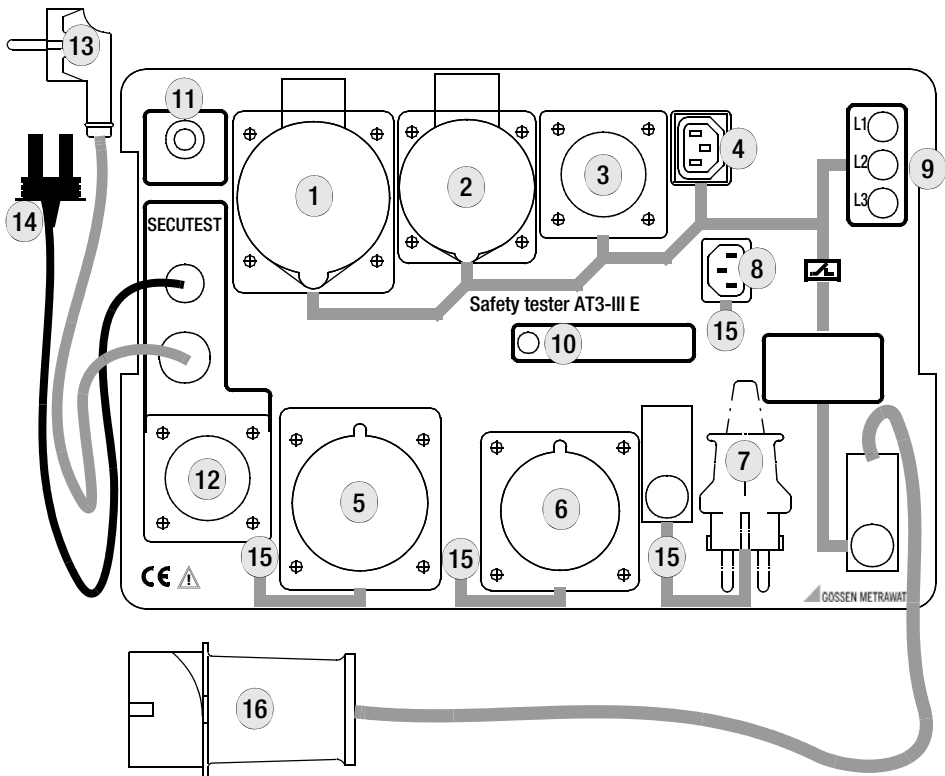


AT3-III E Safety Tester

**For Testing Single and 3-Phase Consumers
and Extension Cables in Combination with
SECUTEST.../SECULIFE ST Test Instruments**

3-349-155-37
9/11.11





Device Plugs and Outlets

- 1 CEE outlet
3P+N+PE, 32 A, 400 V
- 2 CEE outlet
3P+N+PE, 16 A, 400 V
- 3 Earthing contact outlet
1P+N+PE, 16 A, 250 V
- 4 Device outlet for cable testing
1P+N+PE, 10 A, 250 V
- 5 CEE plug for cable testing
3P+N+PE, 32 A, 400 V
- 6 CEE plug for cable testing
3P+N+PE, 16 A, 400 V
- 7 Earthing contact plug for cable testing
1P+N+PE, 16 A, 250 V
- 8 Device plug for cable testing
1P+N+PE 10 A 250 V

Indicator Displays

- 9 Mains indicator lamps for L1, L2 and L3
- 10 Function LED

Self-Test

- 11 Test key for triggering $I_{\Delta n}$ ($I_{\Delta n}$ = residual current)

Connectors for

SECUTEST... (as of version 3.1) Test Instrument

- 12 Blue earthing contact outlet for power supply to SECUTEST... test instruments
- 13 Earthing contact plug with cable, for insertion into the test socket at SECUTEST... test instruments
- 14 SECUTEST port: for insertion into sockets 2 and 3 at the SECUTEST... test instrument
- 15 Connector sockets for probe cable of the SECUTEST... test instrument (for testing cables only)

AT3-III E Power Supply

- 16 Via connector cable with CEE plug
3P+N+PE, 16 A

SECUTEST... series test instruments are not included in the scope of delivery.

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1 Applications

The portable safety tester, which can also be permanently mounted with the wall bracket, is used for measuring and testing single and 3-phase electrical devices and extension cables in combination with SECUTEST... (as of version 3.1) test instrument.

Suitable instruments are identified in the following pages with the following abbreviated designation: SECUTEST....

