

4.11 Test devices

4.11.1 Introduction

Test devices are required in order to perform local tests of the 3VA6 molded case circuit breakers with electronic trip units (ETUs).

Two versions of the test devices are available:

- TD300 activation and trip box
- TD500 test device

Functional scope of test devices

ETU	TD300 activation and trip box			TD500 test device		
	3-series	5-series	8-series	3-series	5-series	8-series
Activation of ETUs		■	■	■	■	■
Mechanical trip tests	■	■	■	■	■	■
Testing of trip functions				■	■	■
Testing of metering function				■	■	■
Testing of transformers ¹⁾				■	■	■
Connection to a PC with powerconfig				■	■	■
ETU parameterization					■ ²⁾	■ ²⁾
Saving test results				■	■	■

1) One energy transformer, one Rogowski coil

2) Via powerconfig

4.11.2 The TD300 activation and trip box

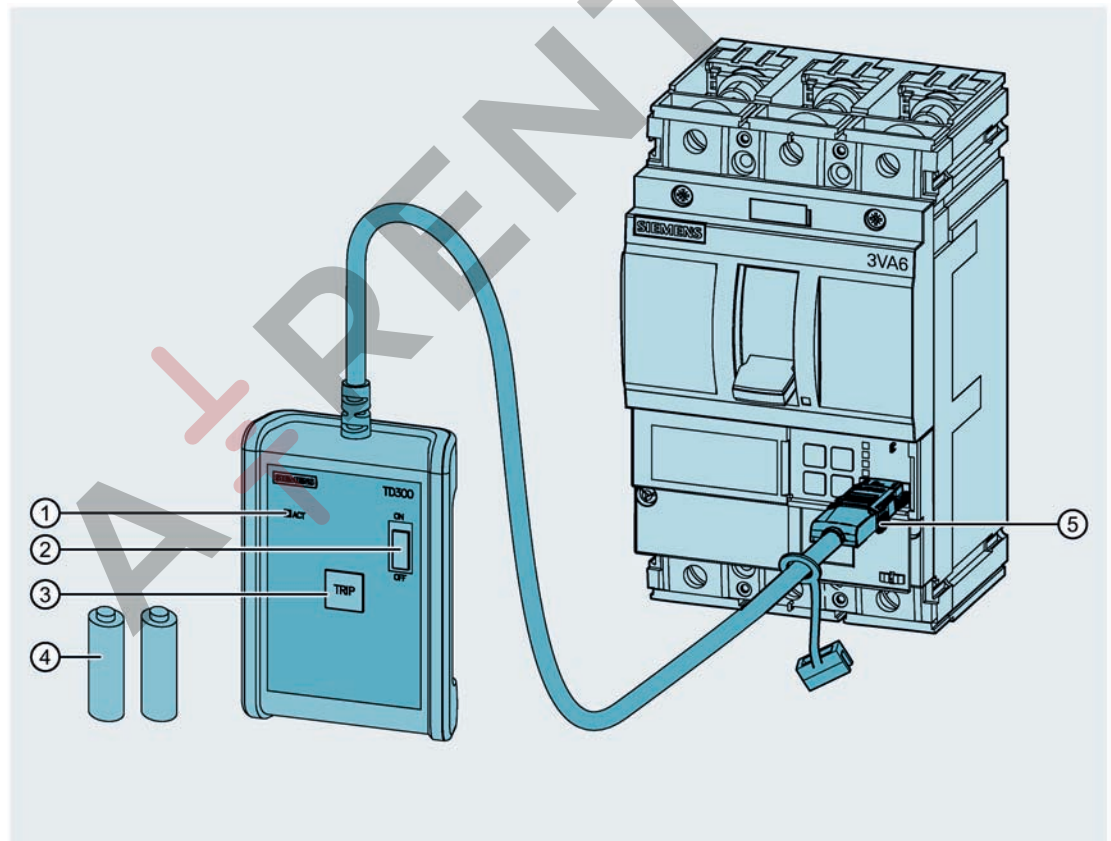
The TD300 activation and trip box is a mobile, battery-operated local test device. Its purpose is:

- To supply the ETU with power so that the ETU can be parameterized when the molded case circuit breaker is switched off and de-energized.
- To test and service the electronic trip unit (ETU).

The power supply is provided by two AA batteries included in the scope of supply.


The TD300 activation and trip box has a compact size of 3 x 4.21 x 1" / 76 x 107 x 25 mm (W x H x D).

