MULTI PS 7450

profi scale

MULTI

1,5V ⎓ 9V

200 mV ⎓ 600 V

200 mA ⎓ 1/10 A

ProfiScale MULTI Multimeter

en Operating instructions

BURG-WÄCHTER KG
Altenhofer Weg 15
58300 Wetter
Germany

www.burg-waechter.de

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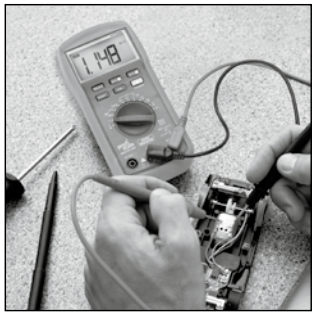
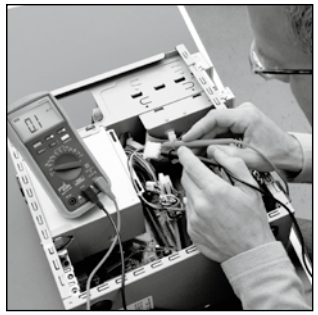
EXTRA





Introduction

Want the reassurance of knowing whether current is flowing in an electrical appliance? With the ProfiScale multi-meter, you can measure all your domestic appliances easily and reliably – even sensitive electronic devices such as computers and televisions. The digital display provides you with an instant reading. A handy support bracket helps make the display even easier to read.

Safety instructions

Failure to observe the following instructions may result in personal injury:

To ensure that you operate the measuring device and all of its functions safely, carefully follow the instructions in this section. This digital measuring device was designed in accordance with IEC 61010 1 for electronic measuring devices and belongs to overvoltage category CAT III 600 V and isolation degree II.

If properly used and maintained, the digital measuring device will give you many years of satisfactory service.

1. Before using the device, you must read these instructions carefully to ensure that you operate the device safely. Keep these instructions in a safe place.
2. When using the measuring device, you must observe the following safety regulations:
   · protection against the hazards of electrical current.
   · protection of the device against misuse.
3. After delivery of the device, check for any signs of damage caused in transit.
4. The measurement leads must be in perfect condition. Make sure that the insulation on the leads is not damaged and/or that the wires in the measurement leads are not exposed.
5. Compliance with safety standards can only be guaranteed if the measurement leads supplied are used.
6. Before using the device, you must select the correct input socket, the function and the measurement range.
7. Never exceed the specified limit values for the relevant measurement ranges.
8. Do not touch any unused connections while the measuring device is connected to another electrical circuit.
9. Do not measure any voltage that exceeds 600 V at the contacts.
10. Always exercise caution when measuring voltages above 60 V DC or 30 V AC rms. While taking the measurements, keep your fingers behind the boundary.
11. Never connect the measurement leads to a voltage source while the selector switch is set to one of the following measurement ranges: current measurement, resistance measurement, capacitance measurement, temperature measurement, diode or transistor test and continuity test mode.
12. Before you turn the selector switch to select another measurement range, remove the measurement leads from the circuit to be tested.
13. Never carry out resistance measurements, capacitance measurements, temperature measurements or transistor, diode and continuity tests on live circuits.

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14. If you discover any faults or deviations from standards, stop using the device and have it examined.
15. The device must only be used with the rear casing properly secured.
16. Do not store the device in areas where it will be exposed to direct sunlight, high temperatures, high air humidity or precipitation.
17. Never attempt to repair the device yourself.
18. Before opening the battery compartment cover or the casing on the device, always disconnect the measurement leads from all circuits tested.
19. If this symbol "[−+]" appears in the display, the battery must be changed immediately to avoid false readings that could lead to an electrical shock.
20. If the measuring device is not used for a long period, the batteries must be removed to avoid damage to the device.
21. To prevent the risk of fire, only use fuses with the corresponding voltage and current rating: F 200 mA/250 V
22. Do not use abrasive cleaners or solvents to clean the measuring device. Use a damp cloth and mild detergent.
23. Always switch the measuring device to OFF when not in use.
24. Keep the device away from children and unauthorized persons.
25. For safety reasons and to maintain the warranty on the device, repairs must only be carried out by qualified personnel using genuine parts.
26. Do not use the device in the vicinity of inflammable or explosive gases.
27. Handle the device with care and do not drop it.
28. To avoid functional errors, do not dismantle the device.
29. Keep the device clean and dry.
30. When not in use, the device should be stored in the bag supplied.
31. Avoid contact with water and dust.

