

BENNING MA 2-16

CEE 5-Pin Measuring Adapter

Instruction Manual

Translation of German original version



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1. Application

With the **BENNING MA 2-16** measuring adapter you can test devices equipped with a 5-pin 16 A/ 6h CEE plug quickly and efficiently. To do this connect the adapter to a tester for testing portable devices in compliance with DIN VDE 0701-0702 or for testing in compliance with DIN EN 62353 (VDE 0751-1) or DIN EN 60974-4 (VDE 0544-4), that has only a shock-proof socket for connecting to the test sample and that can measure protective conductor current directly.

The adapter is suitable for connection to the appliance testers **BENNING ST 755** and **BENNING ST 760**.

The following tests can be carried out with the measuring adapter on appliances with CEE plugs:

- Test of the continuity of the protective conductor system
- Test of insulation
- Measurement of the protective conductor current with the method:
direct measurement method/ differential and alternative leakage current
- Functional test



Attention! Restriction of the application

The **BENNING MA 2-16** measuring adapter may only be used for testing purposes in combination with tester types **BENNING ST 755** and **BENNING ST 760**. Any other use of the adapter, in particular for permanent connection of three-phase appliances to a three-phase mains, is not permissible under any circumstances!

The maximum permissible thermal continuous current in all cases is 16 A AC per phase.

2. Safety features and measures

The measuring adapter is constructed and tested in compliance with the safety regulations IEC 61010-1/ EN 61010-1/ VDE 0411-1. The safety of users and the device is guaranteed if it is used for its intended purpose.

The device may only be connected to a TN, TT or IT power supply of max. 240 V/ 400 V, which complies with the applicable safety regulations (e. g. IEC 60346, VDE 0100) and is secured with a maximum nominal current of 16 A.

Before use please read this instruction manual carefully and completely and in particular the instruction manual of the tester with which you intend to use this measuring adapter. Observe and follow all points included in the instructions.

The adapter may only be used for testing appliances with a 5-pin CEE plug and a maximum current consumption of 3 x 16 A (AC-1).

The measuring adapter must not be used:

- with the housing open
- if there are any signs of external damage
- if the CEE socket or connection cable are damaged
- after severe overuse, i. e. exceedance of the load limits in the technical specifications
- after storage over a longer period of time under unfavourable conditions
(e. g. humidity, dust, temperature)

Meanings of the symbols on the device



Attention: Observe documentation!

This symbol means that the instructions in the instruction manual must be observed in order to prevent danger.

CAT II

Device in the measuring category II



Earth (voltage to earth)



This symbol on the measuring adapter means that the measuring adapter conforms to the EU directives.



The device must not be disposed of with household waste. You will find more information about the WEEE symbol on the Internet under the search term WEEE.

3. Connecting the BENNING MA 2-16

Before you can start testing, you have to connect the **BENNING MA 2-16** to your tester and the mains. To do this proceed as follows:

- Connect the mains cable of your tester to the shock-proof socket on the **BENNING MA 2-16** marked "mains connection tester".
- Connect the protective contact line of the **BENNING MA 2-16** to the test/ mains socket of your tester. The connection on the **BENNING MA 2-16** is marked "for test/ mains socket tester".
- Connect the CEE connection lead of the **BENNING MA 2-16** to a suitable CEE socket 16 A/ 6h in your electrical installation. The connection on the **BENNING MA 2-16** is marked "3~/ N/ PE, 400 V, 50-60 Hz, 16 A". From this time onwards the **BENNING MA 2-16** and your tester will be supplied with electrical power.
- Finally connect your test sample to the CEE socket of the **BENNING MA 2-16**. The socket is marked "Test/ mains socket test sample 16 A".

You can now start the tests. (s. Chapter.4)

4. Testing with the BENNING MA 2-16

All tests that you can carry out with your tester on devices with a shock-proof plug and that are supported by the **BENNING MA 2-16** adapter can now be carried out in an identical manner on devices with a CEE plug. Proceed here as indicated in the operating manual of your tester.

The following special features of the **BENNING MA 2-16** adapter must be taken into account during testing with the tester.

- In the case of an insulation or alternative leakage current test, the three phase connections L1, L2, L3 and N of the test sample are short-circuited in the adapter and then the tests carried out.
- In the case of a protective conductor resistance test, the value of the measured protective conductor resistance is increased by the proportion that is caused by the protective conductor system of the **BENNING MA 2-16** measuring adapter itself.

If in doubt, i. e. in cases where the results of a measurement are close to the permissible limit value, measure the protective conductor resistance of the adapter on the PE connection of its CEE socket and subtract this value from the measured value of the system.

- To measure the protective conductor current with the differential current method set the measurement type switch to **ΔI** (Differential Current). In the case of a 3-phase differential current measurement, the resulting differential current is transmitted to the tester and recorded as protective conductor current on the protective conductor.
- To measure the protective conductor current directly set the measurement type switch to **I_{direkt}**
- Before carrying out the functional test and all tests in which the test sample has to be supplied with supply voltage and put into operation, it is imperative that there are no short circuits in the test sample within the phases L1, L2, L3 and the neutral conductor N! Non-observance could result in the **BENNING MA 2-16** measuring adapter, or even your test sample, being damaged or destroyed!
- The values for the power and current consumption of the test sample cannot be measured with the **BENNING MA 2-16** adapter within the scope of the functional test. The values displayed relate to the power consumption of the **BENNING MA 2-16** adapter.



Attention!
Sequence of the test –
Problem starting currents
Starting the test

To put your test sample into operation it is imperative that you first start the test of your tester (orange lamp on the **BENNING MA 2-16** illuminated) and then switch on your test sample!

Ending the test

It is imperative that you first switch off the test sample and then end the test on your tester.

In the case of extreme starting currents of your test sample or in the case of inductances in the circuit, non-observance of this sequence could result in the **BENNING MA 2-16** adapter being damaged or destroyed!



Attention!
Short circuit test of the test sample

A short circuit of two or all three phases in the test sample cannot be determined by the tester before the differential current test! In such a case the **BENNING MA 2-16** adapter can be severely damaged by the arising current surge when carrying out this test!

For this reason test that there is no short circuit between the phases of the test sample, e. g. with a continuity tester, before connecting a device to the BENNING MA 2-16!



Attention!
Correct phase connection of the test sample

Take care, especially after a repair of three-phase devices or reconnection of a CEE plug, that the phases are connected in the correct sequence.



Attention!
Interruption of the protective devices – max. current consumption

As soon as the orange signal lamp on the **BENNING MA 2-16** lights up, the connections of the supplying mains socket are unprotected or a different type of protective element is connected to the test/mains socket of the measuring adapter. Take care that only devices designed for a three-phase current with a max. current consumption of 3 x 16 A (AC-1) are connected to this socket.

5. Technical Data

Nominal voltage:	3 x 400 V ± 10 %
Current carrying capacity	16 A three-phase current
Intrinsic connected load	
“Mains active”	7 VA, cos φ ~ 0.4
Protection class:	I in compliance with: IEC 61010-1/ EN 61010-1/ VDE 0411-1
Measuring category	II
Contamination level	2
EMC	EN 61326-1

Differential current

Measuring range	0.08 mA ... 10.0 mA AC
Intrinsic deviation	4 % of measured value ± 40 µA
Operating measurement deviation	6 % of measured value ± 60 µA

Direct measurement method

See tester specifications

Mechanical design

Protection type:	Housing IP40, connections IP20
Dimensions	L x W x H: 290 mm x 120 mm x 105 mm (without cables and sleeves)
Weight	2.0 kg
Part number	044160

BENNING

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