



VOLTCRAFT

- Ⓓ **Bedienungsanleitung**
VC252 Digital Multimeter
Best.-Nr. 2576861 Seite 2 - 48
- ⒼⒷ **Operating Instructions**
VC252 Digital Multimeter
Item No. 2576861 Page 49 - 94
- Ⓕ **Mode d'emploi**
VC252 Multimètre Numérique
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- ⒼⒻ **Gebruiksaanwijzing**
VC252 Digitale Multimeter
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2 Introduction

Dear customer,

Thank you for purchasing this product.



These operating instructions are part of this product. They contain important notes on commissioning and handling. Also consider this if you pass on the product to any third party. Therefore, retain these operating instructions for reference!

If there are any technical questions, please contact: www.conrad.com/contact

3 Delivery content

- Digital multimeter
- 2x safety test leads with CAT III protective caps
- 3x AAA 1.5 V batteries
- Operating instructions

4 Up-to-date operating instructions

Download the latest operating instructions at www.conrad.com/downloads or scan the QR code shown. Follow the instructions on the website.



5 Description of symbols



The symbol warns of hazards that can lead to personal injury.



The symbol warns of dangerous voltage that can lead to personal injury by electric shock.



The arrow symbol indicates special information and advice on how to use the product.



This product has been CE tested and complies with the necessary national and European regulations.



This device is UK conformity assessed and meets applicable Great Britain directives.



Protection class 2 (double or reinforced insulation, protective insulation)

CAT II

It is applicable to test and measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.

CAT III

It is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

CAT IV

Measurement Category IV: For measuring at the origin of a low-voltage installation (e.g. mains distribution, electricity provider's transfer points to homes) and outdoors (e.g. when conducting tasks on underground cables or overhead lines). This category also includes all lower categories. Measuring in CAT IV is only permitted with test prods with a maximum free contact length of 4 mm or with cover caps over the test prods.



Earth potential



Direct current



Alternating current

6 Intended use

- Measures and displays electrical parameters in measurement category CAT III (up to 600 V).
- Complies with the EN 61010-1 and EN 61010-2-033 standards and all lower categories.
- Measures direct and alternating voltages up to 600 V
- Measures direct and alternating currents up to 10 A
- Measures frequency from 10 Hz to 10 MHz (max. 20 Vrms)
- Measures capacitance up to 40 mF
- Measures resistances up to 40 M Ω
- Continuity tests (<10 Ω acoustic)
- Diode tests

The measuring mode can be selected using the control dial. The measurement range is selected automatically in most modes (except continuity test, diode test and current measuring mode).

Effective (True RMS) measurements are displayed when measuring AC voltages/ currents with a frequency of up to 400 Hz. This ensures that sinusoidal and non-sinusoidal voltage/currents are measured accurately.

Negative polarity readings are indicated with the (-) sign.

The multimeter features a low-impedance function (LoZ) that enables you to measure the voltage with reduced internal resistance. This suppresses phantom voltages that may appear in high-impedance measurements. The low-impedance function must only be used to measure circuits of up to 250 V for a maximum of 3 seconds.

The two current measurement inputs are protected against overload. The voltage in the measuring circuit must not exceed 600 V.

The 10 A current measuring input is equipped with a ceramic high-performance fuse.

The mA/ μ A measurement input is equipped with 2x maintenance-free self-resetting PTC fuse and one ceramic tube fuse, which can be used in the case of conventional overload misoperation of less than about 5A, the current is limited and the meter is well protected. When the meter is being used for mA/ μ A measurement, but the meter is mistakenly connected to a high-energy high-voltage power supply, then the

ceramic tube fuse will work and probably blow to protect the meter. In such case, the blown ceramic tube fuse is required to be replaced by a new one.

The device switches off automatically after 15 minutes if no buttons are pressed. This prevents the battery from draining. The automatic power-off function can be disabled.

A fold-out stand is attached to the back of the multimeter. This allows you to place the multimeter on a level surface for better readability.

Do not use the multimeter when the battery compartment is open or when the battery compartment cover is missing.

Do not take measurements in potentially explosive areas, damp rooms or adverse conditions. Adverse conditions include: Moisture or high humidity, dust and flammable gases, vapours or solvents, thunderstorms, and strong electromagnetic fields.

For safety reasons, only use test leads or accessories that match the multimeter's specifications and meet IEC/EN 61010-031 standards.

The multimeter must only be used by people who are familiar with the relevant regulations and understand the potential hazards. The use of personal protective equipment is recommended.

Using this product for any purposes other than those described above may damage the product and result in a short circuit, fire or electric shock. The product must not be modified or reassembled!

Read the operating instructions carefully and keep them in a safe place for future reference.

Always observe the safety information in these instructions.

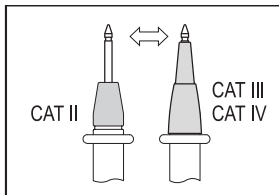
7 Safety instructions



Read the operating instructions carefully and especially observe the safety information. If you do not follow the safety instructions and information on proper handling in this manual, we assume no liability for any resulting personal injury or damage to property. Such cases will invalidate the warranty/guarantee.



- This device was shipped in a safe condition.
- To ensure safe operation and avoid damaging the device, always observe the safety information and warnings in these instructions.
- Check that the measuring device is functioning correctly with a known source before using it.
- Consult a technician if you are not sure how to use or connect the device.
- Measuring instruments and their accessories are not toys and must be kept out of the reach of children.
- Always comply with the accident prevention regulations for electrical equipment when using the product in commercial facilities.
- In schools, educational facilities, hobby and DIY workshops, the multimeter must be used under the responsible supervision of qualified personnel. The same applies when the multimeter is used by people with reduced physical and mental capabilities.
- Always ensure that the multimeter is set to the correct measurement mode before taking a measurement.
- When using measuring probes without protective caps, measurements between the multimeter and the earth potential must not exceed the CAT II measurement category.
- When taking CAT III measurements, the cover caps must be placed on the probe tips (max. length of exposed contacts = 4 mm) to avoid accidental short circuits. These are supplied with the device.



