

PROFiTEST[®] DC-II

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

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1 Safety Precautions

The PROF/TEST®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).

Meanings of symbols on the instrument



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



Protection class II device



EU seal of approval

Meaning of symbols in the operating instructions



Selective RCCB



Pulse-controlled RCCB



AC-DC sensitive RCCB



I_F Rising DC residual current

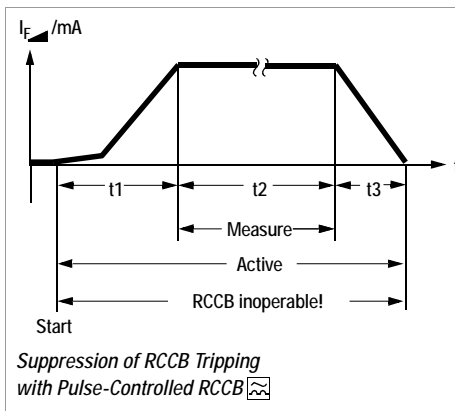
2 Description

2.1 Loop Resistance Measuring Mode with the PROF/TEST[®]0100S-II with Suppression of RCCB Tripping

The PROF/TEST[®]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 PROF/TEST[®]0100S-II (PROF/TEST[®]0100S as well) 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.



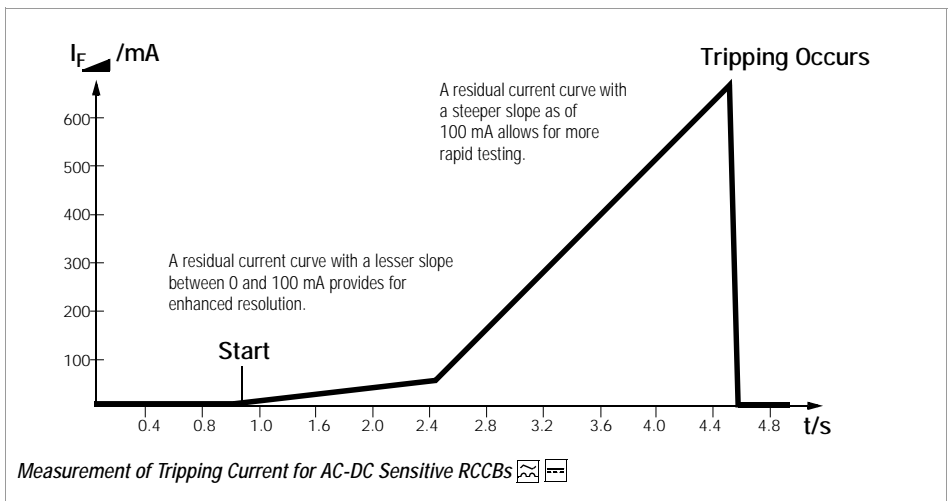
2.2 Tripping Test Operating Mode for AC-DC Sensitive RCCBs

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.

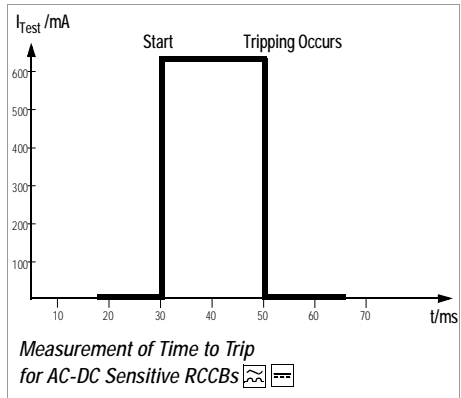
2.2.2 With Rising DC Residual Current and Measurement of Tripping Current for Selective or Short-Time-Delay RCCBs

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

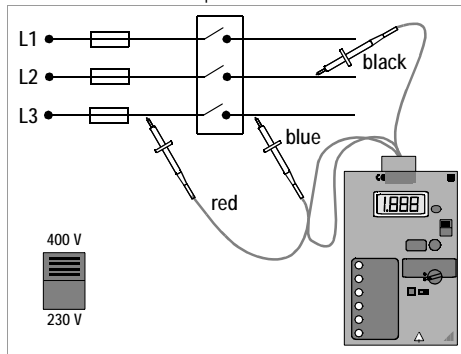
3.1 Testing in Systems with Neutral Conductor

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

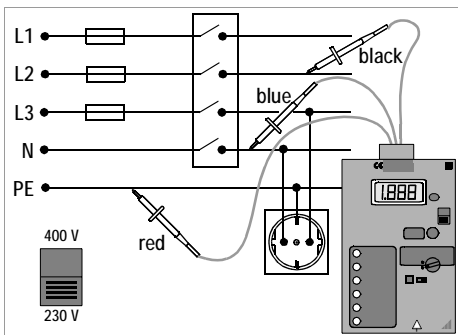
- ⇨ Set the voltage selector switch to 230 V (at the right hand side of the housing labelled: 230/400 V).

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®0100S-II
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®0100S-II 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®0100S-II via the earthing contact outlet at the PROFITEST®DC-II mains plug. Select positive half-wave for the R_{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®0100S-II with the rotary switch in the " R_{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®0100S-II.

Important Notes

If the " $R_{Loop} > \max.$ " 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 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.

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 Error
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 Temp. Range -10 °C ... +50 °C

Storage Temp. Range -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
Overvoltage Category	II
Contamination Level	2
Interference Emission	IEC/EN 61326-1
Interference Immunity	IEC/EN 61326/A1
Internal Fuse	electronic (PTC)
External Fuse	cartridge fuse link in plug: 5 mm x 20 mm: FF 1.6/250

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
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.

7 Repair and Replacement Parts Service DKD Calibration Lab and Rental Instrument Service

When you need service, please contact:

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Service-Center
Thomas-Mann-Str. 20
90471 Nuremberg, Germany
Phone +49 911 86 02 - 410 / 256
Fax +49 911 86 02 - 2 53
e-mail fr1.info@gmc-instruments.com

8 Product Support

When you need support, please contact:

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