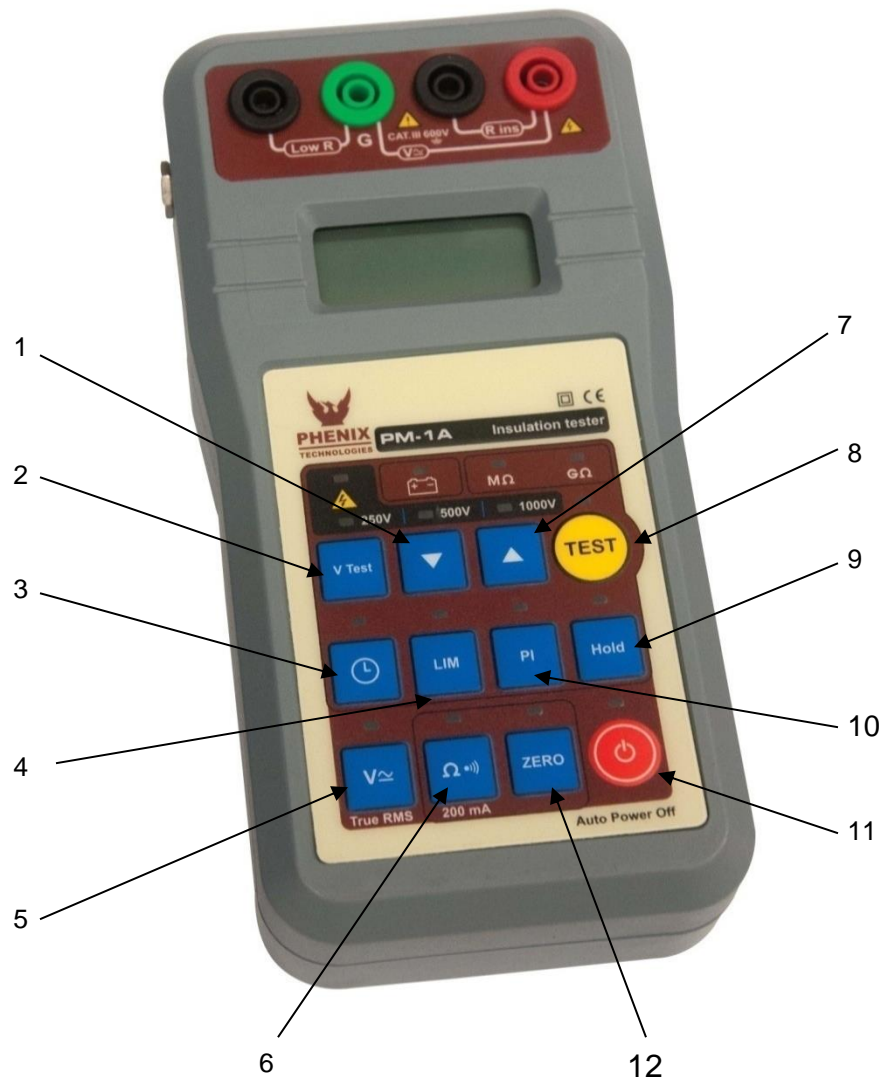
## Connectors and Controls



1. Power Supply Input
2. Terminals
3. 3 1/2 digit display
4. Keyboard

PM1A

## Key Functions



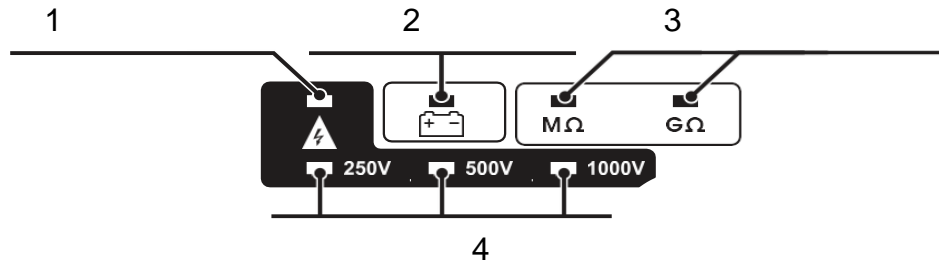
1. Press to decrease the value being programmed.
2. Press to program voltage tests.
3. Press to program the test duration.
4. Press to program the limit of the Pass-Fail test.
5. Press to activate the voltmeter.
6. Press to activate low resistance / continuity.
7. Press to increase the value being programmed.