- Always remove the test probes from the measured object before changing the measurement range.
- The voltage between the multimeter connection points and earth must never exceed 600 V DC/AC in CAT III.
- Exercise particular caution when working with voltages higher than AC 30 Vr.m.s, 42.4 V peak or DC 60 V. Touching electrical conductors with these voltages may cause a fatal electric shock.
- To prevent an electric shock, do not touch the measuring points when taking measurements, either directly or indirectly. When taking measurements, do not touch any area beyond the grip markings on the test probes / test leads.
- Check the measuring device and test leads for signs of damage before each measurement. Never take measurements if the protective insulation is damaged (torn, missing, etc.). The test leads come with a wear indicator. A second layer of insulation will become visible if the lead is damaged (the second layer of insulation is a different colour). If this occurs, discontinue use and replace the measurement accessory.
- Do not use the multimeter immediately prior to, during or just after a storm (risk of electric shock / power surge). Ensure that your hands, shoes, clothes, the floor, circuit and circuit components are dry.
- Avoid using the device in the immediate vicinity of:
 - Strong magnetic or electromagnetic fields
 - Transmitting antennas or HF generators.
- These may distort the measurements.
- If you suspect that safe operation is no longer possible, discontinue use immediately and prevent unauthorized use. Safe operation can no longer be assumed if:
 - There are signs of damage
 - The device does not function properly
 - The device was stored under unfavourable conditions for a long period of time
 - The device was subjected to rough handling during transport

- Do not switch the device on immediately after it has been brought from a cold room into a warm one. The condensation generated may destroy the product. Leave the device switched off and allow it to reach room temperature.
- Do not leave packaging material lying around carelessly, as it may become a dangerous toy for children.
- Observe the safety information in each section.

7.1 (Rechargeable) batteries

- Correct polarity must be observed while inserting the (rechargeable) batteries.
- The (rechargeable) batteries should be removed from the device if it is not used for a long period of time to avoid damage through leaking. Leaking or damaged (rechargeable) batteries might cause acid burns when in contact with skin, therefore use suitable protective gloves to handle corrupted (rechargeable) batteries.
- (Rechargeable) batteries must be kept out of reach of children. Do not leave (rechargeable) batteries lying around, as there is risk, that children or pets swallow them.
- All (rechargeable) batteries should be replaced at the same time. Mixing old and new (rechargeable) batteries in the device can lead to (rechargeable) battery leakage and device damage.
- (Rechargeable) batteries must not be dismantled, short-circuited or thrown into fire. Never recharge nonrechargeable batteries. There is a risk of explosion!

7.2 Connected devices

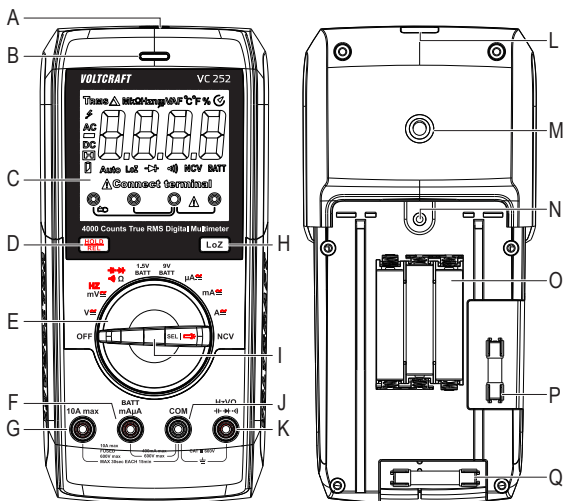
- Also observe the safety and operating instructions of any other devices which are connected to the product.



7.3 LED light

Attention, LED light:

- Do not look directly into the LED light!
- Do not look into the beam directly or with optical instruments!

8 Product overview



- A. Non-contact voltage sensor
- B. Tri-color indicator LED
- C. Display
- D. **HOLD/REL** button
- E. Control dial for selecting the measurement mode
- F. **BATT/mA μ A** measurement terminal
- G. 10 A measurement terminal
- H. **LoZ** Low impedance 400 k Ω button for changing the impedance
- I. **SEL** 
- J. **COM** measurement terminal (reference potential, "negative")
- K. **HzV Ω**  measurement terminal ("positive potential" for direct voltages)
- L. LED light
- M. Connection thread for stand
- N. Battery compartment screw
- O. Battery compartment
- P. F2 fuse
- Q. F1 fuse

9 Product description

The digital multimeter (DMM) displays measurements on a digital 4000-count display (count = smallest display value). The display shows the correct terminal assignment for each measurement mode. The multimeter beeps and displays a warning when the terminals are not assigned correctly. This is a built-in safety feature to protect the user.

The display also indicates the correct measurement terminals to use for each measurement range.


The DMM can be used to take measurements up to CAT III 600 V. It is suitable for use in hobby and professional applications.

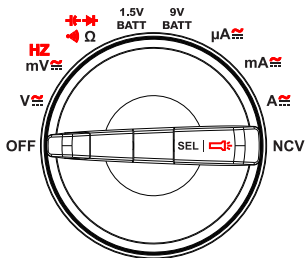
It is not necessary to replace a triggered fuse for mA/ μ A current measurements. The built-in PTC fuse restricts the current flow in the event of an overflow to protect the multimeter and the circuit. The PTC fuse resets itself automatically after a short cool-down phase, meaning that the current measurement circuit is only briefly interrupted.

When the meter is being used for mA/ μ A measurement, but the meter is mistakenly connected to a high-energy high-voltage power supply, then the ceramic tube fuse will work and probably blow to protect the meter. In such case, the blown ceramic tube fuse is required to be replaced by a new one.

The battery and fuse compartment can only be opened when all test leads have been disconnected from the multimeter. It is not possible to insert the test leads into the terminals when the battery and fuse compartment is open. This is a built-in safety feature designed to protect the user.

10 Control dial







- Use the control dial to select the measurement mode.
- Automatic range selection (“Autorange”) is enabled and the range will be automatically selected.
 - The measurement ranges must be selected manually.
 - Always start with the largest measurement range, and then switch to a smaller range if necessary.
- The control dial features a function button.
 - Use the **SEL** /  button to switch to sub-modes when the measuring mode has more than one function
- To turn the multimeter off, move the control dial to the **OFF** position. Always turn the multimeter off when it is not in use.





11 Display elements and symbols






The following symbols and letters appear on the device/display. Other symbols may appear on the display (display test), but these have no function.

11.1 Display elements

Element	Description
TRMS	True RMS measurement
	Delta symbol for relative measurement (= reference measurement)
M	Mega symbol (exp.6)
k	Kilo symbol (exp.3)
Ω	Ohm (unit of electrical resistance)
Hz	Hertz (unit of frequency)
n	Nano symbol (exp.-9)
m	Milli symbol (exp. -3)
V	Volt (unit of electrical voltage)
μ	Micro symbol (exp. -6)
A	Ampere (unit of electrical current)
F	Farad (unit of electrical capacity)
	Automatic power-off function is enabled
	Diode test symbol
•))	Symbol for the acoustic continuity tester
LoZ	Low impedance symbol
▲Connect terminal	Terminal assignment indicator
Auto	Automatic range selection is enabled
	Battery status indicator
	Hold function is enabled
DC	Direct current symbol (—)
	Polarity indicator for current flow direction (negative pole)

Element	Description
AC	Alternating current symbol ()
	Warning symbol for dangerous voltage
AUTO	Auto range
NCV	Non-contact AC voltage measurement
BATT	Battery test

