GOSSEN METRAWATT

# AT16-DI

## 3-Phase 16 A Current Adapter with Residual Current Logging

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## 1 Applications

Devices which are equipped with a 5-pole, 16 A / 6 h CEE plug can be quickly and efficiently tested with the **AT16-DI** CEE adapter. Connect the adapter to a test instrument designed for testing portable devices in accordance with DIN VDE 0701-0702 in order to perform testing per DIN VDE 0750/IEC 601, which is equipped with an earthing contact outlet for connecting the device under test, and is capable of directly measuring protective conductor current.

The adapter is especially well suited for connection to **SECUSTAR FM+** and **SECUTEST...** test instruments.

The following tests can be performed on devices with CEE plugs with the help of the **AT16-DI** adapter:

- Testing of protective conductor continuity
- Insulation test
- Measurement of protective conductor resistance with the following methods: equivalent leakage current / residual current / direct
- Function test

**Attention!**
**Application Restrictions**
The **AT16-DI** CEE adapter may only be used for test purposes in combination with a **SECUSTAR FM+** or **SECUTEST...** test instrument. Other use of the adapter, in particular for continuous connection of 3-phase current devices to 3-phase electrical systems, is not permissible under any circumstances!
In any case, maximum permissible conventional thermal current is 16 A AC per phase.

## 2 Safety Features and Precautions

The CEE adapter is manufactured and tested in accordance with safety regulations IEC 61010-1 / EN 61010-1 / VDE 0411-1.

When used for its intended purpose, safety of the operator, as well as that of the instrument, is assured.

**The instrument may only be connected to electrical systems (TN, TT or IT) with a maximum of 240 V which complies with applicable safety regulations (e.g. IEC 60346, VDE 0100) and is protected with a fuse or circuit breaker with a maximum rating of 16 A.**

Carefully read the operating instructions before use, in particular the operating instructions included with the test instrument with which you intend to use the adapter. Follow all instructions contained therein.

The adapter may only be used for testing devices with 5-pin CEE plugs and current consumption of no greater than 3 x 16 A (AC-1).

**The AT16-DI CEE adapter may not be used:**

- With open housing
- If external damage is apparent
- If the CEE outlet or the connector cable is damaged
- After excessive stress, i.e. if the load capacities specified in the technical data have been exceeded
- After a long period of storage under unfavorable conditions (e.g. humidity, dust or extreme temperature)

**Meanings of Symbols on the Instrument**

Warning concerning a point of danger (attention, observe documentation!)

**CAT II** Measuring category II device

CE Conformity Marking
Harmlessness with regard to interference emission and interference immunity in accordance with EN 61 326-1

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 AT16-DI

Before testing can be started, the **AT16-DI** must be connected to the test instrument and to mains power. Proceed as follows:

- ➪ Connect the mains cable from the test instrument to the earthing contact outlet labeled “Tester Outlet” included on the **AT16-DI**.
- ➪ Connect the earthing contact cable from the **AT16-DI** to the test/mains outlet at the test instrument. The connection at the **AT16-DI** is labeled “to test instrument test/mains outlet”.
- ➪ Plug the CEE connector cable from the **AT16-DI** into a suitable 16 A / 6 h CEE outlet within your electrical installation. The connection at the **AT16-DI** is labeled “Mains, 3~ 400 V, 16 A 50...60 Hz”. As of this point in time, the **AT16-DI** and the test instrument are supplied with electrical power.
- ➪ Finally, connect the device under test to the CEE outlet at the **AT16-DI**. The outlet is labeled “Test/mains outlet for DUT connection”.

Testing can now be started (see section 4).

## 4 Testing with the AT16-DI

You can now execute all tests which are otherwise possible with the test instrument, and which are supported by the **AT16-DI** adapter, on devices with CEE plugs just as you would for devices with earthing contact plugs. Proceed as described in the operating instructions for the test instrument to this end.

