

PROFiTEST DC-II

Test Instrument for the Suppression of RCCB Tripping
and for Tripping Tests of DC Components
in AC-DC Sensitive RCCBs

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1 Safety Precautions

The PROFiTEST DC-II test instrument has been manufactured in accordance with safety regulations EN 61010-1, VDE 0411-1 and IEC 61010-1. If used for its intended purpose, the safety of both the operator and the instrument is assured. Their safety is however not assured, if the test instrument is operated incorrectly or handled improperly.

The test instrument should only be connected to the mains as long as is necessary to perform the desired measurement, in order to avoid unnecessarily high temperatures within the instrument.



Attention!

Always be certain to select the correct line voltage when operating the test instrument (voltage selector switch at the right hand side of the housing labelled: 230/400 V).

Opening the instrument / repairs

The instrument may only be opened by authorized, trained personnel in order to ensure flawless operation and to assure that the guarantee is not rendered null and void.

Even original replacement parts may only be installed by authorized, trained personnel.

If it can be ascertained that the instrument has been opened by unauthorized personnel, no guarantee claims can be honored by the manufacturer with regard to personal safety, measuring accuracy, compliance with applicable safety measures or any consequential damages.

Any warranty claims will be forfeited when the warranty seal has been damaged or removed.

Meanings of symbols on the instrument



Warning concerning a point of danger (Attention: observe documentation!)



Protection class II device



EU seal of approval



This device may not be disposed of with the trash. Further information regarding the WEEE mark can be accessed on the Internet at www.gossenmetrawatt.com by entering the search term "WEEE".

Meaning of symbols in the operating instructions



Selective RCCB



Pulse-controlled RCCB



AC-DC sensitive RCCB



Rising DC residual current

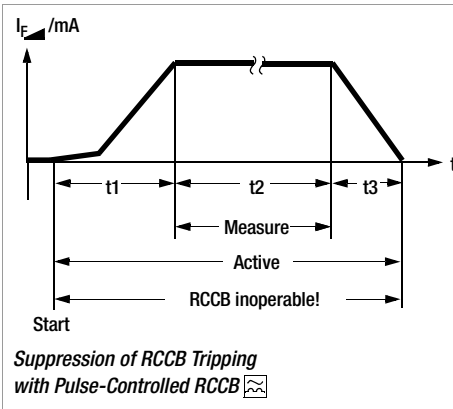
2 Description

2.1 Loop Resistance Measuring Mode with the PROFiTEST... with Suppression of RCCB Tripping

The PROFiTEST DC-II test instrument allows for the measurement of loop resistance in TN systems with RCCBs (10/30/100/300/500 mA nominal residual current) without DC sensitive components.

The test instrument generates a DC residual current which saturates the magnetic circuit of the RCCB.

The PROFiTEST 0100S/S-II, PROFiTEST 2 or PROFiTEST²-C superimposes a measuring current which demonstrates only half-waves of like polarity. The RCCB cannot detect this measuring current and can thus no longer be tripped during measurement.



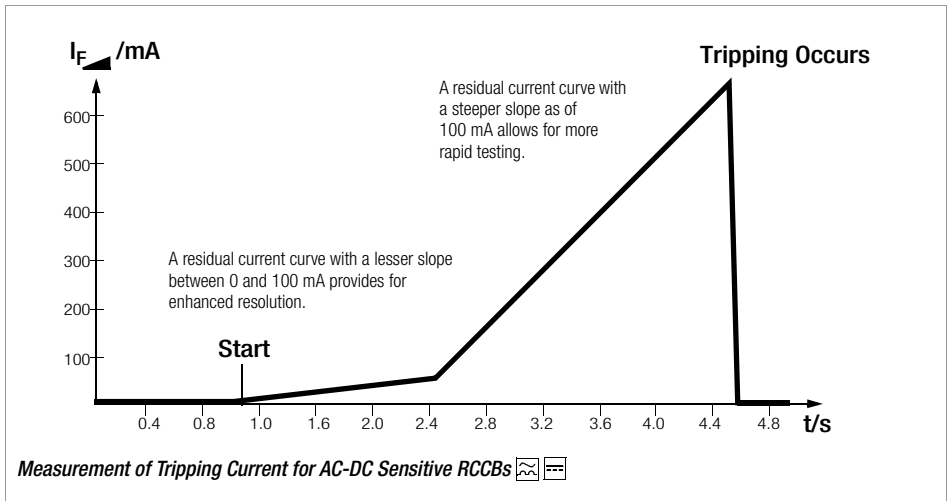
2.2 Tripping Test Operating Mode for AC-DC Sensitive RCCBs