11.2 Symbols

Symbol	Description
REL	Relative measurement button (= reference measurement)
SELECT	Switch to sub-functions
HOLD	Freezes the current measurement
OL	Overload = The measuring range was exceeded
LEAd	warning "Incorrect terminal"
OFF	Move to this position to turn the multimeter off
	Diode test symbol
	Acoustic continuity tester
	Capacity measuring range
	Alternating current
	Direct current
COM	Connection for reference potential
MV	Millivolt mode (exp.-3)
V	Voltage mode (Volt = unit of electrical voltage)
A	Current mode (Ampere = unit of electric current)
mA	Milliamp mode (exp.-3)
µA	Microamp mode (exp.-6)
Hz	Frequency mode (Hertz = unit of frequency)
Ω	Resistance mode (Ohm = unit of electrical resistance)
TRMS	True root mean square measurement

12 Taking measurements



Never exceed the maximum permitted input values. Never touch circuits or circuit components if they may carry voltages greater than AC 30 Vr.m.s, 42.4 V peak or DC 60 V! This may cause a fatal electric shock!



Measurements can only be taken when the battery and fuse compartment is closed. Cables cannot be inserted when the compartment is open.

Before measuring, check the connected test leads for damage, such as cuts, tears and kinks. Never use damaged test leads, as this may cause a fatal electric shock!

When taking measurements, do not touch any area beyond the grip markings on the test probes / test leads.

Only connect the two test leads that you require to take measurements. For safety reasons, remove all unnecessary test leads from the device before taking a measurement.

Measurements in circuits rated at AC 30 Vr.m.s, 42.4 V peak or DC 60 V! must only be made by qualified and trained personnel who are familiar with the relevant regulations and the associated hazards.

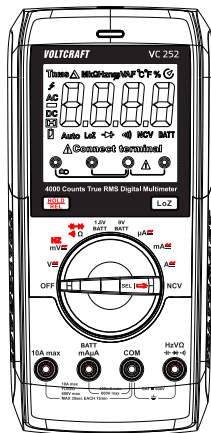


“OL” (overload) indicates that the measuring range has been exceeded.

The display shows the correct connection sequence of the measurement terminals for each measurement mode. Follow the sequence indicated on the display when connecting the test leads.

12.1 Turning the multimeter on and off

1. Turn the control dial to select the desired mode.
 - The optical measuring range is automatically selected (except in current mode).
 - When measuring a current, always start with the largest measurement range, and then switch to a smaller range if necessary.
 - Always disconnect the test leads from the multimeter before switching to another mode.
2. To turn the multimeter off, move the control dial to the **OFF** position.
 - Always turn the multimeter off when it is not in use.
3. Before storing the multimeter, insert the test leads into the high-impedance terminals (**COM** and **HzVΩ**). This helps to prevent errors when making subsequent measurements.



The battery must be inserted before you can use the multimeter. See “Cleaning and maintenance” for instructions on how to change/replace the battery.

12.2 Incorrect wiring alarm

- The DMM automatically detects which terminals are connected to the test leads. If the test leads are connected to the wrong terminals (which can be dangerous for the user and damage the DMM), the DMM triggers an acoustic and optical alarm.
- If you switch to another measurement mode (except current mode) when the test leads are connected to the terminals, the DMM triggers an alarm. The alarm is also triggered when the measuring input is switched from the **10A** terminal to the **BATT/mA μ A** terminal.
- If the alarm is triggered and “LEAd” appears on the display, check that the leads are connected to the correct terminals and that you have selected the correct measurement mode.
- The multimeter triggers the alarm when the terminals are connected as follows:


The multimeter triggers the alarm when the terminals are connected as follows:

Measurement mode	V / Ω / Hz / NCV	mA / μ A / 1.5V BATT / 9V BATT	10 A
Connected terminals	mA / μ A / 10 A	10 A	mA / μ A



If the alarm is triggered, check that you have selected the correct measurement mode and that the cables are connected to the correct terminals. The correct terminals are indicated on the display for each measurement range.

12.3 AC (“V ~”) / DC (“V ===”) voltage measurement

1. Switch on the DMM and select “V” mode.
 - “DC” will show on the display.
 - For lower voltages up to max. 400 mV, select the “mV” measuring range.
2. Press **SEL**  to switch to ACV mode.
 - “AC” will show on the display.
3. Plug the red lead into the **V** terminal and the black lead into the **COM** terminal.
4. Connect the two measuring probes in parallel to the object that you want to measure (e.g. generator or circuit).
 - The measurement will appear on the display.
5. After taking a measurement, remove the leads from the measured object and switch off the DMM.

→ The “V/AC” range has an input resistance of $\geq 10 \text{ M}\Omega$. This means that there is almost no load on the circuit.

If “-” appears in front of a direct voltage measurement, this indicates that the measured voltage is negative (or that the measuring probes have been connected in reverse).

The “V DC/AC” voltage range has an input resistance of $>10 \text{ M}\Omega$; the “mV DC” range has an input resistance of $>100 \text{ M}\Omega$.

12.4 AC (“mV ~”) / (“mV ===”) voltage mode

1. Switch on the DMM and select “mV ~” or “mV ===” measurement mode.
→ “DC” and “mV” will appear on the display.
 2. Press the **SEL** button on the control dial to switch to “AC” mode.
→ “AC”, “TRMS” and “mV” will appear on the display.
 3. Plug the red lead into the **V** terminal and the black lead into the **COM** terminal.
 4. Connect the two measuring probes in parallel to the object that you want to measure (e.g. generator or circuit).
→ The measurement will appear on the display.
 5. After taking a measurement, remove the leads from the measured object and switch off the DMM.
- The “V/AC” range has an input resistance of $\geq 10\text{ M}\Omega$. This means that there is almost no load on the circuit.

12.5 LoZ voltage mode

LoZ mode allows you to measure DC and AC voltages with a low impedance (approx. 400 k Ω). In this mode, the multimeter lowers the internal resistance to prevent ‘phantom’ voltage readings. As a result, the circuit is more heavily loaded than in the standard measuring mode.

1. To enable LoZ mode, press the **LoZ** button when taking a voltage measurement. The impedance will be reduced until you release the button.
2. “LoZ” will appear on the display.



LoZ mode can only be used for circuits with a voltage of up to 250 V for a maximum of 3 seconds. This function is not available in mV mode.

After using LoZ mode, leave the multimeter for 1 minute before using it again.

12.6 Taking current measurements



Never exceed the maximum permitted input values. Never touch circuits or circuit components if they may carry voltages greater than AC 30 V r.m.s, 42.4 V peak or DC 60 V. This may cause a fatal electric shock!

The voltage in the measured circuit must not exceed 600 V.

Measurements greater than 6 A must only be made for a maximum of 30 seconds in 15-minute intervals.