Testing must be performed by a qualified electrician with an appropriate test instrument after repair or modification, and is also required for periodic testing per DIN VDE 0105/0701-0702. According to these regulations, testing must be performed for protective conductor resistance,

insulation resistance, equivalent leakage current, residual current and contact current, as well as for the absence of voltage depending upon the type of device under test.

The following values are tested by the safety tester in combination with a SECUTEST... test instrument:

- Protective conductor resistance
- Insulation resistance
- Dielectric strength (HV test) *
- Earth leakage current
- Residual current
- Contact current
- Protective conductor current (AC and DC are tested separately) *
- For extension cables:
 - Short-circuit
 - Conductor continuity
- And for 3-phase extension cables:
 - Phase reversal at L1, L2 and L3 for substantiation of clockwise rotation

* Only if the utilized SECUTEST... is capable of performing this measurement

Measurement results are displayed at the SECUTEST... test instrument.

Note!

The AT3-III E safety tester is equipped with electronic error monitoring which disconnects the device under test from the mains in the event of fault currents of greater than 18 mA.

2 Safety Precautions

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

IEC 61010-1/DIN EN 61010-1/VDE 0411-1 "Regulations for electronic testers and controllers, part 1: Safety measures for electrical measuring instruments"

DIN VDE 0404 "Devices for technical safety testing of electrical equipment, parts 1 and 2."

EN 61326-1 product standard EMC requirements. Safety is only assured for the user and the safety tester when used for its intended purpose in combination with SECUTEST... test instruments. In order to maintain flawless technical safety conditions, and to assure safe use, it is imperative that you read these operating instructions thoroughly and carefully before placing your safety tester into service, and that you follow all instructions contained herein.

Due to the fact that all tests performed with the AT3-III E must be executed in combination with a SECUTEST... test instrument, you must also read the safety precautions and liability limitations included in the operating instructions for this instrument.

Observe the following safety precautions:



Attention!

If the red LED (10) remains lit even after the AT3-III E has been disconnected from the mains and connected once again, the safety tester is defective. If this is the case, the AT3-III E must be removed from service and repaired before it is used again.

- In order to assure compliance with technical safety requirements, the AT3-III E safety tester should only be repaired by the manufacturer.
- The AT3-III E must be disconnected from the mains and from the SECUTEST... test instrument before it is opened.

Measurements within electrical systems are prohibited!

- The safety tester's 16 A CEE 3P+N+PE (16) plug may only be connected to 230/400 V 50 Hz mains power. In order to avoid undesired shutdown of defective devices under test, the electrical circuit for the device under test should be separately fused.
- Before connecting the AT3-III E to the mains, the SECUTEST... test instrument must first be connected to the AT3-III E.



Attention!

Tests during which mains power is applied may only be selected with the function selector switch at the SECUTEST... test instrument after safety class I devices under test have passed the protective conductor test.

If the protective conductor is defective (interruptions / reversed conductors), line voltage may be present at the housing of a defective device under test, at the earthing contacts of the test plugs (4 – 7) and at the safety socket (15)!

- For **REASONS OF SAFETY**, the device under test must be turned off before switching to "MAINS" so that dangerous devices under test (e.g. a circular saw) can only be switched on intentionally.
- Be prepared for the occurrence of unexpected voltages at devices under test (e.g. due to charged capacitors).

- Before connecting the device under test to the safety tester, subject it to a thorough **VISUAL INSPECTION** first. Damaged devices under test must be repaired prior to testing.
- Only extension cables which have been plugged into the test outlets (1 – 4) at the safety tester may be connected to the device plugs (4 – 7) at the safety tester.
- Due to safety tester design in accordance with DIN VDE 0404, the "PE" contacts at the outlets (1 – 4) are only connected to the mains protective conductor when the SECUTEST... test instrument has been set for testing with mains power.
- If the safety tester and/or its connector cables demonstrate visible damage, no longer function, have been stored for a lengthy period of time under unfavorable conditions or have been subject to excessive stress during transport, it must be assumed that hazard-free operation is no longer possible. Remove the AT3-III E from service and secure it against inadvertent use in such cases.

Meanings of Symbols on the Instrument



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



Indicates EC conformity



This device may not be disposed of with the trash. Further information regarding the WEEE mark can be accessed on the Internet at www.gossenmetrawatt.com by entering the search term 'WEEE'.

