

# OPERATING INSTRUCTIONS

2/4.25

3-447-280-03



## PROFITEST H+E CABLE

TESTER FOR STANDARDS-COMPLIANT  
TESTING OF MODE 2 (IC-CPD) AND MODE 3  
CHARGING CABLES

---

**TABLE OF CONTENTS**


---


<b>1</b>	<b>Safety Instructions</b> .....	<b>4</b>
<b>2</b>	<b>Applications</b> .....	<b>6</b>
2.1	Intended Use / Use for Intended Purpose .....	6
2.2	Use for Other than Intended Purpose.....	6
2.3	Liability and Guarantee.....	6
<b>3</b>	<b>Documentation</b> .....	<b>7</b>
3.1	Information Concerning these Instructions.....	7
3.2	Identification of Warnings .....	7
3.3	Identifiers .....	8
3.4	Symbols in the Documentation .....	8
3.5	Definition of Terms .....	8
<b>4</b>	<b>Getting Started</b> .....	<b>9</b>
<b>5</b>	<b>The Instrument</b> .....	<b>10</b>
5.1	Scope of Delivery .....	10
5.2	Accessories .....	10
5.3	Instrument Overview .....	10
5.3.1	Front.....	10
5.3.2	Thermal printer.....	11
5.3.3	Symbols on the Instrument and the Included Accessories.....	11
5.4	Included Features .....	12
5.5	Relevant Standards.....	12
5.6	Technical Data .....	13
5.7	Characteristic Values.....	14
5.7.1	Protective conductor resistance $R_{PE}$ -Continuity, Mode 2 and Mode 3 Charging Cables.....	14
5.7.2	Insulation Resistance $R_{ISO}$ (single measurement), Mode 2 and Mode 3 Cables .....	14
5.7.3	RCD Time to Trip and Tripping Current, 230 V Single-Phase, Mode 2 Charging Cable.....	15
5.7.4	EV Charging Function Test, Mode 2 Cables.....	16
5.7.5	Resistance in PP Cable, Mode 3 Charging Cables .....	16
5.7.6	Voltage Measurement, Mode 2 and Mode 3 Charging Cables.....	17
5.7.7	Differential Leakage Current $I_{PE}$ – Protective Conductor Current (differential current measuring method), Mode 2 Cables .....	17
<b>6</b>	<b>Menu and Functions</b> .....	<b>18</b>
6.1	Function Keys and Icons.....	18
6.2	User Interface .....	19
<b>7</b>	<b>Operation</b> .....	<b>20</b>
7.1	Electrical Power Supply.....	20
7.2	Switching the Instrument On and Off.....	20
7.2.1	Switching the Instrument On .....	20
7.2.2	Switching the Instrument Off .....	20
7.3	Performing a Measurement .....	20
7.3.1	Preparation for a Mode 2 Measurement .....	20
7.3.2	Preparation for a Mode 3 Measurement .....	21
7.3.3	Selecting a Cable Type from the Database.....	21
7.3.4	Entering Vehicle Data .....	21

## TABLE OF CONTENTS

---

7.3.5	Visual Inspection.....	22
7.3.6	Starting Automatic Measurement.....	24
7.4	Printing Out the Test Report.....	25
7.5	Saving the Measurements.....	25
7.6	Opening the “System” Menu.....	25
7.7	Performing Single Measurements.....	26
7.8	Editing a Limit Value.....	27
7.9	Retrieving a Test Report from the Database.....	27
7.10	Deleting a Test Report from the Database.....	28
7.11	Adding/Editing an Inspector.....	29
7.12	Adding/Editing Company Data.....	30
7.13	Creating a Backup.....	32
7.14	Entering the Calibration Date.....	34
7.15	Customizing System Settings.....	35
7.15.1	Changing the Display Language.....	35
7.15.2	Changing Date and Time.....	35
7.16	Updating the cable database.....	36
7.17	Updating the Firmware.....	37
7.18	Restoring the Instrument to Default Settings.....	38
<b>8</b>	<b>Storage and Transport.....</b>	<b>39</b>
<b>9</b>	<b>Maintenance.....</b>	<b>40</b>
9.1	Cleaning.....	40
9.2	Calibration.....	40
9.3	Replacing the Fuse.....	41
9.4	Loading the Thermal Printer with Thermal Paper.....	41
<b>10</b>	<b>Repair.....</b>	<b>42</b>
<b>11</b>	<b>Contact, Support and Service.....</b>	<b>43</b>
<b>12</b>	<b>Certifications.....</b>	<b>44</b>
12.1	CE Declaration.....	44
12.2	Calibration Certificate.....	44
<b>13</b>	<b>Disposal and Environmental Protection.....</b>	<b>45</b>
	<b>Figures.....</b>	<b>46</b>
	<b>Tables.....</b>	<b>47</b>

# 1 SAFETY INSTRUCTIONS

	<p>Read and follow these instructions carefully and completely in order to ensure safe and proper use.</p> <p>The instructions must be made available to all persons who use the instrument.</p> <p>Keep for future reference.</p>
---	--

## General

- The instrument may only be used by electro-technically trained persons (ETPs), electricians and persons with at least level 2 qualification as specialists for high-voltage systems in commercial environments. It is not intended for private end users.
- Observe the five safety rules in accordance with DIN VDE 0105-100, Operation of electrical installations – Part 100: General requirements.  
(1. Shut down entirely. 2. Secure against restart. 3. Assure absence of voltage at all poles. 4. Ground and short circuit. 5. Cover neighboring live components, or make them inaccessible.)
- 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.
- The functioning of active medical devices (for example pacemakers, defibrillators) and passive medical devices may be affected by voltages, currents and electromagnetic fields generated by the instrument and the health of their users may be impaired. Implement corresponding protective measures in consultation with the manufacturer of the medical device and your physician. If any potential risk cannot be ruled out, do not use the instrument.

## Accessories

- Use only the specified accessories (included in the scope of delivery or listed as optional accessories) with the instrument.
- Carefully and completely read and adhere to the product documentation for optional accessories. Retain these documents for future reference.

## Handling

- Use the instrument in undamaged condition only.  
Inspect the instrument before use. Pay particular attention to damage, interrupted insulation or kinked cables. Damaged components must be replaced immediately.
- Use the accessories and all cables in undamaged condition only.  
Inspect accessories and all cables before use. Pay particular attention to damage, interrupted insulation or kinked cables.
- If the instrument or its accessories don't function flawlessly, permanently remove the instrument/accessories from operation and secure them against inadvertent use.
- If the instrument or accessories are damaged during use, for example if they're dropped, permanently remove the instrument/accessories from operation and secure them 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.
- The instrument and the accessories may only be used for the tests/measurements described in the documentation for the instrument.
- Equipment and accessories from Gossen Metrawatt GmbH are designed to function ideally with products from Gossen Metrawatt GmbH which are specifically intended for this purpose. Unless expressly confirmed otherwise in writing by Gossen Metrawatt GmbH, they are not intended or suitable for use with other products.
- Route cables in an orderly fashion, e.g. the mains power cable and accessory cables. Loose, disorderly cables result in unnecessary danger of tripping and falling.

## Operating Conditions

- Do not use the device and its accessories after long periods of storage under unfavorable conditions (e.g. humidity, dust or extreme temperature).
- Do not use the device and its accessories after extraordinary stressing due to transport.
- Do not expose the instrument to direct sunlight for long periods of time. Overheating can cause damage to the instrument.
- Only use the instrument and its accessories within the limits of the specified technical data and conditions (ambient con-

ditions, IP protection code, measuring category etc.).

- Do not use the instrument in potentially explosive atmospheres. Danger of explosion!
- Do not use the instrument in areas subject to the risk of fire. Danger of fire!
- Implement adequate measures for protection against electrostatic discharge (ESD).

#### **Fuses**

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

#### **Measurement Cables and Establishing Contact**

- Plugging in the measurement cables must not necessitate any undue force.
- Never touch conductive ends.
- Fully unroll all measurement cables before starting a test/measurement. Never perform a test/measurement with the measurement cable rolled up.
- Avoid short circuits due to incorrectly connected measurement cables.
- Ensure that the test cables make good contact.
- Do not move or remove the cables until testing/measurement has been completed. Unwanted sparking may otherwise occur due to test current.

#### **Data Security**

- The instrument is equipped with a data memory to which personal and/or sensitive data can be stored. Observe and comply with respectively applicable national data protection regulations. Use the corresponding functions provided by the instrument (such as access protection), as well as other appropriate measures to prevent unauthorized access to the data.
- Protect the instrument against unauthorized tampering. Use the functions provided by the instrument (e.g. key disabling / sealing / lock) as well as other appropriate measures (e.g. restricting physical access to the instrument).

#### **Documentation**

- Test reports must be checked for correctness and signed by the inspector.

## 2 APPLICATIONS

---

Please read this important information!

### 2.1 INTENDED USE / USE FOR INTENDED PURPOSE

The PROFITEST H+E CABLE tester is used for standards-compliant testing of charging cables for electric vehicles. It's laid out for the testing of mode 2 (IC-CPD) and mode 3 charging cables. The following tests are conducted:

- Low-resistance protective conductor continuity  $R_{LO}$
- Insulation resistance  $R_{ISO}$
- RCD AC tripping current and time to trip
- DC sensor test, 6 mA tripping time/current
- L/N/PE simulation
- Function test, states B, C and E

The test sequence is run automatically or single individual measurements<sup>1</sup> are performed by a qualified electrician. Safety of the user, as well as that of the instrument, is only assured when it's used for its intended purpose.

### 2.2 USE FOR OTHER THAN INTENDED PURPOSE

Use of the tester for any purposes other than those described in these operating instructions is contrary to use for intended purpose. Use for other than the intended purpose may lead to unforeseeable damage!

### 2.3 LIABILITY AND GUARANTEE

The warranty provided by Gossen Metrawatt GmbH, as well as its liability, are governed by the applicable contractual and mandatory statutory provisions.

---

1. Individual measurements have to be enabled upon request.

## 3 DOCUMENTATION

### 3.1 INFORMATION CONCERNING THESE INSTRUCTIONS

Read these instructions carefully and attentively. 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.gossenmetrawatt.de/en/service-support/download-center/>



#### Firmware Version

This documentation describes instruments with software version 1.1.0. You can view your instrument's firmware version ⇒ "Updating the Firmware" 37.

