

PROFITEST | PRCD Pro

Adapter for Standards Compliant Testing of PRCDs by Fault Simulation

3-447-119-03
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- Testing of type S and K PRCDs per DIN EN 50678, DIN EN 50699, BGI / GUV-I 608 and manufacturer specifications using a guided test sequence with the PROFITEST MF / PROFITEST MXTRA
- Testing of portable safety switches of the following types:
 - PRCD-S and PRCD-K (single-phase / 3-pole)
Kopp et al: PRCD-S pro, PRCD-S, PRCD-K
PCE: PRCD-S+, PRCD-K+
 - PRCD-S (3-phase / 5-pole):
Kopp et al: PRCD-S
PCE: NM5p
elektron BERLIN: ABL Sursum SLU3P
 - Doepke module DPRCD-M1(3-phase/5-pole)
 - PRCD, (2-pole / 3-pole):
All PRCDs without protective conductor detection and monitoring
- Function test, i.e. tripping test by means of simulating the following faults:
Interruption, wire reversal and interference voltage in the protective conductor
- Measurement of protective conductor current with current clamp transformer as accessory
- Measurement of productive conductor and insulation resistance per DIN EN 50678 and DIN EN 50699 with PROFITEST MF / PROFITEST MXTRA
- Tripping test with nominal residual current and measurement of time to trip with the PROFITEST MF / PROFITEST MXTRA
- Evaluation and documentation of the individual test steps with the PROFITEST MF / PROFITEST MXTRA
- For testing portable safety switches used on constructions sites, by fire department and in the field of disaster control



Application

According to DIN VDE 0661, portable protective devices are circuit breakers which can be connected between power consuming devices and permanently installed electrical outlets by means of standardized plug-and-socket devices. They offer the increased levels of protection provided by protective measures utilized in electrical systems for the prevention of dangerous shock current as defined in DIN VDE 0100-410. These portable protective devices serve to protect persons from electrical accidents in the low-voltage range from 130 to 1000 V, and consequently have to be suitable for commercial use.

The following faults can be simulated with regard to mains supply power to the PRCD:

- Wire reversals
- Failure of individual conductors (undervoltage detection)
- Interference voltage on the protective conductor
 - a) By applying interference voltage by means of a test adapter (switch position **PE-U_{EXT}**) and test instrument with a $I_K \geq 1.6 \text{ mA}$ at U_{ISO} or
 - b) By touching the ON key of the single-phase PRCD with the probe
- Increased protective conductor resistance R_{PE} high

The evaluation of the PRCD's reaction to each respective fault is strictly visual:

- PRCD active or inactive (signal LED at PRCD)
- Fault indication by means of LEDs on the test adapter

The following functions are possible after connecting the PROFITEST MF / PROFITEST MXTRA test instrument to the test adapter:

- There are three preset test sequences:
 - PRCD-S (single-phase)
 - PRCD-K (single-phase)
 - PRCD-S (3-phase)
- The test instrument runs through all test steps semi-automatically:

Single-phase PRCDs:	PRCD-S: 11 test steps
	PRCD-K: 4 test steps
3-phase PRCDs:	PRCD-S: 18 test steps
- Each test step is assessed and evaluated by the user (go/no-go) for subsequent documentation.
- Measurement of the PRCD's protective conductor resistance using the test instrument's R_{IO} function.
- Measurement of the PRCD's insulation resistance using the test instrument's R_{INS} function
- Tripping test with nominal residual current using the test instrument's I_F function
- Measurement of time to trip using the test instrument's Δt_N function
- Varistor test for PRCD-K: measurement via ISO ramp
- Interference voltage on the protective conductor

Measuring Protective Conductor Current

Protective conductor current or bias current may result in premature tripping of PRCDs.

For this reason, the protective conductor is led out of the housing as a loop between the surface mount sockets. This makes it pos-

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sible to measure possible protective conductor current with the help of the **METRACLIP 61** current clamp transformer as an accessory.

Simulation of "Interference Voltage in the Protective Conductor" with Probe

The probe socket on the PRCD adapter is connected to the phase conductor (L) of the power supply network via a series resistor (safety impedance) with a value of 1 MΩ using the test adapter's earthing contact plug to this end.

The internal protective circuit limits the touch current at the probe socket to less than the maximum permissible touch current of 0.5 mA in accordance with DIN EN 61010-1.