Description of the TD300 activation and trip box



- ① LED "ACT" for indicating the battery status
- ② Slide switch ON/OFF
- ③ <TRIP> pushbutton for testing the molded case circuit breaker
- ④ 2 1.5 V AA batteries
- ⑤ Plug-in connector for insertion in the test socket on the ETU

4.11.2.1 Operation and execution of the tripping function

 CAUTION
Personal injury, unintentional tripping and irreparable damage to the TD300
Use of the TD300 when the molded case circuit breaker is not de-energized can result in personal injury, unintentional tripping of the circuit breaker and irreparable damage to the TD300.
Disconnect the molded case circuit breaker from the power supply before using the TD300 activation and trip box.

TD300: Connect, switch on and off, disconnect

Connect the TD300 to the 3VA6 molded case circuit breaker

1. Disconnect the molded case circuit breaker from the power supply.
2. Insert the connecting cable in the test socket of the ETU.

Switch the TD300 on and off

1. Check whether the molded case circuit breaker is disconnected from the power supply. If it is not, disconnect it.
2. Push the slide switch to ON.
The LED labeled "ACT" on the TD300 lights up and the ETU display is activated. The TD300 is ready.


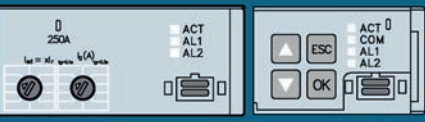
















If the "ACT" LED does not light up:

- Push the slide switch to OFF.
 - Detach the connecting cable from the molded case circuit breaker.
 - Replace the batteries.
 - Follow the correct sequence of steps to connect the unit to the molded case circuit breaker again.
 - Push the slide switch to ON.
3. Push the slide switch to OFF.
The LED labeled "ACT" on the TD300 goes out to indicate that the unit is switched off.

Disconnect the TD300 from the 3VA6 molded case circuit breaker

1. Switch off the molded case circuit breaker (OFF position).
2. Detach the connecting cable from the molded case circuit breaker.

LED states when the TD300 and the molded case circuit breaker are switched on

TD300	ETU					Description
ACT	ACT	COM	AL1	AL2		
						
						TD300 and ETU are ready
	 					The batteries on the TD300 need to be replaced
						TD300 is ready ETU is not ready

Test the molded case circuit breaker (mechanical trip test)

1. Connect the TD300 to the molded case circuit breaker in the correct sequence and switch on.
2. Switch on the molded case circuit breaker (ON position).
3. Press the pushbutton labeled <TRIP> on the TD300.


The molded case circuit breaker trips:

The molded case circuit breaker is functioning correctly.

The molded case circuit breaker does not trip:

- Switch off the TD300.
- Switch off the molded case circuit breaker (OFF position).
- Detach the connecting cable from the molded case circuit breaker.
- Connect the TD300 correctly to the molded case circuit breaker again and switch on.
- Repeat the trip test (by pressing the pushbutton labeled <TRIP> on the TD300).
- If the molded case circuit breaker fails to trip again, contact Technical Support (Page 10) .

4.11.2.2 Technical specifications of TD300

Mechanical characteristics		
Height	inch	4.21
	mm	107
Width	inch	3
	mm	76
Depth	inch	1
	mm	25
IP degree of protection		IP30
Ambient temperature		
- in operation	°C	-10 ... +40
- in storage	°C	-40 ... +50
- with installed battery		
- in storage	°C	0 ... +25
Mounting position		Any
Interface to circuit breaker		
Number of circuit breakers / directly connectable		1
Length / of connecting cable	m	1
Power supply		
Type of batteries		AA, alkaline, 1.5 V
Approvals / certificates:		
Declaration of conformity		
 EG-Konf.		