Documentation for other firmware versions is available on request ⇒ "Contact, Support and Service" 43.

#### 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.

#### Trademark Law

Product designations used in this document may be subject to trademark law, brand law and patent law. They are the property of their respective owners.

#### Copyright

This document is protected by copyright. Content modifications, reproduction, duplication, processing or translation in any form (including excerpts) are only permissible after previously obtaining written consent from Gossen Metrawatt GmbH. This applies in particular to storage and processing in electronic systems provided they do not exclusively serve legitimate internal purposes.

### 3.2 IDENTIFICATION OF WARNINGS

Instructions for your safety and for the protection of the device and its environment are provided as warnings and notes at certain points within these instructions.

They're laid out as shown below and are graded in terms of the severity of the respective hazard. They also describe the nature and cause of the hazard, the consequences of non-observance and what must be done to avoid it.



#### **DANGER**

Death or serious injury is almost certain.



#### **WARNING**

Death or serious injury is possible.



#### **CAUTION**

Minor or moderate injury is possible.

**ATTENTION**

Damage to the product or the environment is possible.

**Note**

Important information

**Tip**

Useful additional information or application tip

**3.3 IDENTIFIERS**

The following identifiers are used in this documentation:

Identifier	Meaning
<b>Control element</b>	Keys, buttons, menus and other controls
✓ Prerequisite	A condition etc. which must be fulfilled before a given action can be taken
▶ <b>Procedure</b>	Beginning of a procedural instruction
1. Procedural step	Steps of a procedure which must be completed in the specified order
↳ Result	Result of a procedural step
■ Enumeration ■ Enumeration	Bullet lists
Figure 1: Caption	Description of the content of a figure
Table 1: Table 1	Description of the content of a table
<b>Footnote</b>	Comment

Tab. 1: Identifiers in this Document

**3.4 SYMBOLS IN THE DOCUMENTATION**

The following symbols are used in this documentation:

Icon	Meaning
	Read and adhere to the product documentation.
	General warning symbol
	Warning regarding electrical voltage

Tab. 2: Symbols Used in this Document

**3.5 DEFINITION OF TERMS**

Term	Definition
EV	Abbreviation for “electric vehicle”
EVSE	Abbreviation for “electric vehicle supply equipment”, i.e. a charging station
CP	Abbreviation for “control pilot” = control/data cable for exchanging control signals between the electric vehicle and the charging station
PP	Abbreviation for “proximity pilot” or “plug present” = charging cable detection contact

Tab. 3: Definition of Terms

---

## 4 GETTING STARTED

---

This chapter provides an overview of the initial steps for working with the instrument.

1. Read and adhere to the product documentation. In particular, observe all safety information in the documentation, on the instrument and on the packaging.
  - Safety instructions → 4
  - Applications → 6
  - Documentation → 7
2. Familiarize yourself with the device → 10.
3. Start up the instrument → 20.
4. Familiarize yourself with the display and instrument operation → 18.
5. Configuration and operation → 20

Further topics of interest: Maintenance → 40

## 5 THE INSTRUMENT

### 5.1 SCOPE OF DELIVERY

Please check the scope of delivery for completeness and intactness.

- 1 PROFITEST H+E CABLE tester
- 1 Keyboard
- 1 Roll of thermal paper
- 1 3-phase measuring adapter, CEE 16 A to Schuko
- 1 3-phase measuring adapter, CEE 32 A to Schuko
- 1 3-phase measuring adapter, Camping to Schuko
- 1 Calibration certificate
- 1 Operating instructions

### 5.2 ACCESSORIES

- Z525V PROFITEST H+E CABLE paper for thermal printer, 5 rolls
- Z751A Barcode Scanner

### 5.3 INSTRUMENT OVERVIEW

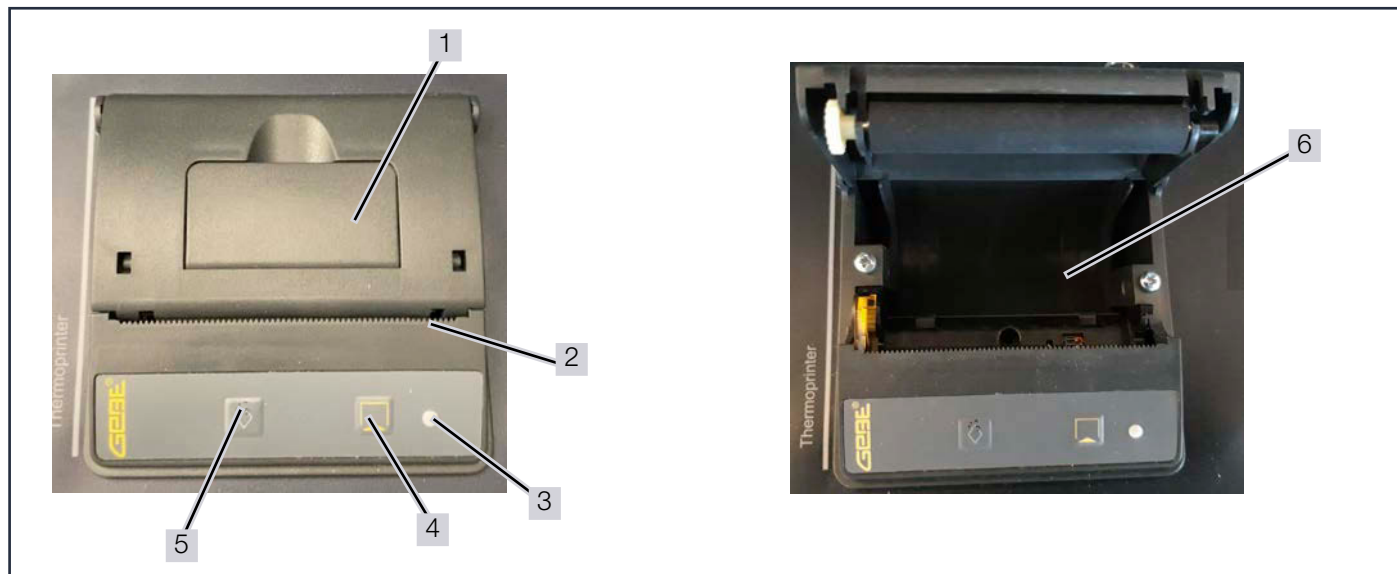
#### 5.3.1 FRONT



Abb. 1: Front Panel

- |   |                             |    |                                 |
|---|-----------------------------|----|---------------------------------|
| 1 | Inlet socket (power supply) | 7  | $F_{CP}$ fuse                   |
| 2 | Mains connection fuses      | 8  | Mode 2 test socket              |
| 3 | <b>OFF/ON</b> switch        | 9  | Type 2 test socket, vehicle end |
| 4 | USB ports                   | 10 | Mode 3 type 2 test socket       |
| 5 | Display                     | 11 | Thermal printer                 |
| 6 | $F_L$ fuse                  |    |                                 |

### 5.3.2 THERMAL PRINTER



- |   |                         |   |                      |
|---|-------------------------|---|----------------------|
| 1 | Cover handle            | 4 | Short paper feed key |
| 2 | Perforated tearing edge | 5 | Long paper feed key  |
| 3 | Status lamp             | 6 | Paper compartment    |

Abb. 2: Thermal Printer

### 5.3.3 SYMBOLS ON THE INSTRUMENT AND THE INCLUDED ACCESSORIES

Symbol	Meaning
	Warning concerning a point of danger (attention, observe documentation!)
	Protective conductor (protection class I)
	European conformity marking
	The instrument may not be disposed of with household trash ⇒ "Disposal and Environmental Protection" 45.

Tab. 4: Symbols on the Instrument and the Included Accessories

## 5.4 INCLUDED FEATURES

Standards-compliant testing of mode 2 (IC-CPD) and mode 3 charging cables with automatic test sequence:

- Low-resistance protective conductor continuity  $R_{LO}$
- Insulation resistance  $R_{ISO}$
- RCD AC tripping current and time to trip
- DC sensor test, 6 mA tripping time/current
- L/N/PE simulation
- Function test Status B, C, E

Test results appear as a pass/fail display, report printing via thermal printer

## 5.5 RELEVANT STANDARDS

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

DIN EN 61326-1 IEC 61326-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
EN 55011:2016 + A1+ A11 + A2	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement
DIN EN 61010-1 +A1 + A1/AC	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
EN IEC 61010-031	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test
EN 61557-1	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 1: General requirements
EN 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 – Part 2: Insulation resistance
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
IEC 62321	Electrotechnical products – Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)
IEC 62321-3-1	Determination of certain substances in electrotechnical products – Part 3-1: Screening – Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry
IEC 62321-4 + A1	Determination of certain substances in electrotechnical products – Part 4: Mercury in polymers, metals and electronics by CV-AAS, CV-AFS, ICP-OES and ICP-MS
IEC 62321-5	Determination of certain substances in electrotechnical products – Part 5: Cadmium, lead and chromium in polymers and electronics and cadmium and lead in metals by AAS, AFS, ICP-OES and ICP-MS
DIN EN IEC 61851-1 Revision 2: VDE 0122-1 Revision 2	Electric vehicle conductive charging systems – Part 1: General requirements
IEC 62955	Residual direct current detecting device (RDC-DD) to be used for mode 3 charging of electric vehicles

