USER MANUAL

INSULATION TESTER

PCE-IT 110

ENGLISH

User manuals in various languages (français, italiano, español, português, nederlands, türk, polski) can be found via our product search on:
www.pce-instruments.com

PRECAUTIONS AND SAFETY MEASURES

» The instrument has been designed in compliance with directive IEC/EN61010-1 relevant to electronic measuring instruments.

» For your safety and in order to prevent damaging the instrument, please carefully follow the procedures described in this manual and read all notes preceded by symbol with the utmost attention.

» The Meter wirelessly transmits data to the mobile app via Bluetooth allowing you to view, save, organize and share datalogs and take measurements from a safe distance.

Before and after carrying out measurements, carefully observe the following instructions:

» Do not carry out any measurement in humid environments.

» Do not carry out any measurements in case gas, explosive materials or flammables are present or in dusty environments.

» Avoid any contact with the circuit being measured if no measurements are being carried out.

» Avoid any contact with exposed metal parts, with unused measuring probes, circuits, etc.

» Do not carry out any measurement in case you find anomalies in the instrument such as deformation, breaks, substance leaks, absence of display on the screen, etc.

» Pay special attention when measuring voltages higher than 20V, since a risk of electrical shock exists.

In this manual, and on the instrument, the following symbols are used:


WARNING: Observe the instructions given in this manual; improper use could damage the instrument or its components.


Double-insulated meter


AC voltage or current


DC voltage or current


Connection to earth

Do not test Voltage more than 550V

Safety
Per IEC1010 Overvoltage Installation Category

- Overvoltage Category I: Equipment of Overvoltage Category I is equipment for connection ta circuits in which measures are taken to limit the transient overvoltages to an appropriate low level.
  Note: Examples include protected electronic circuits.
- Overvoltage Category II: Equipment of Overvoltage Category II is energy-consuming equipment to be supplied from the fixed installation.
  Note: Examples include household, office, and laboratory appliances.
- Overvoltage Category III: Equipment of Overvoltage Category III is equipment in fixed installations.
  Note: Examples include switches in the fixed installation and some equipment for industrial use with permanent connection to the fixed installation.
- Overvoltage Category IV: Equipment of Overvoltage Category IV is for use at the origin of the installation.
  Note: Examples include electricity meters and primary over-current protection equipment.

Safety Instructions
This meter has been designed for safe use, but must be operated with caution.
The rules listed below must be carefully followed for safe operation.

- Never apply voltage or current to the meter that exceeds the specified maximum:

Input Protection Limits Function	**Maximum Input**
V DC or V AC	1000VDC/AC rms
mA AC/DC	600mA MAX, 10A 1000V fast acting fuse
A AC/DC10A	10A 1000V fast acting fuse
Frequency, Resistance, Capacitance,	(10A for 30 seconds max every 10 minutes)
Duty Cycle, Diode Test,	1000VDC/AC rms
Continuity Temperature	1000VDC/AC rms

Surge Protection: 8kV peak per IEC 61010

- Use extreme CAUTION when working with high voltages.
- Do not measure voltage if the voltage on the COM input jack exceeds 1000V above earth ground.
- Never connect the meter leads across a voltage source while the function switch is in the current, resistance or diode mode, doing so can damage the meter.
- Always discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.
- Always turn off the power and disconnect the test leads before opening the covers to replace the fuse or batteries.
- Never operate the meter unless the back cover and the battery and fuse covers are in place and fastened securely.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Electromagnetic Environment: IEC EN 61326-1, This equipment meets requirements for use in basic and controlled electromagnetic environments like residential properties, business premises, and light-industrial locations.

GENERAL DESCRIPTION

The instrument carries out the following measurements:

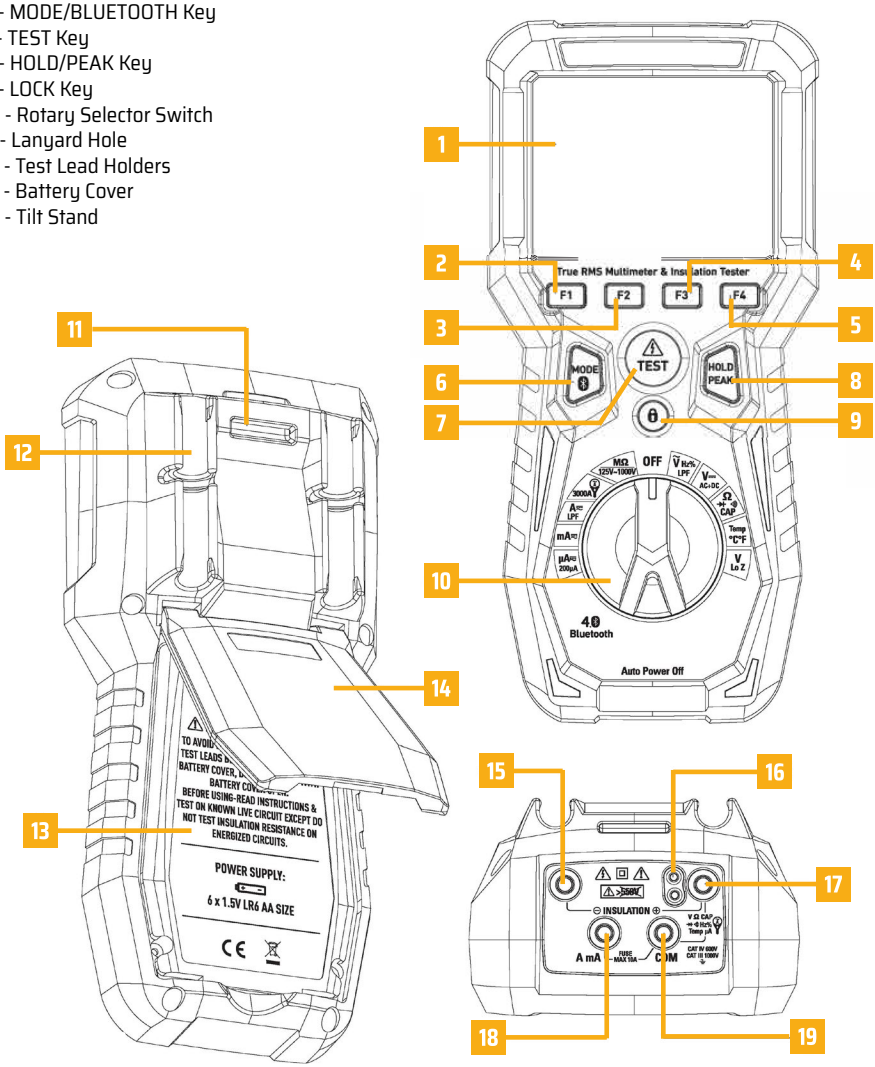
- DC Voltage
- AC/AC+DC TRMS Voltage
- LPF, Law Pass Filter
- Law Z AC/DC Voltage
- DC Current
- AC TRMS Current
- 30A/300A/3000A AC, TRMS Current with Current Transducer
- Resistance and Continuity Test
- Diode Test
- Capacity
- Frequency
- Duty Cycle
- Temperature with K-Type Probe
- Insulation Tester
- PI/DAR Test
- Data Logger Function and Measured Data

Each of these functions can be selected by means of the appropriate switch. The instrument is also equipped with function keys, analogue bargraph and LCD RGB high-contrast colour display. The instrument is also equipped with an Auto Power OFF function which automatically switches off the instrument after a certain (programmable) idling time.

DESCRIPTION

Meter Description

1 - RGB Display
2 - Function Key F1
3 - Function Key F2
4 - Function Key F3
5 - Function Key F4
6 - MODE/BLUETOOTH Key
7 - TEST Key
8 - HOLD/PEAK Key
9 - LOCK Key
10 - Rotary Selector Switch
11 - Lanyard Hole
12 - Test Lead Holders
13 - Battery Cover
14 - Tilt Stand
15 - Input Terminal INSULATION-
16 - Insulation Test Key Input Terminal 10A
17 - Input Terminal Positive and INSULATION+
18 - Input Terminal mA A
19 - Input Terminal COM



Description of Function Keys

HOLD/PEAK Key

- Pressing the HOLD/PEAK Key freezes the value of the measured quantity on the display, after pressing this key, the message **Hold** appears on the display.
- Press the HOLD/PEAK Key again to exit the function, to save the vale on the display.
- Press and hold the HOLD/PEAK Key for a long time in order to PMAX/PMIN measurement.
- The PEAK function is accessible when measuring AC Voltage or Current, it captures and displays the highest positive peak and the highest negative peak of the AC waveform.
- Momentarily press the PEAK Key to view the highest positive peak, Peak MAX/MIN will appear on the LCD display and meter will display and hold the highest reading, the meter will update the reading when a higher positive peak occurs.
- Press and hold the key to exit PEAK and return to normal operation.

Function Keys F1, F2, F3, F4

- Use keys Fl, F2, F3 and F4 to manage the instrument´s internal functions.

MODE/BLUETOOTH Key

- Momentarily press the MODE/BLUETOOTH Key to select AC, LPF or DC, Frequency or Duty Cycle, Resistance, Continuity or Diode Test and °C or °F.
- Bluetooth allows readings to be displayed and stored on mobile devices, to activate Bluetooth, press and hold the MODE/BLUETOOTH Key until the bluetooth symbol appears on the LCD display.
- Bluetooth should be disabled when not connected to a mobile device in order to conserve battery power.
- To turn off Bluetooth, press and hold the MODE/BLUETOOTH Key until the bluetooth symbol no longer appears on the display.