2.2.1 With Rising DC Residual Current and Measurement of Tripping Current for Undelayed RCCBs

A slowly rising direct current is applied to N and PE with the selector switch in the I_F position. The measured current value is displayed continuously. When the RCCB is tripped, the last measured current value is stored for several seconds and can be read from the display.

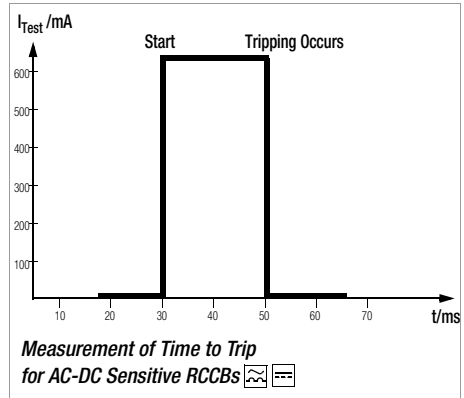
2.2.2 With Rising DC Residual Current and Measurement of Tripping Current for Selective or Short-Time-Delay RCCBs

The current ramp demonstrates a gradual overall rise with the selector switch in the I_S position. Test duration is considerably longer. Use this selector switch position for testing tripping current for selective or short-time-delay AC-DC sensitive RCCBs.



2.2.3 With Constant DC Residual Current and Measurement of Time to Trip

With the selector switch set to the respective nominal residual current, twice the nominal current is applied to N and PE. Time to trip is measured and displayed for the RCCB.



3 Connecting the PROFiTEST DC-II Test Instrument to the System Under Test

3.1 Testing in Systems with Neutral Conductor

Perform testing at an earthing contact outlet with the provided earthing contact device connector cable in systems that have both a neutral and a protective conductor.

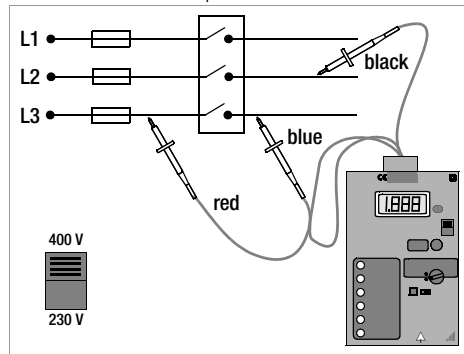
- Set the voltage selector switch to 230 V (at the right hand side of the housing labelled: 230/400 V).



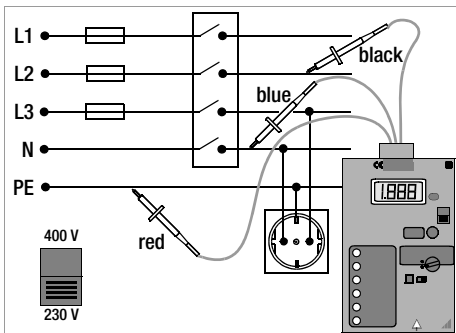
Note!

If the voltage selector switch has been set to 400 V, the test instrument is inoperable and only random values appear at the display.

- Connect the test probes as follows:



- Connect the black test probe to a phase conductor downstream from the RCCB.
- Connect the blue test probe to a different phase conductor downstream from the RCCB.
- Connect the red test probe to the same phase conductor as the blue test probe has been connected to, but **upstream** from the RCCB.
- We recommend performing the test on all three phases.



- Perform testing as described in chapter 4.2.1.

