Operating Instructions

GOSSEN METRAWATT
GMC-INSTRUMENTS GROUP

PROFITEST | EMOBILITY

Adapter for Standards-Compliant Testing of Single and 3-Phase, Mode 2 and 3 Charging Cables

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1 Safety Instructions

Read and follow these instructions carefully and completely in order to ensure safe and proper use.
Read the operating instructions for the respective test instrument as well, in particular the sections concerning the $R_{PE,\ R}$ISO and time-to-trip measurements, as well as the tripping test.

General

- Measurements/tests may only be performed by a qualified electrician, or under the supervision and direction of a qualified electrician. The user must be instructed by a qualified electrician concerning performance and evaluation of the tests/measurements.
- Observe and comply with all safety regulations which are applicable for your work environment.
- Wear suitable and appropriate personal protective equipment (PPE) whenever working with the instrument.

Handling

- The instruments and accessories of Gossen Metrawatt GmbH are designed such as to ensure optimum compatibility with the Gossen Metrawatt GmbH products that are expressly provided for them. Unless otherwise expressly confirmed in writing by Gossen Metrawatt GmbH, they are not intended and suited for use with other products.
- Use the instrument in undamaged condition only.
  Inspect the instrument before use. Pay particular attention to damage, interrupted insulation or kinked cables.
  Also test the LEDs: if the LEDs are defective, voltage at the ICCB-IN1 sockets is no longer indicated.
- If the instrument doesn't function flawlessly, permanently remove it from operation and secure it against inadvertent use.
- If the instrument is damaged during use, for example if it's dropped, remove it from operation permanently and secure it against inadvertent use.
- If there are any signs of interior damage to the instrument or accessories (e.g. loose parts in the housing), permanently remove the instrument/accessories from operation and secure them against inadvertent use.
- Route cables in an orderly fashion, e.g. the mains power cable. Loose, disorderly cables result in unnecessary danger of tripping and falling.
- The instrument may only be used for the measurements/tests described in the documentation for the instrument.
- The instrument may only be connected to electrical systems with a maximum of 230/400 V which comply with applicable safety regulations (e.g. IEC 60346, VDE 0100) and are protected with a fuse or circuit breaker with a maximum rating of 16 A.
- The test adapter may only be used for testing mode 2 and 3 charging cables.
- No power consuming devices may be connected to any of the sockets.
- Measurements within electrical systems are prohibited.
- Observe the manufacturer's specifications for DUTs.

Operating Conditions

- Do not use the instrument and its accessories after long periods of storage under unfavorable conditions (e.g. humidity, dust or extreme temperature).
- Do not use the instrument and its accessories after extraordinary stressing due to transport.
- The instrument must not be exposed to direct sunlight.
- Only use the instrument and its accessories within the limits of the specified technical data and conditions (ambient conditions, IP protection code, measuring category etc.).

Measurement Cables and Establishing Contact

- Plugging in the measurement cables must not necessitate any undue force.
- Never touch conductive ends (e.g. of test probes).
- Do not touch the insulation measuring instrument's test probes during insulation resistance measurements!
- Fully unroll all measurement cables before starting a test/measurement. Never perform a test/measurement with the measurement cable rolled up.
- When using a test probe with coil cord: Grip the tip of the test probe firmly, for example if it has been inserted into a jack socket. Tensioning at the coil cord may otherwise cause the test probe to snap back resulting in possible injury.

Fuses

- The instrument may only be used as long as the fuses are in flawless condition. Defective fuses must be replaced.
- Never bridge the fuses. Never put the fuses out of operation.

2 Application

2.1 Intended Use / Use for Intended Purpose

The PROFITEST EMOBILITY is an adapter for standards-compliant testing of single and 3-phase, mode 2 and 3 charging cables with simulation of faults in accordance with DIN EN 50678 VDE 0701 / DIN EN 50699 VDE 0702 and per manufacturer's specifications.

Some measurements/tests can be performed with the adapter only, others require a compatible test instrument or accessory.

Test Adapter

The following faults can be simulated using the test adapter with mains supply to a charging cable:

- Interruption of individual conductors (undervoltage detection)
- Reversed wires
- PE to phase
  (Interference voltage in the protective conductor due to connection of the phase conductor to the protective conductor)

Evaluation of the charging cable's reaction to each fault is strictly visual in this case via the ICCB indicator lamp or the LEDs at the test adapter.

Test Adapter + Test Instrument

The following additional measurements/tests are possible when a compatible test instrument (see below) is connected:

- Protective conductor resistance measurement of the charging cable
- Insulation resistance measurement of the charging cable
- RCD tripping test at the ICCB with nominal residual current
  (not possible with SECUTEST ST PRO.)
- Measurement of time to trip of the RCD at the ICCB
- Guided test sequences (device-specific)
  (not possible with PROFITEST MXTRA and PROFITEST MTECH+)

Compatible test instruments:
- PROFITEST MF XTRA (M534H)
- PROFITEST MF XTRA (LEMONGREEN) (M534Y)
- PROFITEST MF TECH (M534K; M534X)
- PROFITEST MXTRA (M520P; M522P)
- PROFITEST MXTRA IQ (M534M; M534D)
- PROFITEST MTECH+ (M520R; M522R)
- PROFITEST MTECH+ IQ (M534L; M534B)
- PROFITEST PRIME (M506A; M516A)
- PROFITEST PRIME AC (M506C; M516C)
- SECUTEST ST PRO (M707B)

Test Adapter + Accessories

Further measurements/tests can be performed when special accessories (see below) are connected.
- Measurement of protective conductor current with current clamp transformer METRACLIP 61
- Measurement of resistance coding with standards-compliant resistance measuring instrument (not possible with SECUTEST ST PRO).