Execution of this test results in maximum touch current of:

$$I_B [A] = \frac{U_{\text{Mains (L-PE)}} [V]}{1 \text{ M}\Omega}$$

Applicable Regulations and Standards

IEC 61010-1/EN 61010-1/VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use – General requirements
EN 60529 VDE 0470, part 1	Test instruments and test procedures Degrees of protection provided by enclosures (IP code)

Characteristic Values

Measurement with **METRACLIP 61** as accessory

Protective Conductor Current Measurement

Measuring range: 0 ... 30 mA AC

Measurements with **PROFITEST MF / PROFITEST MXTRA** as accessory:

Protective conductor measurement

Measuring range: 0.1 Ω ... 6 Ω, see technical data on R_{LO} function of the **PROFITEST MF / PROFITEST MXTRA**

Insulation measurement

Measuring range: 50 kΩ ... 500 MΩ, see technical data on R_{ISO} function of the **PROFITEST MF / PROFITEST MXTRA**

Connections

Test outlets

Earthing contact (SCHUKO®) 1P+N+PE, 16 A, 230 V
CEE 3P+N+PE 16 A 400 V

Test Plug

Earthing contact (SCHUKO®) 1P+N+PE, 16 A, 230 V
CEE 3P+N+PE 16 A 400 V

Probe connection

Connector socket 2 mm with 1 MΩ safety impedance (design: 5 × 200 kΩ in series) as series resistor to conductor L at the connection of the earthing contact plug

Touch current limited to max. 0.5 mA in accordance with **DIN EN 61010-1** if the device is used for its intended purpose

Power Supply

Nominal line voltage	230/400 V 50 Hz
Mains connection	Earthing contact (SCHUKO®) plug: 230 V 1P+N+PE 16 A or CEE plug: 230/400 V 3P+N+PE 16 A
Throughput rating	Earthing contact (SCHUKO®) 10 VA CEE: 30 VA
Power consumption	Earthing contact (SCHUKO®) < 2 VA CEE: < 4 VA

Electrical Safety

Measuring category	300 V CAT II
Pollution degree	2
Fuse links	5 × FF315 mA/500 V

Ambient Conditions

Operating temperature	–5 ... + 50 °C
Storage temperature	–20 ... + 60 °C
Relative humidity	Max. 75%, no condensation allowed

Mechanical Design

Test adapter protection	IP 40 per DIN VDE 0470, part 1, connections: IP 20
Dimensions (W x H x D)	Housing: approx. 24 × 17.5 × 11 cm (without connector cable, with surface mount sockets) Mains connector cable length with plug: Earth contact/CEE: approx. 97/100 cm Connector cable length with test plug: Earth contact/CEE to PRCD: approx. 57/60 cm
Weight	approx. 2.4 kg (with connector cable)

Scope of Delivery

- 1 Test adapter
- 1 Probe cable with plug-in test probe
- 1 Set of operating instructions



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Sample Applications

Tripping test for a connected single-phase PRCD with the help of the included probe



Measurement of protective conductor current for a connected PRCD using the METRACLIP 61 current transformer clamp as an accessory



Report generation, protective conductor resistance and insulation resistance measurements with the help of the PROFITEST MF / PROFITEST MXTRA as an accessory



Accessories

SORTIMO L-BOXX GM (Z503D)



Plastic system case, outside dimensions:
W x H x D:
450 x 255 x 355 mm

Z701E foam insert for adapter and accessories must be ordered separately.

PRCD-Adapter-Case (Z512R)



Aluminum case, outside dimensions:
W x H x D:
500 x 165 x 370 mm

Including foam divider to keep the adapter in place

Additional space in the cover for operating instructions, etc.

Sample content (case is supplied without content)

METRACLIP 61 (M311D)



Digital clamp meter (leakage current clamp) 1 mA... 300 A AC

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Order Information

Description	Type	Article Number
Test adapter for testing portable safety switches (types PRCD-K and PRCD-S) with the help of the PROFITEST MF / PROFITEST MXTRA test instrument (not included)	PROFITEST PRCD PRO	M512S
Accessories		
Plastic system case	SORTIMO L-BOXX GM	Z503D
Foam insert with compartment for test adapter	Foam SORTIMO L-BOXX adapter	Z701E
PRCD adapter case printed, with compartments for PROFITEST PRCD and test adapter AT16-DI/AT32-DI	PRCD adapter case	Z512R
Digital clamp meter (leakage-current clamp), 1 mA ... 300 A AC, including 2 installed button-cell batteries, operating instructions and pouch	METRACLIP 61	M311D
Accessories (see data sheet 3-349-646-03 / 3-447-158-03)		
Universal protective measures test instrument per EN 61557 Part 1+2+3+4+5+6+7+10 with integrated memory and insulation measurement up to 1000 V as well as additional tripping test for AC/DC sensitive RCDs, loop impedance measurement as well as selective earth measurement with current clamps as optional accessories, testing of insulation monitoring devices (IMDs) and RCMs and e-mobility test, Bluetooth interface, with DAkkS calibration certificate and IZYTRONIQ BUSINESS Starter + context-sensitive, high-resolution color graphic display	PROFITEST MXTRA IQ PROFITEST MF XTRA PROFITEST MF TECH	M535D M535H M535K

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