TEST Key

- With the test leads connected to the equipment under test, press and hold the TEST Key to begin an insulation resistance test.
- The lower-right display will show test voltage, and the main display will show the resistance.
- This key is used to start the insulation measurement, it must be kept pressed until the insulation measurement is stabilized, the symbol is displayed on the screen during the measurement.
- After each measurement, the HOLD symbol is displayed and the HOLD function automatically activated, if the object being measured is charged and the voltage is greater than 30V (AC or DC) the meter will automatically reject the test without generating a high voltage.
- The LCD display the lightening bolt symbol and the unit beeps if the test leads are inserted into a live >30V (AC or DC) outlet when switching to a insulation test mode.
- If the battery is low, Insulation measurement does not start.

LOCK Key

» For hands-free insulation resistance testing, use the LOCK Key feature.

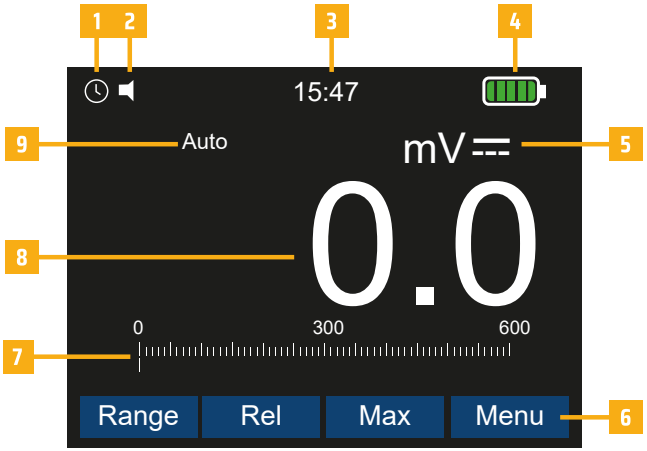
» With the test leads connected to the equipment under test, press the LOCK Key for two seconds, and then press the TEST Key to begin the test.

» The lock icon will appear on the display and the meter will beep to indicate it is in lock mode.

» Press the TEST Key to end the test.

Description of the Display

1 - Indication of Auto power off
2 - Indication of buzzer
3 - Indication of the system´s time
4 - Indication of battery level and activation/deactivation of key tone [Not associated with continuity test]
5 - Indication of measuring unit



DESCRIPTION OF INTERNAL FUNCTIONS

HOLD Function and Saving

» Press the HOLD/PEAK Key again to freeze the result, the message **Hold** appears on the display.

» Press the F1 Key to save the data in the instrument's memory.

» Enter the General menu to display the saved result.

Relative Measurement

» Press and hold the F2 Key to enter relative measurement, the message **REL** and symbol **Δ** appear on the display.

» Press the F4 Key to enter the General menu, save the measured result and display it.

Saving MIN/MAX and PEAK Values

» Press the F3 Key to enter the measuring mode of MAX, MIN values of the quantity to be measured, the message **MAX MIN** appears on the display.

» The values are automatically updated by the instrument, which emits a short beep whenever the actually displayed values are exceeded (Higher for MAX value, Lower for MIN value).

» Press the F3 Key again to end MAX MIN.

» Press the HOLD and SAVE (F1) Key to the measured result.

» Press and hold the PEAK Key to enter the measuring mode of Peak values, the message **PEAK** appears on the display and the values are updated in the same way as for the MAX/MIN function.

» Press and hold the PEAK Key again to end PMAX, PMIN.

» Press the HOLD and SAVE (F1) Key to save the result.

Insulation Measurement

» The default voltage for the insulation test range is 125V.

» Press F1 Key to enter test rang 250V;
Press F2 Key to enter test rang 500V;
Press F3 Key to enter test rang 1000V;
EXT: voltage values.

» Press F4 Key to enter PI.DAR measuring mode: Polarization (PI) or Medium absorption ratio (DAR).

» The polarization index (PI) is the ratio of the 10-minute insulation resistor to the 1-minute insulation resistor, the media absorption ratio (DAR) is the ratio of 1-minute insulation resistance to 30-second insulation resistance.

Note: Insulation tests can only be performed on the power-off circuit. Measure the polarization index or medium absorption ratio.
Note: Test time is not completed and interrupted, the interface shows test fail.

» Pressing the LOCK Key is the test lock, and pressing this key and then pressing the TEST Key will keep the test locked.

Instrument General Menu

» With a measurement on the display, press function key F4 to enter the instrument's general menu.

Recording Data (Logger) and Setup New Recordings

» Use the F2 or F3 Key to select symbol **Record Menu** and Press F1 [Enter] Key to select symbol.

» Use the F2 or F3 Key to select symbol **Setup New Recordings** or **Start Recording.**

» Press F1 [Enter] Key to select symbol.

» Use the F2 or F3 Key to select:
Setting of **recording duration**, from 1 min ta 23h:59min.
Setting of **sampling interval** from 1 s to 59min:59s.

» Press the F1 Key to enable the editing functions and the F2 [Up] and F3 [Down] Keys to carry out the desired settings.

» Press the F1 [Enter] Key to confirm the settings or the F4 [Cancel] Key to go back to editing.

» Press the Key F4 [Cancel] to go back to the main screen

» Select the option **Start Recording** and press the F1 Key.