3 Connecting the Safety Tester to the Mains

The following connections must first be established before connecting the safety tester to the mains:

- a) Insert the mains plug from the SECUTEST... into the earthing contact outlet (12) at the AT3-III E.
- b) Insert the earthing contact plug (13) from the AT3-III E into the test socket at the SECUTEST....
- c) In order to measure protective conductor current, connect the SECUTEST port (14) of the AT3-III E into sockets 2 and 3 at the SECUTEST....
- d) In order to test extension cables, insert the test probe at the end of the SECUTEST... probe cable into the socket (15) at the AT3-III E.

Connect the safety tester to 230/400 V mains power. The safety tester now performs a self-test. If the tester is intact, the red LED lights up briefly.

4 Connecting a Device Under Test to the Safety Tester

After the device under test has passed a visual inspection and before connecting it to the appropriate plug or socket at the safety tester, as well as before each new test, the SECUTEST... test instrument must be returned to its initial setting depending upon the type of test.

Connect the device under test to the safety tester and switch all of its functions on, making sure that, for example, thermostat contacts are closed etc. Always measure protective conductor resistance first for safety class I devices, because if the protective conductor is defective, insulation resistance, equivalent leakage current and protective conductor current cannot be measured, and high-voltage testing cannot be performed.

5 Testing Devices

Perform testing in accordance with the operating instructions included with the SECUTEST... test instrument!

Observe the following instructions when using the SECUTEST... in combination with the AT3-III E during automatic test sequence :

5.1 Measuring Protective Conductor Resistance

The clip or the test probe at the end of the probe cable from the SECUTEST... test instrument must be connected to the housing of the device under test such that good contact is assured.

Note!

Connector cable (13) resistance is 0.07 Ω . In order to compensate for this error, proceed as described in the operating instructions included with the SECUTEST... test instrument under Individual Measurements → Protective Conductor Resistance → Zero Balancing.

If the AT3-III E is out of use for a prolonged period of time, the earthing contact faces of the plug-and-socket connectors and the connecting plug (13) may corrode, thus leading to slightly elevated resistance measurement values. In this case, plug and unplug the connections several times until the expected values are reached again.

5.2 Measuring Insulation Resistance and Equivalent Leakage Current

L1, L2, L3 and N (short-circuited) are measured against PE during insulation testing.

5.3 Measuring Protective Conductor Resistance with the Residual Current Method

The DUT is placed into operation during residual current measurement. The L1, L2 and L3 mains lamps light up at the AT3-III E during this test.

This measurement may not be performed on safety class I devices until after the protective conductor test has been passed in accordance with chapter 5.1.

- ☞ Turn off the device under test.
- ☞ Select the I_L -DI measurement setting at the SECUTEST...
- ☞ The line contactor switches mains power to the test outlets (1 – 4) at the AT3-III E. Signal lamps L1, L2 and L3 indicate the presence of line voltage.
- ☞ Now switch on the DUT (as described in chapter 2).

Contact current is measured by means of residual current measurement for safety class II devices, and safety class I devices with accessible conductive parts which are not connected to the protective conductor. Contact all accessible conductive parts at the device under test with the test probe at the end of the probe cable from the SECUTEST... to this end.

These measurements must be performed with the plug in both positions for DUTs with earthing contact plugs!

Note!

This test must be performed in accordance with the specified test sequence. **Mains power must be indicated by signal lamps L1, L2 and L3 (9) before switching the device under test on.**

The test outlets (1 – 4) are disconnected from the mains by the safety shutdown function included with the AT3-III E for devices under test with fault currents of greater than 18 mA during measurement of protective conductor current with residual current. Mains power may be disconnected if the AT3-III E is used in systems protected with RCCBs rated less than 30 mA. Mains signal lamps L1, L2 and L3 (9) go out. The function LED (10) blinks.

Disconnect the AT3-III E from the mains to reset. Reconnect the AT3-III E to the mains. The safety tester is once again ready for use after a brief self-test.

The short-circuit test displayed at the SECUTEST... cannot be performed due to safety impedances which have been integrated into the AT3-III E for testing 3-phase devices.

