



## MRT1 – Test Unit

(August 2003)

Manual MRT1 (Revision New)

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## Contents

<b>1. Summary and applications</b> .....	<b>4</b>
<b>2. Functions</b> .....	<b>5</b>
2.1 Connections .....	6
2.2 Current test .....	8
2.2.1 Secondary current injection test of a HIGH TECH LINE-relay .....	9
2.2.2 Checking the actual current values .....	10
2.3 Voltage test .....	11
2.3.1 Secondary voltage injection test of a HIGH TECH LINE-relay .....	12
2.3.2 Checking actual voltage values.....	13
<b>3. Terminal connections</b> .....	<b>14</b>
<b>4. Technical data</b> .....	<b>16</b>
<b>5. Order form</b> .....	<b>17</b>

# 1. Summary and applications

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The MRT1 is a test unit for all relays of the HIGH TECH LINE. By means of this test unit the functions of the relay, as well as the set values and actually measured values can be checked.

The MRT1 can be mounted side by side with a HIGH TECH LINE relay and can be used as a permanent measuring point after wiring accordingly, or as 19" plug-in types, it is simply plugged in beside the installed relay. For this a plug-in section must be reserved beside the relay to be checked, with the respective HIGH TECH LINE terminal block being fixed there. If not used by a plugged-in MRT1, this section can be closed with a delivered cover plate.

## 2. Functions

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Basically, the test unit MRT1 consists of two components: the basic unit MRT1-B and the test insert MRT1-T. In case of the individual housing design (module type D), the basic unit consists of an empty housing, a terminal block with integrated shorting links and a front cover plate. In case of the 19" rack mounting design, the basic unit consists of a terminal block with integrated shorting links and a cover plate (12 TE). The test insert MRT1-T fits into both, the individual housing, as well as into the 19" mounting rack. This test insert leads the connections from the terminal block of the basic unit to the front of the device via 4mm test sockets. In case the test unit MRT1 is used only occasionally for testing relays, a basic unit MRT1-B can be installed beside each HIGH TECH LINE - relay to be tested, and one common test insert can be used for subsequent testing of several HIGH TECH LINE - relays. The integrated shorting links of the basic units allow plugging in and out of the test inserts also during operation of the plant, without destroying connected current transformers. Please make sure that in this case the delivered short-circuiting plugs are plugged in according to picture 2.3.

If the test unit is used as central measuring point for the equipment, the test insert must stay in the basic unit.

## 2.1 Connections

As is the case for HIGH TECH LINE - devices, the contacts of series A and B are equipped with automatic short-circuiters. The terminals of series D are not reserved for specific functions. Any functions can be assigned to them, i.e. auxiliary voltages or fault alarms of the HIGH TECH LINE - relays. The MRT1 test unit is equipped with a SUB-D-plug connection, which leads the RS 485 interface of the HIGH TECH LINE - relays to the front plate for easier handling. The MRT1 of its own has no interface.

### Note!

If current transformers are connected to the terminal series B, make sure that the test sockets B1 - B8 on the front plate are always connected with short-circuit plugs or current measuring instruments with corresponding measuring ranges in order to avoid that a current transformer is never operated without burden.