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**Key Functions (Cont'd)**

8. Press TEST to start / stop the test.
9. Press HOLD to freeze the displayed value.
10. Press to display Polarization Index value
11. Press to turn ON / OFF.
12. Press ZERO to compensate the test lead resistance in low resistance measurements.

## LEDs



1. Indicates High Voltage present in output terminals.
2. Indicates battery charger is operating.
3. Indicates the unit of measured value showed in the display.
4. Indicates the selected test voltage.

**WARNING:** Do NOT connect the test leads during the measurement or when the HV LED is lit.

## Power Supply

The PM1A uses a rechargeable Ni-MH battery for power (4 x 1.2 V)

**WARNING:** Use ONLY rechargeable batteries, Ni-MH AA size, 1.2 V each, with a capacity of 1.3 Ah up to 2.5 Ah. It is dangerous to use any other type of batteries!




## Low Battery Indication

When the battery charge reaches a minimum value, approximately 10%, the message "LO BAT" appears automatically in the display.

## Charging the Battery

To recharge the battery:

- Check if the PM1A is turned OFF.
- Connect the equipment to the mains using the external power supply.
- The battery LED  will continue lighting with a red light until completing the charge. It then changes to a green light, remaining on until equipment is disconnected from the mains supply. The average time to fully charge the battery is approx.5 hours.

Battery connected to Mains

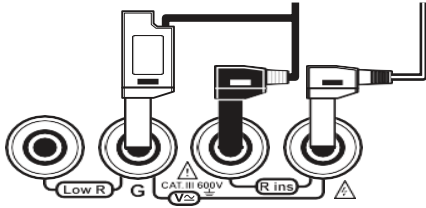


NOTE: The battery loses part of its charge while being stored. Before using the insulation tester for the first time, or after a period when stored, the battery should be recharged.

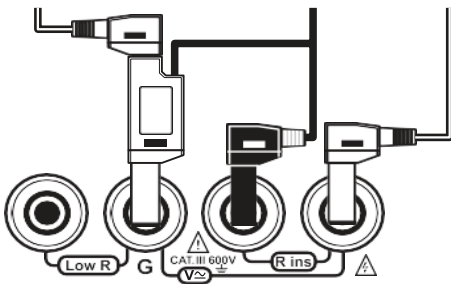
## Connecting the Equipment

Connect the PM1A as follows:

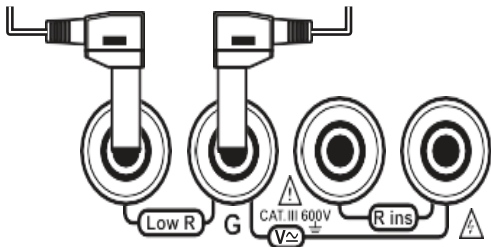
To measure insulation resistance:



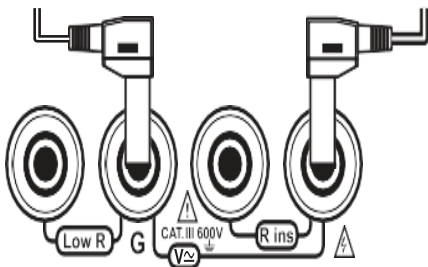
To measure insulation resistance using the Guard Terminal:



To measure low resistance:

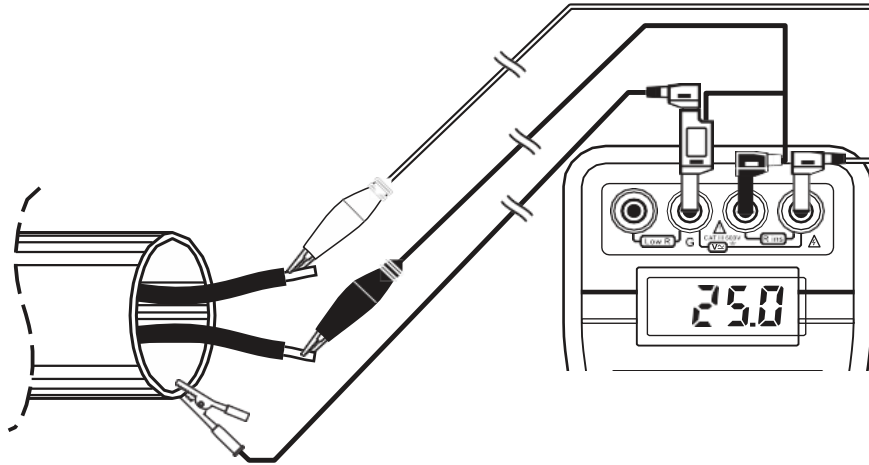


To use AC/DC Voltmeter:



## Connecting the Equipment (Cont'd)

Connect the test leads to the circuit and turn ON (⊗) the equipment::



**NOTE;** When measuring very high resistances, the operator can obtain more accurate readings by using the Guard terminal.