» The instrument shows the remaining time and the number of samples taken in real time, and the message **Stopped** at the end of recording. Press the F4 [Stop] Key to stop recording at any time.

» Press the F1 Key to save recorded data in the internal memory and view it again on the display.

» Press the F4 [Close] Key to go back to the previous screen.

Recalling Recordings

» Use the F4 Key to select symbol **Menu** and press the F2 [<<] or F3 [>>] Key to select symbol **Record Menu**

» Press F1 [Enter] Key to select symbol.

» Press the F1 [Trend] Key to display the trend of recording and press the F2 [Prev] or F3 [Next] to select Different data records.

» Press the F2 [<<] or F3 [>>] Key to move the cursor on the graph and observe the corresponding value at the bottom of the display.

» Press the F1 [Summ] Key to go back to the Trend screen.

» Press the F4 [Back] Key to go back to the previous screen.

Delete Recordings

» Use the F4 Key to select symbol **Menu** and press the F2 [<<] or F3 [>>] Key to select symbol **Record Menu**

» Press F1 [Enter] Key to select symbol.

» Use the F2 or F3 Key to select symbol **Delete Recordings**, all recordings are deleted.

Note: No recording function in insulation test mode.

Measure Recall

» Use the F4 Key to select symbol **Menu** and press the F2 [<<] or F3 [>>] key to select symbol **Measure Recall** and press F1 [Enter] Key to select symbol **Recall Measurements, Delete Measuemens, Recall Insulations, Delete Insulations**

» Press F1 [Enter] Key to see recorded.

» Use the F1 Key to select symbol **Delete** and press the F4 key to select symbol **Cancel**

General Settings of the Instrument

» Use the F4 Key to select symbol **Menu** and press the F2 [<<] or F3 [>>] Key to select symbol **Common Setup**

» Press the F1 [Enter] Key to select the options.

» Use the F2 [Up] or F3 [Down] Key to select the Common options:
Key Sound: Allows activating/deactivating the tone of the function keys.
APO lime: Allows defining the instruments auto power off interval when idling in the range: 5min ... 60min with resolution 1 min, Set value 00 to disable the function; Press the F3 Key to switch on the instrument again after it has automatically switched off.
12 Hour: Allows defining the format of the system time between the options: 12 Hours [on] and 24 Hours [off].
Bluetooth: Allows setting bluetooth turn on or off.

» Press the F1 [Enter] Key to carry out the selected operation or the F4 [Back] Key to go back to the measuring screen.

» Use the F2 [Up] or F3 [Down] Key to select the Date/lime options:
Set Date: Allows setting the system´s date as defined in the Format menu.
Set Time: Allows setting the system´s time as defined in the Format menu.

» Use the F1 [EDIT] Key to save and the F2 and F3 Keys for settings or the F4 Key to go back to the previous screen.

Meter Info on the Display

» Use the F4 Key to select symbol **Menu**

» Use the F2 [<<] or F3 [>>] to select symbol **Meter Info**

» Press the F1 [Enter] Key to enter Meter Info

» Press F4 [Back] Key to go back to the main screen

OPERATING INSTRUCTIONS

DC/AC+DC Voltage Measurement

CAUTION: The maximum input DC voltage is 1000V. Do not measure voltages exceeding the limits given in this manual. Exceeding voltage limits could result in electrical shocks to the user and damage to the instrument.

- Set the function switch to the **V=/AC+DC** Position.
- Insert the black test lead into the COM Input Jack and the red test lead into the Positive Input Jack.
- Position the red lead and the black lead respectively in the spots with positive and negative potential of the circuit to be measured.
- Read the DC voltage in the display.
- If the display shows the message **O.L,** select a higher range.
- To use the HOLD, RANGE and REL function, see the key operation instructions.
- For AC+DC measurement, press the MODE Key to indicate **AC+DC** on the display.

AC Voltage Measurement

CAUTION: The maximum input AC voltage is 1000V. Do not measure voltages exceeding the limits given in this manual. Exceeding voltage limits could result in electrical shocks to the user and damage to the instrument.

- Set the function switch to the **V-Hz%/LPF** Position.
- Insert the black test lead into the COM Input Jack and the red test lead into the Positive Input Jack.
- Position the black test probe tip and red test probe tip respectively in the spots of the circuit to be measured.
- Read the AC voltage in the display.
- If the display shows the message **O.L,** select a higher range.
- Press the MODE Key to select measurements **Hz or %** in order to display the values of frequency and duty cycle of input voltage.
- Press the MODE Key to select low pass filter test

Low Z AC/DC Voltage Measurement

CAUTION: Observe all safety precautions when working on live voltage. Do not connect to circuits that exceed 600V when the meter is set to Low Z. Do not use Low Z when testing circuits that could be harmed by this function's low input impedance. Let the meter stabilize 15 minutes after using Lo Z.