Safety of the operator, as well as that of the test adapter, is only assured when it's used for its intended purpose.

2.2 Use for Other than Intended Purpose

Using the instrument for any purposes other than those described in these instrument operating instructions constitutes improper use. Use for Other than Intended Purpose may lead to unpredictable damage!

2.3 Liability and Guarantee

Liability and guarantee granted by Gossen Metrawatt GmbH complies with the applicable contractual and mandatory legal regulations.

3 Documentation

3.1 Information Concerning these Instructions

Read these instructions attentively and carefully. They contain all necessary information for safe use of the instrument. Comply with them in order to protect yourself and others from injury, and to avoid damaging the instrument.

The latest version of these instructions is available on our website:

https://www.gmc-instruments.de/en/services/download-center/

Errors and Suggestions for Improvement

These instructions have been prepared with utmost care in order to ensure correctness and completeness. Unfortunately, errors can never be entirely avoided. Continuous improvement is part of our quality goal, so we always appreciate your comments and suggestions.

Gender Equality

For better readability, only the masculine form is used in these instructions in a grammatically impartial sense. The feminine and diverse forms are of course always implied as well.

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3.2 Meanings of Symbols in the Operating Instructions

LED L1, L2, L3, N or PE at test adapter

 LED on  LED off

4 The Instrument

4.1 Scope of Delivery

Please check the scope of delivery for completeness and intactness.

1 Test adapter PROFITEST EMOBILITY (M513R) in case
1 Mains power cable
1 Set of operating instructions (this document)

4.2 Optional Accessories

Some measurements/tests necessitate optional accessories:

- METRACLIP 61 (M311D)
  Digital current clamp
- Adapter Connecting-Cable-16 (Z570B)
- Adapter Connecting-Cable-32 (Z570c)
- standards-compliant resistance measuring instrument

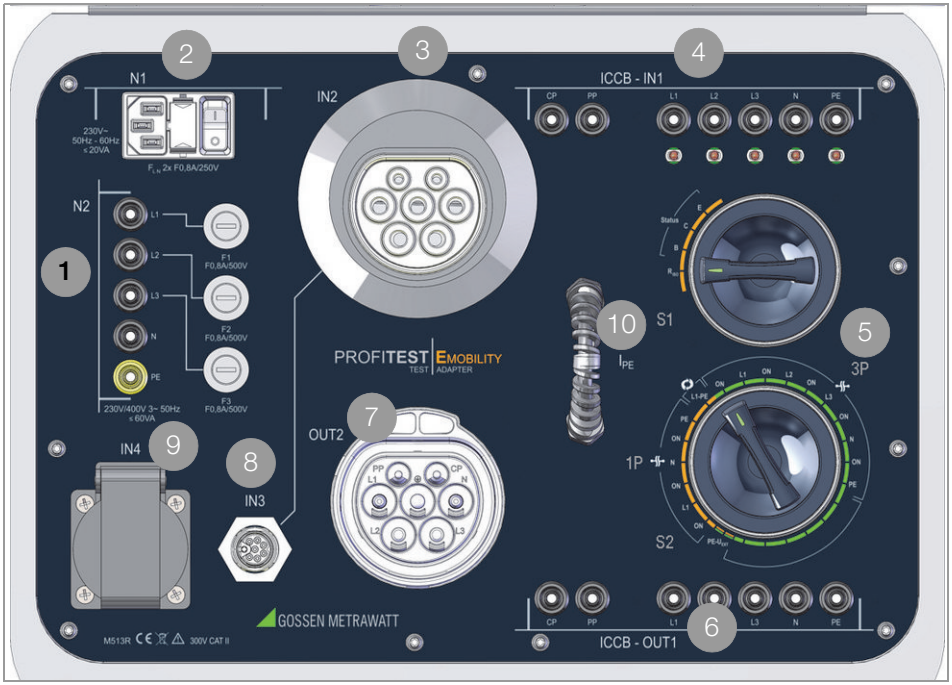
Additional adapters and additional information on accessories are available in the data sheet of the PROFITEST EMOBILITY.

For information on the current compatible test instruments please refer to the data sheets of the respective test instruments. You can find the datasheets on our website.

4.3 Symbols on the Instrument

300 V CAT II	Maximum permissible voltage and measuring category between connections and ground
	Warning concerning a point of danger (Attention, observe documentation!)
	Indicates EC conformity
	The device may not be disposed of with household trash. For further information see “Disposal and Environmental Protection” on page 21.