Always start each measurement using the largest measuring range, and then switch to a smaller range if necessary. Always disconnect the circuit before connecting the multimeter and changing the measurement mode. All measurement ranges are protected against overload.

Do not measure any currents above 10 A in the A range or currents above 400 mA in the mA/ μ A range, as this will trigger the fuses.

The μ A/mA input has a resettable PTC fuse, meaning that you do not need to replace the fuse in the event of an overload.





Current measurements in the mA/ μ A range should be made as quickly as possible. Avoid taking measurements for prolonged periods. Due to the PTC technology, increasing currents/prolonged measurements cause the protective components in the circuit to increase in temperature. This increases the internal resistance and restricts the current flow. Bear this in mind when taking a series of measurements.

When the meter is being used for mA/ μ A measurement, but the meter is mistakenly connected to a high-energy high-voltage power supply, then the ceramic tube fuse will work and probably blow to protect the meter. In such case, the blown ceramic tube fuse is required to be replaced by a new one.

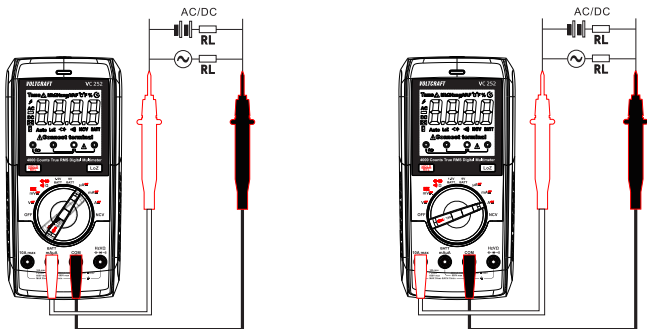
- An optical and acoustic alarm is triggered when the measurement range is exceeded.
- If the PTC fuse is triggered (the measurement steadily decreases, "OL" appears on the display or the alarm is triggered), stop the measurement and switch off the DMM. Wait for approximately 5 minutes for the resettable fuse to cool down and reset itself.

12.6.1 Follow the steps below to measure DC currents (A $\overline{\text{---}}$)



1. Switch on the DMM and select “10A, mA, or μA ” mode.
2. Press **SEL**  to switch to DC mode. “DC” will appear on the display.
3. Press the **SEL**  button again to switch back to AC mode.
4. Select the desired measurement range and connect the corresponding terminals.

Measurement mode	Measurement range	Terminals
μA	<4000 μA	COM + $\text{mA}\mu\text{A}$
mA	4000 mA – 400 mA	COM + $\text{mA}\mu\text{A}$
10A	400 mA – 10 A	COM + 10A

5. Insert the red lead into the **BATT $\text{mA}\mu\text{A}$** or **10 A** terminal. Plug the black test lead into the **COM** terminal.
6. Connect the two measuring probes in series to the object that you want to measure (e.g. battery or circuit). The electrical circuit must be disconnected before you connect the probes.
7. Reconnect the circuit. The measurement will appear on the display.
8. After measuring, disconnect the circuit and remove the test leads from the measured object.
9. Switch off the multimeter.

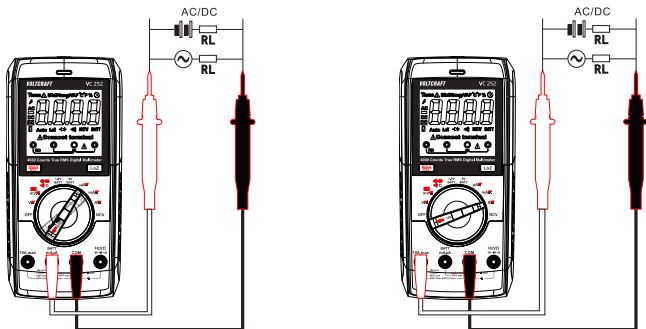


12.6.2 Follow the steps below to measure AC currents (A ~)

1. Switch on the DMM and select “10A, mA, or μA ” mode.
2. Press **SEL**/ to switch to AC mode. “AC” will appear on the display.
3. Press the **SEL**/ button again to switch back to DC mode.
4. Select the desired measurement range and connect the corresponding terminals.

Measurement mode	Measurement range	Terminals
μA	<4000 μA	COM + mA μA
mA	4000 mA – 400 mA	COM + mA μA
10A	400 mA – 10 A	COM + 10A


5. Insert the red lead into the **BATT mA μA or 10 A** terminal. Plug the black test lead into the **COM** terminal.
6. Connect the two measuring probes in series to the object that you want to measure (e.g. battery or circuit). The electrical circuit must be disconnected before you connect the probes.
7. Reconnect the circuit. The measurement will appear on the display.
8. After measuring, disconnect the circuit and remove the test leads from the measured object.
9. Switch off the multimeter.

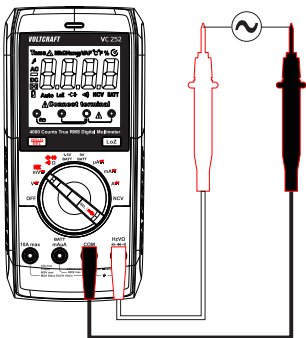


12.7 Measuring frequency

The multimeter can be used to measure the frequency of a signal voltage (supports frequencies from 10 Hz to 10 MHz). The maximum input is 20 Vrms. This mode is not suitable for taking measurements on mains voltages. Observe the input specifications in the technical data.

Proceed as follows to take a frequency measurement:

1. Switch on the DMM and select **mV** mode.
2. Press **SEL**/ to switch to "Hz" mode. "Hz" will appear on the display.
3. Plug the red lead into the **H_z** terminal and the black lead into the **COM** terminal.
4. Connect the two measuring probes to the object that you want to measure (e.g. signal generator or circuit).
→ The frequency and corresponding unit will be displayed.
5. After taking a measurement, remove the leads from the measured object and switch off the DMM.



12.8 Measuring resistance

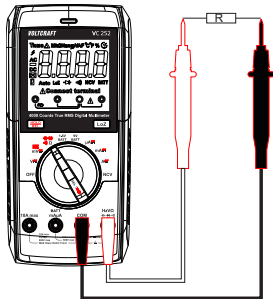


Make sure that all objects that you wish to measure (including circuit components, circuits and component parts) are disconnected and discharged.

Follow the steps below to measure the resistance:

1. Switch on the DMM and select the Ω measurement mode.
2. Plug the red lead into the Ω terminal and the black lead into the **COM** terminal.
3. Check the measuring leads for continuity by connecting both measuring probes to one another. The multimeter should show a resistance value of approx 0–0.5 Ω (inherent resistance of the test leads).

→ For low-impedance measurements of <math><600 \Omega</math>, hold down the **REL** button for approximately one second when the measuring probes are short circuited. This ensures that the inherent resistance of the test leads does not affect the resistance measurement. The display should show “0 Ω ”.



