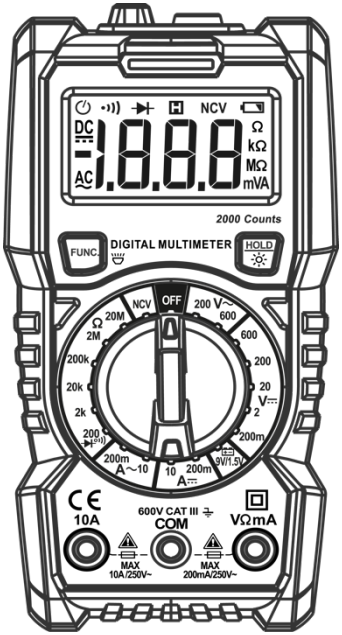


User Manual PCW01A

Digital Multimeter

PCWork

EN User Manual

Copyright Statement

Safety Statement

 The “**Caution**” symbol refers to any condition or operation which might cause damage to the instrument or equipment.

Any such operation has to be performed with caution. If incorrectly performed or without following the procedures, the instrument and equipment might get damaged. In case that conditions are not fully met or not fully understood, do not continue to perform any operation flagged with the “Caution” symbol.

 The “**Warning**” symbol refers to any condition or operation which might cause damage to the user. Any such operation has to be performed with caution. If incorrectly performed or without following the procedures, personal injury or casualties might result. In case that conditions are not fully met or not fully understood, do not continue to perform any operation flagged with the “Warning” symbol.

General Notes

- It is not permitted to change the manual in any way or add additional content, without given permission in written form by the distributor.
- The operator of this multimeter is obliged to ensure that every other person using this device has read and understood the manual, especially the safety instructions.
- The operator is obliged to ensure proper usage, a functioning device prior usage, the provision of the manual, and that only qualified users operate the device.
- Any change related to the design or construction of the device is not permitted.
- Warranty and any liability in regards to material damage or personal injury are suspended in the following cases:
  - Improper usage and operation of the device
  - Not following the instructions and safety regulations provided by the manual
  - Operation and usage without wearing proper personal protection equipment
  - Usage and installation of non-approved spare parts
  - Improper maintenance and changes related to the design or construction of the device; removal of the type plate

Safety Instructions

The instrument is designed according to the requirements of the international electrical safety standard IEC61010-1, which defines the safety requirements for electronic testing instruments. The design and manufacturing of this instrument strictly comply with the requirements of the IEC61010-1 CAT.III 600V over voltage safety standards and pollution level 2.

⚠ Warning:

In order to avoid possible electric shock, personal injury, or any other safety accident, please abide by the following instructions:

- Please read this manual carefully before using the instrument, and pay special attention to safety warning information.
- Strictly follow this manual when using the instrument. In addition, pay attention to any safety information on the device itself. Otherwise, the protection function of the instrument may be damaged or weakened. Safe operation and safety for the user cannot be guaranteed in this case.

- Do not provide children access to the multimeter. Parents are fully responsible for any safety hazards caused by non-compliance.
- Please be careful if the measurement exceeds 30V AC True RMS, a 42V AC peak, or 60V DC. There might be the danger of getting an electric shock with this kind of voltage. Follow all relevant safety requirements.
- When measuring known voltage, in order to check if the multimeter works normally, results in the multimeter not working normally or being damaged, stop any measuring operation and do not continue using the multimeter.
- Before using the device, please check whether it has any crack or plastic damage. If so, do not use the device.
- Before using the instrument, please check whether the probes are cracked or damaged. If so, please replace them with the same type, having the same electrical specifications.
- The instrument shall be used in accordance with the specified measurement category, voltage, or current rating.
- Do not exceed the max. input values as specified in this manual.
- Never change the measurement function during a measuring operation on an object or circuit. Always disconnect the measuring object/circuit first.
- Opening, repairing, or maintenance should only be executed by trained/qualified professionals.

- Never look directly into the LED flashlight of the device. Non-compliance bears the risk of permanently damaging your eyesight.
- Please comply with the local and national safety code. Wear personal protection equipment to prevent any injury through being exposed to electrical shock or electrical arc caused by an exposed hazardous live conductor.
- When low battery is indicated, please replace the battery in time to prevent of any measurement error.
- Do not use the instrument around explosive gas, steam, or in an wet environment.
- When using the probe, please put your fingers behind the finger protector of the probe.
- When measuring, please connect the zero (neutral) line/ ground line first, then connect the live wire; when measuring is done, please disconnect the live wire first, then disconnect the zero (neutral) line / ground line.
- Before opening the outer cabinet or the battery cover, please remove the probes from the device. Do not use the device, when it is taken apart or the battery cover is open.
- The safety standards are only met when the instrument is used together with the supplied probes. If the probes are damaged and need to be replaced, only use probes with the same model number and the same electrical specifications for replacement.