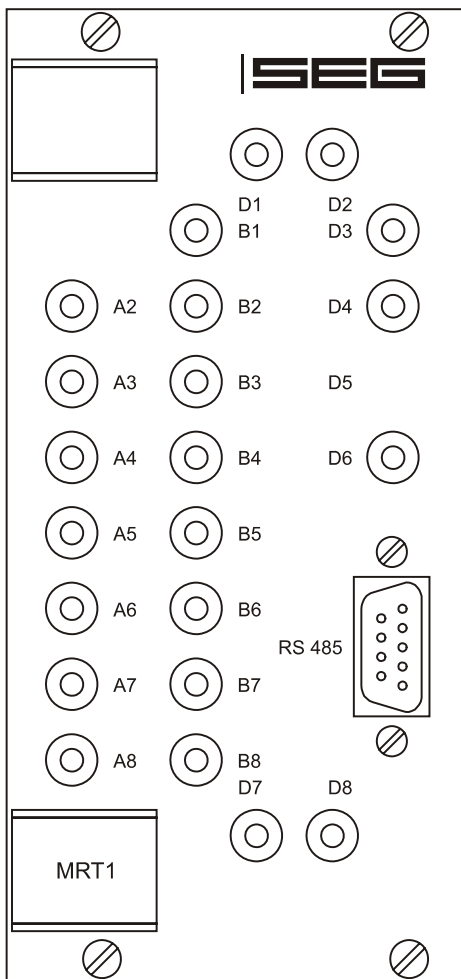


Figure 2.1: Front plate with test sockets

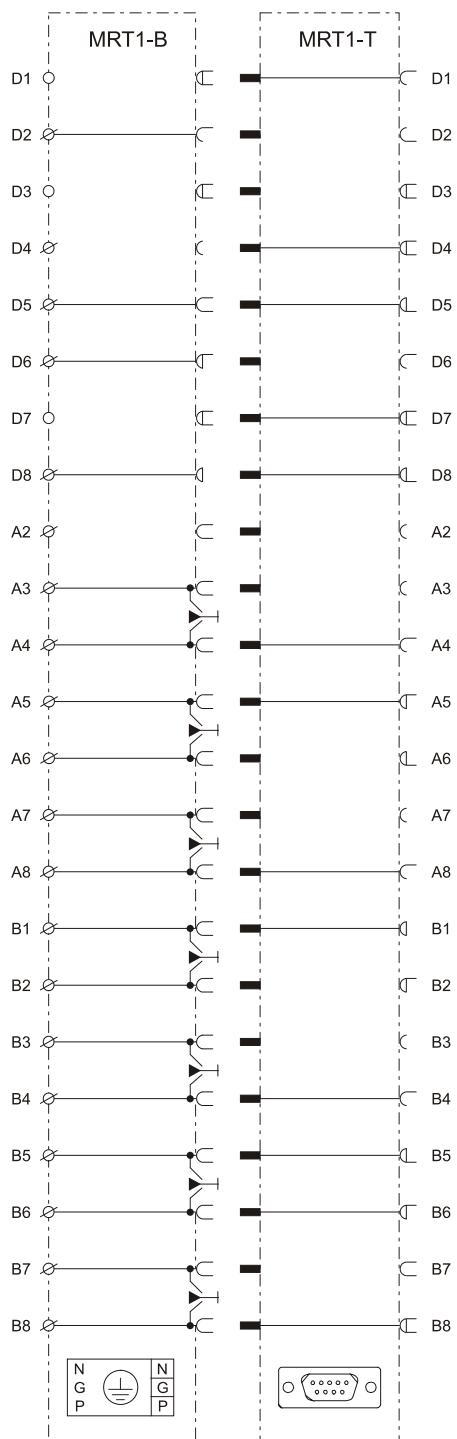


Figure 2.2: Connections MRT1-B and MRT1-T

## 2.2 Current test

In the following, only the current test in phase 1 is described, valid as an example also for all other phases. Figure 2.3 shows the complete test unit MRT1 with plugged-in test insert during operation of the plant.