Warranty

Congratulations!
Thank you for choosing ProfiScale quality measuring technology by BURG-WÄCHTER. BURG-WÄCHTER offers a warranty of 2 years' duration from the date of purchase. The warranty does not cover damage caused by improper use, overloading the device or incorrect storage as well as normal wear and defects that only have an insignificant effect on the value or usability of the device. The warranty shall be immediately invalidated if unauthorized persons work on the device. In the event that a warranty claim arises, please hand over the entire device incl. packaging, description and batteries along with the sales receipt to your dealer.

Symbols

⚠	Important safety information – read the operating instructions carefully
⧈	Double insulation (protection class II)
CAT III	Overvoltage (assembly) category III, pollution degree 2 as per IEC1010-1
CE	As per Directives of the European Union
⏚	Earth
⎓	Fuse protection
AC	Alternating current
DC	Direct current
⏩	Diode
•))	Continuity buzzer
≂	AC or DC (alternating current or direct current)
°C	Celsius
°F	Fahrenheit
Max. H	Hold maximum measured value
DATA-H	This indicates that the data displayed will be retained
AUTO	Automatic measurement range
[−+]	Replace battery
☀	Backlight display
Ω	Resistance measurement

Technical data

Max. voltage between the connections and earth	600 V DC oder AC
Fuse protection	F 200 mA/250 V
Operational altitude	Max. 2000 metres (7000 ft.)
Display	20 mm LCD
Max. display values	1999 (3 ½)
Polarity indicator	"-" indicates negative polarity
Overload limit	"OL" display
Sampling time	Approx. 0.4 seconds
Device display	Display of functions and electrical capacitance
Automatic switching off	If not in use, the device switches off automatically after 15 minutes
Power supply	3 batteries, AAA, 1.5 V
Choice of measurement range	Automatic and manual
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature	-10 °C to 50 °C (10 °F to 122 °F)
Relative humidity	< 75 %

Direct current voltage (DC)

Messbereich	Auflösung	Genauigkeit
200 mV	0.1 mV	± (0.7 % of rdg + 2 digits)
2 V	0.001 V	± (0.7 % of rdg + 2 digits)
20 V	0.01 V	± (0.7 % of rdg + 2 digits)
200 V	0.1 V	± (0.7 % of rdg + 2 digits)
600 V	1 V	± (0.7 % of rdg + 2 digits)

Input resistance: 10 MΩ
Overvoltage protection: 200 mV range: 250 V DC or AC rms
2 V – 600 V range: 600 V DC or AC rms
Max. input voltage: 600 V DC

Alternating current voltage (AC)

Measurement range	Resolution	Accuracy
200 mV	0.1 mV	± (0.8 % of rdg + 3 digits)
2 V	0.001 V	± (0.8 % of rdg + 3 digits)
20 V	0.01 V	± (0.8 % of rdg + 3 digits)
200 V	0.1 V	± (0.8 % of rdg + 3 digits)
600 V	1 V	± (1.0 % of rdg + 3 digits)

Input resistance: 10 MΩ
Overvoltage protection: 200 mV range: 250 V DC or AC rms,
2 V – 600 V range: 600 V DC or AC rms
Frequency range: 40 to 400 Hz
Response characteristic: Average, calibrated in rms of sine wave
Max. input voltage: 600 V AC rms