3.2 Testing in Systems without Neutral Conductor

Proceed as follows in order to test RCCBs in systems without a neutral conductor:

- Set the voltage selector switch to 400 V.
- Use the Z523A test adapter with three test probes.



Attention!

When a connection is made between two phases, the voltage selector switch must be set to 400 V. Otherwise the internal device fuse will blow!

4 Operation

Overview

Measurement	RCCB Type	Selector Switch Position	Display
Loop Resistance	Standard	I_F undelayed	PROFITEST...
Triggering Current	AC-DC Sensitive	I_F undelayed	PROFITEST DC-II
Triggering Current	AC-DC Sensitive, Delayed	I_F [S]	PROFITEST DC-II
Time to Trip	AC-DC Sensitive	10/30/100/300/500 mA	PROFITEST DC-II

4.1 Loop Resistance Measurement Mode with the PROFITEST... with Suppression of RCCB Triggering

- Connect the PROFITEST DC-II to the system under test:
The "Mains" lamp lights up green. The display value is equal to or close to 0.
- If the polarity lamp lights up, reverse the poles at the mains connection.
- Connect the PROFITEST... via the earthing contact outlet at the PROFITEST DC-II mains plug. Select positive half-wave for the R_{Loop}/Z_{Loop} range (loop resistance).
- Set the selector switch to the I_F position and the slide switch to "undelayed".
- Press the "START" key at the PROFITEST DC-II.
The "Active" lamp lights up.
- The "Measuring" lamp lights up after approximately 4 to 5 s.
The RCCB is disabled (disabling of the RCCB lasts for approximately 30 s).
Magnetizing current is displayed in mA.
- Measure loop resistance with the PROFITEST... with the switch in the " R_{Loop}/Z_{Loop} " position after "positive half-wave to earth" has been selected in the menu.
- After the measurement has been completed, wait until the "Measuring" lamp has gone out, followed by the "Active" lamp about 6 s later. Disconnect the instrument from the system.



Attention!

The RCCB is disabled **during operation** and measurement.

The RCCB must be tripped **after measurement** with the PROFITEST DC-II in order to test for proper functioning.

Either activate the test button at the RCCB, or perform a tripping test with the PROFITEST...

Important Notes

If the " $R_{Loop}/Z_{Loop} > \max.$ " lamp lights up, loop resistance is greater than approximately 8Ω . Correct measurement is impossible in this case. The fact that the lamp may flicker during measurement is of no consequence.

If the "Temperature" lamp lights up, disconnect the PROFITEST DC-II from the mains and allow it to cool.

4.2 Tripping Test Operating Mode for DC Components in AC-DC Sensitive RCCBs

4.2.1 With Rising DC Residual Current and Measurement of Tripping Current for Undelayed RCCBs

- Connect the PROFITEST DC-II to the system under test:
The "Mains" lamp lights up green. The display value is equal to or close to 0.
- If the *polarity lamp lights up*, reverse the poles at the mains connection.
- Set the function selector switch to the I_F position and the slide switch to "undelayed".
- Press the "START" key at the PROFITEST DC-II.
The "Active" lamp lights up.

Measurement Results:

- a) Current rises until the RCD is tripped. Tripping current is subsequently displayed for approximately 5 s.
- or
- b) If the RCD fails, current rises until saturation current has been reached. Saturation current is displayed in mA for approximately 30 s, after which the displayed current value again approaches 0.

4.2.2 With Rising DC Residual Current and Measurement of Tripping Current for Delayed RCCBs

Set the slide switch to the **S** position in order to determine tripping current for selective or short-time-delay AC-DC sensitive RCCBs.

- Connect the PROFITEST DC-II to the system under test:
The "Mains" lamp lights up green. The displayed value is equal to or close to 0.
- If the *polarity lamp lights up*, reverse the poles at the mains connection.
- Set the function selector switch to the I_F position and the slide switch to **S**.
- Press the "START" key at the PROFITEST DC-II.
The "Active" lamp lights up.

Measurement Results

Current rises continuously, but gradually, until the RCD is tripped. Tripping current is then displayed in mA for about 5 s.

