

USER MANUAL

CURRENT CLAMP

PCE-LCT 1

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

INTRODUCTION

The PCE-LCT 1 multimeter can measure leakage currents in the range of up to 100A. Leakage currents occur when current flows through an electrical conductor that is not normally intended for conducting current. The PCE-LCT 1 multimeter detects these currents and displays them on the screen. With the help of the PCE-LCT 1, faults in the insulation can be detected, for example. This is particularly advantageous where machines are operated that cannot or must not be switched off and where insulation testing is pending. The fact that the leakage current clamp can be used to measure not only leakage currents but also normal current flow, voltage up to 400 V, resistance and continuity makes it ideal for industrial electricians who have to perform other measurement tasks in addition to testing equipment. Thanks to its compact design, the PCE-LCT 1 leakage current clamp fits in any pocket. The robust rubber protection protects the measuring device from minor falls from low heights and makes the leakage current clamp a reliable companion, especially in the field of electrical inspection and workshop technology.

SCOPE OF DELIVERY

- 1 x PCE-LCT 1 current clamp
- 1 x 9V block battery
- 1 x carrying case
- 1 x measuring leads
- 1 x operating instructions

SAFETY

Please read the operating instructions carefully before using the device. We accept no liability for damage caused by failure to observe the instructions in the operating instructions.

WARNING SYMBOLS

	General warning
	Warning of dangerous electrical voltage
	Low battery (a low battery level can lead to incorrect measurements)

WARNING NOTICES

- » This measuring device may only be used in the manner described in this operating manual. Using the measuring device in any other way may result in dangerous situations.
- » Do not expose the device to extreme temperatures, direct sunlight, extreme humidity or moisture.
- » The device housing may only be opened by qualified personnel from PCE Deutschland GmbH.
- » The measuring device must never be placed with the user interface facing down (e.g. keyboard side down on a table).
- » The function switch must be in the correct position and the measuring range should not be adjusted during measurement to avoid damage.
- » Never use the measuring device with wet hands.
- » No technical modifications may be made to the device.
- » The device should only be cleaned with a damp cloth. Do not use abrasive cleaners or cleaning agents containing solvents.
- » The device may only be used with accessories supplied by PCE Germany or equivalent replacements.
- » Before each use of this measuring device, please check the housing and measuring cables for visible damage. If visible damage is found, the device must not be used.
- » Furthermore, this measuring device must not be used if the ambient conditions (temperature, humidity, etc.) are not within the limits specified in the specifications.
- » The measuring device must not be used in an explosive atmosphere.
- » If the battery is empty (as indicated by the battery indicator, for example), the device must no longer be used, as incorrect measurements can lead to life-threatening situations. The measuring device may only be used again after the battery has been replaced.
- » Before each use, please check the measuring device by measuring a known quantity.
- » The limit values for the measured variables specified in the specifications must not be exceeded under any circumstances.
- » Before starting the measurement, always check that the correct measuring range is set and that the measuring leads are plugged into the sockets intended for the respective measurement.
- » Never touch the bare tips of the measuring probes, as there is a risk of electric shock.
- » The device is designed for indoor use.
- » Take particular care when measuring high voltages ($>30\text{ V AC}$).
- » Before opening the housing to change the battery or fuse, please remove all measuring leads, as otherwise there is a risk of electric shock.
- » Failure to observe the safety instructions may result in damage to the device and injury to the operator.

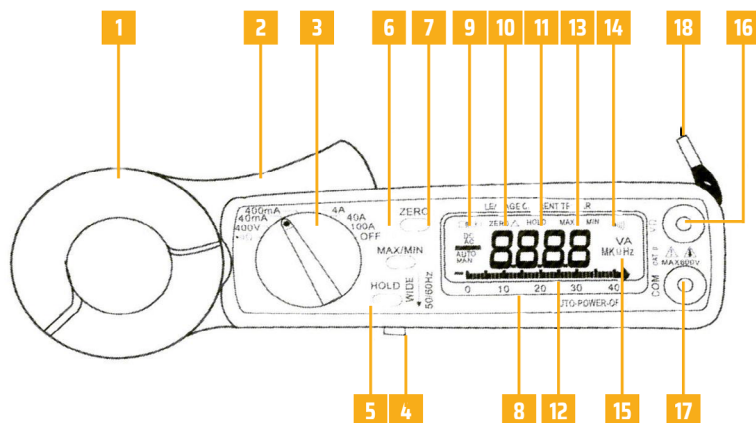
If you have any questions, please contact PCE Deutschland GmbH.