4.11.3 The TD500 test device

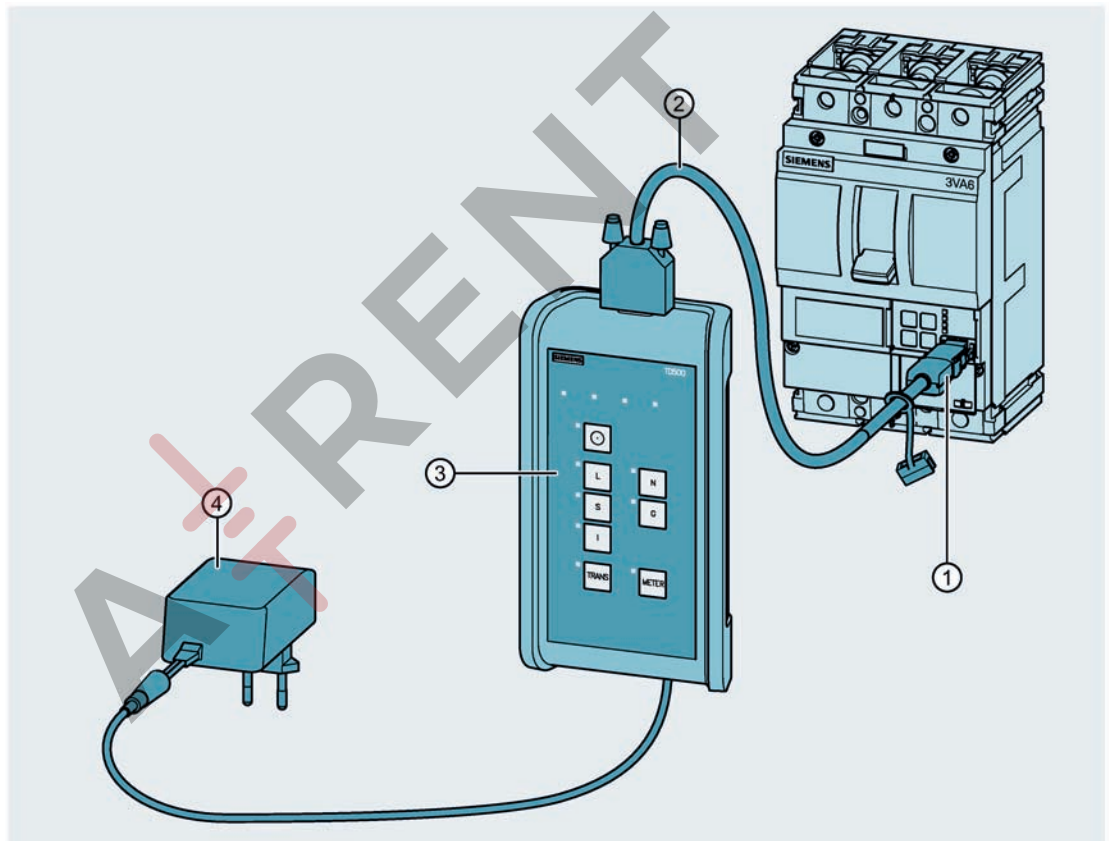
4.11.3.1 General information, preparations

The TD500 mobile test device can be used to test the different causes of ETU trips. This enables testing of the functioning and wiring of all connected system components before the 3VA6 molded case circuit breaker is commissioned. The system behaves as it would in the case of a real trip event. The molded case circuit breaker trips when the set delay times expire and signals all alarms and tripped signals from connected components.

