

**Tester for Motor-Driven Relays
Type Siemens**

SICO 1225

MANUAL



8 Technical Data

Operating temperature range	5°C ... 40°C
Power supply	230 V, 50 Hz net
Power input	25 W
Protection degree	IP 42
Protection class	II
Dimensions	280 x 140 x 240 mm
Weight	approx. 4 kg

Dear customer,

Thank you for choosing the Tester for Motor-driven Relays Type Siemens SICO 1225. You have purchased a high quality technical device for testing two- and three-layer motor-driven relays. We hope that all of your expectations are met and that we are able to support your work.

This product was designed, produced and tested with due care and according to the applicable European Standards. If the device is yet not working correctly under the conditions given in this operating manual, please contact the manufacturer:

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Signal Concept GmbH confirms the conformity of the device according to the directives given by the European Parliament and Council 2014/30/EU (EMC-Directive), 2006/42/EC (Machinery Directive), 2014/35/EU (Low Voltage Directive), 85/374 EEC (Product Liability Directive), 2011/65/EU (RoHS Directive) and 2012/19/EU (WEEE Directive).



Signal Concept GmbH holds a Quality Management (DIN EN ISO 9001:2015), which is checked annually by Bureau Veritas Quality International Deutschland GmbH as accredited organization.

This manual serves as an introduction to your new device. Please read it carefully for your own protection. Furthermore, it enables you to use all functions properly. Please follow all directions and hints to avoid accidents with persons and damages of the device.

The manual is part of the device. The user has to keep it until the disposal of the device. When handing the device to other users, the manual must be given too.

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Accessory

Included in the delivery are the following parts. Please check if all of these components were supplied. If parts are missing or damaged, please contact your reseller.

Pieces	Item name	Order number
1	Tester SICO 1225	100404
1	Control wire for motor-driven relay	on request
1	Sensor cable	100405
1	Power cable	on request
1	Transport case	100402
1	Manual	on request
1	Acceptance test certificate 3.1 to BS EN 10204	on request

The test can be restarted by pressing the buttons "STOP" and then "START". If the above mentioned displays repeat for one and the same motor-driven relay, it is assumed that this motor-driven relay works irregularly. Therefore, it must not to be used anymore.

7.1.3 Automatic Shut-down Immediately After the Start

If the device shuts down immediately after the start, avoid to restart the tester directly and do not press the start button over a longer time period. Check the motor-driven relay for e.g. winding and turn-to-turn faults.

7 Notes

1. Put the motor-driven relay into a horizontal position before starting the test.
2. Connect the motor-driven relay with the switched-off tester.
3. If two or more contacts of a two-layer motor-driven relay are defective, then the display might show mistakenly "Dreilagenrelais" (three-layer motor-driven relay). In this case a trailing factor measurement will not be carried out.
4. For the tester, a 230 V, 50 Hz power supply voltage shall be used as power supply. Using the tester at places without a power supply is only permitted with a DC-AC Sinus-alternating-current converter approved by the manufacturer.
5. The compliance of the tester with all safety instructions and with the accuracy of the measurements shall be checked every 12 months. These tests have to be carried out by the manufacturer or a company authorized by the manufacturer.

7.1 More Displays

7.1.1 Current Detection

Display A: „ABABABABABABAB“ The track phase voltage has been switched off.

Causes: The track phase current was not within the permissible range. The track phase coil might have e.g. a turn-to-turn fault or the control wire has been removed during the test.

Display B: „ABABABABABABAB“ The auxiliary phase voltage has been switched off.

Causes: The auxiliary phase current was not within the permissible range. The auxiliary phase coil might have e.g. a turn-to-turn fault or the control wire has been removed during the test.

After the power supply monitoring has been activated, the tester can be restarted after a trouble shooting.

7.1.2 Comparison

Display A: „VGLABABABABAB“ The inspection by the tester is interrupted.

Causes: The trailing factors, which were calculated by the two processors within the tester, diverge from each other.

Display B: „XABABABABAB“ The inspection by the tester is interrupted.

Causes: The trailing factors, which were calculated by the two processors within the tester, diverge from each other. X names an error code between 0 and 255.