4. Connect the measuring probes to the object that you want to measure. The measurement will be indicated on the display (provided that the object you are measuring is not highly resistive or disconnected). Wait until the display stabilises. This may take a few seconds for resistances greater than 1 M Ω .

→ “OL” (overload) indicates that the measuring range has been exceeded or that the circuit is broken.

5. After taking a measurement, remove the leads from the measured object and switch off the DMM.

→ When taking a resistance measurement, make sure that the points that come into contact with the measuring prods are free from dirt, oil, solder and other impurities. These substances may distort the measurement.

The **REL** button only works when a measured value is displayed. It cannot be used when “OL” is displayed.

12.9 Diode test



Make sure that all objects that you wish to measure (including circuit components, circuits and component parts) are disconnected and discharged.

1. Switch on the DMM and select the desired mode $\rightarrow \text{▶}$.

2. Press **SEL** $\left[\text{▶} \right]$ 2x to switch to diode test mode.

→ The diode symbol " $\rightarrow \text{▶}$ " and "V" will appear on the display.

3. Press the button again to switch to the next measuring mode.

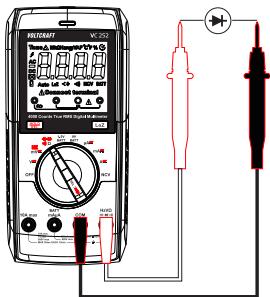
4. Plug the red lead into the $\rightarrow \text{▶}$ terminal and the black lead into the **COM** terminal.

5. Check the measuring leads for continuity by connecting both measuring probes to one another. A value of approx. "0.000 V" should be shown.

6. Connect the two measuring probes to the object that you want to measure (diode). Connect the red lead to the anode (+) and the black lead to the cathode (-).

→ The normal PN junction forward voltage will be shown in Volts ("V"). "OL" indicates that the diode is reverse-biased or defective. Try taking the measurement again in the opposite polarity.


7. After taking a measurement, remove the leads from the measured object and switch off the DMM.



12.10 Continuity test

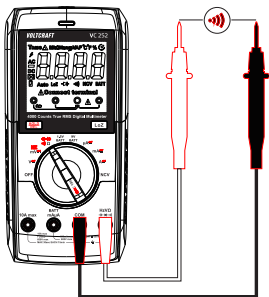


Make sure that all objects that you wish to measure (including circuit components, circuits and component parts) are disconnected and discharged.

1. Switch on the DMM and select the desired mode (•)).
2. Press the **SEL**/ button 1x to switch to continuity test mode.

→ The continuity test symbol and the “ Ω ” symbol will appear on the display.

3. Press the button again to switch to the next measuring mode.
4. Plug the red lead into the Ω terminal and the black lead into the **COM** terminal.



5. Connect the measuring probes to the object that you want to measure.
 - If the measured resistance is equal to or less than 10 Ω , the multimeter will beep to indicate continuity. The beeps stop when the resistance exceeds 100 Ω . The continuity test measures resistances of up to 400 Ohm.
 - “OL” (overload) indicates that the measuring range has been exceeded or that the circuit is broken.
6. After taking a measurement, remove the leads from the measured object and switch off the DMM.

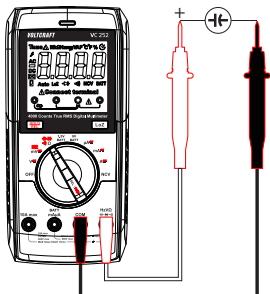
12.11 Measuring capacitance



Make sure that all objects that you wish to measure (including circuit components, circuits and component parts) are disconnected and discharged.

1. Switch on the DMM and select the mode ⏏ .
2. Press **SEL**/ ⏏ 3x to switch to capacitance mode.
→ “nF” will appear on the display.
3. Plug the red lead into the **V** terminal and the black lead into the **COM** terminal.

→ Due to the sensitive measuring input, a value may appear on the display when the measuring leads are “open”. Press the **REL** button when measuring small capacitances (<400 nF). The display will be reset to “0” and the auto-range function will be disabled.

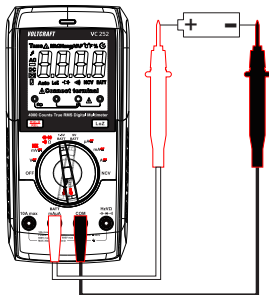


4. Connect the two test probes (red = positive, black = negative) to the object that you want to measure (condenser). The capacitance will be shown on the display after a few seconds. Wait until the display stabilises. This may take a few seconds for capacitances greater than 40 μF .
→ “OL” (overload) indicates that the measuring range has been exceeded.
5. After taking a measurement, remove the leads from the measured object and switch off the DMM.

12.12 Conducting a battery test

The battery test is designed to test standard 1.5 V and 9 V block batteries. The batteries are measured at a low load to ensure an objective measurement. The display indicates the actual terminal voltage under load. If you wish to test a rechargeable battery, select the range that is closest to the battery voltage (e.g. 1.5 V if the rechargeable battery voltage is 1.2 V).

1. Switch on the DMM and select the measurement range **1.5V BATT** or **9V BATT**.
2. Plug the red lead into **BATT** terminal and the black lead into the **COM** terminal. "BATT" will appear on the display.
3. Connect the red measuring probe to the positive battery terminal and the black probe to the negative terminal.
4. The terminal voltage of the battery will be shown on the display.
→ "OL" indicates that the measuring range has been exceeded.
5. After taking a measurement, remove the leads from the measured object and switch off the DMM.



12.13 Non-contact AC voltage test “NCV”

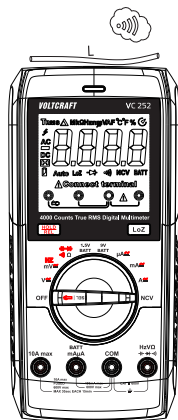


Make sure that all measuring sockets are unoccupied. Please remove all measuring leads and adapters from the measuring device.

This function only serves as an aid. Prior to performing work on these cables, you must perform contact measuring operations to check for the absence of voltage.

Test this function beforehand on a known AC voltage source.

1. Set the function dial to **NCV**, “EF” and “NCV” will show on the display.
2. Guide the non-contact voltage sensor area to the test location (max. 5 mm). For twisted cables, it is recommended to touch the cable with the end of non-contact voltage sensor.
 - If AC power is sensed, the tri-color indicator LED will light up and the buzzer will sound.
 - The higher the voltage, the higher the frequency at which the buzzer will beep.
 - The tri-color indicator LED will change from green to yellow to red as the voltage increases.
3. When finished measuring, switch the power OFF.





13 Additional functions

You can use the function button to enable a range of different functions. The multimeter beeps each time you press the button.