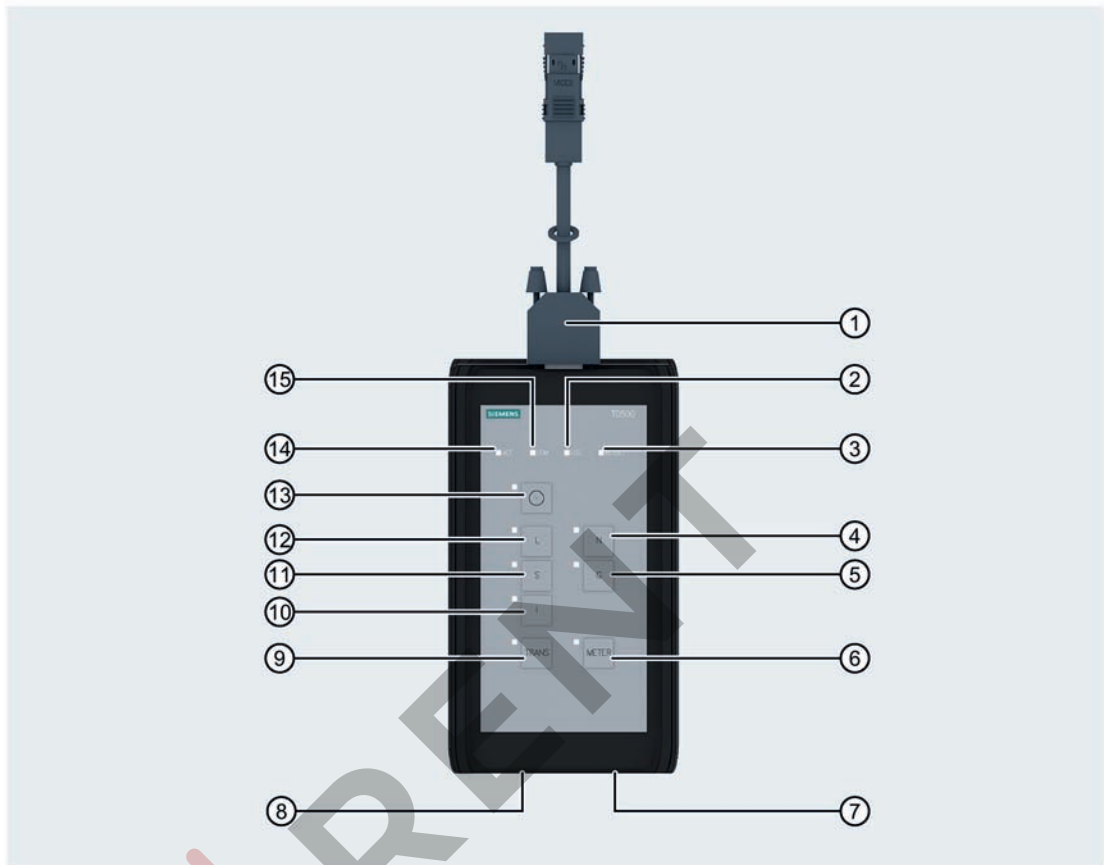
Benefits of the TD500 test device

- With a TD500 test device, all 3VA6 molded case circuit breakers can be configured one after the other directly at the installation via powerconfig
- The device can store up to 100 test results.
- With the TD500 test device and the powerconfig software, all diagnostic data of the 3VA6 molded case circuit breaker can be archived electronically or as a printed document.
- In addition, test functions can be performed directly on the PC with the powerconfig software.

Description of the TD500










- ① Plug-in connector for insertion in the test socket on the ETU
- ② TD500-to-ETU connecting cable
- ③ TD500 test device
- ④ Power supply unit



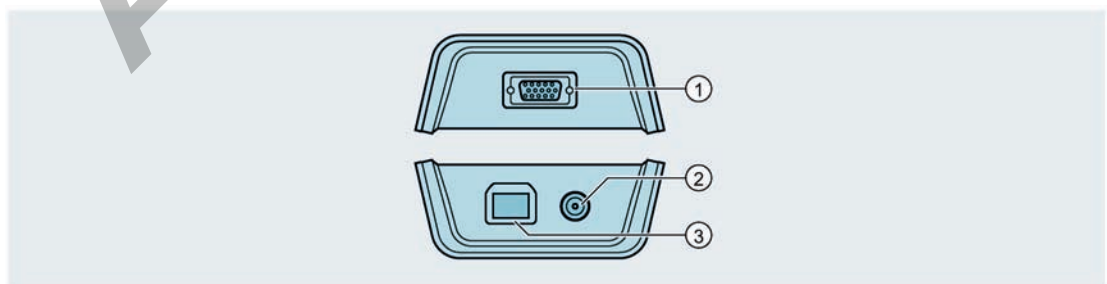
- | | |
|---|--|
| ① Connecting cable for ETU | ⑨ Pushbutton for transformer test |
| ② LED "LOG" (available memory status) | ⑩ Pushbutton for instantaneous short-circuit trip test I |
| ③ LED "RESULT" | ⑪ Pushbutton for short-time delayed short-circuit test S |
| ④ Pushbutton for neutral trip test N | ⑫ Pushbutton for overload trip test L |
| ⑤ Pushbutton for ground fault trip test G | ⑬ Pushbutton for ETU Power ON/OFF |
| ⑥ Pushbutton for meter test (current measurement display) | ⑭ LED "ACT" (status) |
| ⑦ PC connection | ⑮ LED "COM" (communication status) |
| ⑧ Mains cable connection | |

LED display

LED	Meaning	Description
<input type="checkbox"/> ACT	Off	TD500 switched off
 ACT	On	TD500 ready
<input type="checkbox"/> COM	Off	No communication link with ETU
 COM	Flashing (2 Hz)	- Establishing communication link with ETU - Communications error - TD500 not ready
 COM	On	Communication link established with ETU
<input type="checkbox"/> LOG	Off	No free memory space The TD500 device can continue to be used, but the results of the trip tests will no longer be stored on the TD500. The device is still capable of executing all test functions.
 LOG	Flashing (2 Hz)	Available memory space < 25 % The TD500 device can continue to be used without restriction, but there is only enough memory space available to store a few test results. In order to ensure safe storage of test results, save the existing results to a PC and delete the contents of the TD500 memory using powerconfig.
 LOG	On	Free memory space ≥ 25 % The TD500 device can continue to be used without restriction.
<input type="checkbox"/> RESULT	Off	No test has been carried out and no test result has been recorded.
 RESULT	Flashing red (2 Hz)	It has not been possible to establish whether or not the molded case circuit breaker is functioning correctly.
 RESULT	On	No faults have been detected.