4.4 Connections Overview



1 **N2:** Input sockets for 3-phase mains connection with the help of a CEE adapter (16 A, 32 A with five 4 mm safety sockets) and mains connection fuses F1, F2 and F3 for the 3 phases

2 **N1:** Inlet plug for mains connection, mains connection fuses F_{LN} for L and N

3 **IN2:** Socket (MENNEKES) for connecting a 3-phase, mode 3 charging cable (charging station end) via a type 2 charging plug

4 **ICCB-IN1*:** Input sockets wired parallel to connection sockets IN2, IN3 and IN4 for connecting a test instrument for protective conductor and insulation measurement

5 **Rotary selector switches (S1 and S2):** See description on page 3.

6 **ICCB-OUT1*:** Charging cable output sockets wired parallel to OUT2 for connecting a test instrument for protective conductor and insulation measurement

7 **OUT2:** Socket (MENNEKES) for connecting a mode 2 charging cable (vehicle end) via a type 2 charging plug

8 **IN3:** Input socket in order to be able to connect a charging cable with specific plug per IEC 62196 or CEE plug (charging station end) via adapter

9 **IN4:** Earthing contact input socket for connecting the supply plug of a single-phase, mode 2 charging cable (charging station end)

10 I_{PE}: Loop for measuring protective conductor current with a current clamp transformer

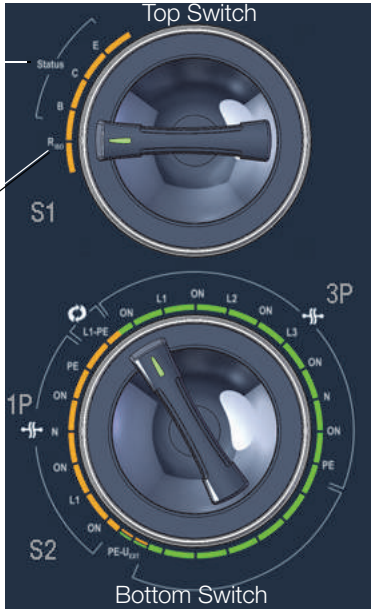
* ICCB = **i**n-**c**able **c**ontrol **b**ox: control box inside the mode 2 charging cable

4.5 Operating Overview

Mains connect, mode 2 charging cable
Status B, C, E
– for fault simulation
– for R_{PE} measurement
– for tripping test with I_{nom}
and measurement of time to trip

Mains disconnect, mode 2/3 charging cable
– for R_{ISO} measurement

Fault Selection
Interrupted phase
Reversed wires



Orange switch positions: Measurements/tests at single-phase, mode 2/3 cables
Green switch positions: Measurements/tests at 3-phase, mode 2/3 cables

4.6 Relevant Standards

The test adapter has been manufactured and tested in accordance with the following safety regulations:

DIN EN 60529	Degrees of protection provided by enclosures (IP code)
DIN EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
DIN EN IEC 61557-2	Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures
DIN EN 61557-4	Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC– Equipment for testing, measuring or monitoring of protective measures– Part 4: Resistance of earth conductors, protective conductors and equipotential bonding conductors
DIN EN 61557-16	Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 16: Devices for testing the effectiveness of protective measures of electrical devices and/or electrical medical devices
DIN EN IEC 61851-1	Electric vehicle conductive charging systems Part 1: General requirements

4.7 Technical Data

Terminals – test outlets

Earth contact	IN4: 1P+N+PE, 0.8 A, 230 V
3P+N+PE	IN2/OUT2: 0.8 A, 400 V

Power Supply

Nominal line voltage	230/400 V 50 Hz
Mains connection	Single-phase via recessed power receptacle: 230 V 1P+N+PE 16 A or 3-phase via ISO adapter: 230/400 V 3P+N+PE 16 A
Throughput rating	Earth contact: 20 VA CEE: 60 VA
Power consumption	Earth contact: < 3 VA CEE: < 6 VA

Electrical Safety

Measuring category	300 V CAT II
Pollution degree	2
Fuse links	Supply network: Single-phase (N1): FLN: 2 × F0,8A/ 250V, 5 × 20 mm 3-phase (N2): F1, F2 and F3: 3 ea. F0.8A/500V, 6.3 x 32 mm

Ambient Conditions

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

Mechanical Design

Protection	Housing: IP40 (protection against ingress of solid foreign objects: ≥ 1.0 mm diameter, protection against ingress of water: not protected) Terminals IP20 (protection against ingress of solid foreign objects: ≥ 12.50 mm diameter, protection against ingress of water: not protected) per DIN EN 60529 / IEC 60529
Dimensions	Housing (W × H × D): Approx. 401 × 307 × 173 mm (without connector cable, with surface mount sockets)
Weight	Approx. 4.6 kg (incl. connector cable)

4.8 Characteristic Values

Measurement/test with METRACLIP 61 current clamp:

Protective conductor current measurement	Measuring range: 0 mA … 30 mA AC

Measurements/tests with compatible test instrument:

Protective conductor measurement	see technical data on R_{LO} function of the test instrument
Insulation measurement	see technical data on R_{ISO} function of the test instrument

5 Initial Startup

See the connections overview for all connection variants on page 7.

5.1 Mains Connection

The test adapter must be connected to the mains for fault simulation, as well as for indication by means of the phase LEDs.

Attention!
Only one mains power cable (single or 3-phase) may be connected to the test adapter at any given time.

Attention!
Despite isolation of mains connections N1 and N2, do not touch open inlet plug N1 in the case of CEE connection at N2.