Low Z is used to check for **ghost** voltage.
Ghost voltages are present when non-powered wires are in close proximity to wires powered wires. Capacitive coupling between wires make it appear that non-powered wires are connected to a real source of voltage.
The Low Z setting places a load on the circuit, which greatly reduces the voltage reading when connected to ghost voltage.

» Set the function switch to the **Low Z** Position.

» Insert the black test lead into the COM Input Jack and the red test lead into the Positive Input Jack.

» Touch the test leads to the circuit under test.

» If the display shows the message **O.L,** select a higher range.

Resistance Measurement and Continuity Test

CAUTION: Before attempting any resistance measurement, cut off power supply from the circuit to be measured and make sure that all capacitors are discharged, if present.

» Set the function switch to the Ω •))) ⊣ CAP Position.

» Insert the black test lead into the COM Input Jack and the red test lead into the Positive Input Jack.

» Position the test leads in the desired spots of the circuit to be measured, the display shows the value of resistance.

» If the display shows the message **O.L,** select a higher range.

» Press the MODE Key to select measurement •))) relevant to the continuity test, and position the test leads in the desired spots of the circuit to be measured.

» The value of resistance (which is only indicative) is displayed in and the instrument sounds if the value of resistance is <50Ω.

» To use the HOLD, RANGE and MAX function, see the key operation instructions.

Diode Test

CAUTION: Before attempting any resistance measurement, cut off power supply from the circuit to be measured and make sure that all capacitors are discharged, if present.

- Set the function switch to the CAP Position.
- Press the MODE Key to select measurement.
- Insert the black test lead into the COM Input Jack and the red test lead into the Positive Input Jack.
- Position the leads at the ends of the diode to be tested, respecting the indicated polarity. The value of directly polarized threshold voltage is shown on the display.
- If threshold value is equal to OmV, the P-N junction of the diode is short-circuited.
- If the display shows the message **O.L,** the terminals of the diode are reversed or the P-N junction of the diode is damaged.

Capacitance Measurement

CAUTION: Before carrying out capacitance measurements on circuits or capacitors, cut off power supply from the circuit being tested and let all capacitance in it be discharged. When connecting the multimeter and the capacitance to be measured, respect the correct polarity (when required.)

- Set the function switch to the CAP Position.
- Press the MODE Key until the symbol **nF** is displayed.
- Insert the black test lead into the COM Input Jack and the red test lead into the Positive Input Jack.
- Press the F2 [REL] key before carrying out measurements.
- Position the leads at the ends of the capacitor to be tested, respecting, if necessary, the positive (Red cable) and negative (Black cable) polarity.
- The display shows the value of capacitance, the bargraph is not active in this function.
- The message **O.L,** indicates that the value of capacitance exceeds the maximum measurable value.

Temperature Measurement with K-Type Probe

CAUTION: Before attempting any temperature measurement, cut off power supply from the circuit to be measured and make sure that all capacitors are discharged, if present.

» Set the function switch to the **Temp°C°F** Position.

» Press the MODE Key until the symbol °C or °F is displayed.

» Insert the provided adapter into input terminals **Positive+** and **COM-.**

» Connect the provided K-type wire probe or the optional K-type thermocouple to the instrument by means of the adapter, respecting the positive and negative polarity on it.

» The display shows the value of temperature, the bargraph is not active in this function.

» The message **O.L,** indicates that the value of temperature exceeds the maximum measurable value.

AC/DC µA Current Measurement

CAUTION: Maximum input uA current is 200uA (Input terminals Positive+). Do not measure currents exceeding the limits given in this manual. Exceeding voltage limits could result in electrical shocks to the user and damage to the instrument.

» Cut off power supply from the circuit ta be measured.

» Set the function switch ta the 200µA ⎓ Position.

» Press the MODE Key to select **AC** measurement.

» Insert the black test lead into the COM Input Jack and the red test lead into the Positive Input Jack.

» Connect the red lead and the black lead in series to the circuit whose current you want to measure.

» Supply the circuit to be measured, the display shows the value of current.

» If the display shows the message **O.L,** the maximum measurable value has been reached.

» Press the MODE Key to select **DC** measurement.

» Microamps DC is applied to a flame rectifier diode test on a heater control.

» The current measurement will be shown in the main display.

Note: When the flame is on, there should be a measureable µA DC signal, typically under 10 µA DC. Compare measurement to manufacturer´s specifications.

AC/DC Current Measurement

CAUTION: Maximum input AC current is 10A (Input 10A) or 600mA (Input mA). Do not measure currents exceeding the limits given in this manual. Exceeding voltage limits could result in electrical shocks to the user and damage to the instrument.

» Cut off power supply from the circuit to be measured.

» Set the function switch ta the mA or A Position.

» Press the MODE Key to select **DC** measurement.

» Insert the black test lead into the COM Input Jack and the red test lead into the A/mA Input Jack.

» Connect the red lead and the black lead in series to the circuit whose current you want to measure.

» Supply the circuit to be measured, the display shows the value of current.

» If the display shows the message **O.L,** the maximum measurable value has been reached.