This test may last as long as 1 minute.

4.2.3 With Constant DC Residual Current and Measurement of Time to Trip for Undelayed RCCBs

- Connect the PROFITEST DC-II to the system under test:
The "Mains" lamp lights up green. The displayed value is equal to or close to 0.
- If the *polarity lamp lights up*, reverse the poles at the mains connection.
- Set the function selector switch to the 10, 30, 100, 300 or 500 mA position, depending upon the rated current for the RCCB.
- Set the slide switch to the "undelayed" position.
- Press the "START" key at the PROFITEST DC-II.
The "Active" lamp lights up and remains lit until testing has been completed.

Time to trip is continuously displayed.

Measurement Results

- a) Time to trip is displayed in ms for about 5 s after tripping occurs or
- b) If the RCD fails, or if the selected nominal residual current value is too small, measurement is performed for a period of up to 2000 ms. Time overflow is indicated thereafter by means of a flush left 1 at the display.



Note!

Test current is two times nominal residual current in accordance with DIN VDE 0664.

The AC components of AC-DC sensitive RCCBs are to be tested with the PROFITEST....

5 Characteristic Values

Line Voltage 230/400 V
(-10%, +25%), 50 Hz

DC Residual Current for Suppression of RCCB Tripping DC 1.25 A +30%

Measurement	Measuring Range	Measuring Accuracy	Measurement uncertainty
Tripping Current	1 ... 1999 mA*	±(4% rdg. + 5 d)	±(8% rdg. + 5 d)
Time to Trip	2 ... 1999 ms	±(3% rdg. + 5 d)	±(6% rdg. + 5 d)

* limited by means of maximum DC residual current (see above)

Selector Switch Position for Measurement of Time to Trip (nominal residual current)	Test Current
10 mA	20 mA +10%
30 mA	60 mA +10%
100 mA	200 mA +10%
300 mA	600 mA +10%
500 mA	1000 mA +10%

Temperature Ranges / Climatic Category

Operating Temperatures -10 °C ... +50 °C
Storage Temperatures -20 °C ... +60 °C

Electrical Safety

Protection Class II per IEC 61010-1/
EN 61010-1/
VDE 0411-1

Operating Voltage 300 V

Test Voltage 3.7 kV 50 Hz

Measurement Category II

Pollution degree 2

Internal Fuse electronic (PTC)

External Fuse cartridge fuse link in plug:
5 mm x 20 mm:
FF 1.6/250

Electromagnetic Compatibility (EMC)

Product standard DIN EN 61326:2006

Interference Emission	
EN 55022	class B
Interference Immunity	Test Value
EN 61000-4-2	Contact/Atmosphere - 4 kV/8 kV
EN 61000-4-3	10 V/m
EN 61000-4-4	Mains connection - 2 kV
EN 61000-4-5	Mains connection - 1 kV
EN 61000-4-6	Mains connection - 3 V
EN 61000-4-11	0.5 period / 100%

Inputs and Outputs

The mains connection provides for power supply and simultaneously functions as an output for test and magnetizing current.

Mechanical Design

Protection housing: IP 40 per
DIN VDE 0470

Extract from table on the meaning of IP codes

IP XY (1 st digit X)	Protection against foreign object entry	IP XY (2 nd digit Y)	Protection against the penetration of water
4	≥ 1,0 mm ∅	0	not protected

Dimensions L x W x D:
205 mm x 120 mm x
100 mm (without power
cable)

Weight 1.5 kg (without power
cable)

6 Maintenance

6.1 Internal Fuse

An internal fuse protects the test instrument against operator error.

If the instrument is overloaded with 400 V instead of 250 V mains power, the electronic fuse is tripped. LEDs may still be illuminated and characters may still appear at the display, but the instrument will not function if a test is started.

In such a case, wait for approximately 2 minutes until the protective circuit has been deactivated and the test instrument is once again ready for operation.

6.2 External Fuse

The device connector cable is equipped with a fuse.



Attention!