Tab. 5: Relevant Standards

## 5.6 TECHNICAL DATA

<b>Power Supply</b>	Nominal line voltage:	220 V <sub>AC</sub> / 230 V <sub>AC</sub> 50 ... 60 Hz
	Mains connection:	Inlet plug Mains connection fuses: F <sub>LN</sub> for L and N
<b>Connections Test outlets</b>	Mode 3: Single or 3-phase charging cable, type 2 charging plug	Charging station end / house end: 32 A 480 V~ 2 A, 30 V  Vehicle end: 250 V <sub>AC</sub> / 480 V <sub>AC</sub> 16 A ... 32 A
	Mode 2: single-phase charging cable	16 A 250 V <sub>AC</sub>
<b>Ambient Conditions</b>	Operating temperature:	0 ... +40 °C
	Storage temperature:	-30 ... +60 °C
	Relative atmospheric humidity:	Max. 80%, no condensation allowed
	Elevation:	Max. 2000 m
<b>Electrical Safety</b>	Measuring category:	300 V CAT II
	Protection category:	I per EN 61140
	Pollution degree:	2
	Fuse links:	Mains connection: 5 × 20 mm, 1 A/250 V/T F <sub>L</sub> : 6.3 × 32 mm, 400 mA/600 V F <sub>CP</sub> : 6.3 × 32 mm, 100 mA/700 V
<b>Electromagnetic Compatibility (EMC)</b>	Interference emission:	EN 61326-1, class A
	Interference immunity:	DIN EN 61326-1 / IEC 61326-1 DIN EN 61326-2-1 / IEC 61326-2-1
<b>Mechanical Design</b>	Protection:	Tester: IP 40 per DIN EN 60529 / IEC 60529 (protection against ingress of solid foreign objects: ≥ 1.0 mm Ø; protection against water ingress: not protected)  Housing: IP 67 per DIN EN 60529 / IEC 60529 (protection against ingress of solid foreign objects: dust-proof; protection against water ingress: protected when immersed)
	Housing (W × H × D):	Approx. 469 × 177 × 372 mm
	Weight:	Approx. 8.8 kg
	Display:	7-inch TFT LCD Resolution: 1280× 800 pixels Color depth: : 24 bit Background illumination
<b>Data Interfaces</b>	USB:	Socket: USB-A
<b>Internal Memory</b>	1000 measurements	
<b>Printer</b>	Thermal printer, integrated	Direct thermal printing Paper width: 56.5 mm (±0.5 mm) Print width: 48.0 mm Paper length: approx. 11 m

Tab. 6: Technical Data

## 5.7 CHARACTERISTIC VALUES

### 5.7.1 PROTECTIVE CONDUCTOR RESISTANCE $R_{PE}$ -CONTINUITY, MODE 2 AND MODE 3 CHARGING CABLES

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
Measurement with 200 mA <ul style="list-style-type: none"> <li>■ Mode 3 cable</li> <li>■ Mode 2 cable, PE not connected</li> </ul>	0.05 Ω ... 10.00 Ω	0.01 Ω	± (5% + 2 places)
<b>Specified measuring range</b>	0.05 Ω ... 10.00 Ω		
<b>Test current</b>	≥ 200 mA, ≤ 2 Ω), automatic polarity reversal (first „+“ then „-“)		
<b>Open-Circuit Voltage</b>	< 6 V		
<b>Default pass/fail limit</b>	≤ 0.3 Ω (up to a length of 5 m) Max. limit (to be set at the tester): 1 Ω (in steps of 0.1 Ω)		

Tab. 7: Characteristic Values, Continuity Test, Protective Conductor Resistance  $R_{PE}$ , Mode 2 and Mode 3 Charging Cables

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
Measurement with 3 mA <ul style="list-style-type: none"> <li>■ Mode 2 cable, PE connected</li> </ul>	0.1 Ω ... 10.00 Ω	0.1 Ω	± (5% + 3 places)
<b>Specified measuring range</b>	0.1 Ω ... 10.00 Ω		
<b>Test current</b>	≤ 3 mA (≤ 2 Ω), automatic polarity reversal (first „+“ then „-“)		
<b>Open-Circuit Voltage</b>	< 6 V		
<b>Default pass/fail limit</b>	≤ 0.5 Ω ... (PE cable continuity: whether connected or not)		

Tab. 8: Characteristic Values, Continuity Test, Protective Conductor Resistance  $R_{PE}$ , Mode 2 Charging Cables

### 5.7.2 INSULATION RESISTANCE $R_{ISO}$ (SINGLE MEASUREMENT), MODE 2 AND MODE 3 CABLES

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
	0.10 MΩ ... 19.99 MΩ	0.1 MΩ	± (5% + 2 places) 70% of measuring accuracy
<b>Specified measuring range</b>	0.10 MΩ ... 19.99 MΩ		
<b>Test voltage</b>	250 V <sub>DC</sub> 500 V <sub>DC</sub>		
<b>Test current</b>	> 1 mA < 2 mA @ 2 kΩ		
<b>Default pass/fail limit</b>	1 MΩ ... (protection class 1) The limit values are based on the standard, the tester model etc., and can be set at the instrument.		

Tab. 9: Insulation Resistance  $R_{ISO}$  (single measurement), Mode 2 and Mode 3 Charging Cables

### 5.7.3 RCD TIME TO TRIP AND TRIPPING CURRENT, 230 V SINGLE-PHASE, MODE 2 CHARGING CABLE

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
RCD time to trip, 10 mA, 20 mA, 30 mA AC test	10 ms ... 500 ms	1 ms	± (5% + 2 places)
<b>Test current</b>	10.5 mA <sub>AC</sub> , 21 mA <sub>AC</sub> , 31.5 mA <sub>AC</sub> (5 % above nominal tripping current)		
<b>Test current accuracy</b>	± 1.0 mA		
<b>Max. test time</b>	200 ms, 300 ms, 400 ms		
<b>Polarity selection</b>	0° and 180° of an input sine wave		
<b>Default pass/fail limit</b>	Measured tripping time > 300 ms = fail Max. limit (to be set at the tester): 200 ms, 300 ms, 400 ms		

Tab. 10: RCD Time to Trip, 10 mA, 20 mA, 30 mA AC Test

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
RDC-DD 6 mA DC test (per IEC 62955)	10 ms ... 500 ms	1 ms	± (5% + 2 places)
<b>Test current</b>	6 mA <sub>DC</sub> (0 ... 10% above nominal tripping current)		
<b>Test current accuracy</b>	± 0.6 mA		
<b>Polarity</b>	Positive and negative		
<b>Max. test time</b>	10 s		
<b>Polarity selection</b>	0° and 180° of an input sine wave		
<b>Default pass/fail limit</b>	Measured tripping time > 10 s = fail		

Tab. 11: RDC-DD 6 mA DC Test (per IEC 62955)

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
RCD AC ramp test	2 mA ... 10 mA / 20 mA /30 mA	2 mA	± (5% + 2 places)
<b>Test current</b>	AC current ramp up to 10 mA / 20 mA / 30 mA in steps of 2 mA		
<b>Test current accuracy</b>	± 0.5 mA		
<b>Step time</b>	200 ms, 300 ms, 400 ms		
<b>Max. test time</b>	6 s		
<b>Default pass/fail limit</b>	Measured tripping current < 6 mA <sub>AC</sub> / 10 mA <sub>AC</sub> / 16 mA <sub>AC</sub> = fail		

Tab. 12: RCD Tripping Current, AC Ramp Test

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
RCD DC ramp test	2 mA ... 10 mA / 20 mA /30 mA	2 mA	± (5% + 2 places)
<b>Test current</b>	DC current ramp from 1.2 mA ... 6 mA in steps of 0.3 mA		
<b>Step time</b>	1.8 s		
<b>Max. test time</b>	approx. 30 s		
<b>Default pass/fail limit</b>	Measured tripping current < 3 mA = fail		

Tab. 13: RCD Tripping Current, DC Ramp Test

#### 5.7.4 EV CHARGING FUNCTION TEST, MODE 2 CABLES

Measurement	Setting and Reading States
CP state (control pilot)	State A: unused State B: charge in preparation State C: active charging State E: error (simulated short-circuit CP-PE) State F: charger error status (read-only status)
<b>Max. voltage</b>	±12 V
<b>Frequency range</b>	940 Hz ... 1040 Hz
<b>Duty cycle range</b>	8% ... 97%
<b>Maximum charging current display</b>	Per IEC 61851-1/COR1 / DIN EN IEC 61851-1/COR1 / DIN EN IEC 61851-1 revision 2; VDE 0122-1 revision 2, tables A.7 and A.8
<b>Default pass/fail limit</b>	Measured voltage and/or frequency out of range = fail

Tab. 14: EV Charging Function Test, Mode 2 Charging Cables

#### 5.7.5 RESISTANCE IN PP CABLE, MODE 3 CHARGING CABLES

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
Coding resistor test (PP)	10 Ω ... 4.5 kΩ	10 Ω	± (10% + 2 places)
<b>Default pass/fail limit</b>	Measured resistance deviates from standard = fail (per IEC 61851-1:2017/COR1:2023 / DIN EN IEC 61851-1:2019 revision 2:2024-04, VDE 0122-1 revision 2:2024-04, table B.2 – Current-coding resistor for EV plug and vehicle connector)		

Tab. 15: Resistance in PP Cable, Mode 3 Charging Cables

### 5.7.6 VOLTAGE MEASUREMENT, MODE 2 AND MODE 3 CHARGING CABLES

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
Voltage measurement at external, grounded outlet	5 V <sub>AC</sub> ... 270 V <sub>AC</sub>	1 V	± (10% + 2 places)
<b>Default pass/fail limit</b>	Measured voltage out of range ±10 % (207 V <sub>AC</sub> ... 253 V <sub>AC</sub> = fail)		

Tab. 16: Voltage Measurement, Mode 2 and Mode 3 Charging Cables

### 5.7.7 DIFFERENTIAL LEAKAGE CURRENT I<sub>PE</sub> – PROTECTIVE CONDUCTOR CURRENT (DIFFERENTIAL CURRENT MEASURING METHOD), MODE 2 CABLES

Measurement	Measuring Range	Resolution	Measuring Accuracy (at 23 °C ± 5 °C, ≤ 80% RH)
Leakage current measurement (differential)	0.30 mA ... 19.99 mA	0.01 mA	± (5% + 5 places)
<b>Test voltage</b>	230 V <sub>AC</sub> ±10%		
<b>Default pass/fail limit</b>	< 3.5 mA (protection class 1)		

Tab. 17: Differential Leakage Current I<sub>PE</sub> – Protective Conductor Current (differential current measuring method), Mode 2 Cables





## 6 MENU AND FUNCTIONS












The instrument is operated using the function keys to the left and right of the display.









Settings and values appear at the display.

Entries are made via the USB keyboard (included).