- Connect the test adapter to the mains via the single or 3-phase mains power cable (with the help of the Z570B adapter for 3-phase 16 A mains or the Z570C adapter for 3-phase 32 A connection).
  Refer to the characteristic values on page 9 for nominal mains values.

Attention!
Single-Phase Mains Connection
For correct phase connection, the earthing contact plug must inserted into the mains outlet such that only the **ICCB-IN1 L1** LED lights up.
The **ICCB-IN1** PE LED lights up as well in the case of polarity reversal.

5.2 Testing the LEDs

Single-Phase Mains Connection

- Insert the earthing contact plug into the earthing contact mains outlet, remove it, rotate it 180° and insert it again.

When connected with correct polarity, only the **ICCB-IN1 L1** LED may light up. When connected with incorrect polarity or if rotated 180°, the **ICCB-IN1 L1** and **ICCB-IN1 PE** LEDs light up simultaneously.

3-Phase Mains Connection

- Connect socket N2 to the 3-phase 16 A mains with the help of the Z570B adapter (or the Z570C adapter for 3-phase 32 A connection).

The **ICCB-IN1 L1**, **L2** and **L3** LEDs must light up.

5.3 Connecting the Mode 2/3 Charging Cable

The respective charging cable must be connected to the test adapter for all measurements/tests.

Connecting a Single-Phase, Mode 2 Charging Cable

- Insert the power supply plug of the mode 2 charging cable into earthing contact outlet **IN4**, or into **IN3** at the test adapter via an adapter.
- Insert the test object's plug at the vehicle end into test socket **OUT2**.

Connecting a 3-Phase, Mode 2/3 Charging Cable

- Insert the plug at the power supply end of the test object into the outlet of the adapter connected to **IN3**, or into **IN2** (mode 3 charging cable).
- Insert the test object's plug at the vehicle end into test socket **OUT2**.

6 Fault Simulation

Mode 2 and 3 charging cables can be tested with the test adapter with simulation of faults.

Attention!
In any case, comply with the manufacturer's recommendations concerning measurements/tests to be conducted in accordance with DGUV, regulation 3.

The following faults can be simulated for mains power supply to a mode 2 charging cable:

- Reversed wires
- Interruption of individual conductors (undervoltage detection)
- PE to phase (interference voltage in the protective conductor due to connection of the phase conductor to the protective conductor)

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

- ICCB active or inactive (indicator lamp on the ICCB)
- Fault indication by means of LEDs on the test adapter

6.1 Mode 2 Charging Cable (Single-phase)



➪ Switch mains power on by turning the top rotary selector switch (S1) to the **Status C** position.

6.1.1 Simulation of Reversed Wires

➪ Turn the bottom rotary selector switch (S2) to the **L1-PE** position in the orange area for single-phase wire reversal.

Instead of the **L1 LED**, the **PE LED** must light up.

Step	Rotary switch	Test Adapter L1 LED	Test Adapter PE LED	ICCB LED	Action
7	L1-PE	○	☀	○	The test object's correct reaction to the simulated fault can be found in the manufacturer's operating instructions.

6.1.2 Simulated Interruption

➪ Start with the bottom rotary selector switch (S2) in the first **ON** position in the orange area for single-phase interruption.

➪ Switch through the positions, one after the other, in the clockwise direction (table from top to bottom):

Step	Rotary switch	Test Adapter LED L1	Test Adapter PE LED	ICCB LED	Action
1	ON	☀	○	☀	The test object's correct reaction to the simulated fault can be found in the manufacturer's operating instructions.
2	L1	○	○	○	
3	ON	☀	○	☀	
4	N	☀	○	○	
5	ON	☀	○	☀	
6	PE	☀	○	○	

6.1.3 Simulation of PE to Phase (PE-U_{EXT})

➪ Set the bottom rotary selector switch (S2) to the **PE-U_{EXT}** position.

Interference voltage is switched to PE with touch protection.

The **L1 LED** and the **PE LED** light up.

Step	Rotary switch	Test Adapter L1 LED	Test Adapter PE LED	ICCB LED	Action
8	PE-U_{EXT}	☀	☀	○	The test object's correct reaction to the simulated fault can be found in the manufacturer's operating instructions.

6.2 Mode 2 (3-phase) Charging Cable



➪ Switch mains voltage on by turning the top rotary selector switch (S1) to the **Status C** position (system state: vehicle ready for charging).

6.2.1 Simulated Interruption

➪ Start with the bottom rotary selector switch (S2) in the first **ON** position in the green area for single-phase interruption.

➪ Switch through the positions, one after the other, in the clockwise direction (table from top to bottom). Conductor interruption using a 3-phase, mode 3 charging cable as an example:

Note

Tripping performance may deviate from this example in the case of ICCBs from other manufacturers – adhere to the manufacturer's test instructions!