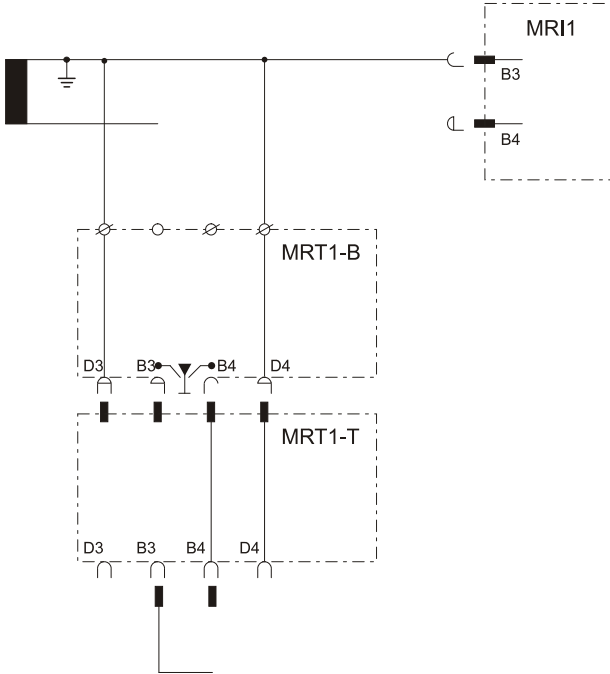


Figure 2.3: Normal operation

Before plugging the test insert MRT1-T into the basic unit, please be sure, that the test sockets B1 B2, B3 B4, B5 B6 and B7 B8 are short-circuited with the delivered short-circuit plugs.

### Note!

By inserting the short-circuit plugs incorrectly, current transformers may be damaged.

## 2.2.1 Secondary current injection test of a HIGH TECH LINE-relay

For feeding a test current, the test insert MRT1-T must be taken out. Then the short-circuit plugs must be inserted acc. figure 2.4 and the test unit be connected to the current source. Now the test insert can be put back into the basic unit, without damage to the current transformers. When disconnecting the unit from the mains, the aforementioned procedure must be carried out in reverse order.

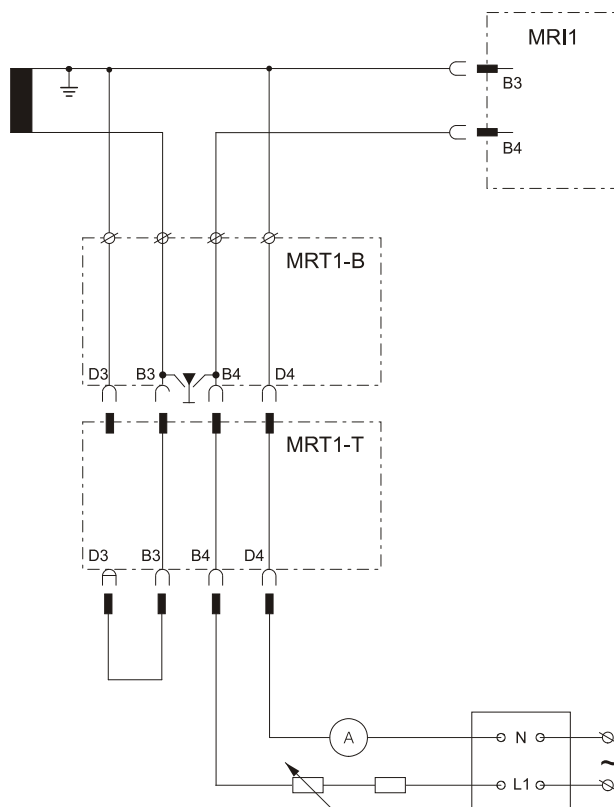


Figure 2.4: Secondary current injection

### Note:

If the current source is not galvanical decoupled, it must be ensured that the neutral of the test device is connected to the earthed terminal of the C.T. (see fig. 2.4).

## 2.2.2 Checking the actual current values

The actually measured current values can be compared with the values shown on the display by means of an ammeter - see figure 2.5. Before connecting the ammeter, first the test insert must be taken out of the basic unit. The short-circuit plug B3-B4 must be removed and an ammeter with a suitable measuring range must be connected. After this the test insert can be put back into the basic unit. Testing the other phases is done in the similar manner. When removing the ammeter, the same procedure must be carried out in reverse order.