SPECIFICATIONS

Electrical specifications			
Leakage current, current measurement (AC A)			
Measuring range	Resolution	Accuracy	
		50 / 60 Hz	400 Hz ... 1kHz
40 mA	10 µA	±(2% + 3 Digits)	
400 mA	100 µA		
4 A	1 mA		
40 A	10 mA		
80 A	100 mA		
80 A - 100 A	100 mA		
Voltage measurement (AC V)			
Measuring range	Resolution	Accuracy	
		50 / 60 Hz	400 Hz ... 1kHz
400 V	0,1 V	±(2% + 3 Digits)	
Widerstandsmessung			
Measuring range	Resolution	Accuracy	Alarm
40 Ω ... 400 Ω	0,1 Ω	±(2% + 3 Digits)	Messwert < 38 Ω
General technical specifications			
Display		3 ½ advertisement	
Measurable electrical quantities		AC V, AC A, resistance	
Safety standard		CAT III 300V, CAT II 600V	
Clamp diameter		30 mm	
Input impedance		10 MΩ	
Measurement recording interval		2 Hz (numerical values), 20 Hz (Bargraph)	
Operating temperature		-10 °C ... 50 °C	
Ambient humidity		< 85 % RH	
Storage temperature		-20°C ... 60°C	
Automatic switch-off		after 30 minutes without service	

Power supply	9 V block battery
Current consumption	10 mA
Weight	200 g
Dimensions	210 x 62 x 35,6 mm

DEVICE DESCRIPTION



Nr.	Term	Explanation
1	Current clamp	The clamp is required to pick up the signal. To measure AC/DC current, you must pass the appropriate cables through it.
2	Clamp lever	Use the lever to open the pliers.
Buttons and switches		
3	Function rotary switch	Here you can set the appropriate measuring ranges.
4	Frequency selection switch	Here you can set whether you want to measure low frequencies of 50/60 Hz or high frequencies of 400 Hz-1 kHz in the WIDE position.
5	Data hold button	Press this button to save the current measured value shown on the display.

Nr.	Term	Explanation
6	MAX/MIN-key	You can use the button to activate the display of maximum and minimum values. Press the button once to display the minimum value. Press twice to display the maximum value and press three times to return the device to normal measurement mode.
7	ZERO-key	Pressing the button resets the display to zero. You can use the zero value as a reference for all other measurements.
Display		
8	LCD	This 3 ¾ digit display can show a maximum value of 3999. Function symbols, units, bar graph, characters, decimal points, battery symbol, max/min symbols and ZERO symbol are also shown on the display.
9	Battery symbol	When this symbol appears, the battery voltage has fallen below the minimum required value. To replace the battery, see the chapter entitled „Maintenance and cleaning“.
10	ZERO-symbol	When this symbol appears, a reference value has been subtracted from the current value. Press and hold the ZERO button for 2 seconds to deactivate the function.
11	Data-Hold symbol	This symbol appears as soon as the data hold button is pressed. The current value is stored in the display.
12	Bargraph	The bar graph has forty segments. The segments are displayed proportionally to the current measured value.
13	Max/Min Hold symbol	As soon as the Min/Max button is pressed, either MAX or MIN appears on the display.
14	Continuity test symbol	If the ohms or continuity test function is selected, this symbol appears on the LCD.
15	Unit symbol	Once a function has been selected, the corresponding unit (V, Ω , A or Hz) appears on the display.
Connections		
16	V Ω Hz Connection	This input is for connecting volt, ohm or frequency measurements.
17	COM Connection	The connection is the common reference input for all measuring ranges.
18	Hand sling	Put your hand through the loop to prevent accidental dropping.

OPERATING INSTRUCTIONS

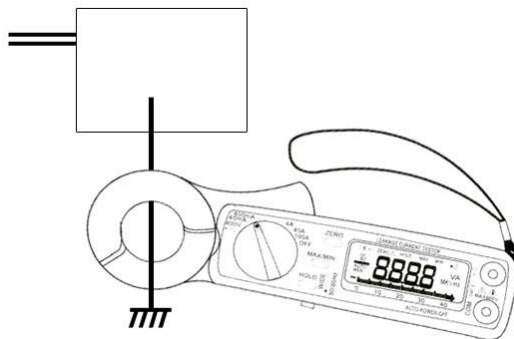
AC leakage current measurement



Warning: Ensure that no measuring lead is connected to the multimeter when measuring current.

Leakage current at PE (protective earth)

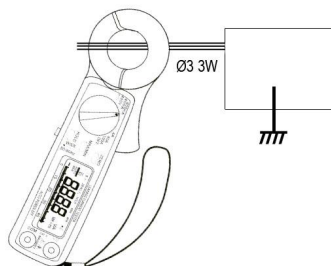
Measure a leakage current on PE as follows:



- Set the rotary switch (3) to the desired value.
- Press the pliers lever (2) to open the pliers (1) and enclose the earth cable with them. Ensure that the pliers are completely closed.
- Read the measured value from the display (8).