» Press the MODE Key to select low pass filter test or DC current measurement.

AC Current (with Current Transducer) Measurement

CAUTION: Maximum input AC current is 3000A (Input terminals Positive+). Do not measure currents exceeding the limits given in this manual.

» Set the function switch to the 3000A Position.

» Insert the black test lead into the COM Input Jack and the red test lead into the Positive Input Jack.

» Connect the Current Transducer in series to the circuit whose current you want to measure.

» Supply the circuit to be measured, the display shows the value of current.

» If the display shows the message **O.L,** the maximum measurable value has been reached.

Insulation Resistance Measurement

CAUTION: Disconnect the circuit under test and isolate it from any stray resistance. Insulation test should only be performed on de-energized circuits.

» Insert red test lead into INSULATION+ Input Jack, and black test lead into INSULATION- Input Jack, and rotate the function selector to the desired test voltage.

» Choose from 125V, 250V, 500V or 1000V based on the compatibility with the device tested.
Note: Disconnect the circuit under test and isolate it from any stray resistance. Insulation test should only be performed on de-energized circuits.

» Connect the red and black leads to the circuit under test, if there is a voltage in the circuit, a constant beep will sound and the **Test Voltage** symbol will be displayed.

» Press and hold the TEST Key to begin test, the lower right display shows test voltage, and the main display shows the resistance.

» The measured insulation resistance is displayed on the main display in MΩ, allow the reading to stabilize before recording the measurement, turning the function switch, at any time during the insulation test will end the testing process.

» The circuit will discharge through the meter, keep the test leads connected until the circuit is completely discharged and the lower right display shows near zero volts.

» Press the F4 [PI/DAR] Key to select **PI TEST or DAR TEST.**

MAINTENANCE

CAUTION:

» Only expert and trained technicians should perform maintenance operations.

» Before carrying out maintenance operations, disconnect all cables from the input terminals.

» Do not use the instrument in environments with high humidity levels or high temperatures. Do not expose to direct sunlight.

» Always switch off the instrument after use.

» In case the instrument is not to be used for a long time, remove the battery to avoid liquid leaks that could damage the instrument´s internal circuits.

The Internal Battery
When the LCD displays symbol for LOW BATTERY, it is necessary to Replace the batteries.
Refer to Figure and replace the batteries as follows:

» Turn the Meter off and remove the test leads from the terminals.

» Remove the battery door assembly by using a standard blade screwdriver to turn the battery door screw one-half turn counterclockwise.

» Replace the batteries 1.5V AA x 6.

» Reinstall the battery door assembly and secure it by turning the screw one-half turn clockwise.

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover.
WARNING: To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely.

Replacement of Internat Fuses
Referring to Figure, examine or replace the Meter's fuses as follows:

» Turn the Meter off and remove the test leads from the terminals.

» Remove the battery door assembly by using a standard blade screwdriver to turn the battery door screw one-half turn counterclockwise.

» Remove the fuse by gently prying one end loose, then sliding the fuse out of its bracket.

» Install only specified replacement fuses (F10A/1000V, 10 x 38mm).

» Reinstall the battery door assembly and secure it by turning the screw one-half turn clockwise.

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the meter cover.
WARNING: To avoid electric shock, do not operate your meter until the fuse cover is in place and fastened securely.

Cleaning the Instrument

» Use a soft and dry cloth to clean the instrument.

» Never use wet cloths, solvents, water, etc.

SPECIFICATIONS

Technical Specifications
Accuracy calculated as [%reading + (num. digits*resolution)] at 18°C 28°C <75%HR

Function	Range	Resolution	Accuracy	Input Impedance
DC Voltage	600.0mV	0.1mV	±(0.9% + 5 digits)	>10MΩ
	6.000V	0.001V		
	60.00V	0.01V		
	600.0V	0.1V	±(1.0% + 5 digits)	
	1000V	1V		

Protection against overcharge: 1000VDC/ACrms.

Function	Range	Resolution	Accuracy (50 ... 60Hz)	Accuracy (61 ... 1kHz)
AC TRMS Voltage	6.000V	0.001V	±(1.0% + 5 digits)	±(3.0% + 5 digits)
	60.00V	0.01V		
	600.0V	0.1V	±(1.0% + 5 digits)	
	1000V	1V	±(1.2% + 5 digits)	

Protection against overcharge 1000VDC/ACrms.
[*]Accuracy specified from 10% ... 100% of the measuring range, Input impedance: >9MΩ.
Distorted, pulsed, triangle or trapezia waveform Accuracy: [10%rdg + 10dgt].
Accuracy PEAK function: ± 10%rdg; PEAK response time: 1 ms.

Function	Range	Resolution	Accuracy (50 to 60Hz)	Input Impedance
AC+DC TRMS Voltage	6.000V	0.001V	±(3.0% + 20 digits)	>10MΩ
	60.00V	0.01V		
	600.0V	0.1V		
	1000V	1V		

Protection against overcharge: 1000VDC/ACrms.