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1 Safety Instructions

The Tester for Motor-driven Relay SICO 1225 is to be used exclusively according to the description in this manual. Otherwise, the protection given by the tester can be limited.

! Warning !

To avoid the damage of persons or products, mind the following guidelines:

Do not use the testing unit if it is damaged. Check the housing before use. Check carefully the insulation around the socket of the power cord, the power switch and around the plug-in point for the control wire of the motor-driven relay.

Check the power cord, the control wire of the motor-driven relay and the sensor wire for damages of the insulation. Replace damaged wires before using the testing unit.

Do not use a power cord other than supplied with the testing unit.

Never put any metal objects into the plug-in point of the testing unit for the control wire of the motor-driven relay or the plug-in point of the motor-driven relay control wire.

Never unplug the sensor from the motor-driven relay. Never touch the sockets at the front of the motor-driven relay.

Do not use the tester in environments with explosive gases, steam or dust.

Do not use the tester when it shows a malfunction. The protective devices could be affected. In case of doubt send the tester to the manufacturer or to a company authorized by the manufacturer for checking.

The manufacturer or a company authorized by the manufacturer are the only ones being responsible for repairing.

High voltages occur at some parts inside the tester. For that reason do not start or run the tester while it is opened.

Do not use a protection system other than stated for this testing unit.

Qualified professionals only may use the tester.

Do not drop or shock the tester.

Disposal

Electric and electronic devices must not be given to the general rubbish, since they mostly contain noxious elements. Instead, dispose them at the collecting points for special waste.

Display A

AFA = 0.78 MI = 0.76

AN = 15.9 AB = 12.1 V

Display B

MESSUNG 9
(measurement 9)

MESSUNG ZU ENDE
(end of measurement)

(Display B shown above alternates with the following.)

6.10 Warning Due To "Sticking" during Trailing

Display A

AFA = MI = 0.78

Abfallzeit >180 MS
(trailing time)

Display B

MESSUNG 2
(measurement 2)

IH = 38 MILLIA

- MI Minimum of the measured trailing factors for the connected motor-driven relay
- AN Limit attraction voltage of the track phase
- AB Limit trailing voltage of the track phase

The displayed measuring results are not valid before they flash.

6.7 Display of Track Phase Currents

Display A

AFA = 0.78 MI = 0.76
AN = 15.9 AB = 12.1 V

Display B

IAN = 11.6 MILLIA
IAB = 8.9 MILLIA

Display A

AFA = 0.78 MI = 0.76
AN = 15.9 AB = 12.1 V

Display B

MESSUNG 2 (measurement 2)
IH = 38 MILLIA

- IAN Limit attraction current of the track phase
- IAB Limit trailing current of the track phase

6.8 Possibilities to Switch Over

Display A

AFA = 0.78 MI = 0.76
AN = 15.9 AB = 12.1 V

Display B

MESSUNG 2 (measurement 2)
WECHSEL ? (switch over?)

6.9 Possibility to Switch Over or End of Inspection after 9 Measurements

Display A

AFA = 0.78 MI = 0.76
AN = 15.9 AB = 12.1 V

Display B

MESSUNG 9 (measurement 9)
WECHSEL ? (switch over?)

2 Operation

The tester may only be used for testing the following motor-driven relays by Siemens:

- Two-layer motor-driven relay V25437-A1001-A2
- Two-layer motor-driven relay V25437-A1001-D2
- Three-layer motor-driven relay V25437-B2001-B1
- Three-layer motor-driven relay V25437-B2001-C1
- Three-layer motor-driven relay V25437-C2001-A3
- Three-layer motor-driven relay V25437-C2001-D3

2.1 Tester

The tester is the main part for the testing of motor-driven relays. It has two graphic displays which report instructions for the user, measurement data as well as warnings and failure notes.

3 Start-Up

Preparation of the inspection according to the picture on page 14:

- Connect the motor-driven relay to the tester via the control wire of the motor-driven relay,
- Connect the motor-driven relay to the tester via the sensor wire at the front, and
- Connect the tester to the 230 V supply system and switch it on by the power switch on the back's right side.