Direct current (DC)

Measurement range	Resolution	Accuracy
200 µA	0.1 µA	± (1.2 % of rdg + 3 digits)
2000 µA	1 µA	± (1.2 % of rdg + 3 digits)
20.000 µA	0.01 mA	± (1.2 % of rdg + 3 digits)
200.0 mA	0.1 mA	± (1.2 % of rdg + 3 digits)
2.000 A	0.001 A	± (2.0 % of rdg + 10 digits)
10.00 A	0.01 A	± (2.0 % of rdg + 10 digits)

Overvoltage protection: µA, mA range: F 200 mA/250 V, 2 A,
10 A range: not fused.
Max. input current: Input socket: 200 mA, 10 A socket: 10 A
Voltage drop: 200 µA, 20 mA, 2 A, 20 mV, 2000 µA, 200 mA,
10 A range: 200 mV

Alternating current (AC)

Measurement range	Auflösung	Genauigkeit
200 µA	0.1 µA	± (1.5 % of rdg + 5 digits)
2000 µA	1 µA	± (1.5 % of rdg + 5 digits)
20.000 µA	0.01 mA	± (1.5 % of rdg + 5 digits)
200.0 mA	0.1 mA	± (1.5 % of rdg + 5 digits)
2.000 A	0.001 A	± (3.0 % of rdg + 10 digits)
10.00 A	0.01 A	± (3.0 % of rdg + 10 digits)

Overvoltage protection: µA, mA range: F 200 mA/250 V, 2 A,
10 A range: not fused.
Max. input current: Input socket: 200 mA, 10 A socket: 10 A
Frequency range: 40 to 400 Hz
Response characteristic: Average, calibrated in rms of the sine wave
Voltage drop: 200 µA, 20 mA, 2 A, 20 mV, 2000 µA, 200 mA,
10 A range: 200 mV

Continuity test

Measurement range	Function
	Signal sounds if resistance is below 50 Ω

Open-circuit voltage: Approx. 0.5 V
Overvoltage protection: 250 V DC or AC rms

Resistance

Measurement range	Resolution	Accuracy
200 Ω	0.1 Ω	± (1.0 % of rdg + 8 digits)
2 kΩ	0.001 kΩ	± (1.2 % of rdg + 8 digits)
20 kΩ	0.01 kΩ	± (1.2 % of rdg + 8 digits)
200 kΩ	0.1 kΩ	± (1.2 % of rdg + 8 digits)
2 MΩ	0.001 MΩ	± (1.2 % of rdg + 8 digits)
20 MΩ	0.01 MΩ	± (1.2 % of rdg + 8 digits)

Open-circuit voltage: Approx. 0.25 V
Overvoltage protection: 250 V DC or AC rms

Temperature

Measurement range	-20 °C to 1000 °C	-20 °C to 1000 °C
Resolution	1 °C	1°C
Accuracy	-20 °C to 0 ° C	± (5 % of rdg + 4 digits)
Accuracy	0 °C to 400 °C	± (1 % of rdg + 3 digits)

Accuracy	400 °C to 1000 °C	± (2 % of rdg + 3 digits)
Measurement range	0 °F to 1800 °F	0 °F to 1800 °F
Resolution	1 °F	1 °F
Accuracy	0 °F to 50 °F	± (5 % of rdg + 4 digits)
Accuracy	50 °F to 750 °F	± (1 % of rdg + 3 digits)
Accuracy	750 °F to 1800 °F	± (2 % of rdg + 3 digits)

Open-circuit voltage: Approx. 0.25 V
Overvoltage protection: 250 V DC or AC rms

Capacitance

Measurement range	Resolution	Accuracy
20 nF	0.01 nF	± (4.0 % of rdg + 10 digits)
200 nF	0.1 nF	± (4.0 % of rdg + 3 digits)
2 µF	0.001 µF	± (4.0 % of rdg + 3 digits)
20 µF	0.01 µF	± (4.0 % of rdg + 3 digits)
200 µF	0.1 µF	± (4.0 % of rdg + 3 digits)
1000 µF	1 µF	± (4.0 % of rdg + 3 digits)