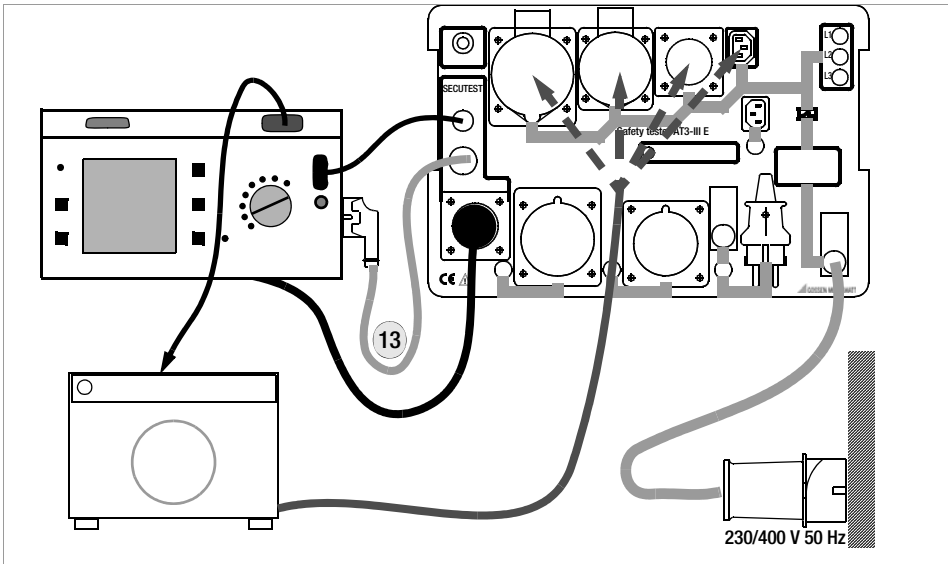


Figure 1 Connecting Single and 3-Phase Devices to the AT3-III E and the SECUTEST...

5.4 Testing of Differential Current during Automatic Testing per Test Standard SECUTEST SII / SIII / SECULIFE ST:

- Initiate the standard-specific setup.
- Select „Sequence“ and deactivate the automatic test method.

During testing according to standard, a menu appears which proposes two options, i.e. equivalent leakage current and differential current.

- Select „Differential current“.

SECUTEST S2N+ / S2N+10 / S2N+W:

- Select switch position „active“ here.

Line voltage is applied to the DUT via the AT3-III E tester. The differential current of the DUT is measured while allowing for a function test of the DUT.

5.5 High-Voltage Test



Caution: High-Voltage!

Prior to performing the test remove the probe including probe tip from sockets 4 and 5 of the SECUTEST.... Do not touch the DUT, the device plug and the earthing contact cable of the AT3-III E during the voltage test.

Do not unplug the AT3-III E connector cable (13) from the test socket at the SECUTEST...: the device under test may still be charged, and high voltage may be present at the earthing contact plug.

During this test, L1, L2, L3 and N (short-circuited) are measured against PE with the preset high voltage (**max. 1.5 kV!**).

Please observe all additional safety precautions on performing the test as well as the note on the exclusion of liability in the operating instructions of the SECUTEST... test instrument.

6 Testing Extension Cables

The SECUTEST port (14) may remain connected to sockets 2 and 3 at the SECUTEST... during this test. Perform testing in accordance with the operating instructions included with the SECUTEST... test instrument!

Observe the following instructions when using the SECUTEST... in combination with the AT3-III E:

The test probe at the end of the probe cable of the SECUTEST... must first be connected to the respective socket (15) (probe 1 to 4) of the associated plug at the AT3-III E. In order to test, only connect the plug and socket at the ends of the respective extension cable to be tested to the associated device plug and socket at the AT3-III E.

SECUTEST SII / SIII / SECULIFE ST:


Select the following test sequence from the initial window at the SECUTEST... test instrument:

Extension cable: "X" WITH EL1

Note!

Testing cables by means of the AT3-III E is only possible with this setting.

SECUTEST S2N+ / S2N+10 / S2N+W:

- Select the following switch position:
VDE 0701-0702 

6.1 Measuring Protective Conductor Resistance

Testing is performed according to the instructions included in chapter 5.1.

6.2 Measuring Insulation Resistance

L1, L2, L3 and N (short-circuited) are measured against PE during insulation testing. Due to good cable insulation, a value of 2 MΩ should not be significantly exceeded.

6.3 Testing for Short-Circuits, Interruptions and Reversed Conductors

Testing of single-phase cables is performed as described in the instructions included with the SECUTEST... under (optional EL1 adapter).

The EL1 adapter accessory is included in the AT3-III E as a subassembly.

Note:

When testing device cable connections (socket 4/ plug 4) polarity L/N is not being checked.

Testing of 3-phase cables is the same, except that it also includes an additional test for reversing of conductors L1, L2, L3 and N.

3-phase cables have only passed testing for short-circuits, interruptions and reversed conductors (clockwise rotation) if the following test result appears: "Cable OK".

