

PRO-AB

Leakage Current Measuring Adapter

3-349-621-15
4/2.19



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1 Scope of delivery

- 1 Leakage current measuring adapter
- 1 Set of operating instructions

2 Safety Precautions

The leakage current measuring adapter is a measuring device in accordance with IEC 62353 (VDE 0750, part 1).

It may only be used for its intended purpose!

Permissible values for continuous leakage and patient auxiliary current must be taken into consideration. For safety reasons, the adapter must be checked for correct functioning before and after measurements (e.g. by means of the self-test function included in the test instrument, or perhaps by measuring ohmic input and output impedance).

Input impedance

With open output

- When fuse is OK: $1020 \Omega \pm 3\%$
- When fuse is blown: infinite

Output impedance

Range: 10:1

- With open input: $10.1 \text{ k}\Omega$
- With closed input: $10 \text{ k}\Omega$

Range: 1:1

- With open input: $11.0 \text{ k}\Omega$
- With closed input: $10 \text{ k}\Omega$

Opening of Adapter / Repair

The adapter may be opened only by authorized service personnel to ensure the safe and correct operation of the equipment and to keep the warranty valid.

Even original spare parts may be installed only by authorized service personnel.

In case the adapter was opened by unauthorized personnel, no warranty regarding personal safety, measurement accuracy, conformity with applicable safety measures or any consequential damage is granted by the manufacturer.

3 General

In order to measure contact voltage in accordance with DIN VDE 0107, part 10, as well as continuous leakage and patient auxiliary current per IEC 62353 (VDE 0750, part 1) / IEC 601-1 / EN 60 601-1:2006 (Medical electrical equipment – General requirements for basic safety), the PRO-AB leakage current measuring adapter must be used as an accessory for the **PROFITEST MXTRA** or **SECULIFE IP** test instrument.

When performing leakage current measurements, the adapter is plugged into the measurement inputs at the left-hand side of the **PROFITEST MXTRA** or **SECULIFE IP** (2-pole current clamp input and probe input) as shown in figure 1.

As specified in the standards listed above, current values of up to 10 mA may be measured with this adapter. In order to be able to fully cover this measuring range using the measurement input provided on

the test instrument (2-pole current clamp input), the measuring instrument is equipped with range switching between transformation ratios of 10:1 and 1:1. In the 10:1 range, voltage dividing takes place at the same ratio.

The internal measurement resistor (1.0 k Ω) is protected by an upstream device fuse in order to prevent overloading (see “Characteristic Values” on page 8).

The adapter’s frequency response is determined by a low-pass filter (10 k Ω / 0.015 μ F) with a cut-off frequency of 1 kHz (20 dB attenuation).

4 Preparing for Measurement

Before performing measurements, the adapter’s measurement outputs must be plugged into the measurement inputs at the left-hand side of the **PROFITEST MXTRA** or **SECULIFE IP** (2-pole current clamp input and probe input).



Figure 1: Leakage Current Measuring Adapter at the **PROFITEST MXTRA**

Either of the leakage current measuring adapter’s inputs is connected to reference earth (e.g. safe earth electrode / equipotential bonding) via a measurement cable. The metallic housing (accessible part) of the device under test is contacted with a test probe or alligator clip which is connected to the other input by means of a second measurement cable.

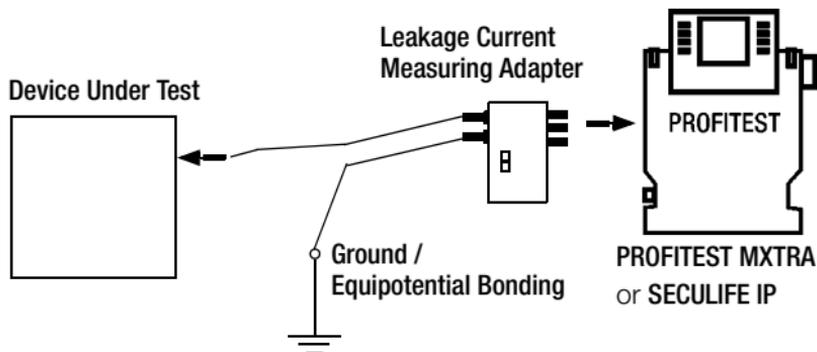


Figure 2: Test Setup for Leakage Current Measurement

5 Performing Measurement

Measurement is performed with the rotary switch in the “EXTRA” position and with “EXTRA” measurements selected as an option in the submenu.