Safety Symbols

	High voltage warning (dangerous voltage might be present)
	AC (Alternating current)
	DC (Direct current)
	AC or DC
	Warning, important safety information
	Ground
	Fuse

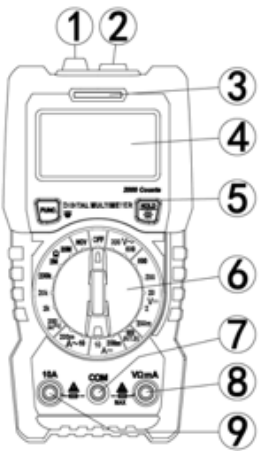
	Equipment with double insulation/reinforced insulation protection
	Low Battery
	Product complies with all relevant European directives
	Do not dispose of this electrical/electronic product as unsorted household garbage.

CAT. II	Suitable for testing and measuring circuits directly connected to power points (sockets and similar) of low voltage power installations.
CAT. III	Suitable for testing and measuring circuits connected to the distribution part of low voltage power supply devices in buildings.

Product Description

Instrument Panel Description

1. NCV probe
2. Flashlight
3. Red / green indicator light
4. LCD display (backlight)
5. Function buttons
6. Rotary switch
7. COM Input socket
8. **VΩmA** input socket
9. 10A input socket



FUNC. Button

When there are multiple measurement functions available, press the “FUNC.” button to select the desired option.

Auto Power Off

- If there is no operation for 15 minutes , the device will turn off automatically to save power. After an automatic shutdown, press any button to turn the device on again.
- If you press the "FUNC." button and turn on the device, the automatic shutdown function will be disabled. After turning off the device, the automatic shutdown function will be enabled again for the next measuring session.

Data Hold Button

Press 

button to record data. Press the button again to exit the hold function.

Backlight Button

Press 

button for more than 2 seconds to turn on the display's backlight. Press it again for more than 2 seconds to turn off the backlight. After 10 seconds the backlight will automatically turn off.

Flashlight

Press FUNC. button for more than 2 seconds to turn on the flashlight/turn off the flashlight.

Measurement Operation

Connect Measuring Probes

Do not operate the device before the test probes are not connected correctly. To ensure this, push the cables fully into the input sockets.

AC/DC Voltage Measurement

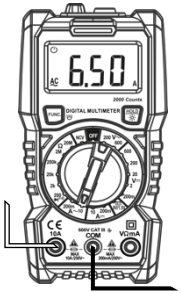
1. Turn the rotary switch to the DC voltage or AC voltage measurement function. Then select the appropriate range.
2. Insert the red probe in the "**VΩmA**" socket and insert the black probe in the "COM" socket.
3. When dealing with an unknown voltage range, always start with the higher measurement range, then switch to a lower range, if applicable.
4. Connect the probes' tips (red probe is the positive pole, black probe is the negative pole) in parallel to the measuring circuit, measure the voltage.
5. The measurement result is displayed on the screen.

⚠ WARNING:

- **Do not measure voltage above 600V; otherwise the instrument might get damaged.**
- **If the display shows "OL", disconnect the probes' tips from the measuring circuit immediately (Overload)**
- **Never connect voltage if probes are in current measurement sockets. This could result in electric shock for the user and damage the device.**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.**
- **Always test known voltage before using the device, in order to ensure that the device functions properly.**
- **Do not touch the bare tips of the probes; when measuring is finished, always remove the probes from the measuring object and the device.**

AC/DC Current Measurement

1. Turn the rotary switch to the DC current or AC current measurement function. Then select the appropriate range.
2. When dealing with an unknown current range, always start with the higher measurement range, then switch to a lower range, if applicable.
3. Insert the red probe in the “10A” socket (current >600mA) or the “ **VΩmA** ” Socket (current <600mA), depending on the measurement range chosen prior, and insert the black probe in the “COM” socket.
4. Connect the probes’ tips in series to the measuring circuit, measure the current.
5. The measurement result is displayed on the screen.



⚠ WARNING:

- **The voltage in the measured circuit cannot exceed 250V; otherwise the device might get damaged.**
- **If the display shows "OL", disconnect the probes' tips from the measuring circuit immediately (current exceeds measurement range).**
- **Always test known current before using the device, to ensure that device functions properly**
- **When measuring large current (>5A), continuous measurement should not exceed 10 seconds. After that, disconnect the device from the measuring circuit and do not use the multimeter for 10 minutes.**
- **When measuring is finished, always remove the probes from the measuring object and the device.**

⚠ Caution:

To avoid damaging the instrument or equipment, check the fuses before measuring and ensure that the measured current does not exceed the rated maximum current. If the fuses are released during measurement, stop the operation immediately. Always use the correct input sockets.