Messages such as "interruption / short-circuit" always indicate that the cable is defective. If this is the case, conductors L1, L2, L3 and N may also be reversed. The actual defect must be determined.

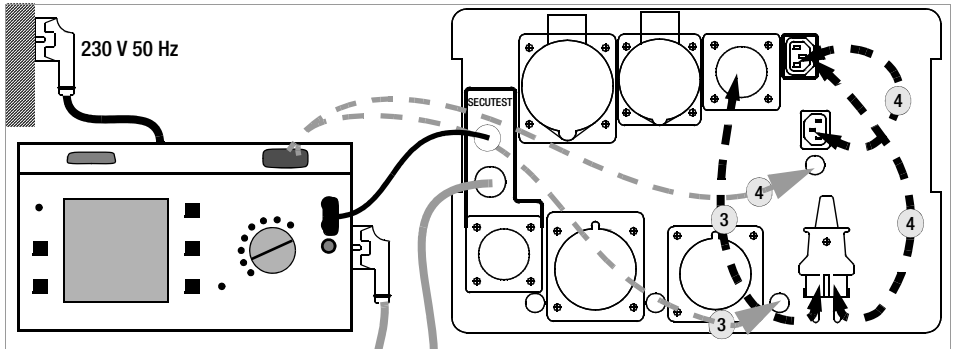


Figure 2 Connecting Single Phase Extension Cables to the AT3-III E with the SECUTEST...

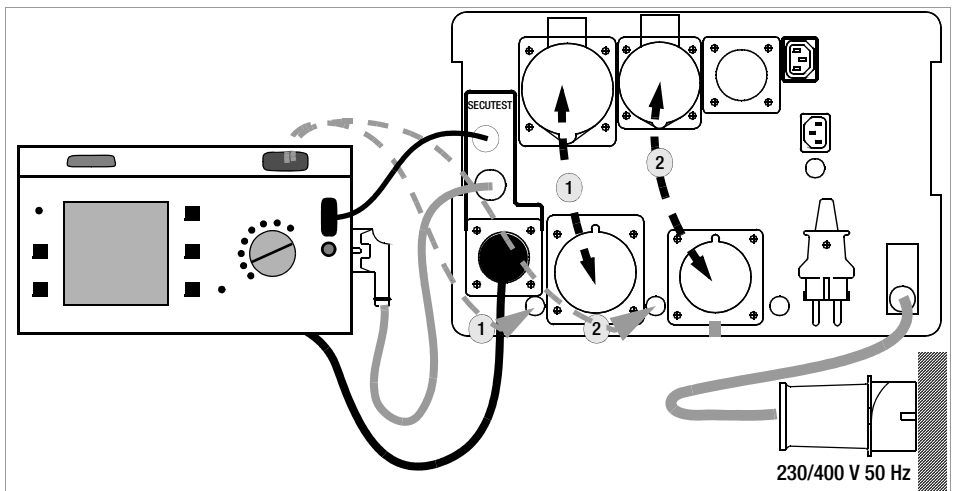


Figure 3 Connecting 3-Phase (or Single Phase) Extension Cables to the AT3-III E with the SECUTEST...

7 Self-Test

Because it is so easy to perform, the self-test should be conducted before each use of the AT3-III E.

Please be careful to ensure that the case of the AT3-III E is not being contacted with devices under PE or earth potential during the self-test.

Performing the Protective Conductor Test

- ⇨ Insert the mains plug from the SECUTEST... into the earthing contact outlet (12) at the AT3-III E.
- ⇨ The earthing contact plug (13) and the SECUTEST port (14) of the AT3-III E may not be plugged into the SECUTEST....
- ⇨ Connect the AT3-III E to mains power.
- ⇨ Set the SECUTEST... to the protective conductor test individual measurement (R_{SL}/R_{PE}).
- ⇨ Contact protective conductor potential at the mains system which is supplying power to the AT3-III E with the test probe at the end of the probe cable from the SECUTEST..., e.g. at the earthing contact of an earthing contact outlet. If an excessively high value or interruption is indicated, the protective conductor is interrupted.

The AT3-III E safety tester must be disconnected from the mains, and the error in the electrical system or the safety tester must be corrected. The AT3-III E is equipped with a "Trigger $I_{\Delta n}$ " test key in order to allow for testing the included $I_{\Delta n}$ safety shutdown function at any time.