## Setting the Equipment:

Test Voltage

To Select the test voltage:

1- Press the V TEST key.



2.- Press the key, the selected test voltage will be indicated by the LEDs.



**NOTE:** After 5 seconds without pressing any key, the equipment enters safety mode. In this mode, the operator cannot change the selected test voltage unless the key is pressed again. This function prevents accidental changes during the measurement.

## Timer

### To program the test duration:

To program the test duration:

1- Press the key.



2- Press the key or (The defined time is shown on the display).

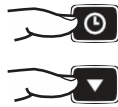


The possible values are:

**5 - 10 - 15 - 30 seconds**  
**1 - 2 - 3 - 5 - 10 - 15 minutes**



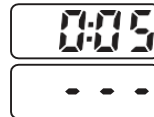
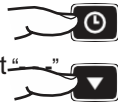
To cancel the Timer, repeat the above procedure and select "---"



The possible values are:

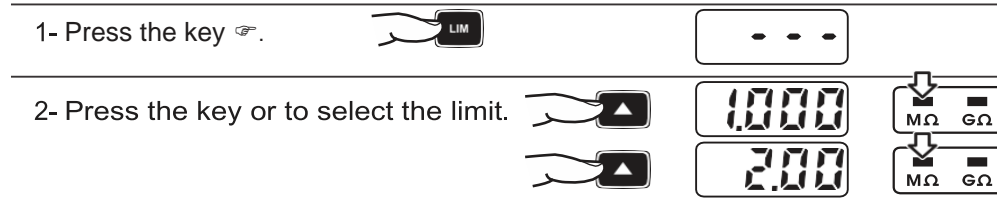
**5 - 10 - 15 - 30 seconds**  
**1 - 2 - 3 - 5 - 10 - 15 minutes**

To cancel the Timer, repeat the above procedure and select "---"



## Limit

Programming the lower insulation limit to perform a "Pass-fail test."



1 - 2 - 5 - 10 - 20 - 50 - 100 - 200 - 500 MΩ

1 - 2 - 5 - 10 - 20 - 50 - 100 GΩ



The equipment will indicate with a BEEP (intermittent sound) when the insulation resistance is lower than the programmed limit.



To cancel the Limit, repeat the above procedure and select "- - -"



## Measuring Insulation Resistance

1- Connect test leads to circuit to be measured.

2- Turn ON (⊕) the equipment.



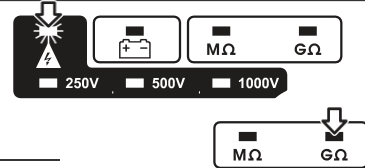
3- Select a test voltage.



4- Press the key to start the test.



5- The high voltage LED turns on, indicating that the equipment is applying voltage to the element that is being tested.



6- The display will show the resistance value and its corresponding unit will be indicated by the LED.



7- The PM1A has a built-in chronometer. To see the elapsed time since test voltage is applied, press the key.



8- Pressing the key during a test to show the voltage effectively applied to the element being tested.



(501 V)

9. To stop the test, press the key. The LED stays lit until the internal as well as external equipment capabilities are discharged by equipment.

If the measured value is bigger than the range of the equipment, the message “OVER” will appear on the display and the range value will keep blinking.



**WARNING: Do NOT touch the circuit or test leads when the LED is lit**

## Polarization Index

The key makes it possible to visualize the PI value on the display. For this type of test, the equipment must be connected and apply voltage to the sample for 10 min. After this period, the operator must press the key to display the PI value.



The Polarization Index is the ratio between the insulation resistance value measured after 10 min. and the value measured after 1 min.

$$= \quad IP \quad \frac{R_{10 \text{ min}}}{R_{1 \text{ min}}}$$

The Polarization Index is useful to determine whether it is necessary to perform predictive maintenance in order to detect any insulation resistance wear and tear due to the excess of dust, dirt, grease, or else the action of chemical or physical agents, etc.