Interfaces of the TD500 test device

The diagram below shows the physical interfaces of the TD500 test device.



- ① Top of unit: Connection to 3VA UL molded case circuit breaker
- ② Bottom of unit on right: 24 V DC supply
- ③ Bottom of unit on left: Connection to PC

Compatibility with molded case circuit breakers

The TD500 test device can be connected to all 3VA6 molded case circuit breakers with the ETUs 3-series, 5-series and 8-series. The connecting cable from the test device is inserted in the test socket of the ETU.

Data stored in the TD500

The following data are stored in the TD500:

- Article number
- ETU parameter settings
- Causes of ETU trips

Note

Readout of data and clearing of the internal memory of the TD500

Using a PC and the powerconfig software, you can read these data out of the TD500 and clear its internal memory.

Test functions of the TD500

The relevant pushbutton must be pressed in order to start a specific test. The molded case circuit breaker is tripped electronically when the pushbutton is actuated. This is essential to allow effectual testing of the electronic and mechanical control elements of the circuit breaker.

Test	Description
L test	Overload function test The circuit breaker trips when the time setting t_l elapses
S test	Function test on the short-time delayed short-circuit protection system The circuit breaker trips when the time t_{sd} set on the ETU elapses
I test	Function test on the instantaneous short-circuit protection system The circuit breaker trips instantaneously
N test	Function test on neutral conductor protection system The circuit breaker trips when the time t_n set on the ETU elapses
G test	Function test on ground fault protection system The circuit breaker trips when the time t_g set on the ETU elapses
TRANS test	Function test on transformers (energy and Rogowski transformers) One energy transformer and one Rogowski transformer is tested The circuit breaker trips after a delay of several seconds
METER test	Function test on the measured value display In order to test the displayed current measurement The circuit breaker does not trip during this test

4.11.3.2 Operation and execution of test functions

Connecting and disconnecting the TD500

⚠ CAUTION


Personal injury, malfunctions and false test results

Failure to connect the TD500 test device to the molded case circuit breaker according to the sequence of steps specified below can result in personal injury, malfunctions and false test results.

Disconnect the molded case circuit breaker from the power supply before connecting the TD500.

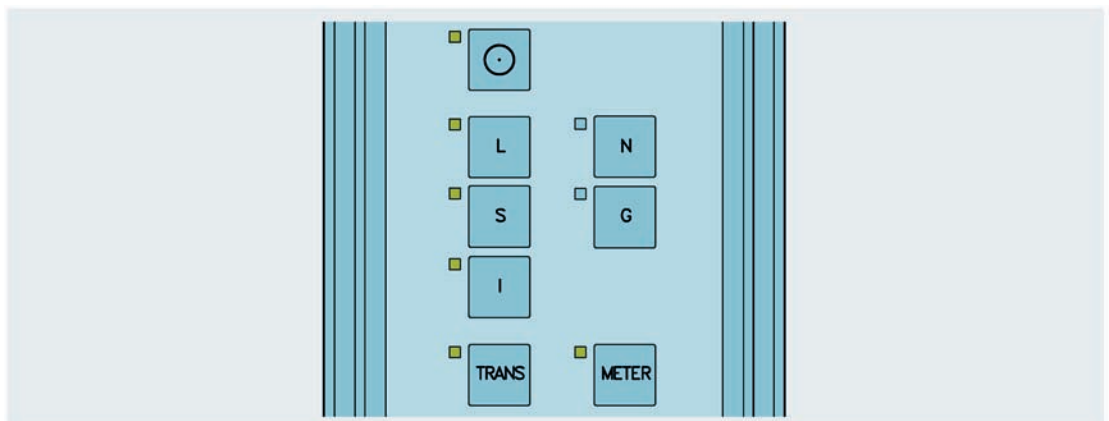
Strictly adhere to the sequence of steps described below for connecting the two devices.

Connect the TD500 to the 3VA6 molded case circuit breaker


1. Disconnect the molded case circuit breaker from the power supply.
2. Insert the connecting cable in the socket on top of the TD500 test device.
3. Insert the connecting cable in the test socket of the ETU.
4. Insert the cable of the power supply unit in the socket on the bottom of the TD500 test device.
5. Connect the power supply unit to a socket.
The TD500 test device is now switched on and ready.
6. Press the pushbutton labeled <ETU Power ON/OFF>  on the TD500 test device.
The ETU is now powered via the TD500 and activated. Successful communication between the TD500 and ETU is indicated by illumination of the LED labeled "COM" on the TD500.