3.1 Inspection Procedure

The tester works automatically, recognizing if the test object is a two- or three-layer motor-driven relay. Analyzing the stop position is realized by evaluating the contacts and by evaluating the sounds of the stop noise.

To start the inspection press the button "START" on the front panel.

Then, the test runs automatically and may be followed on the LC display. Watch the relay during the testing procedure. The test steps are described below.

3.2 Two-Layer Motor-Driven Relay

3.2.1 Relay Type Identification

The tester identifies the relay type automatically and shows "Zweilagenrelais" (two-layer motor-driven relay) on display A.

3.2.2 Contact Testing

A contact testing is carried out, whose results are shown on display A. All contacts are checked to see if they are closing properly. First, the relay is attracted to check if all normally open contacts are closing properly. Then, the relay is trailed to check if all normally closed contacts are closing properly. The contacts are named according to how they are led through at the 16-pole male multipoint connector on the relay's backside (e.g. "SCHLIE 4A-2A ZU").

If all contacts are "ZU" (closed), they are okay.

3.2.3 Setting the Auxiliary Voltage

The auxiliary voltage is set to 130 V and the current is measured by means of the auxiliary voltage winding. Both are displayed on display B.

Display B:

- UH Auxiliary phase voltage
- IH Auxiliary phase current

Display A

AFA =	MI =
FEINMESSG LINKS (precision measurement left)	

Display A

AFA =	MI = 0.78
FEINMESSUNG (precision measurement)	

Display A

AFA =	MI = 0.78
FEINMESSG RECHTS (precision measurement right)	

Display A

AFA =	MI = 0.78
FEINMESSG LINKS (precision measurement left)	

Display B

MESSUNG 1 (measurement 1)
IH = 38 MILLIA

Display B

MESSUNG 2 (measurement 2)
IH = 38 MILLIA

Display B

MESSUNG 2 (measurement 2)
IH = 38 MILLIA

Display B

MESSUNG 2 (measurement 2)
IH = 38 MILLIA

6.6 Display of Current and Minimal Trailing Factor

Display A

AFA = 0.78	MI = 0.78
AN = 15.6 AB = 12.2 V	

Display A

AFA = 0.78	MI = 0.76
AN = 15.9 AB = 12.1 V	

AFA Current trailing factor

Display B

MESSUNG 1 (measurement 1)
IH = 38 MILLIA

Display B

MESSUNG 2 (measurement 2)
IH = 38 MILLIA

6.3 Contact Testing Two-layer Motor-driven Relay / Measuring Auxiliary Phase Current

Display A

SCHLIE 4A-2A ZU
SCHLIE 5A-7A ZU

Display B

UH = 130 V
IH = 38 MILLIA

Display A

OEFFNR 3B-2B ZU
OEFFNR 6B-7B ZU

Display B

UH = 130 V
IH = 38 MILLIA

6.4 Sample Value Determination of the Attraction and Trailing Factors

Display A

AFA = MI =
ZZZZZZZZZZZZZZZZ

Display B

MESSUNG 1 (measurement 1)
IH = 38 MILLIA

6.5 Specification of Measuring Results

- AFA Current trailing factor
- MI Minimum of the measured trailing factors for the connected motor-driven relay
- AN Limit attraction voltage of the track phase
- AB Limit trailing voltage of the track phase

Display A

AFA = MI =
FEINMESSUNG (precision measurement)

Display B

MESSUNG 1 (measurement 1)
IH = 38 MILLIA

Display A

AFA = MI =
FEINMESSG RECHTS (precision measurement right)

Display B

MESSUNG 1 (measurement 1)
IH = 38 MILLIA

3.2.4 Sample Value Determination

The attraction and trailing factors are determined by a special method. Display A shows "ZZZZZZZZZZZZZZZZ". The number of Zs indicates the time remaining until the completion of determination.

3.2.5 Specification of Measuring Results

The attraction and trailing factors are checked and adjusted if necessary. Display A shows "FEINMESSUNG" (precision measurement).

3.2.6 Display of Limit Attraction Voltage, Limit Trailing Voltage and Trailing Factor

After completing the measurement specification, the trailing factor, the limit attraction voltage and the limit trailing voltage are displayed on display A (for the minimum of trailing factors).