If the key is pressed before the 10-minute period has elapsed, the key will show





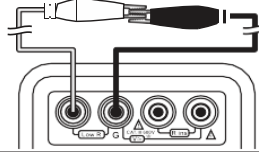
## Low Resistance / Continuity

To measure low resistance / continuity:

1- Press the key .



2- Make a short circuit with the test leads. The resistance value of the test leads will appear in the display.



.25  
(0,25 Ω)

3- Press and hold the key until the Display indicates .00.



.00

4- Connect the test leads to the circuit to be measured. The display will show the resistance value. If the unit detects a short-circuit or the reading is  $R < 5 \Omega \pm 0,5 \Omega$ , the equipment will indicate with a BEEP (intermittent sound).

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**Note:** This function does not compensate values higher than 5 Ω.

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## Auto-Power-off

The PM1A automatically turns off after 5 minutes of non-use. In measurements with programmed time, the countdown of 5 minutes starts after the test conclusion. To turn the megohmmeter back on, press the key ☺.

## Cleaning

Clean this instrument by using a soft (mild) cleaning liquid, after verifying that it doesn't affect the plastic.

## Technical Specifications

<b>Nominal test voltages</b>	: 250 V - 500 V - 1000 V Negative, DC voltage
<b>Resistance measurement</b>	: 10 k $\Omega$ up to 200 G $\Omega$
<b>Short circuit current</b>	: 1.5 $\pm$ 0.3 mA
<b>Test voltage accuracy</b>	: -0 / +15% for resistances between 10 M $\Omega$ and open circuit.
<b>Basic accuracy</b>	: R $\leq$ 50 G $\Omega$ : $\pm$ 5% of reading $\pm$ 2 digits R > 50 G $\Omega$ : $\pm$ 10% of reading $\pm$ 2 digits
<b>Low resistance measurement and Continuity tester</b>	: Range: 0.05 $\Omega$ to 150 $\Omega$ Accuracy: 5% of reading $\pm$ 2 digits Test current: up to 200 mA Continuity: activates at R < 5 $\Omega$ $\pm$ 0.5
<b>Built-in timer</b>	: 5 - 10 - 15 - 30 seconds 1 - 2 - 3 - 5 - 10 - 15 minutes
<b>Pass / fail test</b>	: 1 - 2 - 5 - 10 - 20 - 50 - 100 - 200 - 500 M $\Omega$
<b>Voltmeter</b>	: True RMS Range: 0 - 600V AC/DC Accuracy: 3% of reading $\pm$ 2 digits
<b>Overvoltage protection</b>	: CAT III - 600 V
<b>Additional features</b>	: • Automatic Polarization Index • Guard terminal • Hold function
<b>Safety class</b>	: In accordance with IEC 61010-1
<b>E.M.C.</b>	: In accordance with IEC 61326-1
<b>Electrostatic immunity</b>	: In accordance with IEC 61000-4-2
<b>Electromagnetic irradiation</b>	: In accordance with IEC 61000-4-3
<b>Power supply</b>	: Built-in, Ni-MH battery Autonomy: 1000 tests of 5 seconds with an interval of 25 seconds according to IEC 61557- 2. During the measurement a test resistance is used with the value of UN x (1000 $\Omega$ / V).
<b>Battery charger</b>	: Built-in, with external power supply of 9 V -0.5 A
<b>Operation temperature</b>	: -5 $^{\circ}$ C to 50 $^{\circ}$ C

**Technical Specifications (Cont'd)**

<b>Storage temperature</b>	: -10°C to 60°C
<b>Humidity</b>	: 95% RH (without condensation)
<b>Weight</b>	: Approx. 0.5 kg (1.5 lbs)
<b>Dimensions</b>	: 102 x 195 x 46 mm (4 x 3.7 x 1.9 in)

**Included accessories:**

- 2 measuring test leads**
- 1 Guard test lead**
- 1 power supply**
- 1 carrying bag**
- 1 operator's manual**

*Subject to technical change without notice.*

## CUSTOMER COMMENTS/SUGGESTIONS

Phenix Technologies made significant efforts to ensure that the materials in this Operator's Manual are correct. If there are concerns or comments as you have used this information, Phenix Technologies appreciates any feedback.

Unit Serial Number:

Sect	Page(s)	Comment

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