All test functions available for the connected ETU are indicated by illumination of the appropriately labeled LEDs.

Example: In this example, the L, S and I releases, the transformers (TRANS) and the current meter (METER) can be tested on the connected ETU:

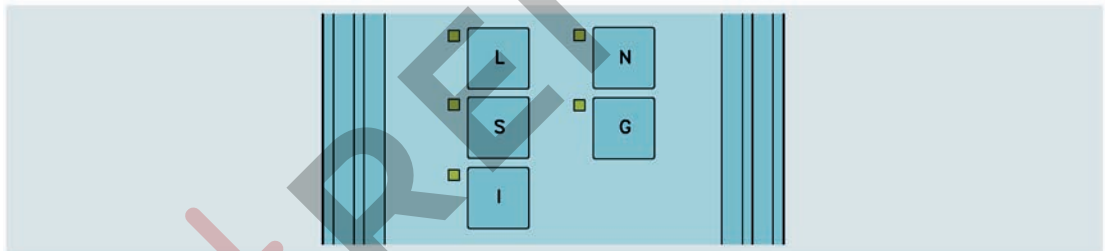


Disconnect the TD500 from the 3VA6 molded case circuit breaker

1. Switch off the 3VA6 molded case circuit breaker.
2. Press the pushbutton labeled <ETU Power ON/OFF>  on the TD500 test device.
The LED labeled "COM" on the TD500 goes out. The ETU is now no longer powered via the TD500 and is deactivated.
3. Disconnect the power supply unit from the socket.
4. Detach the power supply unit cable from the TD500.
5. Detach the connecting cable between the TD500 and the ETU.

Test tripping functions L, S, I, N and G

1. Connect the TD500 test device to the 3VA6 molded case circuit breaker, see above.
2. Switch on the 3VA6 molded case circuit breaker.
3. To test the tripping function, press one of the pushbuttons <L>, <S>, <I>, <N> or <G> on the TD500 test device.