Step	Rotary switch	Test Adapter L1 LED	LED L2	LED L3	N LED	PE LED	ICCB LED	Action
1	ON	☀	☀	☀	○	○	☀	The test object's correct reaction to the simulated fault can be found in the manufacturer's operating instructions.
2	L1	○	☀	☀	○	○	○	
3	ON	☀	☀	☀	○	○	☀	
4	L2	☀	○	☀	○	○	○	
5	ON	☀	☀	☀	○	○	☀	
6	L3	☀	☀	○	○	○	○	
7	ON	☀	☀	☀	○	○	☀	
8	N	☀	☀	☀	☀	○	○	Regarding step 8: The N LED also lights up due to star connection, although N is interrupted!
9	ON	☀	☀	☀	○	○	☀	
10	PE	☀	☀	☀	○	○	○	

6.2.2 Simulation of PE to Phase (PE-U_{EXT})

➪ Set the bottom rotary selector switch (S2) to the **PE-U_{EXT}** position.

Step	Rotary switch	Test Adapter L1 LED	LED L2	LED L3	N LED	PE LED	ICCB-IN1 LED	Action
11	PE-U_{EXT}	☀	☀	☀	○	☀	○	The test object's correct reaction to the simulated fault can be found in the manufacturer's operating instructions.

➪ Step 18: see section "Protective Conductor Current Measurement (IPE) at Mode 2 Charging Cable" on page 15

7 Measurements/Tests with Test Instruments

7.1 General Information

When connecting a compatible test instrument, additional measurements/tests are possible which are described in this chapter.

Important information for the performance of measurements/tests

Attention!
When turning the switch, pay attention to the exact snap-in position and the corresponding optical signals of the LEDs, as described in these operating instructions.

- The test adapter must remain connected to the mains for protective conductor measurements (R_{PE}) at mode 2 charging cables by means of the respective test instrument.
- The test adapter can remain connected to the mains for protective conductor measurements conducted at test objects whose protective conductor is not switched, as well as for insulation measurements (Riso) with the respective test instrument.

7.2 Measurement of Protective Conductor Resistance (R_{LO})

7.2.1 Mode 2 Charging Cable

As opposed to the usual default setting for low-resistance measurements, the device under test does not have to be disconnected from all sources of voltage in this case. Both rotary selector switches (S1 and S2) have to be set to the **ON** and the **Status C** positions, in order to be able to activate the test object and switch the protective conductor through. Prior to a protective conductor resistance measurement, an offset measurement must be carried out (the offset value of the test adapter must be taken into account during the test).

Measurement is carried out between **ICCB-OUT1-PE a**nd **OUT2-PE**.

- ⇨ Connect the test object as described in chapter 5.3.
- ⇨ Connect the test object to the **ICCB-IN1 PE** and **ICCB-OUT1 PE** sockets:
  PROFITEST MF XTRA, PROFITEST MF TECH, PROFITEST MXTRA, PROFITEST MXTRA IQ, PROFITEST MTECH+, PROFITEST MTECH+ IQ: 2-pole measuring adapter
  PROFITEST PRIME, PROFITEST PRIME AC: probes L(1) and PE(3)
  SECUTEST ST PRO: 2-pole measurement with test probes P1 and P2 (P1-P2)
- ⇨ Switch the test object's ICCB on.
- ⇨ Perform the measurement as described in the operating instructions for the respective test instrument.

7.2.2 Mode 3 Charging Cable

- ⇨ The rotary selector switch must be set to the R_{ISO} position.
- ⇨ Connect the test object as described in chapter 5.3.
- ⇨ Connect the test object to the **ICCB-IN1 PE** and **ICCB-OUT1 PE** sockets:
  PROFITEST MF XTRA, PROFITEST MF TECH, PROFITEST MXTRA, PROFITEST MXTRA IQ, PROFITEST MTECH+, PROFITEST MTECH+ IQ: 2-pole measuring adapter
  PROFITEST PRIME, PROFITEST PRIME AC: probes L(1) and PE(3)
  SECUTEST ST PRO: 2-pole measurement with test probes P1 and P2 (P1-P2)
- ⇨ Perform the measurement as described in the operating instructions for the respective test instrument.

7.3 Measuring Insulation Resistance (R_{ISO})

Attention!
Insulation resistance may only be measured at voltage-free devices! The upper-hand rotary selector switch must be set to the mains disconnect position: R_{INS}

- ⇨ Connect the test instrument to the **ICCB-IN1** socket for the mains-end of the cable and the **ICCB-OUT1** socket for the output end of the cable of the device under test:
  PROFITEST MF XTRA, PROFITEST MF TECH, PROFITEST MXTRA, PROFITEST MXTRA IQ, PROFITEST MTECH+, PROFITEST MTECH+ IQ: 2-pole measuring adapter
  PROFITEST PRIME, PROFITEST PRIME AC: probes L(1) and PE(3)

SECUTEST ST PRO: 2-pole measurement with test probes P1 and P2 (P1-P2)

➪ Connect the test object as described in chapter 5.3.

Mode 2 Charging Cable:

➪ Connect the test instrument to the **ICCB-IN1/ICCB-OUT1** L1 or N and PE sockets, one after the other:
PROFITEST MF XTRA, PROFITEST MF TECH, PROFITEST MXTRA, PROFITEST MXTRA IQ, PROFITEST MTECH+, PROFITEST MTECH+ IQ: 2-pole measuring adapter
PROFITEST PRIME, PROFITEST PRIME AC: probes L(1) and PE(3)
SECUTEST ST PRO: 2-pole measurement with test probes P1 and P2 (P1-P2)

➪ Perform the measurement as described in the operating instructions for the respective test instrument.