Display A:

- AFA Current trailing factor
- MI Minimum of the measured trailing factors of the connected motor-driven relay
- AN Limit attraction voltage of the track phase for the minimum of trailing factors
- AB Limit trailing voltage of the track phase for the minimum of trailing factors

3.2.7 Display of Limit Attraction Current and Limit Trailing Current

The limit attraction current and the limit trailing current are displayed on display B.

Display B:

- IAN Limit attraction current of the track phase for the minimum of trailing factors
- IAB Limit trailing current of the track phase for the minimum of trailing factors

While the limit attraction current and the limit trailing current are displayed, you can extend the remaining time of the display by pressing the button "WECHSEL" (switch over). Press the button "WECHSEL" again to continue the test.

3.2.8 Display of "WECHSEL ?" (switch over)

The word "WECHSEL?" (switch over) appears on display B. Different test steps are carried out depending if the button "WECHSEL" is pressed while the word "WECHSEL?" is on the display.

3.2.9 Button "WECHSEL" (switch over)

Pressing "WECHSEL" (switch over)

The inspection is repeated or continued beginning with chapter 3.2.4 Sample Value Determination. The whole inspection is repeated excluding the relay type identification and the contact testing. This procedure applies in case of e.g. an external interference.

No pressing of "WECHSEL" (switch over)

By jerky, multiple turning-on a high track voltage, the motor-driven relay axle rotates in the slipping clutch, which is visualized with a red dot on the motor-driven relay axle.

Afterwards, the inspection is continued with 3.2.5 Specification of Measuring Results. The trailing factor (AFA) is recalculated. The inspection continues until the word "WECHSEL?" appears on display B. As long as the button "WECHSEL" is not pressed, the test procedure Rotating motor-driven relay axle - Recalculating trailing factor - Displaying "WECHSEL" - is repeated 9 times.

Display B shows the number of the active measurement.

In the right upper corner of display A, the minimum of the measured trailing factors during the passed measurements appear.

After the completion of the 9th measurement, display B shows "MESSUNG 9" (measurement 9) and below "WECHSEL?" (switch over?) and, in turn "MESSUNG ZU ENDE" (measurement over). The inspection has been completed.

Press "WECHSEL" as long as it is shown on display B and the inspection is repeated or continued beginning with 3.2.4 Sample Value Determination. The test is restarted beginning with 3.2.1 Relay Type Identification by pressing the buttons "STOP" and then "START".

3.3 Three-Layer Motor-Driven Relay

3.3.1 Relay Type Identification

The tester identifies the relay type automatically and displays "Dreilagenrelais" (three-layer motor-driven relay) on display A.

3.3.2 Contact Testing

A contact testing is carried out, whose results are displayed on display A. All contacts are checked to see if they are closing properly.

First, the relay is attracted with left rotation to check if the respective normally open contacts are closing properly. Then, the relay is trailed with right rotation to check if the respective normally open contacts are closing properly.

Next, it is checked if the normally closed contacts are closing on trailing. The contacts are named according to how they are led through at the 16-pole male multipoint connector on the relay's backside (e.g. "SCHLIE 4A-2A ZU").

If all contacts are "ZU" (closed), they are okay.

As the 4-pin three-layer motor-driven relays V25437-B2001-B1 and V25437-B2001-C1 do not have any normally closed contacts, those normally closed contacts will always be evaluated as "AUF" (open; see 6.2 Contact Testing Three-layer Motor-driven Relay / Measuring Auxiliary Phase).