Be absolutely certain that only the specified fuses are used! If fuses are used which demonstrate other blowing characteristics, rated current or breaking capacity, danger exists for the user, as well as for damping diodes, resistors and other components.

The use of repaired fuses or short-circuiting the fuse holder is prohibited.

6.3 Housing

The test instrument may only be cleaned with a soft cloth or brush. If the housing should become statically charged, discharging may be performed with an antistatic agent or a damp cloth.

6.4 Recalibration

The measuring tasks performed with your instrument, and the stressing it's subjected to, influence aging of its components and may result in deviation from the specified levels of accuracy.

In the case of strict measuring accuracy requirements, as well as in the event of use at construction sites with frequent stress due to transport and considerable temperature fluctuation, we recommend a relatively short calibration interval of once per year. If your instrument is used primarily in the laboratory and indoors without considerable climatic or mechanical stressing, a calibration interval of once every 2 to 3 years is sufficient as a rule. During recalibration* at an accredited calibration laboratory (DIN EN ISO/IEC 17025), deviations from traceable standards demonstrated by your measuring instrument are documented. Ascertained deviations are used to correct displayed values during later use of the instrument.

We would be happy to perform DAkkS or factory calibration for you at our calibration laboratory. Further information is available at our website: www.gossenmetrawatt.com (→ Company → DAkkS Calibration Center or → FAQs → Questions and Answers Regarding Calibration).

Recalibration of your instrument at regular intervals is essential for the fulfillment of requirements according to quality management systems per DIN EN ISO 9001.

* Examination of the specification, as well as adjustment, are not included in calibration. However, in the case of our own products, any required adjustment is performed and adherence to the specification is confirmed.

6.5 Return and Environmentally Sound Disposal

The instrument is a category 9 product (monitoring and control instrument) in accordance with ElektroG (German electrical and electronic device law). This device is RoHS-compliant. Furthermore, we make reference to the fact that the current status in this regard can be accessed on the Internet at www.gossenmetrawatt.com by entering the search term WEEE.

We identify our electrical and electronic devices (as of August 2005) in accordance with WEEE 2002/96/EC and ElektroG using the symbol shown at the right per DIN EN 50419.



These devices may not be disposed of with the trash.

Please contact our service department regarding the return of old devices (see address in section 7).

7 Repair and Replacement Parts Service Calibration Center* and Rental Instrument Service

When you need service, please contact:

GMC-I Service GmbH
Service Center
Thomas-Mann-Str. 20
90471 Nuremberg, Germany
Phone +49 911 817718-0
Fax +49 911 817718-253
E-mail service@gossenmetrawatt.com
www.gmci-service.com

This address is only valid in Germany.
Please contact our representatives or subsidiaries for service in other countries.

* DAKS Calibration Laboratory for Electrical Quantities D-K-15080-01-01 accredited per DIN EN ISO/IEC 17025

Accredited measured quantities: direct voltage, direct current values, DC resistance, alternating voltage, alternating current values, AC active power, AC apparent power, DC power, capacitance, frequency and temperature

Competent Partner

GMC-I Messtechnik GmbH is certified in accordance with DIN EN ISO 9001:2008.

Our DAKS calibration laboratory is accredited by the Deutsche Akkreditierungsstelle GmbH (National accreditation body for the Federal Republic of Germany) in accordance with DIN EN ISO/IEC 17025:2005 under registration number D-K-15080-01-01.

We offer a complete range of expertise in the field of metrology: from **test reports** and **proprietary calibration certificates** right on up to **DAKS calibration certificates**.

Our spectrum of offerings is rounded out with free **test equipment management**.

An **on-site DAKS calibration station** is an integral part of our service department. If errors are discovered during calibration, our specialized personnel are capable of completing repairs using original replacement parts. As a full service calibration laboratory, we can calibrate instruments from other manufacturers as well.

8 Product Support

When you need support, please contact:

GMC-I Messtechnik GmbH
Product Support Hotline
Phone +49 911 8602-0
Fax +49 911 8602-709
E-mail support@gossenmetrawatt.com

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