**The following characteristics of the AT16-DI adapter must be taken into consideration when performing tests with the SECUSTAR FM+ or the SECUTEST... test instrument:**

- During insulation or equivalent leakage current testing, the three phase terminals (L1, L2 and L3) and the neutral terminal (N) at the DUT are short circuited, and testing is then executed.
- When testing protective conductor resistance, measured protective conductor resistance is increased by an amount which results from the protective conductor system of the **AT16-DI** CEE adapter itself.
  If the adapter has not been used for a long period of time, contact resistances in the internal relays may increase.
  If this is the case, the relays should be activated several times.
  Connect the adapter to the **SECUSTAR FM+** or the **SECUTEST...** to

this end, start the function test (orange lamp on the **AT16-DI** lights up) and activate the function selector switch ($\Delta I/I_{direct}$) several times at a frequency of 1 to 2 seconds. In case of doubt, i.e. if measurement results are close to the permissible limit value, measure the adapter's protective conductor resistance at the PE terminal of its CEE outlet, and subtract the results from the measured value obtained for the DUT-adapter system (use zero balancing in the **SECUSTAR FM+** or the **SECUTEST...** for this purpose).

- In order to measure protective conductor resistance using the residual current method, set the measurement type selector switch to $\Delta I$ (residual current). During 3-phase residual current measurement, the resulting residual current is transmitted via the protective conductor to the test instrument as protective conductor current, and recorded.
- In order to measure protective conductor current **directly**, set the measurement type selector switch to $I_{direct}$.

**Note**
When used together with the **SECUSTAR FM+** or the **SECUTEST...**, current can only be acquired with special test sequences which measure protective conductor current using the "direct protective conductor current" or the "earth leakage current" method. When creating test sequences of this sort, the operating instructions for the **SECUSTAR FM+** or the **SECUTEST...** must be observed.

- Before executing the function test, or any other tests for which the DUT is supplied with mains power and must be placed into operation, it must be assured that there are no short-circuits in the DUT between phase conductors L1, L2 and L3 and/or neutral conductor N! Nonobservance may result in damage to, or destruction of the **AT16-DI** adapter, and possibly the device under test as well!
- The DUT's power and current consumption values cannot be determined during function testing with the **AT16-DI** adapter. The displayed values indicate power consumption for the **AT16-DI** adapter.
- Always start the test at the test instrument (orange lamp on the **AT16-DI** lights up) before switching the device under test on! In the case of extreme initial current at the DUT, nonobservance of this startup sequence may result in damage to, or destruction of the **AT16-DI** adapter!

**Attention!**
**Disabling of Protective Devices – Max. Current Consumption**
As soon as the orange lamp at the **AT16-DI** lights up, the terminals at the mains outlet from which power is supplied are connected to the test/mains outlet at the **AT16-DI** adapter without the use of a fuse or any other protective devices. Make sure that only devices designed for use with 3-phase current with a **maximum current consumption of 3 x 16 A (AC-1)** are connected to this outlet.

**Attention!**
**Testing the DUT for Short-Circuits**
Short-circuiting of two or all three phases of the device under test cannot be detected by the test instrument until after residual current testing has been executed! In such cases, the **AT16-DI** adapter may be severely damaged as a result of current surges when this test is executed!
**Before connecting a device to the AT16-DI, make sure that there are no short-circuits between the DUT's phases by means of appropriate testing, for example with a continuity tester!**

**Attention!**
**Connection of the DUT in Correct Phase Sequence**
In particular after repairing 3-phase devices or connecting new CEE plugs to such devices, make sure that the phases are connected in the correct sequence.

**Attention!**
**Test Sequence – Initial Current Problem – Starting the Test**
Always start the test at the test instrument (orange lamp on the **AT16-DI** lights up) before switching the device under test on!
**– Ending the test**
Switch the DUT off first, and then stop testing at the test instrument. In the case of extreme initial current at the DUT or inductivity within the electrical circuit, nonobservance of this sequence may result in damage to, or destruction of the **AT16-DI** adapter!

## 5 Characteristic Values

### Electrical Safety

| | |
|---|---|
| Protection class | I per IEC 61010-1/EN 61010-1/VDE 0411-1 |
| Operating voltage | 300 V |
| Test voltage | 2.2 kV |
| Current-carrying capacity | 16 A / 6 h 3-phase current |
| Intrinsic connected load "Mains active" | 7 VA, cos φ ~ 0.4 |
| Measuring category | II |
| Pollution degree | 2 |
| EMC | EN 61326-1 |

### Residual Current

| | |
|---|---|
| Measuring range | 0.08 to 10.0 mA AC |
| Inherent error | 4% rdg. ±40 µA |
| Operating error | 6% rdg. ±60 µA |

### Mechanical Design

| | |
|---|---|
| Protection | Housing: IP 40, connections: IP 20 |
| Dimensions | W x H x D: 290 x 120 x 105 mm (without cables and grommets) |
| Weight | 2.0 kg |


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