13.1 SEL function

Some measuring modes have additional sub-modes. The sub-modes are marked in grey around the control dial.

1. Press the **SEL**  button briefly (<2 s) to select a sub-mode.
2. Press the **SEL**  button again to switch to the next sub-mode.

13.2 REL function

The REL function allows you to take a reference measurement to avoid possible line losses (e.g. during resistance measurements). This function resets the current measurement to zero.

1. To enable this function, press and hold the **REL** button for approximately 2 seconds.
 - “Δ” will appear on the display and the measurement will be reset to zero.
 - The automatic range selection function will be disabled.
2. To disable this function, change the measurement mode or press and hold the **REL** button for approximately 2 seconds.



The REL function is not available in the following modes: Battery test, diode test and continuity test. The **REL** button only works when a measured value is displayed. It cannot be used when “OL” is displayed.

13.3 HOLD function




This feature freezes the current reading on the display so that you can record it for future reference.





When testing live wires, make sure that this function is disabled before taking any measurements, otherwise the measurement will be incorrect!

1. Press the **HOLD** button to enable this feature, “H” will be displayed.
2. To disable the hold feature, press the **HOLD** button or change the measuring mode.

13.4 Auto power-off function

- The multimeter switches off automatically after 15 minutes if no buttons are pressed. This function saves battery power and prolongs the battery life. The  symbol will be displayed when the automatic power-off feature is enabled.
- The multimeter will beep several times approximately 1 minute before it turns off. If the **REL/HOLD** or **SEL**/ button is pressed before the multimeter switches off, the multimeter will beep again in 15 minutes. A long beep indicates that the multimeter is switching off.
- To switch the DMM back on, move the control dial over the “**OFF**” position or press the **REL/HOLD** or **SEL**/ button.
- The automatic power-off feature can be disabled.

Follow the steps below to disable the automatic power-off feature:

1. Switch the multimeter off (move the control dial to the “**OFF**” position).
2. Hold down the **SEL**/ button and switch on the DMM using the control dial.
 - The multimeter will switch on and the “” symbol will no longer be visible on the display.
 - The automatic power-off feature will remain disabled until the multimeter is turned off using the control dial.

13.5 Torch

Long press the **SEL**/ button to switch the torch ON/OFF.

14 Cleaning and maintenance

14.1 General information

- The multimeter should be calibrated once a year to ensure that measurements remain accurate.
- The multimeter does not need to be serviced (apart from occasional cleaning and battery/fuse replacements).
- Refer to the following sections for instructions on how to change the fuse and battery.



Regularly check the device and test leads for signs of damage.

14.2 Cleaning

Always observe the following safety instructions before cleaning the device:



Opening covers on the product or removing parts that cannot be removed by hand may expose voltage-carrying components.

Before cleaning or servicing the multimeter, disconnect all cables from the multimeter and measured objects, and then switch the multimeter off.

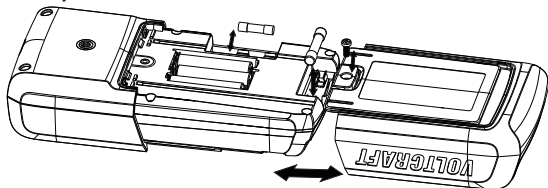
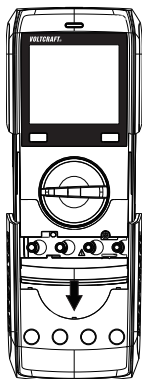
- Do not use abrasive detergents, petrol, alcohol or other similar chemicals to clean the device. These may corrode the surface of the multimeter. In addition, the vapours emitted by these substances are explosive and harmful to your health. Do not use sharp-edged tools, screwdrivers or metal brushes to clean the device.
- Use a clean, damp, lint-free and antistatic cloth to clean the multimeter, display and test leads. Allow the multimeter to dry out completely before using it again.

14.3 Opening the battery/fuse compartment

- The battery/fuse compartment cannot be opened when the leads are connected to the terminals.
- All terminals are automatically locked when the battery/fuse compartment is opened to prevent leads from being inserted.

Follow the steps below to open the battery/fuse compartment:

1. Disconnect all test leads from the multimeter and switch the multimeter off.
2. Loosen and remove the battery compartment screw on the back of the multimeter.
3. Collapse the fold-out stand and slide the battery/fuse compartment cover off the bottom of the multimeter.
→ You should now be able to access the fuses and the battery.



4. Repeat the above steps in the reverse order to replace the battery/fuse compartment cover, and then screw it in place.
→ The multimeter is now ready to use.

14.4 Replacing the 10 A input fuse

The 10 A current measuring input is equipped with a ceramic high-performance fuse. If you cannot take measurements in this range, you will need to replace the fuse.

Follow the steps below to replace the fuse:

1. Disconnect the measuring leads from the circuit and the multimeter, and then switch off the multimeter.
2. Remove the battery/fuse compartment cover (see “Opening the battery/fuse compartment”).
3. Replace the defective fuse with a new fuse of the same type and nominal voltage.

→ F1 fuse: $\Phi 6.35 \times 32$ mm, FF 10 A, H 600 V, breaking capacity: 10 kA

4. Carefully replace the battery/fuse compartment cover.



Using patched fuses or bridging the fuse holder is not permitted for safety reasons. This may cause a fire or explosion. Never use the multimeter when the battery/fuse compartment is open.

The mA/ μ A input is equipped with a maintenance-free resettable PTC fuse. You do not need to replace the fuse in this input.

When the meter is being used for mA/ μ A measurement, but the meter is mistakenly connected to a high-energy high-voltage power supply, then the ceramic tube fuse will work and probably blow to protect the meter. In such case, the blown ceramic tube fuse is required to be replaced by a new one.

14.5 Inserting/changing the battery

1. Disconnect the multimeter and test leads from all circuits, and then disconnect all test leads from the multimeter.
2. Switch off the multimeter.
3. Remove the battery/fuse compartment cover (see “Opening the battery/fuse compartment”).
4. Insert new batteries with the same specifications.
→ Pay attention to the polarity markings in the battery compartment.
5. Carefully replace the battery/fuse compartment cover.



Never use the multimeter when the battery/fuse compartment is open. !RISK OF FATAL INJURY!

Do not leave empty batteries in the device. Even leakproof batteries may corrode and destroy the device or release chemicals that are detrimental to your health.

Do not leave batteries unattended, as they may be swallowed by children or pets. Seek immediate medical attention if a battery is swallowed.

If you do not plan to use the multimeter for an extended period, remove the battery to prevent it from leaking.

Leaking or damaged batteries may cause acid burns if they come into contact with your skin. Always use protective gloves when handling leaking or damaged batteries.

Batteries must not be short-circuited or thrown into open flames!

Do not recharge or disassemble non-rechargeable batteries, as this may cause an explosion.