Overvoltage protection: 20 nF – 20 µF range: F 200 mA/250 V fuse protection
200 µF/1000 µF range: no overvoltage protection
Open-circuit voltage: Approx. 0.5 V
Overvoltage protection: 250 V DC or AC rms

Diode

Measurement range	Resolution	Function
	1 mV	The display shows the blocking voltage across the diode

Direct current in forward direction: As of approx. 1 mA
Direct current in reverse direction: As of approx. 1.5 V
Overvoltage protection: 250 V DC or AC rms

Transistor hFE

Measurement range	Funktion
hFE	The display shows the approximate amplification value (0 – 1000) of the transistor under test

Base current: Approx. 2 µA, Vce: approx. 1 V
Overvoltage protection: F 200 mA/250 V fuse protection
(triggering characteristic: quick-acting)

Battery test

Measurement range	Accuracy	Test current
1.5 V	+/- (0.8 % of rdg + 1 digit)	60 mA
3 V	+/- (0.8 % of rdg + 1 digit)	30 mA
9 V	+/- (0.8 % of rdg + 1 digit)	12 mA

Overvoltage protection: 1.5 V: 200 mA/250 V fused
3 V: 200 mA/250 V fused
9 V: 250 V DC or AC rms

Operating the device

Switching on

Press the "ON/OFF" switch to switch the measuring device on or off.

Saving the measured value

If you want to save a measured value, press the "DATA.H" button. Press the button again to cancel saving the measured value.

Holding the maximum measured value

To hold the maximum measured value during the measurement, press the "MAX.H" button. Press the button again to cancel saving the measured value.

Changing the kind of measurement

If you are measuring current or voltage, you can use the "FUNC" button to switch between direct and alternating current measurement or between DC and AC voltage measurement. For temperature measurements, you can use the "FUNC" button to switch between °C and °F. In the case of diodes and continuity tests, you can use the "FUNC" button to switch between these.

Changing the range

The automatic measurement range is used for current, voltage, capacitor and resistance measurements. Press the "RANGE" button to select a manual measurement range. Each time you press the "RANGE" button, the measurement range increases. When the highest measurement range is reached, pressing the button again will start the process again at the lowest measurement range. If you press the "RANGE" button for more than 2 seconds, the automatic measurement range is activated again.

Backlight

If the reading on the display is not visible, press the "☀" Sbutton to switch on the backlight. This will switch off again automatically after 15 seconds. Press the "☀" button for 2 seconds to switch the backlight off earlier.

The display disposes of an LED backlight. However, the power consumption for this is extremely high despite the time limit (automatic switching off after 15 seconds). Frequent use of the backlight will reduce the useful life of the battery. Do not use the backlight more than necessary.

This symbol "[−+]", appears if the battery voltage drops below 2.4 V. This symbol "[−+]" may also appear if you are using the backlight at the same time because the power consumption is higher and the voltage drops. (Accurate measurements cannot be guaranteed if this symbol "[−+]" appears). Replace the battery. The battery should not be replaced until this symbol "[−+]" is displayed.

Automatic switching off

After 15 minutes not in use, the device signals the automatic switching off function with a long beep per minute followed by five short beeps at the end. After the device has shut down automatically, you can switch it on again by pressing the selector switch or one of the buttons "FUNC", "DATA-H", "MAX-H", or by selecting a measurement range.

Preparing to take a measurement

Switch on the "ON/OFF" button. If the battery voltage is less than 2.4 V, this symbol "[−+]" appears. Replace the battery.

The symbol "⚠" beside the input socket indicates that the input voltage or the input current should be lower the maximum value specified on the device in order to protect the internal circuit.