The leakage current measuring adapter is equipped with a 1 k Ω measurement resistor and a low-pass filter with a cut-off frequency of 1 kHz. The measuring range is selected by means of a switch for the 10:1 and 1:1 ranges. The filter function is always active and cannot be deactivated with the current device design.

After completing the test setup as described in section 4, measurement can be started at the test instrument.



Attention!

The test plug should be located in the storage slot during leakage current measurement. Under no circumstances may the test plug be connected with any system components (including PE / ground potential).

First of all, the rotary selector switch at the test instrument is set to the “EXTRA” measuring function. The “TYPE” softkey is then pressed after which a selection menu appears, by means of which the “Leakage Current Measurement” sub-function is selected with the cursor keys and selection is acknowledged by pressing the enter key. The menu screen for leakage current measurement then appears.

The measurement can be started or stopped by pressing the “START” button. Leakage current measurement is a long-term measurement,

i.e. it continues until it is stopped by the user. The momentary measured value is displayed continuously during measurement.

In order to perform a measurement, the self-test must be deactivated in the menu (set the "TEST ON/OFF" function key to "OFF").

Always start with the large measuring range (10:1), unless there's no doubt that small measured values can be expected, in which case the small measuring range can be used (1:1). The measuring range must be selected at the measuring adapter, as well as in the menu using the corresponding function key ("RANGE"). It must be assured that the range settings at the adapter and at the test instrument are always identical, in order to prevent any distortion of measurement results.

Depending on the magnitude of the measured values, the range setting can, or must (in the case of overranging), be manually corrected at the measuring adapter and the test instrument.

Individual limit values can be adjusted after pressing the "Limits" function key. Exceeded limit values are indicated by the red limit value LED at the test instrument.

The menu includes a self-test function for testing the adapter, which can be selected as needed via the parameter settings. For testing as well as for performing measurements, the adapter is plugged into the sensor sockets at the **PROFITEST MXTRA** or **SECULIFE IP** test instrument. In addition to this, the two test probes at the 2-pole adapter equipped with test plug must be inserted into the measurement sockets at the leakage current measuring adapter. Polarity is irrelevant. The adapter's status is displayed by means of an appropriate message after the test routine has been completed ("OK", "Blown Fuse" or "Interruption"). A detailed description of the test routing is included in section 6.

6 Self-Test Function for Testing the Adapter

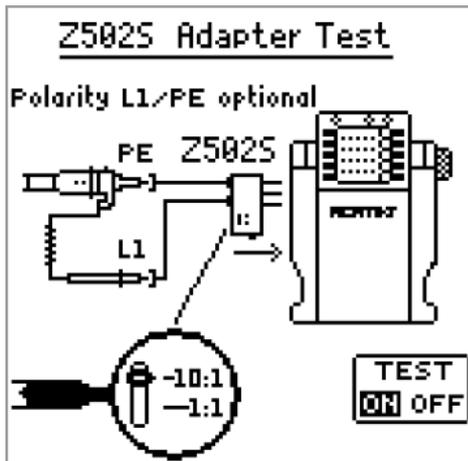
A self-test which checks the adapter's essential functions is included in the test instrument, in order to be able to assure that the leakage current measuring adapter is functioning correctly. During this self-test, the integrated fuse (see "Characteristic Values" on page 8) is tested for continuity and the measurement resistor is checked for a correct value of 1.0 k Ω within the permissible tolerance range. Two additional tests are then executed which check response characteristics, and in particular test for a correct divider ratio after switchover.

The self-test is executed automatically at the test instrument, i.e. the individual tests described above are executed sequentially and the results are displayed after testing has been completed.

6.1 Executing the Test Function at the Instrument

The performance test for the leakage current measuring adapter executed at the test instrument is conducted in accordance with the steps described below:

- 1 Plug the leakage current measuring adapter into the test instrument as shown in figure 1.
- 2 Use the 2-pole adapter at the test instrument (test plug insert), and plug the "PE test probe" and the "L test probe" into the two input jacks at the leakage current measuring adapter (polarity is irrelevant).
- 3 Within the selected measuring function (EXTRA / IL): Activate the test function by pressing the function key (TEST ON / OFF) → a pop-up window appears containing the message "Test 10:1", after which the range selector switch at the leakage current measuring adapter must be set to the "10:1" position (if this is not already the case).