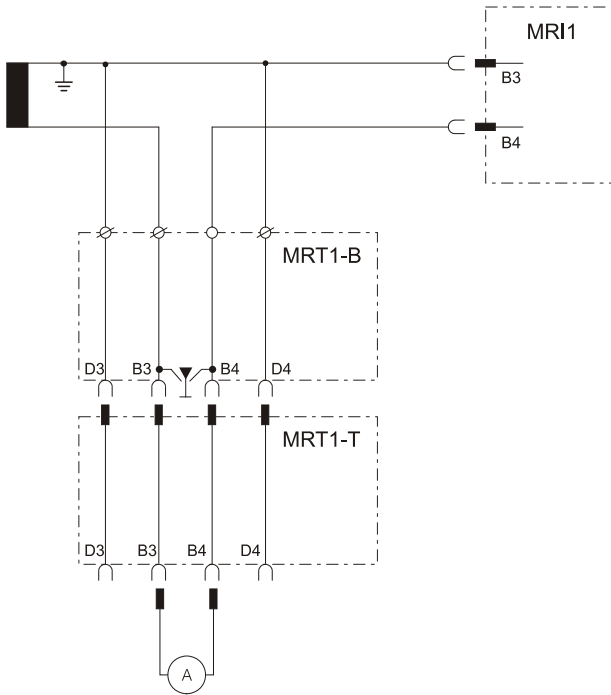


Figure 2.5: Checking actually measured values

## 2.3 Voltage test

Here the voltage test is described only in phase 1, being valid also for all other phases. Figure 2.6 shows the complete test unit MRT1 with plugged-in test insert during operation of the plant.

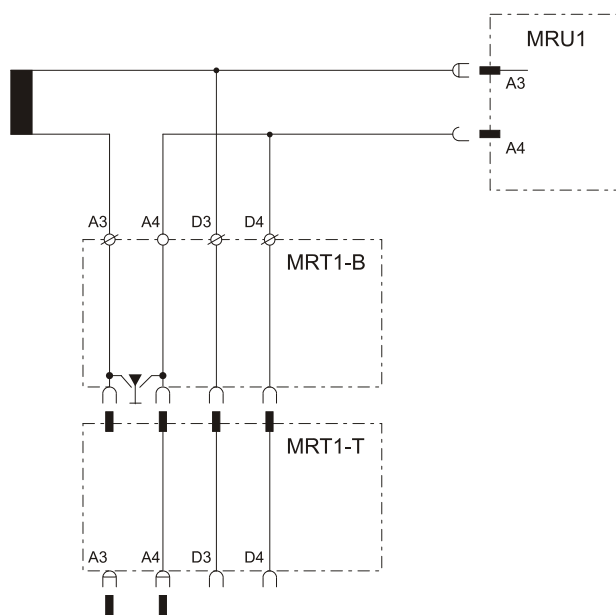


Figure 2.6: Normal operation

In normal operation, i. e. without measuring instruments or test voltage being connected, please make sure that the test sockets A3-A4, A5-A6 and A7-A8 are short-circuited with the delivered short-circuit plugs.

### Note!

By inserting the short-circuit plugs incorrectly, the voltage transformers may be damaged.

### 2.3.1 Secondary voltage injection test of a HIGH TECH LINE-relay

For feeding a test voltage the short-circuit plugs must be removed. After this the test unit can be connected to the voltage source - see figure 2.7.

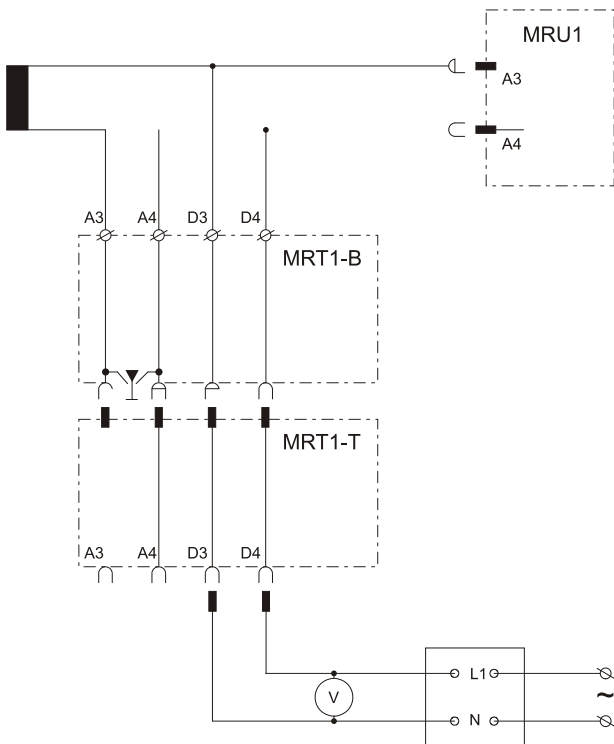


Figure 2.7: Secondary voltage injection

### 2.3.2 Checking actual voltage values

The actually measured voltage values can be compared with the values shown on the display by means of a voltmeter - see figure 2.8.