### 6.1 FUNCTION KEYS AND ICONS

Key	Description	Function
<b>Function Keys with Fixed Assignment</b>		
	START	Start measurement Open submenu Acknowledge entry
	HELP	Access the help menu
	ESC	Exit a menu and return to the previous menu
	PRINT	Start printing

Key	Description	Function
<b>Icons for Function Keys with Flexible Assignment</b>		
	OK	Confirm function/action/selection
	Up	Scroll up
	Down	Scroll down
	Left	Go to previous page Switch to left column
	Right	Go to next page Switch to right column
	Save	Saves a measurement or a setting
	Delete	Delete entry
	New	Create a new entry
	System	Open the "System" menu with system settings
	Edit	Edit an entry
	Edit limit	Edit a limit value

Key	Description	Function
	Reset limit	Reset limit to default setting
	Report	View a report
	Database	Open database
	Update	Start update
	Initial page	Display initial page
	Fail/pass	Selector switch Switch between <b>Yes</b> and <b>No</b>
	No	Answer “No” to the question
	Yes	Answer “Yes” to the question

Tab. 18: Function Keys and Icons

## 6.2 USER INTERFACE

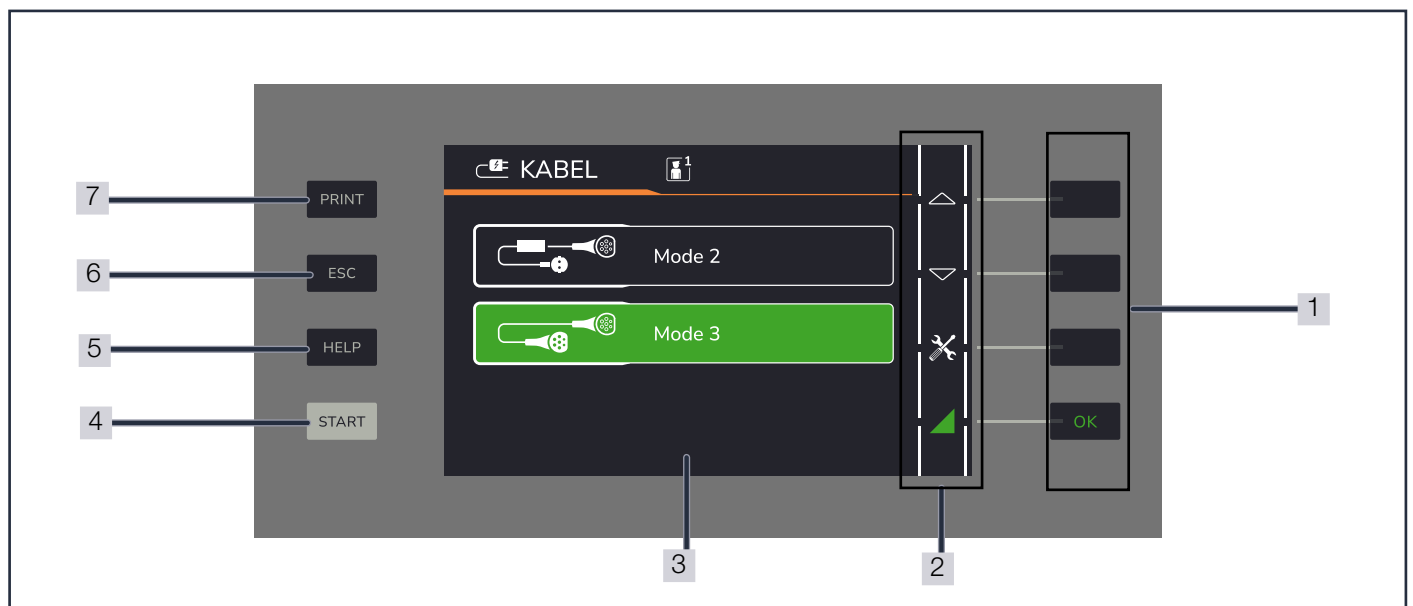


Fig. 3: User interface

- 1 Function keys with fixed assignment
- 2 Function key icons
- 3 Display
- 4 **[START]** function key
- 5 **[HELP]** function key
- 6 **[ESC]** function key
- 7 **[PRINT]** function key

Tab. 19: Menu Layout

## 7 OPERATION

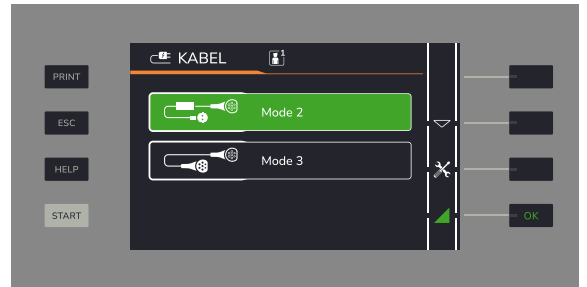
### 7.1 ELECTRICAL POWER SUPPLY

1. Insert the inlet plug into the inlet socket on the instrument.
2. Connect the mains plug to mains power.

### 7.2 SWITCHING THE INSTRUMENT ON AND OFF

#### 7.2.1 SWITCHING THE INSTRUMENT ON

1. Set the **OFF/ON** toggle switch to the **I** position.
  - ↳ The display and user interface are activated.
  - ↳ The initial window for measurement selection is displayed.
- ↳ The instrument is ready for operation.



#### 7.2.2 SWITCHING THE INSTRUMENT OFF

1. Set the **OFF/ON** toggle switch to the **0** position.
- ↳ The instrument is switched off.

### 7.3 PERFORMING A MEASUREMENT

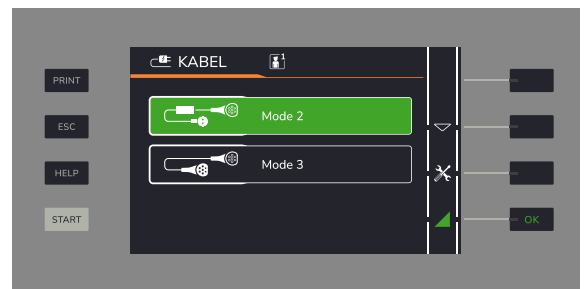
Each measurement consists of two stages:

- Visual inspection
- Automatic measurement

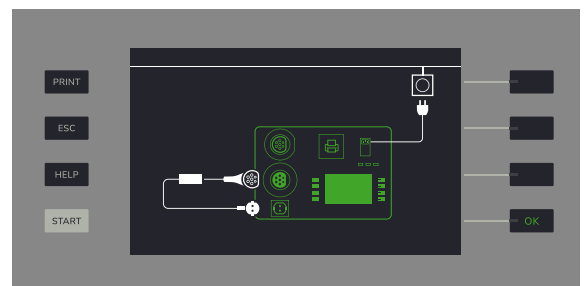
The two stages of the measurement can be performed in either order. It's also possible to perform single tests.

#### 7.3.1 PREPARATION FOR A MODE 2 MEASUREMENT

- ✓ The instrument is connected to mains power.
  - ✓ The instrument is switched on.
  - ✓ The cable under test is a mode 2 cable.
1. Select **Mode 2**.
  2. Press the function key next to the **OK** icon.



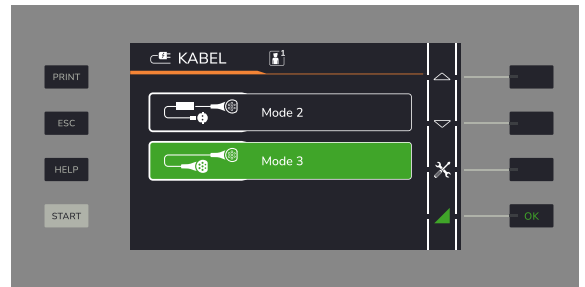
3. Insert the power plug of the mode 2 charging cable into the **mode 2 test socket**.
4. Insert the vehicle plug (type 2) of the mode 2 charging cable into the **type 2 test socket, vehicle end**.



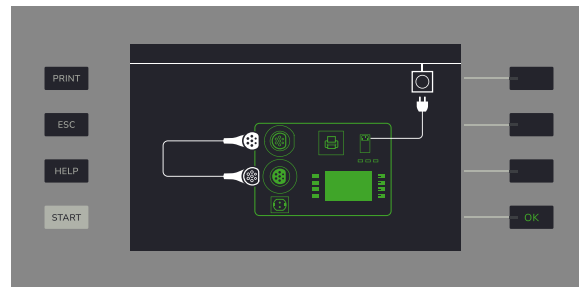
### 7.3.2 PREPARATION FOR A MODE 3 MEASUREMENT

- ✓ The instrument is connected to mains power.
- ✓ The instrument is switched on.
- ✓ The charging cable under test is a mode 3 cable.

1. Select **Mode 3**.
2. Press the function key next to the **OK** icon.



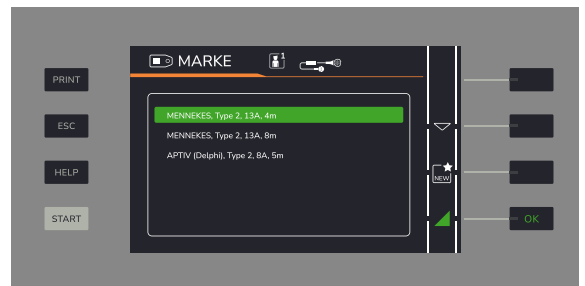
3. Insert the infrastructure charging plug of the mode 3 charging cable into the **mode 3 type 2 test socket**.
4. Insert the vehicle plug (type 2) of the mode 3 charging cable into the **type 2 test socket, vehicle end**.



### 7.3.3 SELECTING A CABLE TYPE FROM THE DATABASE

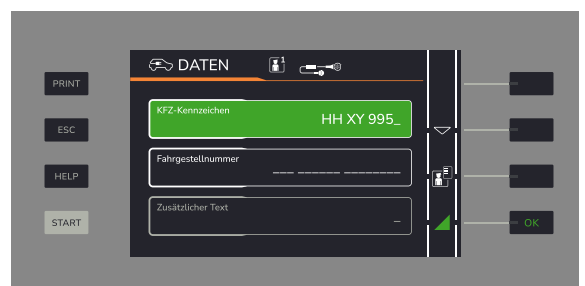
- ✓ The cable under test is connected to the test sockets.
- ✓ The corresponding cable mode for the test has been selected.

1. Press the function key next to the **OK** icon.
  - ↳ A list of cable manufacturers is displayed.
2. Press the function key next to the **Up** or **Down** icon, in order to select the manufacturer of the cable to be tested.
  - ↳ The manufacturer's name appears with a green background.
3. Press the function key next to the **OK** icon.
  - ↳ A list of cable types is displayed.
4. Press the function key next to the **Up** or **Down** icon, in order to select the type of cable to be tested.
5. Press the function key next to the **OK** icon.
  - ↳ The cable type is selected.
  - ↳ The menu is switched automatically to vehicle data entry.