- 4 Start the test sequence by acknowledging with the "START" key at the test instrument. The test sequence is then executed automatically.
- 5 After about 1 second, a pop-up window appears containing the message "Test 1:1". The range selector switch at the leakage current measuring adapter must then be set to the "1:1" position, and testing is continued automatically after once again acknowledging with the "START" key (in this case in order to acknowledge that the range has been switched).
In the event that an error should occur at the leakage current measuring adapter, this is also indicated by means of an appropriate pop-up window ("Blown Fuse" → replace the fuse and repeat self-testing / "Test Error" → faulty test execution or defective, unusable leakage current measuring adapter).
- 6 After the second test phase has been completed (after having switched to the 1:1 range), another pop-up window appears after about 1 second in which the test results are displayed ("Test OK" → test passed, leakage current measuring adapter can be used / "Test Error" → faulty test execution or defective, unusable leakage current measuring adapter, repair or replacement required).

7 Measuring Instrument Requirements

At the moment, this leakage current measuring adapter can only be used in combination with the **PROFITEST MXTRA** and **SECULIFE IP** from GMC-I Messtechnik GmbH.

8 Remediying Malfunctions

In the event that the self-test conducted with the test instrument of the manual inspection of the leakage current measuring adapter reveals a defect, either the internal fuse must be replaced or the adapter must be sent to the service department for repair, depending upon the type of defect.

A blown fuse can be replaced by the user. Proceed as follows in the event that this should become necessary:

- Remove the adapter from the test instrument and disconnect the measurement cables from the adapter.
- Remove the screw-on lid from fuse holder at the adapter.
- Carefully remove the fuse and insert a new one (use correct type only).



Attention!

Use the specified fuse type only (see “Characteristic Values” on page 8).

- After replacing the fuse, the leakage current measuring adapter must be tested for correct functioning as described above.

9 Characteristic Values

Input

Input current	0 to 10 mA
Input impedance	1020 Ω \pm 3% (\pm 5% according to EN60601-1)
Measuring impedance	1000 Ω \pm 3% (\pm 5% according to EN60601-1)
Nominal insulation voltage	250 V
Fuse	GMC-I type G fuse 5 x 20 mm, T 50 mA / 250 V (article no. 3-578-292-01), DIN 41571-3

Output

10:1 range	Output voltage: 0 to 1 V (0.1 V/mA)
1:1 range	Output voltage: 0 to 10 V (1 V/mA)
Output impedance	10 k Ω

Frequency Response

Frequency response per Low-pass filter with cut-off frequency of	EN 60601-1 1 kHz
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Temperature

Ambient temperature	0 to +40 °C
Storage temperature	-25 to +70 °C

Ambient Conditions

Operating temperature	0 to + 40 °C
Storage temperature	-25 to + 70 °C
Relative humidity	Max. 75%, no condensation allowed
Elevation	Max. 2000 m

Electromagnetic Compatibility (EMC)

Interference emission	EN 61326-1:2006, class B
Interference immunity	EN 61326-1:2006

Mechanical Design

Dimensions	W x H x D: 80 x 27 x 71 mm
Weight	Approx. 100 g
Protection	Housing: IP 40 per EN 60529 / DIN VDE 0470, part 1

10 Return and Environmentally Sound Disposal

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

In accordance with WEEE 2012/19/EU and ElektroG, we identify our electrical and electronic devices with the symbol in accordance with DIN EN 50419 which is shown at the right. Devices identified with this symbol may not be disposed of with the trash. Please contact our service department regarding the return of old devices (see address in section 11).



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

If required please contact:

GMC-I Service GmbH
Service-Center
Beuthener Str. 41
90471 Nürnberg, Germany
Phone: +49 911 817718-0
Fax: +49 911 817718-253
E-mail service@gossenmetrawatt.com
www.gmci-service.com

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

* **DAkKS** Calibration laboratory for measured electrical quantities,
D-K-15080-01-01, accredited in accordance with
DIN EN ISO/IEC 17025:2005

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

12 Product Support

If required please contact:

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

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