Resistance Measurement

1. Turn the rotary switch to the resistance "Ω" measurement function. Then select the appropriate range.
2. Insert the red probe in the "**VΩmA**" socket and insert the black probe in the "COM" socket.
3. Connect the probes' tips (red probe is the positive pole, black probe is the negative pole) to the measuring object, measure the resistance.
4. The measurement result is displayed on the screen.
5. When measuring large resistors (>1MΩ), it can take a few seconds for the measurement result to be stabilized. If the screen shows "OL", the measurement range has been exceeded or the measuring circuit is defective.

⚠ WARNING:

When measuring resistance on the line, disconnect the power supply, ensure there is no source of voltage, and discharge all capacitors. Otherwise, the instrument might get damaged and might be in danger of an electric shock. When measuring is finished, always remove the probes from the measuring object and the device.

Continuity Test

1. Turn the rotary switch to the measurement function and select the continuity test function with the "FUNC." button. The display will show "", "OL" and the "Ω" symbol.
2. Insert the red probe in the "**VΩmA**" socket and insert the black probe in the "COM" socket.
3. Connect the probes' tips to the measuring object.
4. The buzzer will signal if continuity is present (resistance is less than 30 ±5Ω.) and the LED-indicator of the device will turn green. In addition the resistance will be shown on the screen. The LED-indicator will turn red, if the resistance is between 30Ω and 50Ω. If the screen shows "OL", the measurement range has been exceeded or the measuring circuit is defective.

⚠ WARNING:

When testing for continuity on the line, disconnect the power supply, ensure there is no source of voltage, and discharge all capacitors. Otherwise, the instrument might get damaged and might be in danger of an electric shock. When measuring is finished, always remove the probes from the measuring object and the device.

Diode Test

1. Turn the rotary switch to the measurement function "⋑" and select the diode test function with the "FUNC." button. The display will show "⋑", "OL" and "V".
2. Insert the red probe in the "**VΩmA**" socket and insert the black probe in the "COM" socket.
3. Connect the probes' tips with the measuring diode. If known, connect the red probe's tip with the anode and the black probe's tip with the cathode.
4. The measurement result is displayed on the screen.
5. If the screen shows "OL", the measuring diode is either in reverse direction or defective.

⚠ WARNING:

When doing a diode test on the line, disconnect the power supply, ensure there is no source of voltage, and discharge all capacitors. Otherwise, the instrument might get damaged and might be in danger of an electric shock. When measuring is finished, always remove the probes from the measuring object and the device.

NCV Test

1. Turn the rotary switch to the measurement function “NCV”. The display will show “NCV”.
2. Gradually approach the voltage source with the NCV probe, which sits on top of the device.
3. When the meter senses weak AC signals, the indicator lights up green, while the buzzer sends out slow-paced acoustic signals.
4. When the meter senses strong AC signals, the indicator lights up red, while the buzzer sends out fast-paced acoustic signals.

⚠ WARNING:

- **Do not measure voltage above 600V; otherwise the instrument might get damaged.**
- **Remove all probes from the input sockets.**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.**
- **The NCV test is only a first indication and cannot replace voltage measuring.**

Battery Test

1. Turn the rotary switch to the battery measurement function and choose either the 9V or 1.5V range.
2. Insert the red probe in the "**VΩmA**" socket and insert the black probe in the "COM" socket.
3. Connect the red probe's tip with the positive pol and the black probe's tip with the negative pole of the battery.
4. The measurement result is displayed on the screen.

Note：1.5V battery → load resistance：30Ω
9V battery → load resistance：300Ω

General Technical Specifications

- Environmental conditions of using the device:
  CAT. III 600V； Pollution level 2, Altitude < 2000m
  Working environment temperature and humidity: 0~40°C（<70% RH，<10°C non condensing);
  Storage environment temperature and humidity: -10~60°C（<70% RH, remove the battery)
- Temperature coefficient 0.1× accuracy /°C（<18°C or >28°C)
- MAX. Voltage between input sockets and earth ground: 600V
- Fuse protection: mA: F200mA/250V fuse
  10A: F10A/250V fuse
- Sampling rate: about 3 times/second.
- Display: 2000 counts readout. Automatically shows the unit's symbol corresponding to the chosen measuring function and range.
- Exceeding measurement range indication: The screen displays "OL".
- Low battery indication: when the battery voltage is lower than the normal working voltage, "  " will be displayed.
- Input polarity indication: screen automatically displays "–".
- Power supply: 2 x 1.5V AAA batteries.