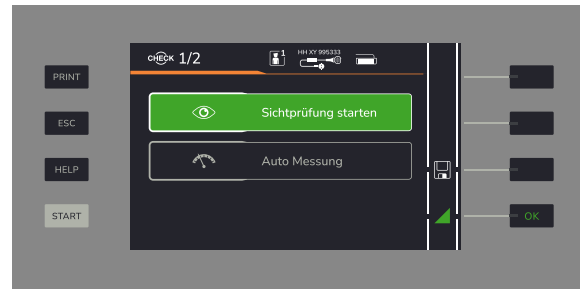
### 7.3.4 ENTERING VEHICLE DATA

1. Connect the USB keyboard to the instrument's USB port.
2. Use the keyboard to enter the license plate number of the vehicle associated with the cable.
3. Press the function key next to the **Down** icon or press **Tab** on the keyboard, in order to switch to the **Chassis Number** field.
4. Use the keyboard to enter the chassis number of the vehicle associated with the cable.
5. Press the function key next to the **Down** icon or press **Tab** on the keyboard, in order to switch to the **Additional Text** field.
6. Additional text can be entered as an option.
7. Press the function key next to the **OK** icon.
  - ↳ The vehicle data are entered.
  - ↳ The menu is switched automatically to visual inspection.



### 7.3.5 VISUAL INSPECTION

1. The **Start Visual Inspection** field appears with a green background.
2. Press the function key next to the **OK** icon.  
↳ The visual inspection interview is started.



3. Press the function key next to the **Fail/Pass** icon, in order to select the appropriate **Yes** or **No** confirmation icon.
4. Answer all questions regarding test criteria. Press the function key next to the **Up** or **Down** icon to scroll back and forth through the test criteria in the questionnaire.



5. Press the function key next to the **Save** icon in order to save the visual inspection.
6. Press the function key next to the **OK** icon.  
↳ The visual inspection is confirmed.

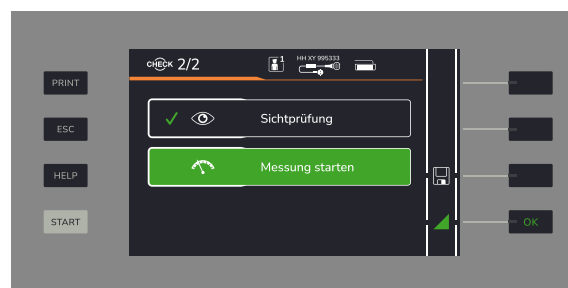


## Criteria for Visual Inspection

Inspection Criterion	Result
Free of damage or contamination	Yes / No
All cables fulfill the requirements for intended use.	Yes / No
The mains plug and the vehicle coupler are free of defects.	Yes / No
Strain reliefs for all cables are free of defects.	Yes / No
The power cable and the connection cable to the vehicle coupling are free of defects.	Yes / No
No visible damage to the housing or protective cover which would make it possible to access live or dangerous moving parts	Yes / No
No signs of overloading, overheating or use for other than intended purpose	Yes / No
No signs of unauthorized modification	Yes / No
No signs of contamination, corrosion or excessive aging	Yes / No
All safety-related labeling and symbols, identification data and position indicators are clearly legible.	Yes / No
Associated accessories (e.g. detachable or permanently attached connection cables) are free of defects.	Yes / No
No damage due to overbending of cables and tubing	Yes / No
No further defects	Yes / No

### 7.3.6 STARTING AUTOMATIC MEASUREMENT

- ✓ Visual inspection has been completed.
- 1. The menu is switched automatically to automatic measurement.
  - ↳ The **Start Measurement** field appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ Automatic measurement is started.
  - ↳ Various test steps are conducted depending on cable mode.



#### Automatic Measurement Test Steps

Mode 2	Mode 3
1/14: RPE PE, 3 mA	1/17: RPE L1
2/14: RISO VEHICLE N-PE, 500V	2/17: RPE L2
3/14: RISO VEHICLE L1-PE, 500V	3/17: RPE L3
4/14: RISO VEHICLE L1-N, 500V	4/17: RPE N
5/14: RISO N-PE, 500V	5/17: RPE PE
6/14: RISO L1-PE, 500V	6/17: RPE CP
7/14: RISO L1-N, 500V	7/17: RISO L1-L2
8/14: RCD AC time to trip 30 mA 0°	8/17: RISO L1-L3
9/14: RCD AC tripping current 30 mA 0°	9/17: RISO L1-PE
10/14: EVSE CP, state A	10/17: RISO L2-L3
11/14: EVSE CP, state B	11/17: RISO L2-N
12/14: EVSE CP, state C	12/17: RISO L2-PE
13/14: EVSE CP, state E	13/17: RISO L2-N
14/14: IDIFF	14/17: RISO L3-PE
	15/17: RISO N-PE
	16/17: PP EV
	17/17: PP CH

## 7.4 PRINTING OUT THE TEST REPORT

- ✓ The test steps for automatic testing have been completed in full.
- ✓ The test report is displayed.

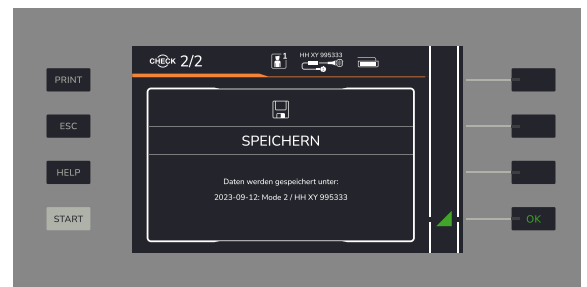


1. Press the **PRINT** function key.
2. The test report is printed.



## 7.5 SAVING THE MEASUREMENTS

- ✓ The test steps for automatic testing have been completed in full.
  - ✓ The test report is displayed.
3. Press the function key next to the **Save** icon.
    - ↳ The file name for the completed test is displayed.
  4. Press the function key next to the **OK** icon.
    - ↳ The data from the automatic test are stored to the instrument's database.



## 7.6 OPENING THE "SYSTEM" MENU

- ✓ The initial page is displayed.
1. Press the function key next to the **System** icon.
    - ↳ The **System** menu with the system settings appears.

## 7.7 PERFORMING SINGLE MEASUREMENTS

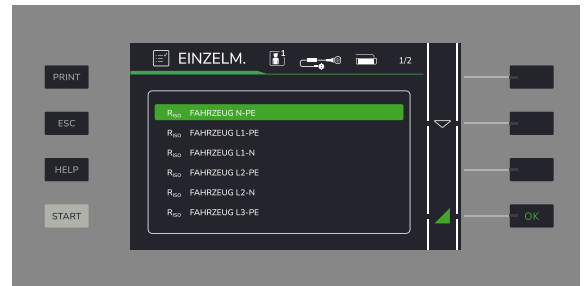
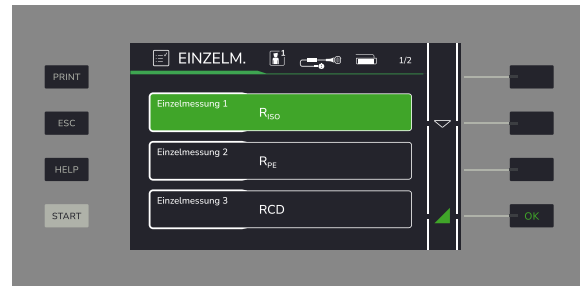


**Note**

Limited function!

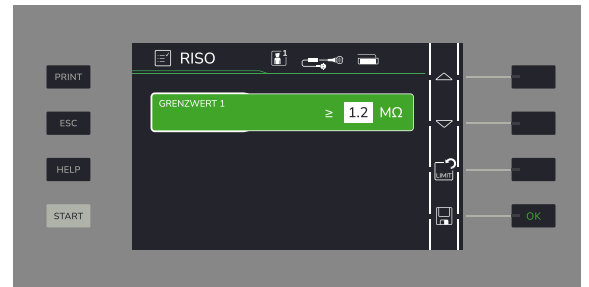
Individual measurements are only available to qualified electricians and only on request ⇨ "Contact, Support and Service" 43.

- ✓ The **System** menu is open.
  - ✓ The cable under test is connected to the test instrument.
1. Press the function key next to the **Up** or **Down** icon, in order to select the **Single Test** submenu.
    - ↳ The **Single Test** submenu appears with a green background.
  2. Press the function key next to the **OK** icon.
    - ↳ The cable mode selection page is displayed.
  3. Press the function key next to the **Up** or **Down** icon, in order to select **Mode 2** or **Mode 3**.
  4. Press the function key next to the **OK** icon.
    - ↳ The list of measurement types is displayed.
  5. Press the function key next to the **Up** or **Down** icon, in order to select the desired type of single measurement:
    - Single measurement 1:  $R_{INS}$
    - Single measurement 2:  $R_{PE}$
    - Single measurement 3: RCD
    - Single measurement 4: EVSE interface
    - Single measurement 5:  $I_{DIFF}$
  6. Press the function key next to the **OK** icon.
    - ↳ The list of single measurements for the selected measurement type is displayed.
  7. Press the function key next to the **Up** or **Down** icon, in order to select the desired single measurement.
  8. Press the function key next to the **OK** icon.
    - ↳ The details of the single measurement are displayed.
  9. Press the function key next to the **OK** icon.
    - ↳ The single measurement is performed.
    - ↳ The measurement result is displayed.
  10. Press the **ESC** function key order to exit the **Single Measurement** menu.
  11. Press the function key next to the **Limit** icon in order to adjust the limit value for the measurement.



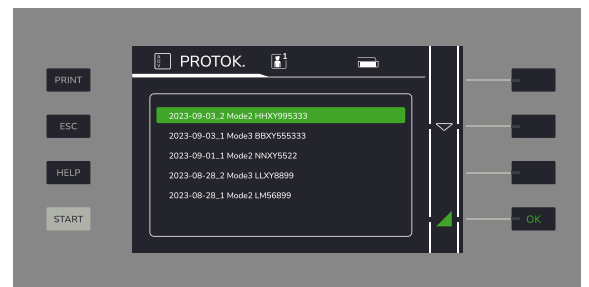
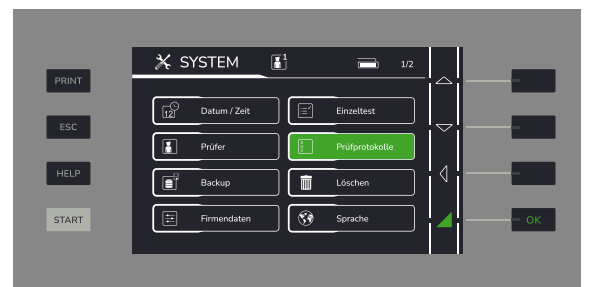
## 7.8 EDITING A LIMIT VALUE

- ✓ The window with the single measurement is open.
- 1. Press the function key next to the **Limit** icon.
  - ↳ The dialog for adjusting the limit value appears.
- 2. Press the function key next to the **Up** or **Down** icon, in order to increase or decrease the limit value.
  - A value can also be entered via the USB keyboard.
- 3. Press the function key next to the **Reset Limit** icon, in order to return the limit value to its default value.
- 4. Press the function key next to the **Save** icon, in order to save a changed limit value.