Select a function for the unit to be measured.
Turn the selector switch accordingly.

When establishing the measurement connection, first connect the earth cables, and only then the measurement lead to be electrified.
When disconnecting the measurement connection, first disconnect the electrified input lead.

Measuring DC voltage

Caution! Input voltages above 600 V DC cannot be measured. Higher input voltages can be displayed but may damage the internal circuit. Take precautions to prevent electric shock when measuring high voltages.

Connect the black measurement lead to the earth socket and the red measurement lead to the input socket.

Set the selector switch to the volt range.

Press the "FUNC" button to go to DC voltage measurement. You can also choose between the manual and automatic measurement range.
Connect the measurement leads for measuring DC voltage in parallel to the voltage source.

The polarity of the red measurement lead connection is displayed on the LCD display.

When choosing a low measurement range and open measurement leads, "measured values" can be indicated by electrical noise fields.
Once the measurement leads are connected with the measuring object, you will receive actual measured values.

Measuring AC voltage

Caution! Input voltages greater than 600 V rms AC cannot be measured. Higher input voltages can be displayed but may damage the internal circuit. Take precautions to prevent electric shock when measuring high voltages.

SConnect the black measurement lead to the earth socket and the red measurement lead to the input socket.

Set the selector switch to the volt range.

Press the "FUNC" button to choose AC voltage measurement. You can also choose between the manual and automatic measurement range.

Connect the measurement leads for measuring AC voltage in parallel to the voltage source.

The values are displayed on the LCD display.

When choosing a low measurement range and open measurement leads, "measured values" can be indicated by electrical noise fields.
Once the measurement leads are connected with the measuring object, you will receive actual measured values.

Measuring direct current

Caution! Disconnect the power to the circuit you want to test before you connect the measuring device to it.

For a max. current measurement of 200 mA, connect the black measurement lead to the earth socket and the red measurement lead to the input socket. For a max. measurement of 10 A, remove the red measurement lead and insert it into the 10 A socket.

Set the selector switch to the required measurement range: μA, mA, or A.

Press the "FUNC" button to go to direct current measurement. You can also choose between the manual and automatic measurement range.

The measurement leads for the current measurement must only be connected in series to the power source.

The polarity of the red measurement lead connection is displayed on the LCD display.

This symbol "⚠" means that the input socket is receiving the max. input current of 200 mA. Overvoltage will destroy the fuse. At the 10 A input socket, the max. input current is 10 A without fused protection.

Measuring alternating current

Caution! Disconnect the power to the circuit you want to test before you connect the measuring device to it.

For a max. current measurement of 200 mA, connect the black measurement lead to the earth socket and the red measurement lead to the input socket. For a max. measurement of 10 A, remove the red measurement lead and insert it into the 10 A socket.

Press the "FUNC" button to start the alternating current measurement. You can also choose between the manual and automatic measurement range.

The measurement leads for the current measurement must only be connected in series to the power source.

The values are displayed on the LCD display.

The input current at the input jacks INPUT and COM may not exceed a maximum value of 200mA. In case of a higher current the unsecured 10A jack must be used instead of the input jack.

Measuring resistance

Caution! When testing internal resistance, make sure that the test circuit is switched off and that all capacitors are fully discharged.

Connect the black measurement lead to the earth socket and the red measurement lead to the input socket.

Set the selector switch to this "Ω" measurement range. You can also choose between the manual and automatic measurement range.

Connect the measurement leads for the resistance measurement in parallel to the resistance you want to measure.

The values are displayed on the LCD display.

If the input value is interrupted, for example, by an open circuit, the "OL" symbol appears on the display and signals that the overload limit has been reached.

Measuring temperature

Caution! To protect against electrical shock, do not connect the thermocouples to the live components.

Set the selector switch to the "TEMP" position.

Press the "FUNC" button to choose between °C and °F.