Mode 3 Charging Cable

➪ Connect the respective test instrument to the **ICCB-IN1/ICCB-OUT1** L1, L2, L3, N and PE sockets, one after the other:
PROFITEST MF XTRA, PROFITEST MF TECH, PROFITEST MXTRA, PROFITEST MXTRA IQ, PROFITEST MTECH+, PROFITEST MTECH+ IQ: 2-pole measuring adapter
PROFITEST PRIME, PROFITEST PRIME AC: probes L(1) and PE(3)
SECUTEST ST PRO: 2-pole measurement with test probes P1 and P2 (P1-P2)

7.4 Tripping Test with Nominal Residual Current and Measurement of Time to Trip at Mode 2 Charging Cable (not possible with SECUTEST ST PRO)

Note

If you operate your test adapter at an electrical system with a 30 mA breaker, the mains RCD may be tripped during the tripping test (tripping current or time to trip) instead of the charging cable's ICCB. In this case the **ICCB-IN1 L1** LED goes out.

We recommend the following procedure in order to prevent an upstream RCD (selective RCD as well) from tripping, and to ensure that actual tripping current or correct time to trip is measured:

➪ Connect the respective test instrument with pole (L1) to the voltage conducting pole depending on the earthing contact plug wiring of charging cable L1, N (**ICCB-OUT1**), and with pole (PE) to N (**ICCB-IN1**). (observe limit values and manufacturer's specifications):
PROFITEST MF XTRA, PROFITEST MF TECH, PROFITEST MXTRA, PROFITEST MXTRA IQ, PROFITEST MTECH+, PROFITEST MTECH+ IQ: 2-pole measuring adapter
PROFITEST PRIME, PROFITEST PRIME AC: probes L(1) and PE(3)

➪ Refer to the operating instructions for the respective test instrument regarding performance of the measurement.

7.5 Guided Test Sequences (not possible with PROFITEST MXTRA and PROFITEST MTECH+)

Test sequences are available for the test instruments. The test instrument runs through all test steps semi-automatically.

Each test step is evaluated and assessed by the user (go/no-go) for later documentation.

It depends on the respective test instrument whether or not and which test sequences are available.

The test sequences are provided free of charge for download from the myGMC portal, however, it is the responsibility of the user to import them into the test instrument.

- ➪ Create a myGMC account and register your test instrument (both free of charge):

https://www.gossenmetrawatt.de/services/mygmc/

- ➪ Download the test sequence(s).
- ➪ Transfer the test sequence(s) to your test instrument. Complete information can be found in the product documentation for the respective test instrument.
- ➪ Perform the test sequence with the test instrument and the test adapter. Detailed information on the test sequences can be found in the product documentation of the respective test instrument.

8 Protective Conductor Current Measurement (I_{PE}) at Mode 2 Charging Cable

Protective conductor current or bias current may result in premature tripping of RCDs used in ICCBs.

For this reason, the protective conductor is led out of the housing as a loop between surface mount sockets 4 and 6. This makes it possible to measure any protective conductor current with the help of a current clamp transformer.

You therefore require an additional current clamp transformer (e.g. METRACLIP 61).

- ➪ Connect the test object as described in chapter 5.3.
- ➪ Switch mains voltage on by turning the top rotary selector switch (S1) to the **Status C** position (system state: vehicle ready for charging).
- ➪ Turn the bottom rotary selector switch (S2) to the first **ON** position in the orange area for single-phase interruption.
- ➪ Close the jaws of the current clamp transformer around the external protective conductor loop I_{PE}.
- ➪ Read the measured value for protective conductor current at the current clamp transformer.
  Protective conductor current should not exceed 3.5 mA.

9 Measuring R_C (Testing of Resistance Coding) (not possible with SECUTEST ST PRO)

Testing of specified resistance value R_C for maximum current-carrying capacity of the mode 2/3 charging cable per DIN EN 61851-1 (VDE 0122-1)

Additionally, you require a standards-compliant resistance measuring instrument.

- ➪ Connect the test object as described in chapter 5.3.
- ➪ Measure resistance between the PP and PE sockets at **ICCB-OUT1** with a standards-compliant measuring instrument.
- ➪ Compare the measured resistance value with the value indicated in the table below (Table B3 off DIN EN 61851-1).

Note

Observe the maximum current-carrying capacity specified on the cable.

Vehicle state	Function Test	Result
Testing of resistance coding for vehicle inlets and vehicle connectors per IEC 61851 Table B.3	Resistance measurement with multimeter or test instrument	13 A charging cable, 1.5 k Ω 20 A charging cable, 680 Ω 32 A charging cable, 220 Ω 63 A charging cable, 100 Ω

10 Storage and Transport

Attention!

Improper Storage

Damage to the product and measuring error due to environmental influences

Store the instrument in a protected location and only within the limits of permissible ambient conditions. The respective ambient conditions (temperature, humidity etc.) can be found under “Technical Data” on page 9.

Note

If the test adapter has not been used for a long period of time, the switches may demonstrate increased contact resistance depending upon storage conditions.

If this is the case, actuate the switches several times.

Attention!

Improper Transport

Damage to the product and measuring error

Transport the instrument only within the limits of permissible ambient conditions (temperature, humidity etc.). See “Technical Data” on page 9.