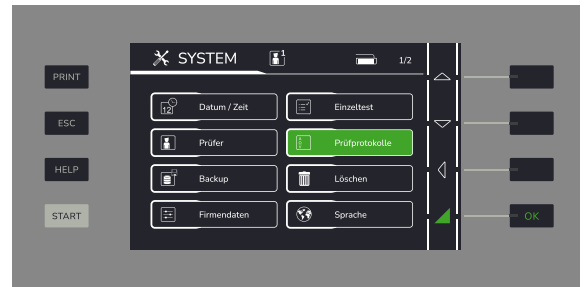
## 7.9 RETRIEVING A TEST REPORT FROM THE DATABASE

- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Test Reports** submenu.
  - ↳ The **Test Reports** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ The list of saved test reports is displayed.
- 3. Press the function key next to the **Up** or **Down** icon, in order to select the desired test report.
  - ↳ The desired test report appears with a green background.
- 4. Press the function key next to the **OK** icon.
  - ↳ The details of the test report are displayed.



## 7.10 DELETING A TEST REPORT FROM THE DATABASE

- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Delete** submenu.
  - ↳ The **Delete** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ A list of deletion options is displayed.
- 3. Press the function key next to the **Up** or **Down** icon, in order to select the **Delete All Test Reports** option.
  - ↳ The **Delete All Test Reports** option appears with a green background.
- 4. Press the function key next to the **Delete** icon.
  - ↳ The **DELETE TEST REPORTS** window appears. A security prompt is displayed: **CAUTION! Data will be irretrievably deleted!**
- 5. Press the function key next to the **OK** icon.
  - ↳ All test reports are deleted.



## 7.11 ADDING/EDITING AN INSPECTOR

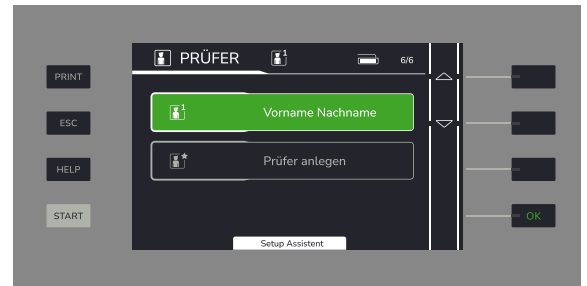
### Opening the “Inspector” Submenu

- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Inspector** submenu.
  - ↳ The **Inspector** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ The **Inspector** submenu is displayed.



### Adding a New Inspector

- ✓ The **Inspector** submenu is displayed.
- ✓ The keyboard is connected to the instrument's USB port.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Add Inspector** dialog.
  - ↳ The **Add Inspector** dialog appears with a green background. **First and Last Name** appears in the field.
- 2. Enter the first and last name of the new inspector.
- 3. Press the function key next to the **Save** icon.
  - ↳ The new inspector is added.



### Editing an Existing Inspector

- ✓ The **Inspector** submenu is displayed.
- ✓ The keyboard is connected to the instrument's USB port.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the inspector you want to edit.
  - ↳ The field for the selected inspector appears with a green background.
- 2. Make the desired changes.
- 3. Press the function key next to the **Save** icon.
  - ↳ Entries for the inspector are edited.



### Deleting an Existing Inspector

- ✓ The **Inspector** submenu is displayed.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the inspector you want to delete.
- 2. Press the function key next to the **Delete** icon.
- 3. A security prompt is displayed.
- 4. Press the function key next to the **OK** icon.
  - ↳ The entry for the inspector is deleted.



## 7.12 ADDING/EDITING COMPANY DATA

### Opening the “Company Data” Submenu

- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Company Data** submenu.
  - ↳ The **Company Data** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ The **Company Data** submenu is displayed.

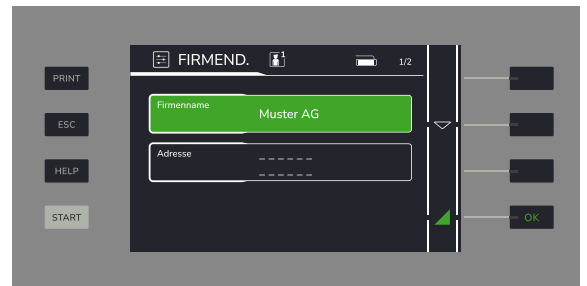


### Adding a New Company Name

- ✓ The **Company Data** submenu is displayed.
- ✓ The keyboard is connected to the instrument’s USB port.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Company Name** field.
  - ↳ The **Company Name** field appears with a green background.

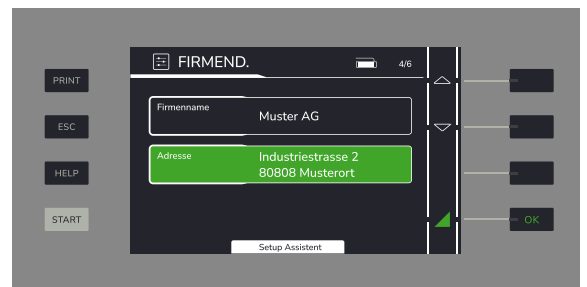


- 2. Enter the company name.

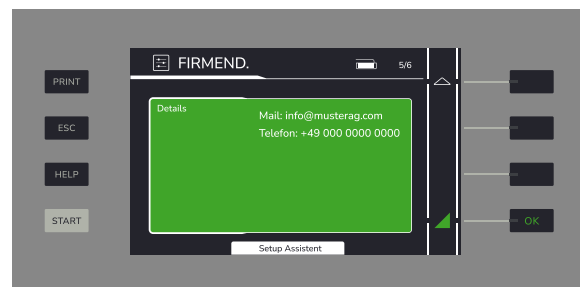


- 3. Press the function key next to the **Up** or **Down** icon, in order to select the **Address** field.
  - ↳ The **Address** field appears with a green background.

- 4. Enter the address.



- 5. Press the function key next to the **Down** icon, in order to view the details of the company data.
- 6. Enter the details for the company data (e-mail and phone).
- 7. Press the function key next to the **Save** icon.
  - ↳ The new company data are added.



## Deleting an Existing Company Name

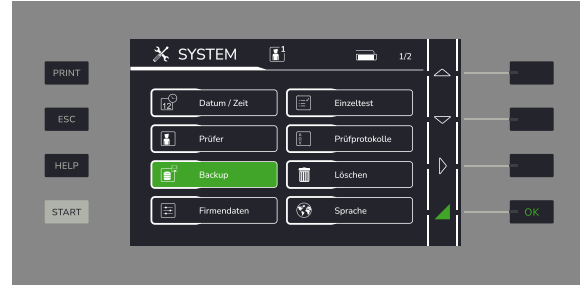
- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Delete** submenu.
  - ↳ The **Delete** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ The **Delete** submenu is displayed.
- 3. Press the function key next to the **Up** or **Down** icon, in order to select the **Delete Company Data** submenu.
  - ↳ The **Delete Company Data** submenu appears with a green background.
- 4. Press the function key next to the **Delete** icon.
  - ↳ A warning appears: **All company data will be permanently deleted! Acknowledge with OK.**
- 5. Press the function key next to the **OK** icon.
  - ↳ The company data are deleted.



## 7.13 CREATING A BACKUP

### Opening the Backup Submenu

- ✓ A USB flash drive is connected to the USB port.
- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Backup** submenu.
  - ↳ The **Backup** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ The **Backup** submenu is displayed.



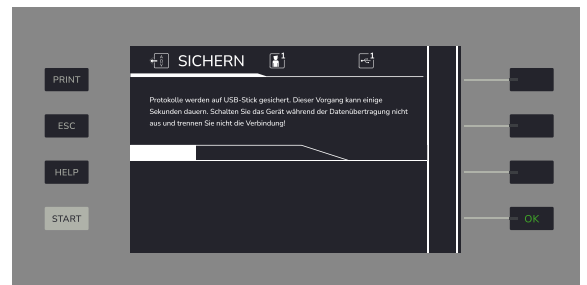
### Backing Up the Database

- ✓ The **Backup** submenu is displayed.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Database Backup** option.
  - ↳ The **Database Backup** option appears with a green background.
- 2. Press the function key next to the **Save** icon.
  - ↳ The database is saved to the USB flash drive.
  - ↳ A confirmation message is displayed.



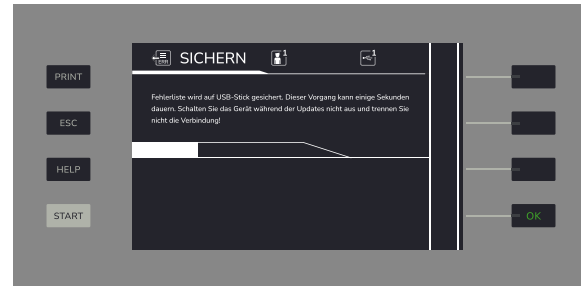
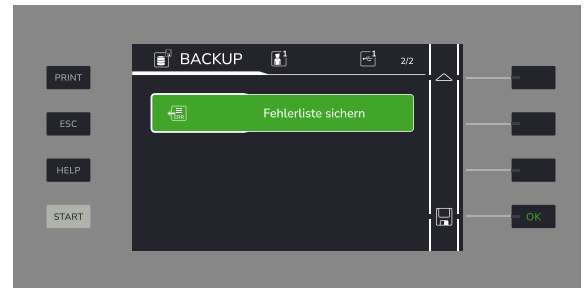
### Saving Test Reports

- ✓ A USB flash drive is connected to the USB port.
- ✓ The **Backup** submenu is displayed.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Save Test Reports** option.
  - ↳ The **Save Test Reports** option appears with a green background.
- 2. Press the function key next to the **Save** icon.
  - ↳ The test reports are saved to the USB flash drive.