Performing the $I_{\Delta n}$ Self-Test

- ⇨ Remove the device under test (device or extension cable).
- ⇨ Set the SECUTEST... to individual measurement.
- ⇨ SECUTEST... (as of version 3.1): Select the "DI current" sub-menu (residual current).
- ⇨ Signal lamps L1, L2 and L3 indicate the presence of line voltage.
- ⇨ Activate the "Trigger $I_{\Delta n}$ " key (11).
- ⇨ The AT3-III E disconnects mains power from the outlets (1 – 4).
- ⇨ Signal lamps L1, L2 and L3 go out.
- ⇨ The function LED (10) blinks. Disconnect the AT3-III E from the mains to reset. Reconnect the AT3-III E to the mains. The safety tester is once again ready for use after a brief self-test.

Note!

If mains power is not switched during this test, the fuses in the AT3-III E may have blown. If the AT3-III E still does not function

correctly after replacing the fuses, it must be removed from service and repaired. Measurement is no longer possible!

8 Technical Data

Equivalent Leakage Current Measuring Function

Measuring Range	0.00 ... 21.00 mA
Intrinsic Uncertainty	$\pm(5\% \text{ of rdg.} + 5 \text{ d}) > 10 \text{ d}$
Measuring Range	20.1 ... 120.0 mA
Intrinsic Uncertainty	$\pm(15\% \text{ of rdg.} + 5 \text{ d}) > 10 \text{ d}$

Residual Current Measuring Function

Measuring Range	0 ... 20 mA
Transformation Ratio	1 V per 10 mA
Intrinsic Uncertainty	$\pm(5\% \text{ of rdg.} + 0.05 \text{ mA})$

Nominal Ranges of Use

Line Voltage	
L1/L2/L3/N	207 ... 253 V AC
Frequency	49 ... 51 Hz
Temperature	0 °C ... +40 °C
Line Voltage	
Waveshape	sinusoidal

Reference Conditions

Ambient Temperature	+23 °C \pm 2 K
Relative Humidity	50% \pm 5%
Line Voltage	230 V/400 V \pm 10%
Frequency	
of Measured Quantity	50 Hz \pm 0.2%

Ambient Conditions

Operating Temperatures	-10 ... +40 °C
Storage Temperatures	-25 ... +60 °C
Humidity	max. 75%, no condensation allowed
Elevation	up to 2000 m

Power Supply

Nominal Line Voltage	3-230/400 V/50 Hz/CAT II
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Connection only permissible with overload protection device $I_n = 16 \text{ A}$ $I_2 \leq 1.45 I_n$

Electrical Safety

Standard	DIN VDE 0404-1/-2:2002-5 IEC/EN 61010-1:2001
Contamination degree	2
Safety Class	I
Residual Current	
Shutdown (4-pole) at	approx. 18 mA
Device Fuses	F0315 L250V
5 x 20	T32mA L 250 V DIN EN 60127-2

Mechanical Design

Protection case: IP40
terminals: IP20

Extract from table on the meaning of IP codes

IP XY (1 st digit X)	Protection against foreign object en- try	IP XY (2 nd digit Y)	Protection against the penetration of water
0	not protected	0	not protected
1	≥ 50.0 mm dia.	1	vertically falling drops
2	≥ 12.5 mm dia.	2	vertically falling drops with encl- sure tilted 15°
3	≥ 2.5 mm dia.	3	spraying water
4	≥ 1.0 mm dia.	4	splashing water

Dimensions 405 x 300 x 220 (mm)
with lid
Weight approx. 6.7 kg

Electromagnetic Compatibility

Intrinsic Uncertainty EN 61326-1:2006
class B
Intrinsic Uncertainty EN 61326:2006

9 Maintenance

Front Panel / Housing

No special maintenance is required for the housing. Keep outside surfaces clean. Use only a cloth for cleaning, which has been slightly dampened with water. Avoid the use of cleansers, abrasives and solvents.

Note!

According to DIN VDE 0701-0702, measuring instruments used for periodic testing must be tested and calibrated in accordance with the manufacturer's specifications on a regular basis. Depending upon usage, the manufacturer recommends an interval of 1 to 3 years for this test instrument.

Device Return and Environmentally Compatible 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 not subject to the RoHS directive.

We identify our electrical and electronic devices (as of August 2005) in accordance with WEEE 2002/96/EG and ElektroG with the symbol shown to the right per DIN EN 50419.

These devices may not be disposed with the trash. Please contact our service department regarding the return of old devices.



10 Repair and Replacement Parts Service, Calibration Center and Rental Instrument Service

If required please contact:

GMC-I Service GmbH
Service-Center
Thomas-Mann-Str. 20
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.

11 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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