11 Maintenance

11.1 Cleaning of Housing

Attention!
Life endangering due to electric shock!
The test adapter is operated with electric power. Therefore there is a general risk of electric shock which can be fatal or cause severe injury.
– The test adapter must be voltage-free both before and during cleaning. Switch the test adapter off and disconnect it from the mains power supply.
– The test adapter may not be connected to a measuring circuit before and during cleaning.
– Never immerse the test adapter in water or other liquids.
– Never touch the test adapter to with wet or moist hands.

No special maintenance is required. Keep outside surfaces clean and dry.

Attention!
Unsuitable cleaning agents such as aggressive or abrasive cleansers result in damage to the test adapter.
– Use a cloth for cleaning which has been slightly dampened with water.
– Avoid the use of cleansers, abrasives or solvents.

11.2 Technical Safety Inspections Testing per DGUV Regulation 3

Subject your test adapter to technical safety inspections at regular intervals.

The test adapter is designed in accordance with IEC 61010 as a protection category I and II test instrument.

Testing of the protective conductor, insulation resistance and touch current is described in the following subsections.

11.2.1 Testing of Protective Conductor Resistance R_{PE}

Test Adapter Contacting, Single-Phase (230 V)

Protective conductor resistance is tested between the PE contact at the mains plug (inlet plug N1) and PE contacts ICCB IN1 through IN4.

Testing the Single-Phase Connection

➪ Turn the top rotary selector switch (S1) at the test adapter to the **Status C** position (system state: vehicle ready for charging).

With the exclusion of the exceptions specified in the following table, a protective conductor resistance R_{PE} of less than 2 Ω is permissible. This is due to the design of the test adapter.

Step	Rotary switch	Test Adapter L1 LED	Test Adapter PE LED	ICCB LED	Protective Conductor Resistance R PE, Permissible
1	ON	☀	○	☀	< 2 W
2	L1	○	○	○	< 2 W
3	ON	☀	○	☀	< 2 W
4	N	☀	○	○	< 2 W
5	ON	☀	○	☀	< 2 W
6	PE	☀	○	○	> 30 MW
	↻				
7	L1-PE	○	☀	○	> 30 MW
8	PE-U_{EXT}	☀	☀	○	> 30 MW

Test Adapter Contacting, 3-Phase (400 V)

Protective conductor resistance is tested between the PE contact at mains connection N2 and the PE contact at ICCB-IN1 (parallel to IN2, IN3 and IN4).

Testing the 3-Phase Connection

- ➪ Turn the top rotary selector switch (S1) at the test adapter to the **Status C** position (system state: vehicle ready for charging).
- ➪ Turn the bottom rotary selector switch (S2) to each switch position*.

With the exclusion of the exceptions specified in the following table, a protective conductor resistance R_{PE} of less than 2 Ω is permissible. This is due to the design of the test adapter.

Step	Rotary switch	Protective Conductor Resistance R PE, Permissible
1	ON	< 2 W
2	L1	< 2 W
3	ON	< 2 W
4	L2	< 2 W
5	ON	< 2 W
6	L3	< 2 W
7	ON	< 2 W
8	N	< 2 W
9	ON	< 2 W
10	PE	> 30 MW
11	PE-U_{EXT}	> 30 MW

The PE connection between OUT1 and OUT2 must also be tested (< 2 Ω).

11.2.2 Testing Insulation Resistance

Testing is conducted in the respective switch positions for Status B, C or E and in the green ON position for 3-phase testing at short-circuited L-N or L1-L2-L3-N contacts (for earthing contact and CEE respectively)

- at mains connections N1 and N2
- at the power supply end of the test object, **ICCB-IN1**
- at the output end of the test object, **ICCB-OUT1**

in each case against PE.

The usual limit values apply.

11.2.3 Touch Current Measurement

Touch current measurement is conducted at the screw connections of the IN sockets (IN2, IN3 and IN4) with the standard limit values (I_B < 0,5 mA).

11.3 Fuse Replacement

The test adapter may only be operated with fuses in flawless condition. Damaged or defective fuses must be replaced immediately.

All fuses for neutral and phase conductors are accessible from the outside.

Attention!
Life endangering due to electric shock!
The test adapter is operated with electric power. Therefore there is a general risk of electric shock which can be fatal or cause severe injury.
– The test adapter must be voltage-free both before and during changing the fuse. Switch the test adapter off and disconnect it from the mains power supply.
– The test adapter may not be connected to a measuring circuit before and during cleaning.

Attention!
Only install fuses of a type that conforms to the details specified in the Technical Data, see page 9.
No other fuses may not be used in the test instrument.

F1, F2 and F3 (3-phase mains supply power system N2)

Required materials:

– A slotted screwdriver for opening the fuse compartment
– Replacement fuses in accordance with the details specified in the Technical Data on page 9.

➪ Open the respective fuse compartment. Insert the slotted screwdriver into the slot on the fuse compartment and turn it counterclockwise.
➪ Pull out the fuse cover as soon as it protrudes slightly from the housing.
➪ Remove the defective fuse from the fuse cover.
➪ Insert the new fuse into the fuse cover.
➪ Insert the fuse cover with the fuse back into the fuse compartment. The two tabs on the fuse cover must be inserted into the recesses in the housing.
➪ Insert the slotted screwdriver into the slot on the fuse compartment and turn it clockwise until the fuse compartment is closed.