15 Disposal

15.1 Product



This symbol must appear on any electrical and electronic equipment placed on the EU market. This symbol indicates that this device should not be disposed of as unsorted municipal waste at the end of its service life.

Owners of WEEE (Waste from Electrical and Electronic Equipment) shall dispose of it separately from unsorted municipal waste. Spent batteries and accumulators, which are not enclosed by the WEEE, as well as lamps that can be removed from the WEEE in a non-destructive manner, must be removed by end users from the WEEE in a non-destructive manner before it is handed over to a collection point.

Distributors of electrical and electronic equipment are legally obliged to provide free take-back of waste. Conrad provides the following return options **free of charge** (more details on our website):

- in our Conrad offices
- at the Conrad collection points
- at the collection points of public waste management authorities or the collection points set up by manufacturers or distributors within the meaning of the ElektroG

End users are responsible for deleting personal data from the WEEE to be disposed of.

It should be noted that different obligations about the return or recycling of WEEE may apply in countries outside of Germany.

15.2 (Rechargeable) batteries

Remove batteries/rechargeable batteries, if any, and dispose of them separately from the product. According to the Battery Directive, end users are legally obliged to return all spent batteries/rechargeable batteries; they must not be disposed of in the normal household waste.



Batteries/rechargeable batteries containing hazardous substances are labelled with this symbol to indicate that disposal in household waste is forbidden. The abbreviations for heavy metals in batteries are: Cd = Cadmium, Hg = Mercury, Pb = Lead (name on (rechargeable) batteries, e.g. below the trash icon on the left).

Used (rechargeable) batteries can be returned to collection points in your municipality, our stores or wherever (rechargeable) batteries are sold. You thus fulfil your statutory obligations and contribute to environmental protection.

Batteries/rechargeable batteries that are disposed of should be protected against short circuit and their exposed terminals should be covered completely with insulating tape before disposal. Even empty batteries/rechargeable batteries can contain residual energy that may cause them to swell, burst, catch fire or explode in the event of a short circuit.

16 Troubleshooting

The multimeter was designed using the latest technology and is safe to use. However, problems and malfunctions may still occur.

This section tells you how to troubleshoot possible faults:



Always observe the safety information in these instructions.

Problem	Possible cause	Suggested solution
The multimeter does not work.	Is the battery empty?	Check the battery level and replace if necessary.
The measured value does not change.	Have you selected the wrong measurement mode (AC/DC)?	Check the display (AC/DC) and select another mode if necessary.
	Did you use the wrong terminals?	Check that the test leads are connected to the correct terminals.
	Is the hold function enabled?	Disable the hold function.
The multimeter cannot take measurements in the 10 A range.	Is the fuse in the 10 A input defective?	Check the 10A F1 fuse.
The multimeter cannot take measurements in the mA/ μ A range.	The F2 fuse has blown.	Replace the blown F2 fuse



Any repair work other than that described above must be carried out by an authorized technician. If you have questions about the multimeter, please contact our technical support team.

17 Technical data

Display.....	4000 Counts (digits)
Measurement interval.....	approx. 2-3 measurements/second
AC measurement method.....	True RMS, AC-coupled
Test lead length	approx. 90 cm
Measuring impedance	≥10 MΩ (400 mV: ≥100 MΩ)
Measuring terminal clearance	19 mm (COM-V)
Low battery indicator	Battery voltage <3.6 ±0.2 V
"Dangerous voltage" indicator	≥30 V/AC-DC
"Range exceeded" alarm.....	≥600 V/AC-DC, ≥10 A/AC-DC
"OL" (overload) alarm	≥610 V/AC-DC, ≥10, 10 A/AC-DC or measurement >4000 counts
Automatic power-off	after approx. 15 minutes (can be manually disabled)
Current consumption (auto off).....	<50 μA
Operating voltage	3 x AAA 1.5 V batteries
Operating conditions.....	0 to +40 °C (<75 % RH)
Operating altitude	max. 2000 m above sea level
Storage temperature.....	-10 °C to +50 °C
Weight	approx. 375 g
Dimensions (L x W x H).....	190 x 90 x 43 mm
Measuring category	CAT III 600 V
Pollution degree.....	2
Operating environment.....	Indoor use
Safety regulations.....	EN 61010-1 and EN61010-2-033
F1 FUSE.....	Φ6.35×32 mm, FF 10 A, H 600 V, breaking capacity: 10 kA
F2 FUSE.....	Φ5×20 mm, FF 2.5 A, H 700V, break- ing capacity: min. 300 A

Measuring tolerances

Accuracy in \pm (% of reading + display error in counts (= number of smallest points)). These accuracy readings are valid for one year at a temperature of $+23\text{ }^{\circ}\text{C}$ ($\pm 5\text{ }^{\circ}\text{C}$) and a relative humidity of less than 75 % (non-condensing). If the multimeter is used outside of this temperature range, use the following coefficient to calculate the accuracy. $+0.1 \times (\text{specified accuracy})/1\text{ }^{\circ}\text{C}$

The accuracy of measurements may be affected when the multimeter is used in a high-frequency electromagnetic field.

Direct voltage (V/DC)

Range	Resolution	Accuracy
40.0 mV	0.01 mV	$\pm(1.2\% + 8)$
400.0 mV	0.1 mV	$\pm(0.9\% + 8)$
4.000 V	0.001 V	$\pm(0.9\% + 4)$
40.00 V	0.01 V	
400.0 V	0.1 V	
600 V	1 V	$\pm(1.3\% + 7)$

Only available in "mV" mode
Specified measuring range: 5–100 % of the measuring range
600 V overload protection; Impedance: 10 M Ω (mV: $\leq 100\text{ M}\Omega$)
The multimeter may display ≤ 5 counts if a measuring input is short-circuited.

Direct voltage (V/DC) LoZ

Range	Resolution	Accuracy
4.000 V	0.001 V	$\pm(1.7\% + 7)$
40.00 V	0.01 V	
400.0 V	0.1 V	
600 V	1 V	

Specified measuring range: 5–100 % of the measuring range
 600 V overload protection; Impedance: 400 k Ω (max. 250 V, 3 secs)
 The multimeter may display ≤ 5 counts if a measuring input is short-circuited.
 After using the LoZ feature, leave the multimeter for 1 minute before using it again.