Function	Range	Resolution	Accuracy
AC/DC Voltage (Low Z)	6.000V	1mV	±(3.0% + 40 digits)
	60.00V	10mV	
	600.0V	0.1V	

Protection against overcharge 1000VDC/ACrms. Input Protection: 600V AC RMS or 600V DC.
Input Impedance: Approx. -3k Ω

Function	Range	Resolution	Accuracy	Protection against overcharge
DC Current	200.0μA	0.1μA	±(0.9% + 8 digits)	MAX 200μA
	600.0mA	0.1mA	±(1.2% + 3 digits)	Quick Fuse 10A/1000V
	10.00A	0.01A	±(1.5% + 5 digits)	

Function	Range	Resolution	Accuracy	Protection against overcharge
AC TRMS Current (50 ... 1kHz)	200.0μA	0.1μA	±(1.2% + 8 digits)	MAX 200μA
	600.0mA	0.1mA	±(1.2% + 5 digits)	Quick Fuse 10A/1000V
	10.00A	0.01A	±(1.5% + 5 digits)	

[*]Accuracy specified from 5% ... 100% of the measuring range.
Distorted, Pulsed, Triangle or Trapezia waveform Accuracy: [10%rdg + 10dgt].

Function	Range	Transducer Ratio	Resolution	Accuracy (50 ... 1kHz)
AC Current (with Current Transducer)	30A*	100mV/1A	0.01A	±(1.2% + 10 digits)
	300A*	10mV/1A	0.1A	
	3000A*	1mV/1A	10A	

[*]Accuracy specified from 5% ... 100% of the measuring range.
[*]Do not include the accuracy of current Transducer.
With Current Transducer [30A/300A*/3000* Rang Corresponding Current Transducer Rang].
Distorted, Pulsed, Triangle or Trapezia waveform Accuracy: [10%rdg + 10dgt].

Function	Test Current	Max Voltage with Open Circuit
Diode Test	<1.5mA	3.2VDC

Function	Range	Resolution	Accuracy	Buzzer
Resistance and Continuity Test	600.0Ω	0.1Ω	±(1.2% + 10 digits)	<50Ω
	6.000kΩ	0.001kΩ	±(1.5% + 5 digits)	
	60.00kΩ	0.01kΩ		
	600.0kΩ	0.1kΩ		
	6.000MΩ	0.001MΩ		
	60.00MΩ	0.01MΩ	±(2.5% + 10 digits)	

Protection against overcharge: 1000VDC/ACrms.

Function	Range	Resolution	Accuracy
Frequency (Electronic Circuits)	40.00 ... 10kHZ	0.01 ... 0.001kHz	±(1.0% + 5 digits)

Sensitivity: 2Vrms

Function	Range	Resolution	Accuracy
Duty Cycle	20.00 ... 80.00%	0.1%	±(1.2% + 2 digits)

Frequency Range: 40Hz ... 10kHz [100s ... 100ms].
Sensitivity: >2Vrms.

Function	Range	Resolution	Accuracy
Capacity	60.00nF	0.01nF	±(5.0% + 35 digits)
	600.0nF	0.1nF	±(2.5% + 8 digits)
	6.000µF	0.001µF	±(3.0% + 5 digits)
	60.00µF	0.01µF	
	600.0µF	0.1µF	
	6000µF	1µF	±(2.5% + 20 digits)

Protection against overcharge: 1000VDC/ACrms.

Function	Range	Resolution	Accuracy
Temperature with K-Type Probe	-20.0 ... 600.0°C	0.1°C	±(3.0% reading + 5°C)
	600 ... 1000°C	1°C	
	-4 ... 600.0°F	0.1°F	±(3.0% reading + 9°F)
	600 ... 1832°F	1°F	

[*]Instrument accuracy without probe; Specified accuracy with stable environmental temperature at ± 1 °C. For long-lasting measurements, reading increases by 2°C.

Function	Terminal Voltage	Range	Resolution	Accuracy	Test Current
Insulation Resistances	125V (0% ... 20%)	0.125 ... 6.000MΩ	0.001MΩ	±(2% + 10)	1mA at load 125kΩ
		6.00 ... 60.00MΩ	0.01MΩ	±(2% + 10)	
		60.0 ... 600.0 MΩ	0.1MΩ	±(4% + 5)	
		600 ... 6000MΩ	1MΩ	±(5% + 10)	
	250V (0% ... 20%)	0.250 ... 6.000MΩ	0.001MΩ	±(2% + 15)	1mA at load 250kΩ
		6.000 ... 60.00MΩ	0.01MΩ	±(2% + 10)	
		60.00 ... 600.0MΩ	0.1MΩ	±(3% + 5)	
		600.0 ... 6000MΩ	1MΩ	±(4% + 10)	
	500V (0% ... 20%)	0.500 ... 6.000MΩ	0.001MΩ	±(2% + 10)	1mA at load 500kΩ
		6.000 ... 60.00MΩ	0.01MΩ	±(2% + 10)	
		60.00 ... 600.0MΩ	0.1MΩ	±(2% + 5)	
		600.0 ... 6000MΩ	1MΩ	±(4% + 10)	
	1000V (0% ... 20%)	1.000 ... 6.000MΩ	0.001MΩ	±(3% + 10)	1mA at load 1MΩ
		6.000 ... 60.00MΩ	0.01MΩ	±(2% + 10)	
		60.00 ... 600.0MΩ	0.1MΩ	±(2% + 5)	
		600.0 ... 6000MΩ	1MΩ	±(4.5% + 10)	

Short Circuit <5mA.