The LCD display shows the current ambient temperature.

For temperature measurements using this device, you must use a sensing element with a "K" type thermocouple. Insert the black connector into the earth socket and the red connector into the input socket. Touch the object to be measured with the end of the temperature sensor.

The values are displayed on the LCD display.

To obtain a more accurate reading, the measuring device and the temperature sensor must be adjusted before the ambient temperature is measured in order to achieve heat compensation.

Measuring capacitance

Caution! To protect against electrical shock, ensure that all capacitors are fully discharged before carrying out a capacitance measurement.

Set the selector switch to the hFE measurement range.

Connect the multifunction connector strip in accordance with the identification marking and insert the capacitor into the relevant opening.

The values are displayed on the LCD display.

Testing diodes

Connect the black measurement lead to the earth socket and the red measurement lead to the input socket. (The polarity of the red measurement lead is "+").

Set the selector switch to the "→|–" position.

Press the "FUNC" button to perform the test.

To test diodes, connect the red measurement lead to the anode and the black lead to the cathode of the diode.

The values are displayed on the LCD display.

The measuring device shows the approximate blocking voltage across the diode.

If the measurement lead connection is reversed, the display only shows "OL".

With an open measuring circuit, "OL" appears on the display.

Continuity test

Caution! Before carrying out the continuity test, ensure that the measuring object is without voltage and that all capacitors are fully discharged.

Connect the black measurement lead to the earth socket and the red measurement lead to the input socket.

Set the selector switch to the "•))" position.

Press the "FUNC" button to start the continuity test.

During the continuity test, connect the two measurement leads in parallel to the circuit.

If continuity exists (for example, resistance is below 50 Ω), , the built-in buzzer sounds.

If no continuity exists (or if the resistance of the circuit is greater than 200 Ω), the symbol "OL" appears on the display.

Checking transistors

Set the selector switch to the "hFE" position.

Connect the two connectors "-" and "+" on the multifunction connector strip to the earth and input socket.

For testing, identify the type of transistor, NPN or PNP, and connect the transistor's emitter, base and collector connections into the holes provided for transistors on the multifunction connector strip.

The values are displayed on the LCD display.

Do not insert the connections into the wrong socket.

Testing batteries

Connect the black measurement lead to the earth socket and the red measurement lead to the input socket.

Set the selector switch to the required 1.5 V, 3 V or 9 V measurement ranges.

When performing the battery test, connect the measurement leads to the battery in parallel.

The values displayed on the LCD display indicate the battery's charge status.

Replacing the battery

Caution! To avoid electrical shock, ensure that all measurement leads are removed and the measuring device is switched off before opening the battery compartment cover on the measuring device.

The appearance of the symbol "⊟+" on the display indicates that the battery must be replaced.

Loosen the screws securing the cover of the battery compartment and remove the cover.

Replace the empty battery with a fresh battery.

Close the battery compartment with the cover.

Replacing fuses

Caution! To avoid electrical shock, ensure that all measurement leads are removed before opening the battery compartment cover on the measuring device. To avoid the risk of fire, use only fuses of the prescribed values: F 200 mA / 250 V.

Fuses seldom need to be replaced. Fuses will only blow as a result of operating errors.

Loosen the screws securing the casing and remove the casing.

Replace the blown fuses with a new fuse of the prescribed rating.

Close the casing again.

Replacing measurement leads

Caution! A warranty can only be provided if the measurement leads supplied have been used in accordance with safety standards. If necessary, they must be replaced with the same model or the same prescribed rating. The prescribed rating of the measurement leads: 600 V 10 A.
You must replace the measurement leads if the insulation is damaged.

Disposing of the device

Dear Customer,
Please help to reduce waste. Should you decide to dispose of the device, please bear in mind that many of the components it contains are made from valuable material that can be recycled.
Please do not throw the device into the normal waste bin. Contact the responsible office in your area and ask about collection points for electrical waste.