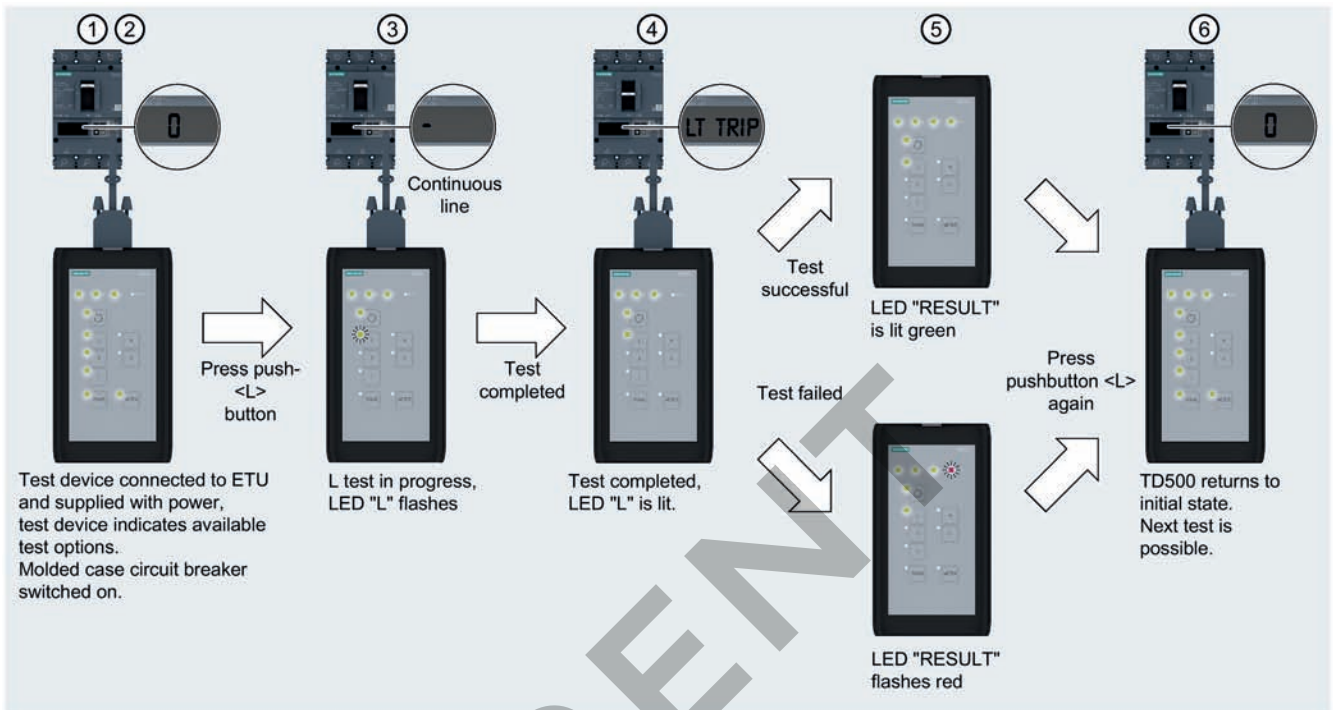


- When a pushbutton is pressed, its LED flashes while the test is in progress.
 - The ETU trips when the set trip times expire and the molded case circuit breaker switches from "ON" to "TRIP".
 - On completion of the test, the LED of the selected pushbutton changes from flashing to steady illumination.
4. Wait for the test to end and evaluate the test result by the status of the LED labeled "RESULT":

Test was successful:
The LED "RESULT" lights up green.

Test was unsuccessful:
The LED "RESULT" flashes red.
Repeat the test. If the test fails again, contact Technical Support (Page 10) .
 5. Press the pushbutton for the same tripping function again in order to confirm the test result and restore the TD500 to its initial state.
 6. Switch on the molded case circuit breaker again (ON position) in order to carry out further tripping function tests.

Example: Testing the tripping function L on an ETU550 LSI



1. Connect the TD500 test device to the 3VA6 molded case circuit breaker.
2. Switch on the 3VA6 molded case circuit breaker.
3. Press pushbutton <L> on the TD500 test device.
The LED in the pushbutton <L> starts to flash.
4. Wait until the LED in the pushbutton <L> changes from flashing to steady illumination.
The test is completed.
5. Evaluate the test result by the status of the LED labeled "RESULT":
LED "RESULT" is **illuminated steadily in green**: **The test was successful.**
LED "RESULT" flashes **red**: **The test was unsuccessful** and must be repeated. If the test fails again, contact Technical Support (Page 10) .
6. Press the pushbutton <L> again in order to confirm the test result and restore the TD500 to its initial state.

Carry out a meter test

The purpose of the meter test is to determine whether the ETU is measuring and displaying current correctly. A test current of $0.4 \times I_{rated}$ is fed into the ETU. The current value measured by the ETU is then checked to confirm that it matches the test current.

Note

The molded case circuit breaker does **not** need to be switched to position "ON" for this test.

Execute the test

1. Connect the TD500 test device to the 3VA6 molded case circuit breaker.
2. Press the pushbutton labeled <METER> ①.



The LED in the <METER> pushbutton begins to flash. The test takes approximately 30 seconds.

3. Wait until the LED in the pushbutton <METER> changes from flashing to steady illumination.
The test is completed.

4. Evaluate the test result by the status of the LED labeled "RESULT":

LED "RESULT" is **illuminated steadily in green**: **The test was successful.**

LED "RESULT" **flashes red**: **The test was unsuccessful** and must be repeated. If the test fails again, contact Technical Support (Page 10) .

5. Press the pushbutton <METER> again in order to confirm the test result and restore the TD500 to its initial state.

Test transformers

This procedure tests the transformers (energy transformer or Rogowski coil) to determine the following:

- Are transformers installed in the ETU?
- Are transformers correctly installed in the ETU?
- Are the installed transformers functioning correctly?

Note

In order to carry out this test, it is absolutely essential to disconnect all external power supplies (e.g. EFB300, COM800, COM100, 24 V module) to the electronics.

Execute the test

1. Disconnect all external power supplies to the electronics.
2. Connect the TD500 test device to the 3VA6 molded case circuit breaker.
3. Switch on the 3VA6 molded case circuit breaker.
4. Press the pushbutton labeled <TRANS> ①.



The LED in the <TRANS> pushbutton begins to flash. The test takes several seconds.