## Backing Up Log Files

- ✓ A USB flash drive is connected to the USB port.
  - ✓ The **Backup** submenu is displayed.
1. Press the function key next to the **Up** or **Down** icon, in order to select the **Backup Log Files** option.
    - ↳ The **Backup Log Files** option appears with a green background.
  2. Press the function key next to the **Save** icon.
    - ↳ The log file is saved to the USB flash drive.

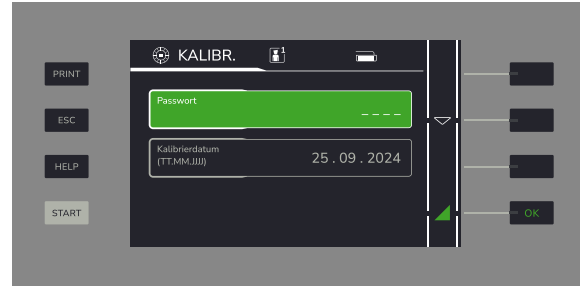


## Restoring Data

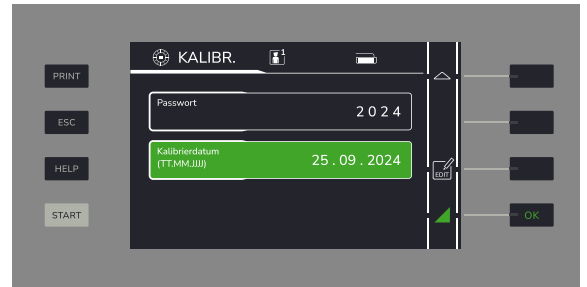
- ✓ A USB flash drive is connected to the USB port.
  - ✓ The **Backup** submenu is displayed.
1. Press the function key next to the **Up** or **Down** icon, in order to select the **Restore** option.
    - ↳ The **Restore** option appears with a green background.
  2. Press the function key next to the **Save** icon.
    - ↳ The database stored on the USB flash drive is displayed.
  3. Press the function key next to the **Save** icon.
    - ↳ The stored database is transferred from the USB flash drive to the instrument.
    - ↳ A confirmation message is displayed: **The data have been successfully restored. Restart the instrument.**
  4. Restart the instrument in order to activate the imported data.

## 7.14 ENTERING THE CALIBRATION DATE

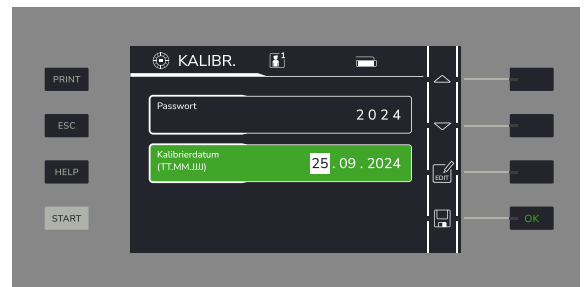
- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Calibration** submenu.
  - ↳ The **Calibration** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ The **Calibration** submenu is displayed.
  - ↳ The **Password** field appears with a green background.
- 3. Enter the password.



- 4. Press the function key next to the **Down** icon, in order to select the **Calibration Date** field.
  - ↳ The **Calibration Date** field appears with a green background.
- 5. Press the function key next to the **Edit** icon.



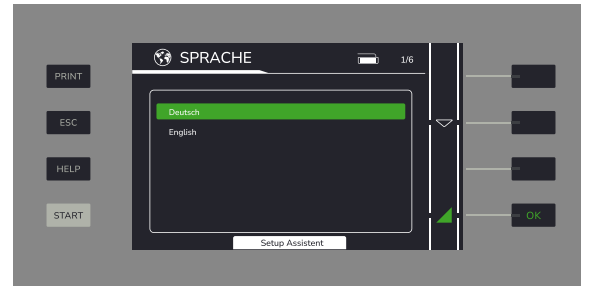
- 6. Press the function key next to the **Up** or **Down** icon, in order to select an earlier or a later date.
- 7. Press the function key next to the **Right** icon, in order to switch to month.
- 8. Press the function key next to the **Up** or **Down** icon, in order to select an earlier or a later month.
- 9. Press the function key next to the **Right** icon, in order to switch to year.
- 10. Press the function key next to the **Up** or **Down** icon, in order to select an earlier or a later year.
- 11. Press the function key next to the **Save** icon.
  - ↳ The calibration date is changed.



## 7.15 CUSTOMIZING SYSTEM SETTINGS

### 7.15.1 CHANGING THE DISPLAY LANGUAGE

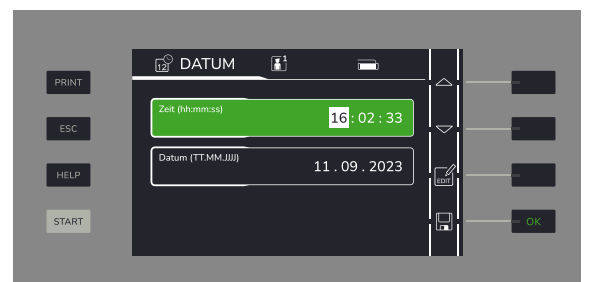
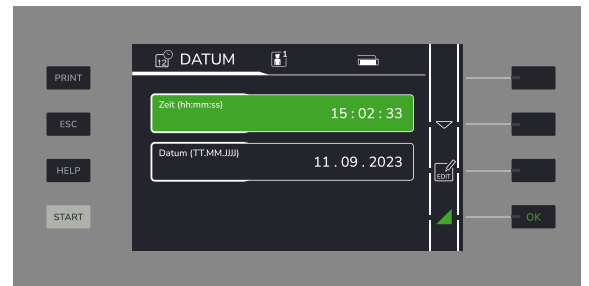
- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Language** submenu.
  - ↳ The **Language** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
- 3. Press the function key next to the **Up** or **Down** icon, in order to select the desired language.
  - ↳ The desired language appears with a green background.
- 4. Press the function key next to the **OK** icon.
  - ↳ The display language is changed.



### 7.15.2 CHANGING DATE AND TIME

#### Changing Time

- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Date/Time** submenu.
  - ↳ The **Date/Time** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
- 3. Press the function key next to the **Up** or **Down** icon, in order to select the **Time** entry dialog.
  - ↳ The **Time** entry dialog appears with a green background.
- 4. Press the function key next to the **Edit** icon.
- 5. Press the function key next to the **Up** or **Down** icon, in order to increase or decrease the hours value.
- 6. Press the function key next to the **Right** icon, in order to switch to minutes.
- 7. Press the function key next to the **Up** or **Down** icon, in order to increase or decrease the minutes value.
- 8. Press the function key next to the **Right** icon, in order to switch to seconds.
- 9. Press the function key next to the **Up** or **Down** icon, in order to increase or decrease the seconds value.
- 10. Press the function key next to the **OK** icon.
  - ↳ The time setting is changed.



## Changing the Date

- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Date/Time** submenu.
  - ↳ The **Date/Time** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
- 3. Press the function key next to the **Up** or **Down** icon, in order to select the **Date** entry dialog.
  - ↳ The **Date** entry dialog appears with a green background.
- 4. Press the function key next to the **Edit** icon.
- 5. Press the function key next to the **Up** or **Down** icon, in order to select an earlier or a later date.
- 6. Press the function key next to the **Right** icon, in order to switch to month.
- 7. Press the function key next to the **Up** or **Down** icon, in order to select an earlier or a later month.
- 8. Press the function key next to the **Right** icon, in order to switch to year.
- 9. Press the function key next to the **Up** or **Down** icon, in order to select an earlier or a later year.
- 10. Press the function key next to the **OK** icon.
  - ↳ The date setting is changed.



## 7.16 UPDATING THE CABLE DATABASE

Regular updates are provided for the cable database. The update is carried out via the USB interface by loading the update file (json) onto a USB flash drive and transferring it to the device. This process must be carried out once for the Mode 2 database and once for the Mode 3 database.

Updates are available to you as a registered user (provided you have registered your measuring/testing device) free of charge from myGMC on the internet:

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



- ✓ You have loaded the update file onto a USB flash drive.
- ✓ The USB flash drive with the update file is connected to the USB interface.
- 1. Depending on the desired update, select **Mode 2** or **Mode 3**.
- 2. Press the function key next to the **OK** icon.
  - ↳ The wiring diagram is displayed.
- 3. Press the function key next to the **OK** icon.
  - ↳ A list of cable manufacturers is displayed.
- 4. Press the function key next to the **NEW** icon.
  - ↳ A security prompt appears.
- 5. Confirm the security prompt by pressing the function key next to the **OK** icon.
  - ↳ The cable database is updated.
  - Repeat this process for the other cable database.

## 7.17 UPDATING THE FIRMWARE

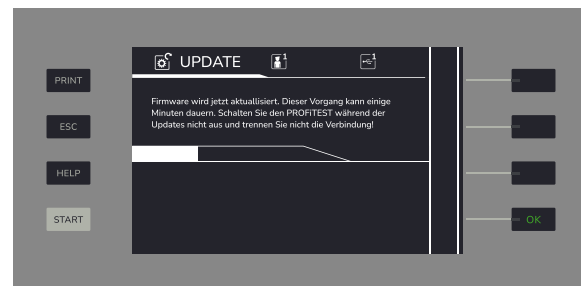
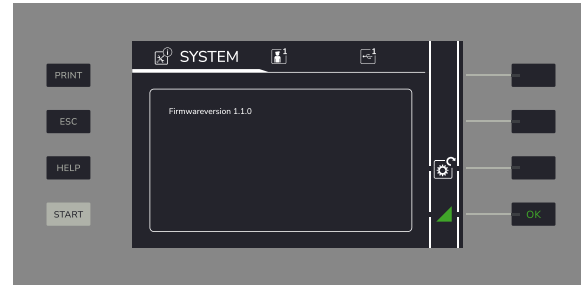
Regular updates are provided for the device. The update is carried out via the USB interface by loading the update file onto a USB flash drive and transferring it to the device.