Determine leakage current via the sum of the currents

The PCE-LCT 1 is capable of measuring not only the current strength, but also the current direction. This means that when several conductors are enclosed, the sum of the currents is always displayed. It can therefore be assumed that if the sum measured at one phase and one neutral conductor is zero, no leakage current is flowing. To measure, proceed as follows:



- a) Set the rotary switch (3) to the desired value
- b) Press the clamp lever (2) to close the clamp (1) and enclose all two conductors (phase + neutral conductor), all three conductors (three phases) or all four conductors (three phases + neutral conductor). Ensure that the clamp is completely closed.
- c) The display (8) shows you the sum of the currents of the individual conductors.

Using the 50/60 and WIDE selector switch (4)

50/60 position

This clamp multimeter has a very good frequency response. Its time resolution is so good that frequencies up to 1kHz can be detected. Therefore, the measurement result not only includes the fundamental frequency of 50/60 Hz, but also higher frequencies and superimposed harmonics of the fundamental frequency. To suppress the effect of noise, a low-pass filter has been built in to filter out the high frequencies. To activate the filter, set the switch to the 50/60 position. The cut-off frequency is 100 Hz with an attenuation of approx. 24 dB/octave.

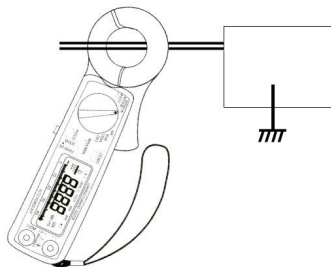
Wide position

If the circuit being tested originates from a high-frequency generating device, such as an inverter, switching regulator, etc., the switch should be set to WIDE in order to measure a signal that contains frequencies between 40Hz and 1kHz.

To be sure whether high frequencies are present, test both positions and note the difference in the measurements. If the displayed measurements are very different, it is certain that the high frequencies represent harmonics.

AC load current measurement

When measuring load current, simply place the measuring clamp around the phase at which you want to measure the load current. Proceed as follows:



- a) Set the rotary switch (3) to the desired value
- b) Press the clamp lever (2) to close the clamp (1) and enclose only one cable. Ensure that the clamp is completely closed.
- c) Read the measured value from the display (8).

AC voltage measurements

You can take AC voltage measurements using the test leads supplied. Proceed as follows:

- a) Set the rotary switch (3) to 400V.
- b) Plug the measuring leads into the connection sockets (16 + 17).
- c) Connect the measuring tips of the measuring leads in PARALLEL to the circuit to be measured.
- d) Read the measured value from the LCD (8).

Resistance and continuity measurements



Warning: When measuring resistance in a circuit, disconnect the power supply and discharge all capacitors.

1. Set the rotary switch (3) to Ω
2. Plug the test leads into the connection sockets (16 + 17).
3. Connect the measuring tips of the measuring leads to the two ends of the resistor or the circuit you want to measure.
4. Read the measured value on the LCD (8).
5. If the resistance is less than 40 Ω , a beep will sound.

Relative measurements

The ZERO button (7) can also be used to perform relative measurements. As soon as the button is pressed, the current measurement value is set to zero and the ZERO symbol appears on the display. All subsequent measurements are displayed as relative values to the zeroed value. Press the ZERO (7) button for 2 seconds to return to normal mode.

„Freezing“ of the LCD display

Press the HOLD button (5) to save the current value in the display. Pressing it again will return you to normal mode.

Find the maximum/minimum value

Press the Max/Min button (6) to activate the storage of the maximum and minimum values. Press the button once if you want to display and update the maximum value. Press the button again to display the minimum value. If you press it a third time, the device will return to normal measurement mode.

Auto-shutdown

The measuring device switches itself off after 30 minutes. To switch it back on, you can either press the HOLD (5) button or switch the device off and on again. To deactivate the auto switch-off function, hold down the HOLD button (5) when switching on the device.

MAINTENANCE AND CLEANING

Battery replacement



Warning: To prevent incorrect measurements and resulting injuries, replace the batteries as soon as the battery symbol appears. Ensure that the test leads are not connected to the circuit under test or to the device before opening the housing.

To replace the batteries, remove the screw securing the battery compartment cover on the back of the measuring device and remove the cover. Replace the batteries with the same type and replace the cover.

Cleaning

Clean the device with a damp cotton cloth and, if necessary, a mild cleaning agent. Do not use abrasive cleaners or solvents under any circumstances.

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.

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