F_{LN} (mains power supply system single-phase N1)

You require replacement fuses in accordance with the details specified in the Technical Data on page 9.

➪ Open the fuse compartment. Press together the plastic wings of the fuse link to this end and pull it up slightly.
➪ As soon as the fuse link protrudes a little bit, pull it out.
➪ Remove the defective fuses from the fuse link.
➪ Insert the new fuses into the fuse link.
➪ Insert the fuse link with the fuses into the fuse compartment. The tab on the fuse cover must be inserted into the recesses in the housing.
➪ Press down the fuse link until it snaps into place.

12 Repair

If your instrument requires repair, please contact our service department, see “Contact, Support and Service” on page 20.

Note

Loss of warranty and guarantee claims!
Unauthorized modification of the tester is prohibited. This also includes opening the meter.
If it can be ascertained that the tester 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.
If the guarantee seal is damaged or removed, all guarantee claims are rendered null and void.

The device may only be repaired or opened by authorized, qualified personnel who are familiar with the associated dangers.

Original replacement parts may only be installed by authorized, qualified personnel.

The instrument may not be placed back into operation until troubleshooting and repair have been performed, and calibration and dielectric strength have been tested and approved at our factory or by an authorized service center.

13 Contact, Support and Service

Gossen Metrawatt GmbH can be reached directly and simply – we have a single number for everything! Whether you require support or training, or have an individual inquiry, we can answer all of your questions here:

+49-911-8602-0

Monday to Thursday:	8 a.m. to 4 p.m.
Friday:	8 a.m. to 2 p.m.

Or contact us by e-mail at:
info@gossenmetrawatt.com

Do you prefer support by e-mail?

Measuring and Test Technology:
support@gossenmetrawatt.com

Industrial Measuring Technology:
support.industrie@gossenmetrawatt.com

Please contact GMC-I Service GmbH for repairs, replacement parts and calibration*:

+49-911-817718-0

service@gossenmetrawatt.com

www.gmci-service.com/en

Beuthener Str. 41
90471 Nürnberg
Germany

14 CE Declaration

The instrument fulfills all requirements of applicable EU directives and national regulations. We confirm this with the CE mark. The CE declaration can be found on our website:
https://www.gmc-instruments.de/en/services/download-center/

* DAkkS calibration laboratory per DIN EN ISO/IEC 17025 accredited by the Deutsche Akkreditierungsstelle GmbH under reference number D-K-15080-01-01.

15 Disposal and Environmental Protection

Proper disposal makes an important contribution to the protection of our environment and the conservation of natural resources.

Attention!
Environmental Damage
Improper disposal results in environmental damage.
Follow the instructions concerning return and disposal included in this section.

The following comments refer specifically to the legal situation in the Federal Republic of Germany. Owners or end users who are subject to other regulations must comply with the respective local requirements and implement them correctly on site. Further information can be obtained, for example, from the responsible authorities or the local distributor.

Waste Electrical Equipment, Electrical or Electronic Accessories and Waste Batteries (including rechargeable batteries)

Electrical equipment and batteries (including rechargeable batteries) contain valuable raw materials that can be recycled, as well as hazardous substances which can cause serious harm to human health and the environment, and they must be recycled and disposed of correctly.



The symbol at the left depicting a crossed-out garbage can on wheels refers to the legal obligation of the owner or end user (German electrical and electronic equipment act ElektroG and German battery act BattG) not to dispose of used electrical equipment and batteries with unsorted municipal waste ("household trash"). Waste batteries must be removed from the old device (where possible) without destroying them and the old device and the waste batteries must be disposed of separately. The battery type and its chemical composition are indicated on the battery's labelling. If the abbreviations "Pb" for lead, "Cd" for cadmium or "Hg" for mercury are included, the battery exceeds the limit value for the respective metal.

Please observe the owner's or end user's responsibility with regard to deleting personal data, as well as any other sensitive data, from old devices before disposal.

Old devices, electrical or electronic accessories and waste batteries (including rechargeable batteries) used in Germany can be returned free of charge to Gossen Metrawatt GmbH or the service provider responsible for their disposal in compliance with applicable regulations, in particular laws concerning packaging and hazardous goods. Waste batteries must be handed over in discharged state and/or with appropriate precautionary measures against short-circuiting. Further information regarding returns can be found on our website.

Packaging Materials

We recommend retaining the respective packaging materials for the case that you might require servicing or calibration in the future.

Attention!
Danger of Asphyxiation Resulting from Foils and Other Packaging Materials.
Children and other vulnerable persons may suffocate if they wrap themselves in packaging materials, or their components or foils, or if they pull them over their heads or swallow them. Keep packaging materials, as well as their components and foils, out of the reach of babies, children and other vulnerable persons.

In accordance with German packaging law (VerpackG), the user is obligated to correctly dispose of packaging and its components separately, and not together with unsorted municipal waste ("household trash").

Private end consumers can dispose of packaging free of charge at the responsible collection point. Packaging which is not subject to so-called system participation is returned to the appointed service provider. Further information regarding returns can be found on our website.

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