Updates are available to you as a registered user (provided you have registered your measuring/testing device) free of charge from myGMC on the internet:

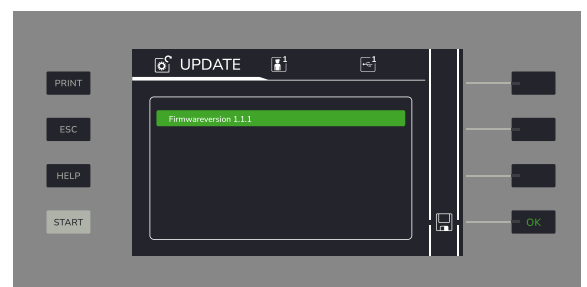
<https://www.gossenmetrawatt.de/services/mygmc/>



- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **System Info** submenu.
  - ↳ The **System Info** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ The current firmware version is displayed.
- 3. Insert a USB flash drive containing the new firmware into the USB port.
- 4. Press the function key next to the **Update** icon.
  - ↳ The firmware is updated.



- ↳ The new firmware version is displayed.



## 7.18 RESTORING THE INSTRUMENT TO DEFAULT SETTINGS

- ✓ The **System** menu is open.
- 1. Press the function key next to the **Up** or **Down** icon, in order to select the **Delete** submenu.
  - ↳ The **Delete** submenu appears with a green background.
- 2. Press the function key next to the **OK** icon.
  - ↳ A list of deletion options is displayed.
- 3. Press the function key next to the **Up** or **Down** icon, in order to select the **Default Settings** option.
  - ↳ The **Default Settings** option appears with a green background.
- 4. Press the function key next to the **Delete** icon.
  - ↳ The **RESET TO DEFAULT SETTINGS** window appears. A security prompt is displayed: **CAUTION! All settings will be deleted! The list of inspectors, the contents of the database and the company logo will also be deleted.**
- 5. Press the function key next to the **OK** icon.
  - ↳ The instrument is reset to default settings.



---

## 8 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 the specified permissible ambient conditions. The respective ambient conditions (temperature, humidity etc.) can be found under ⇨ "Technical Data" 13.
- 

### ATTENTION

#### Improper Transport

Damage to the product and measuring error.

- Transport the instrument only within the limits of permissible ambient conditions (temperature, humidity etc.) ⇨ "Technical Data" 13.
  - Transport the instrument in its original packaging only.
  - For best possible protection, we recommend using the accessories which are available for the instrument (transport case, cover etc.) – refer to the instrument's data sheet for further details.
-

## 9 MAINTENANCE

### 9.1 CLEANING



#### **DANGER**

##### **Life Endangering due to Electric Shock!**

The instrument and its accessories are operated with electrical power, thus resulting in a general risk of electric shock. This can be fatal or cause serious injuries.

- The instrument, the accessories and all connected conductors must be voltage-free before and during cleaning. Switch the test instrument off and disconnect it from mains power.
- Never immerse the instrument/accessories in water or other liquids.
- Never touch the instrument/accessories with wet or moist hands.

#### **ATTENTION**

##### **Unsuitable Cleaning Agents**

Unsuitable cleaning agents such as aggressive or abrasive cleansers result in damage to the instrument/accessories.

- Use a dry cloth for cleaning.
- Avoid the use of cleansers, abrasives or solvents.

Keep the outside surfaces of the device and any accessories clean.

### 9.2 CALIBRATION

Use of the instrument and resultant stressing influence the device and lead to deviation from warranted accuracy values.

In the case of strict measuring accuracy requirements, as well as in the event of severe stressing (severe climatic or mechanical stress), we recommend a relatively short calibration interval of once per year. If this is not the case, a calibration interval of 2 to 3 years is usually adequate.

Please contact GMC-I Service GmbH for calibration services ⇒ "Contact, Support and Service" 43.

A sticker with an instrument-specific guideline value for the calibration interval and information regarding the service provider is included on the instrument as an aid.



#### **Note**

##### **Date on Calibration Certificate / Calibration Interval Begins Upon Receipt**

Your instrument is furnished with a calibration certificate on which a date appears. This date may be further in the past if your instrument has been stored for some time prior to sale.

Instruments are stored in accordance with the specified ambient conditions. Drift is thus negligible for a duration of 1 year and longer storage periods are highly unusual.

Consequently, the instrument's characteristic values lie within the specifications and the first calibration interval can be determined as of the date of receipt.

### 9.3 REPLACING THE FUSE



#### WARNING

##### Risk of accident if the wrong fuse is installed!

Using the wrong fuse may result in fire or failure of safety features due to overload.

Always replace blown fuses with new ones of the same type.

1. Make sure that the instrument is switched off.
2. Make sure that all testing accessories are disconnected from the instrument.
3. Replace the blown fuse with a new one of the same type.

### 9.4 LOADING THE THERMAL PRINTER WITH THERMAL PAPER

- ✓ A roll of PROFITEST H+E CABLE paper for thermal printer (Z525V) is at hand.
- ✓ Make sure that the thermal paper is in flawless condition (not curled, torn, etc.)

#### ATTENTION

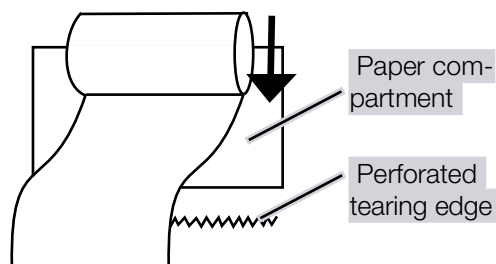
##### Incompatible thermal paper

Damage to the thermal printer.

Printing not possible or faulty.

Only insert the thermal paper specified as an accessory into the device.

1. Remove the beginning of the paper from the roll. Make sure that the paper does not unwind and that the corners are not folded over.
2. Lift the cover handle of the thermal printer and tip up the cover.
3. Remove the old thermal paper roll from the paper compartment.
4. Insert the new thermal paper roll into the paper tray so that the printable (outer side) is facing downwards in relation to the tear-off edge and protrudes beyond it.
5. Press the cover of the thermal printer down until it snaps into place.
  - ↳ The status lamp on the thermal printer lights up green. The thermal printer is ready for use.
6. To advance the thermal paper a few millimeters, press the **short paper feed** button.
7. To advance the thermal paper several centimeters, press the **long paper feed** button.



---

## 10 REPAIR

---

If your instrument requires repair, please contact our service department ⇨ "Contact, Support and Service" 43.



### Note

#### **Loss of Warranty and Guarantee Entitlements**

Unauthorized modification of the instrument is prohibited. This also includes opening the instrument.

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.

- The instrument 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.



### Note

#### **Data Protection**

Data can be stored in the instrument. This may include personal and/or sensitive data.

Back up your data before sending the instrument for repair.

Also, be aware of the owner's or end user's own responsibility with regard to protecting personal data and any other sensitive data stored in the instrument before sending it for repair.

---

## 11 CONTACT, SUPPORT AND SERVICE

---

Gossen Metrawatt GmbH can be contacted directly and conveniently – 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: 08:00 am - 4:00 pm

Friday: 08:00 am - 2:00 PM

Or contact us by e-mail at: [info@gossenmetrawatt.com](mailto:info@gossenmetrawatt.com)

Do you prefer support by e-mail?

Measuring and Test Technology: [support@gossenmetrawatt.com](mailto:support@gossenmetrawatt.com)

Industrial Measuring Technology: [support.industrie@gossenmetrawatt.com](mailto:support.industrie@gossenmetrawatt.com)

Enquiries concerning training and seminars can also be submitted by e-mail and online:

[training@gossenmetrawatt.com](mailto:training@gossenmetrawatt.com)

<https://www.gossenmetrawatt.de/en/knowledge/webinars/>



Please contact GMC-I Service GmbH for repairs, replacement parts and calibration<sup>1</sup>:

+49 911 817718-0

[service@gossenmetrawatt.com](mailto:service@gossenmetrawatt.com)

<https://www.gmci-service.com/en/>

Beuthener Str. 41  
90471 Nürnberg  
Germany



---

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

## 12 CERTIFICATIONS

---

### 12.1 CE DECLARATION

The instrument fulfills all requirements of applicable EU directives and national regulations. We confirm this with the CE mark. The CE declaration is available upon request.

### 12.2 CALIBRATION CERTIFICATE

A calibration certificate is included with the instrument.

## 13 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 local distributors.

#### 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 labeling. 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 returned in the discharged state or with appropriate precautions against short circuiting. Further information regarding returns can be found on our website.

#### Packaging Materials

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



### WARNING

#### 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").

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.

---

**FIGURES**

---

Front Panel.....	10
Thermal Printer.....	11
User interface.....	19

---

## TABLES

---

Identifiers in this Document .....	8
Symbols Used in this Document.....	8
Definition of Terms .....	8
Symbols on the Instrument and the Included Accessories .....	11
Relevant Standards.....	12
Technical Data .....	13
Characteristic Values, Continuity Test, Protective Conductor Resistance $R_{PE}$ , Mode 2 and Mode 3 Charging Cables .....	14
Characteristic Values, Continuity Test, Protective Conductor Resistance $R_{PE}$ , Mode 2 Charging Cables .....	14
Insulation Resistance $R_{ISO}$ (single measurement), Mode 2 and Mode 3 Charging Cables .....	15
RCD Time to Trip, 10 mA, 20 mA, 30 mA AC Test .....	15
RDC-DD 6 mA DC Test (per IEC 62955) .....	15
RCD Tripping Current, AC Ramp Test.....	15
RCD Tripping Current, DC Ramp Test.....	16
EV Charging Function Test, Mode 2 Charging Cables .....	16
Resistance in PP Cable, Mode 3 Charging Cables .....	16
Voltage Measurement, Mode 2 and Mode 3 Charging Cables.....	17
Differential Leakage Current $I_{PE}$ – Protective Conductor Current (differential current measuring method), Mode 2 Cables.....	17
Function Keys and Icons .....	19
Menu Layout .....	19






© Gossen Metrawatt GmbH  
Prepared in Germany • Subject to change without notice /  
Errors excepted • A pdf version is available on the Internet

All trademarks, registered trademarks, logos, product names,  
and company names are the property of their respective  
owners.

## CONTACT US

**Gossen Metrawatt GmbH**  
Südwestpark 15  
90449 Nürnberg  
Germany

 +49 911 8602-0  
 +49 911 8602-669  
 [info@gossenmetrawatt.com](mailto:info@gossenmetrawatt.com)  
 [www.gossenmetrawatt.com](http://www.gossenmetrawatt.com)