Alternating voltage (V/AC)

Range	Resolution	Accuracy
40.00 mV	0.01 mV	$\pm(1.4\% + 5)$
400.0 mV	0.1 mV	
4.000 V	0.001 V	$\pm(1.3\% + 4)$
40.00 V	0.01 V	
400.0 V	0.1 V	
600 V	1 V	$\pm(1.9\% + 7)$
<p>Only available in "mV" mode</p> <p>Specified measuring range: 5–100 % of the measuring range</p> <p>Frequency range: 45–400 Hz; 600 V overload protection; Impedance: 10 MΩ (mV: ≤ 100 MΩ)</p> <p>The multimeter may display 5 counts if a measuring input is short-circuited.</p>		
<p>TrueRMS peak (Crest Factor (CF)) ≤ 3 CF to 600 V</p> <p>TrueRMS peak for non-sinusoidal signals plus tolerance</p> <p>CF >1.0 - 2.0 + 3%</p> <p>CF >2.0 - 2.5 + 5%</p> <p>CF >2.5 - 3.0 + 7%</p>		

Alternating voltage (V/AC) LoZ

Range	Resolution	Accuracy
4.000 V	0.001 V	±(2.2% + 7)
40.00 V	0.01 V	
400.0 V	0.1 V	
600 V	1 V	
<p>Specified measuring range: 5–100 % of the measuring range Frequency range: 45–400 Hz; 600 V overload protection; Impedance: 10 MΩ (mV: ≤100 MΩ) The multimeter may display 5 counts if a measuring input is short-circuited. After using the LoZ feature, leave the multimeter for 1 minute before using it again.</p>		
<p>TrueRMS peak (Crest Factor (CF)) ≤3 CF to 600 V TrueRMS peak for non-sinusoidal signals plus tolerance CF >1.0 - 2.0 + 3% CF >2.0 - 2.5 + 5% CF >2.5 - 3.0 + 7%</p>		

Direct current (A/DC)

Range	Resolution	Accuracy
400.0 μA	0.1 μA	±(0.9% + 7)
4000 μA	1 μA	
40.00 mA	0.01 mA	
400.0 mA	0.1 mA	
4.000 A	0.001 A	±(1.3% + 7)
10.00 A	0.01 A	±(1.5% + 7)

600 V overload protection

Fuses: $\mu\text{A}/\text{mA} = 2 \times 0.55 \text{ A}/240 \text{ V}$ resettable, 1x F2 2.5 A/700 V ceramic

10 A = High-performance FF 10 A/600 V ceramic fuse

$\leq 6 \text{ A} =$ continuous measurement, $>6 \text{ A} =$ max. 30 secs at intervals of 15 minutes

The multimeter may display 3 counts when a measuring input is open

Alternating current (A/AC)

Range	Resolution	Accuracy
400.0 μA	0.1 μA	$\pm(1.3\% + 4)$
4000 μA	1 μA	
40.00 mA	0.01 mA	
400.0 mA	0.1 mA	
4.000 A	0.001 A	$\pm(1.5\% + 4)$
10.00 A	0.01 A	$\pm(1.8\% + 7)$
600 V overload protection		
Fuses: $\mu\text{A}/\text{mA} = 2 \times 0.55 \text{ A}/240 \text{ V}$ resettable, 1x F2 2.5 A/700 V ceramic		
10 A = High-performance FF 10 A/600 V ceramic fuse		
$\leq 6 \text{ A} =$ continuous measurement, $>6 \text{ A} =$ max. 30 secs at intervals of 15 minutes		
The multimeter may display 3 counts when a measuring input is open		
TrueRMS peak (Crest Factor (CF)) ≤ 3 CF over the entire range		
TrueRMS peak for non-sinusoidal signals plus tolerance		
CF >1.0 - 2.0	+ 3%	
CF >2.0 - 2.5	+ 5%	
CF >2.5 - 3.0	+ 7%	

Resistance

Range	Resolution	Accuracy
400.0 Ω^*	0.1 Ω	$\pm(1.3\% + 4)$
4.000 k Ω^*	0.001 k Ω	$\pm(1.2\% + 7)$
40.00 k Ω	0.01 k Ω	
400.0 k Ω	0.1 k Ω	
4.000 M Ω	0.001 M Ω	$\pm(1.5\% + 4)$
40.00 M Ω	0.01 M Ω	$\pm(2.7\% + 7)$
600 V overload protection		
Measuring voltage: Approx. 1.0 V, measuring current approx. 0.7 mA		
*Accuracy for measuring range $\leq 400 \Omega$ was calculated after deducting lead resistance from the REL function		

Capacitance

Range	Resolution	Accuracy
4.000 nF	0.001 nF	$\pm(4.4\% + 9)$
40.0 nF	0.01 nF	
400. nF*	0.1 nF	$\pm(4.4\% + 5)$
4.000 μ F*	0.001 μ F	$\pm(4.4\% + 5)$
40.00 μ F	0.01 μ F	
400.0 μ F	0.1 μ F	
4.000 mF	0.001 mF	
40.00 mF	0.01 mF	$\pm(7.9\% + 5)$
600 V overload protection		
*Accuracy for measuring range ≤ 400 nF only applies when the REL function is used		

Frequency “Hz” (electronic)

Range	Resolution	Accuracy
≤9.999 Hz*	0.001 Hz	Not specified
10.00 Hz – 99.99 Hz*	0.01 Hz	±(0.2 % +7)
100.0 Hz – 999.9 Hz	0.1 Hz	
1.000 kHz – 9.999 kHz	0.001 kHz	
10.00 kHz – 99.99 kHz	0.01 kHz	
100.0 kHz – 999.9 kHz	0.1 kHz	
1.000 MHz – 9.999 MHz	0.001 MHz	
>10.00 MHz*	0.01 MHz	Not specified
<p>*The specified frequency range is 10.00 Hz - 10 MHz</p> <p>Signal level (without DC component):</p> <p>≤100 kHz: 200 mV – 20 Vrms</p> <p>>100 kHz – <1 MHz: 600 mV – 20 Vrms</p> <p>≥1 MHz – 5 MHz: 600 mV – 20 Vrms</p> <p>≥ 5 MHz - 10 MHz: 900 mV - 20 Vrms</p> <p>600 V overload protection</p>		

Diode test

Test voltage	Resolution
Approx. 3.0 V/DC	0.001 V
Overload protection: 600 V; Test voltage: 2 mA.	

Range	Load resistance	Resolution	Accuracy
1.5 V	Approx. 100 Ω	0.001 V	$\pm(0.9\% + 8)$
9 V	Approx. 900 k Ω	0.01 V	
600 V overload protection Fuses: $\mu\text{A}/\text{mA} = 2 \times 0.55 \text{ A}/240 \text{ V}$ resettable, 1x F2 2.5 A/700 V ceramic			

Acoustic continuity tester

Measurement range	Resolution
400 Ω	0.1 Ω
$\leq 10 \Omega$ continuous tone; $\geq 100 \Omega$ no tone Overload protection: 600 V Test voltage approx. 1 V Test current $< 1.5 \text{ mA}$	



Never exceed the maximum permitted input values. Never touch circuits or circuit components if they may carry voltages greater than AC 30 Vr.m.s, 42.4 V peak or DC 60 V. This may cause a fatal electric shock!