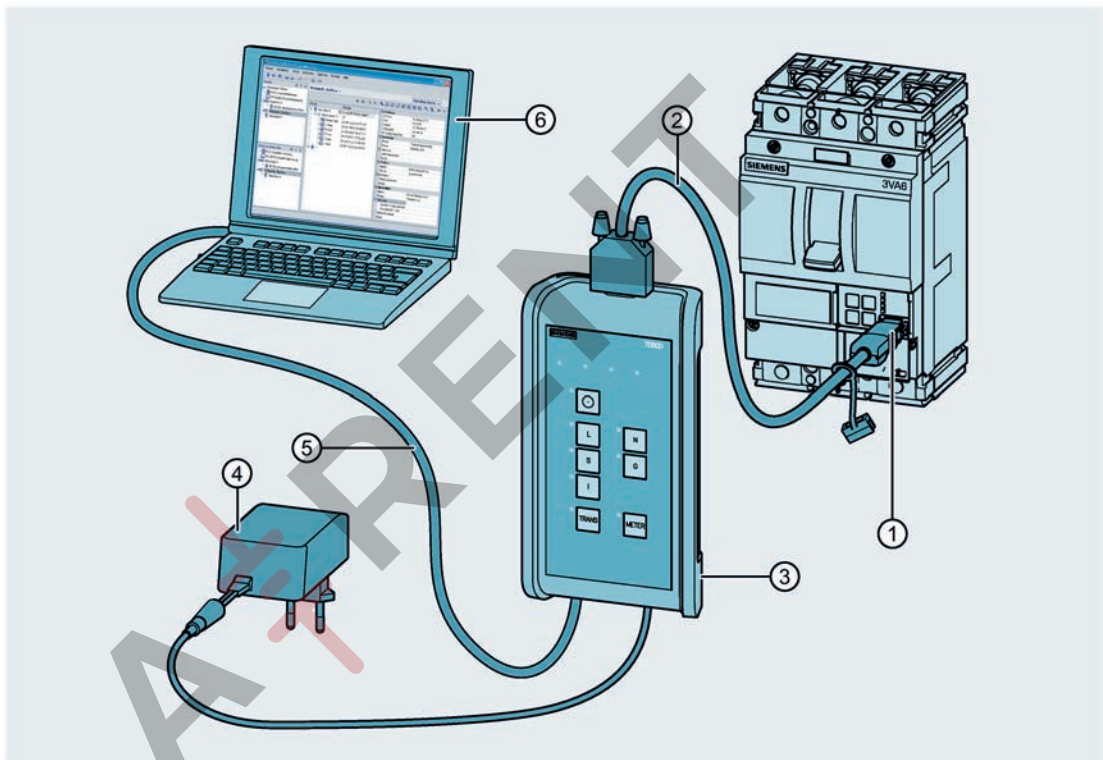
5. Wait until the LED in the pushbutton <TRANS> changes from flashing to steady illumination.
The test is completed.
6. Evaluate the test result by the status of the LED labeled "RESULT":
LED "RESULT" is **illuminated steadily in green: The test was successful.**
LED "RESULT" flashes **red: The test was unsuccessful** and must be repeated. If the test fails again, contact Technical Support (Page 10) .
7. Press the pushbutton <TRANS> again in order to confirm the test result and restore the TD500 to its initial state.

4.11.3.3 Executing the test functions using a PC and powerconfig

In addition to its capabilities as a stand-alone test device, the TD500 can also act as a PC interface to the ETU.

If the TD500 test device is connected both to the ETU and a PC, the protective functions can be triggered from a PC on which the powerconfig software is installed. A test log for the molded case circuit breaker is generated and stored in the powerconfig project. The test log can be printed out.

Connections between ETU - TD500 - PC



- | | |
|---|---------------------------------|
| ① Plug-in connector for insertion in the test socket on the ETU | ④ Power supply unit |
| ② TD500-to-ETU connecting cable | ⑤ USB connecting cable |
| ③ TD500 test device | ⑥ PC with powerconfig installed |


4.11.3.4 Parameterizing using the powerconfig software

In addition to test functions, the powerconfig software package also provides tools for assigning parameters to ETU 5-series and 8-series.

These tools allow you to:

- assign parameters to ETU 5-series and 8-series
- store parameter settings for ETU 5-series and 8-series in the powerconfig project and print them out

4.11.3.5 Technical specifications

Mechanical characteristics		
Dimensions		
Length	inch	7.5
	mm	190
Width	inch	4.13
	mm	105
Depth	inch	4.65
	mm	42
Degree of protection		IP30
Ambient conditions		
Ambient operating temperature		°C -10 ... +40
Storage temperature		°C -40 ... +80
Normal position of use		Any
Interface to molded case circuit breakers		
Number of directly connectable molded case circuit breakers		1
Length of cable	inch	59.05
	m	1.5
Power supply		
Number of electrical connections / for external network		1
External power supply unit		
Input voltage		V AC 100 ... 240
Output voltage		V DC 12
Interface to PC		
Number of interfaces / acc. to USB		1
Approvals / certificates		
Declaration of conformity		
 EG-Konf.		

3VA molded case circuit breakers with UL and IEC certification
Manual, 01/2019, L1V30435333-01

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