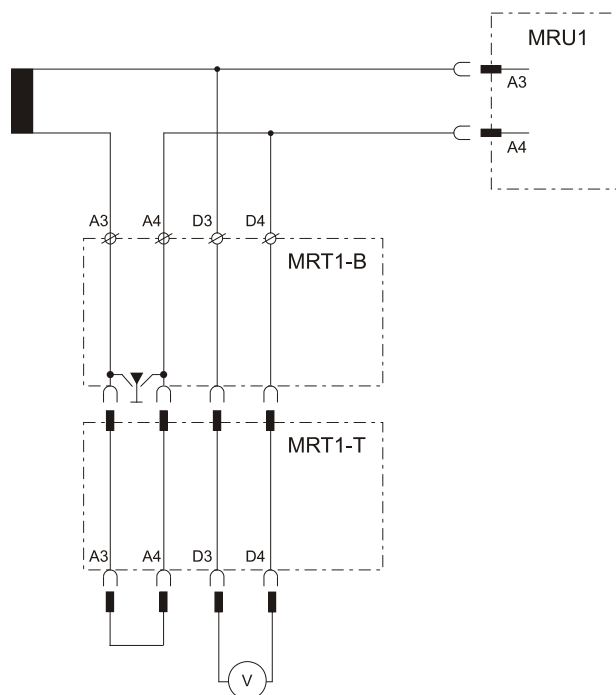


Figure 2.8: Checking actually measured values

### 3. Terminal connections

The terminal connection of the basic unit MRT1-B has a very compact base with plug connectors and screw-type connectors:

- 15 screw-type terminals (terminal connectors series A and B) for voltage and current circuits
- 9 tab terminals for relay outputs, supply voltage etc. Connection with tabs 6.3 x 0.8 mm for cable up to max. 1.5 mm<sup>2</sup> or tabs 2.8 mm x 0.8mm up to max. 1mm<sup>2</sup>.  
By using 2.8 mm x 0.8mm tabs a bridge connection between different poles is possible.