Intrinsic Uncertainity (EN61557)			
Code	Measurement Intrinsic	Operating Uncertainty	Maximum Uncertainty*
A	Insulation Resistance	See Electrical Specifications	<30%
*Indicates maximun amout allowable by standard.			

Influence Variables and Uncertainties (EN61557)			
Code			
E1	Position	±90°	<5%
E2	Supply Voltage	7.5 ... 9.13V	<5%
E3	Temperature	0 ... 35°C	<5%

General Specifications

Reference Standards	
Safety	IEC/EN61010-1
Emc	IEC/EN 61326-1, 61557-1-2-4
Insulation	Double Insulation
Pollution Level	2
Overvoltage Category	CAT IV 600V, CAT III 1000V
Max Operating Altitude	2000m (6562ft)
IP	IP65
Mechanical Characteristics	
Size (L x W x H)	175 x 85 x 55mm (7 x 3 x 2in)
Weight (batteries included)	800g
Power Supply	
Battery type	6x1 .5V AA batteries, 1200mAh
Law battery indication	Symbol on the display
Auto Power Off	After 5 ... 60min (may be disabled)
Fuses	F10A/1000V, 10 x 38mm (Input 10A mA)

Display	
Conversion	TRMS
Characteristics	Color RGB, 6000 dots with bargraph
Sampling Frequency	3 times/s
Environmental Conditions for Use	
Reference Temperature	18 ... 28°C (64 ... 82°F)
Operating Temperature	5 ... 40°C (41 ... 104°F)
Allowable Relative Humidity	<80%HR
Storage Temperature	-20 .. 60°C (-4 ... 140°F)
Storage Humidity	<80%HR

DISPOSAL

For the disposal of batteries in the EU, the (EU) 2023/1542 directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose. In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law. For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations. If you have any questions, please contact PCE Instruments.

PCE INSTRUMENTS CONTACT INFORMATION

Germany
PCE Deutschland GmbH
Im Langel 26
D-59872 Meschede
Deutschland
Tel.: +49 (0) 2903 976 99 0
Fax: +49 (0) 2903 976 99 29
info@pce-instruments.com
www.pce-instruments.com/deutsch

France
PCE Instruments France EURL
2, rue Georges Kuhnmunch
67250 Soultz-sous-Forêts
France
Tel.: +33 (0) 972 35 37 17
Fax.: +33 (0) 972 35 37 18
info@pce-france.fr
www.pce-instruments.com/french

Spain
PCE Ibérica S.L.
Calle Mula, 8
02500 Tobarra (Albacete)
España
Tel. : +34 967 543 548
info@pce-iberica.es
www.pce-instruments.com/espanol

United Kingdom
PCE Instruments UK Ltd
Trafford House
Chester Rd, Old Trafford
Manchester M32 0RS
United Kingdom
Tel: +44 (0) 161 464902 0
Fax: +44 (0) 161 464902 9
info@pce-instruments.co.uk
www.pce-instruments.com/english

Italy
PCE Italia s.r.l.
Via Pesciatina 878 / B-Interno 6
55010 Loc. Gragnano
Capannori (Lucca)
Italia
Telefono: +39 0583 975 114
Fax: +39 0583 974 824
info@pce-italia.it
www.pce-instruments.com/italiano

Turkey
PCE Teknik Cihazları Ltd.Şti.
Halkalı Merkez Mah.
Pehlivan Sok. No.6/C
34303 Küçükçekmece - İstanbul
Türkiye
Tel: 0212 471 11 47
Faks: 0212 705 53 93
info@pce-cihazlari.com.tr
www.pce-instruments.com/turkish

The Netherlands
PCE Brookhuis B.V.
Twentepoort West 17
7609 RD Almelo
Nederland
Telefoon: +31 (0)53 737 01 92
info@pcebenelux.nl
www.pce-instruments.com/dutch

United States of America
PCE Americas Inc.
1201 Jupiter Park Drive, Suite 8
Jupiter / Palm Beach
33458 FL
USA
Tel: +1 (561) 320-9162
Fax: +1 (561) 320-9176
info@pce-americas.com
www.pce-instruments.com/us

Denmark
PCE Instruments Denmark ApS
Birk Centerpark 40
7400 Herning
Denmark
Tel.: +45 70 30 53 08
kontakt@pce-instruments.com
www.pce-instruments.com/dansk

Subject to change without notice