Accuracy Specifications

The accuracy is valid for one year after calibration. Reference conditions: the environment temperature is between 18°C and 28°C, the relative humidity is no more than 70%.

DC voltage

Range	Resolution	Accuracy
200mV	0.1mV	±(0.5% reading+3)
2V	0.001V	
20V	0.01V	
200V	0.1V	
600V	1V	

Input impedance: 10MΩ;
Maximum Input voltage: 600V
Overload protection: 600V

AC voltage

Range	Resolution	Accuracy
200V	0.1V	±(1.0% reading+3)
600V	1V	

Input impedance: 10MΩ
Maximum input voltage: 600V
Overload protection: 600V
Frequency Response：40Hz ~ 500Hz

DC current

Range	Resolution	Accuracy
200mA	0.1mA	±(1.2% reading+3)
10A	0.01A	

Overload protection:

μA/mA: F200mA/250V fuse

10A: F10A/250V fuse

Maximum input current:

mA: 200mA;

A: 10A

When measuring large current, continuous measurement should be no longer than 10 seconds.

AC current

Range	Resolution	Accuracy
200mA	0.1mA	±(1.5% reading+3)
10A	0.01A	

Overload protection:

μA/mA: F200mA/250V fuse

10A: F10A/250V fuse

Maximum input current:

mA: 200mA

A: 10A

Frequency Response: 40Hz ~ 500Hz

When measuring large current, continuous measurement should be no longer than 10 seconds.

Diode test

	Function	
	It displays the approximate forward voltage value of the diode.	Forward DC current is about 1mA Reverse DC voltage is about 2.5V Overload protection:250V

Continuity test

	Function	
	If the resistance is <30, the buzzer will sound and the indicator light will be green. When the resistance is >30 and <60, the buzzer does not ring, the indicator light will be red.	Reverse DC voltage is about 0,5V Overload protection:250V

Resistance

Range	Resolution	Accuracy	
200Ω	0.1Ω	±(1.0% reading+3)	Overload protection: 250V
2kΩ	0.001kΩ		
20kΩ	0.01kΩ		
200kΩ	0.1kΩ		
2MΩ	0.001MΩ	±(1.5% reading+3)	
20MΩ	0.01MΩ		

Maintenance

Cleaning

Clean the device with a dry cloth. When facing stronger contamination, use a slightly damp cloth. Only use water and never use any detergent or chemicals. Before using the device again, ensure that everything is dry and that there is no moisture.

⚠ **WARNING:**

- **Always switch off the device, disconnect it from any voltage source or power supply, and remove the test probes. Otherwise there might be the danger of damaging the device or personal injury.**
- **Ensure that after cleaning, the device is dry and that there is no moisture.**

Replacing Battery and Fuse

Replacing Battery

1. Turn off the power supply of the instrument, and remove the probes from the input sockets.
2. Use a screwdriver to unscrew the screws fixing the battery cover at the back of the device, then remove the battery cover.
3. Replace the old batteries with new ones having the same specifications.
4. Put the battery cover back in place and fix it with the screws.

⚠ **WARNING:**

- **Always switch off the device, disconnect it from any voltage source or power supply, and remove the test probes. Otherwise there might be the danger of damaging the device or personal injury.**
- **Only continue using the device, after the putting everything back together according to the instructions.**

Replacing Fuse

1. Turn off the power supply of the instrument, and remove the probes from the input sockets.
2. Use screwdriver to unscrew the screws fixing the back cover and remove the back cover.
3. Remove the burnt fuse, replace it with a new fuse of the same specifications, and ensure that the fuse is clamped in the safety clip.
4. Install the back cover, fix and lock it with the screws.

⚠ **WARNING:**

- **Always switch off the device, disconnect it from any voltage source or power supply, and remove the test probes. Otherwise there might be the danger of damaging the device or personal injury.**
- **Always replaces fuses with new ones having the same specifications.**
- **Only continue using the device, after the putting everything back together according to the instructions.**

Information regarding waste disposal:

You are not permitted to dispose of this device in household garbage. This multimeter corresponds to the EU-directive concerning the “Waste of Electrical and Electronic Equipment”. Please dispose of the device in your local collection point.
Please follow the decree related to the disposal of batteries. Used batteries are not permitted to be disposed of in household garbage. You are obliged to recycle them. Dispose of used batteries by bringing them to local collection points.