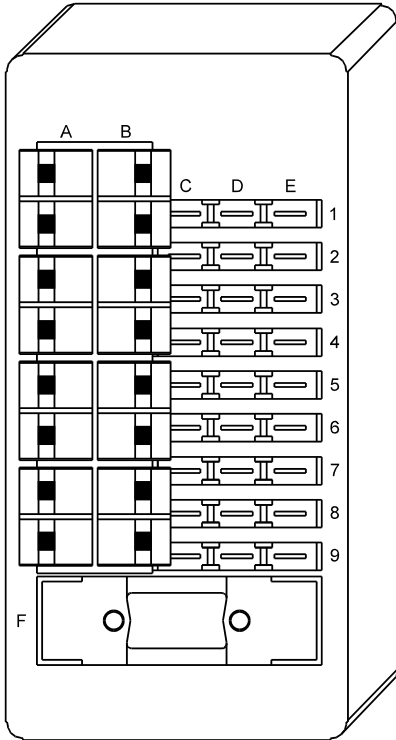


Figure 3.1: Connection panel

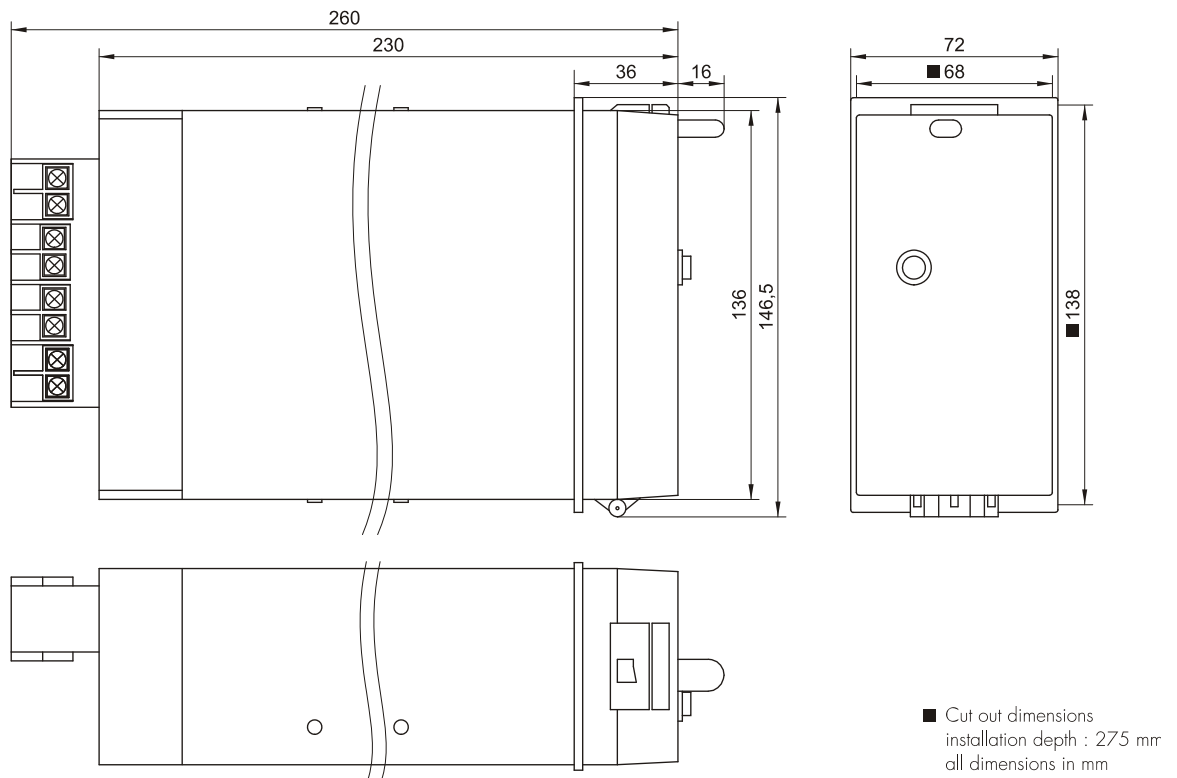


Figure 3.2: Dimensional drawing of individual housing

**Please observe:**

A distance of 50 mm is necessary when the units are mounted one below the other for the front cover to be easily opened. The front cover can be opened downwards.

## 4. Technical data

### System data:

#### Design standard:

Generic standard: EN 50082-2, EN 50081-1

Product standard: EN 60255-6, IEC 255-4, BS 142

Specified ambient service  
Storage temperature range: - 40°C to + 85°C  
Operating temperature range: - 20°C to + 70°C

Environmental protection class F  
as per DIN 40040 and per  
DIN IEC 68 2-3: relative humidity 95 % at 40°C for 56 days

Insulation test voltage, inputs  
and outputs between themselves  
and to the relay frame as per  
EN 60255-6 and IEC 255-5: 2.0 kV (eff.), 50 Hz; 1 min. (between all in  
dependent circuits)

High frequency interference  
voltage test acc. IEC 255-5 5 kV; 1.2/ 50 µs, 0.5 J

Mechanical tests:  
Shock: class 1 acc. DIN IEC 255-21-2  
Vibration: class 1 acc. DIN IEC 255-21-1

Degree of protection: IP 54 by enclosure of the relay case and front  
cover (only version D, individual housing)

Vibration test: 0,5 g, 10-300 Hz

Current carrying  
capacity of the insulated 20 A continuously

test terminals, series A and B: 500 A for 1 s  
series D: 10 A continuously  
100 A for 1s

Technical Data subject to change without notice!

## 5. Order form

### Test unit

*MRT1-*

Test insert individual - appertaining plastic housing with plug block for door installation - appertaining single plug block for rack installation
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T BD BA
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With each test insert MRT1-T seven short-circuit plugs will be delivered.