6 Display Information A and B

6.1 Setting the Auxiliary Voltage and Identification of the Relay Type

Display A

DREILAGENRELAIS
(three-layer motor-driven relay)

Display B

UH = 126 V

Display A

ZWEILAGENRELAIS
(two-layer motor-driven relay)

Display B

UH = 126 V

UH Auxiliary phase voltage
IH Auxiliary phase current

6.2 Contact Testing Three-layer Motor-driven Relay / Measuring Auxiliary Phase Current

Display A

SCHLIE 5A-7A ZU

SCHLIE 6B-7B ZU

Display B

UH = 130 V

IH = 38 MILLIA

Display A

SCHLIE 4A-2A ZU

SCHLIE 3B-2B ZU

Display B

UH = 130 V

IH = 38 MILLIA

Display A

OEFFNR 4B-5B AUF

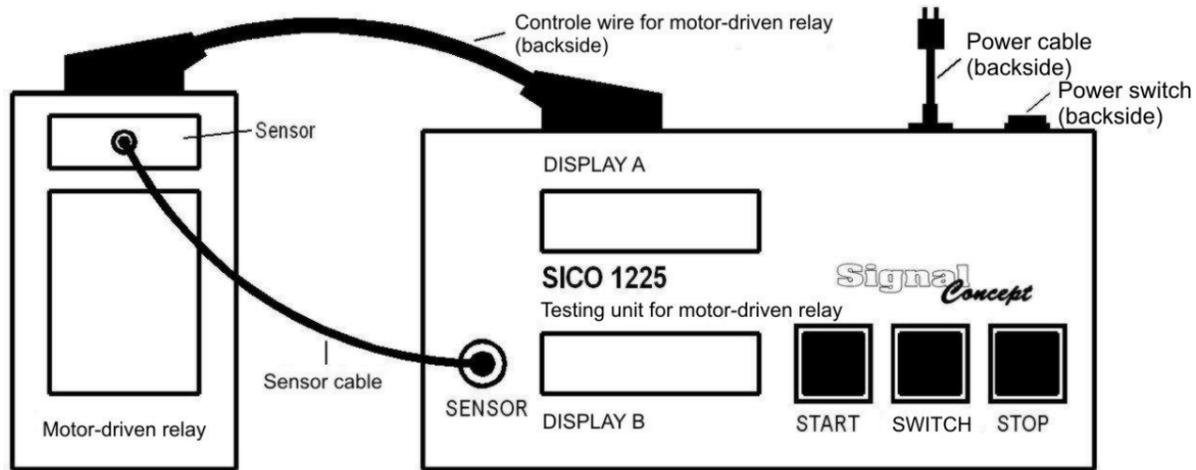
OEFFNR 3A-6A AUF

Display B

UH = 130 V

IH = 38 MILLIA

Displayed is the three-layer motor-driven relay without back contact (V25437-B2001-B1; V25437-B2001-C1)



3.3.3 Setting the Auxiliary Voltage

The auxiliary voltage is set to 130 V and the current is measured by means of the auxiliary voltage winding. Both are shown on display B.

Display B:

- UH Auxiliary phase voltage
- IH Auxiliary phase current

3.3.4 Sample Value Determination

The word "WECHSEL?" (switch over) appears on display B before the sample value determination begins. The left rotation test (when attracting) starts by pressing "WECHSEL" while the word appears on display B. The test starts with a right rotation (attraction) if "WECHSEL" is not pressed. The attraction and trailing factors are determined by a special method. Display A shows "ZZZZZZZZZZZZZZZZZZ". The number of Zs indicates the time remaining until the completion of determination.

3.3.5 Specification of Measuring Results

The attraction and trailing factors are checked and adjusted if necessary. Display A shows "FEINMESSG RECHTS" (precision measurement right) or when rotating to the left "FEINMESSG LINKS" (precision measurement left).

3.3.6 Display of Limit Attraction Voltage, Limit Trailing Voltage and Trailing Factor

After completing the measurement specification, the trailing factor, the limit attraction voltage and the limit trailing voltage appear on display A (for the minimum of trailing factors).

Display A:

- AFA Current trailing factor
- MI Minimum of the measured trailing factors of the connected motor-driven relay
- AN Limit attraction voltage of the track phase for the minimum of trailing factors
- AB Limit trailing voltage of the track phase for the minimum of trailing factors

3.3.7 Display of Limit Attraction Current and Limit Trailing Current

The limit attraction current and the limit trailing current appear on display B

Display B:

- IAN Limit attraction current of the track phase for the minimum of trailing factors
- IAB Limit trailing current of the track phase for the minimum of trailing factors

While the limit attraction current and the limit trailing current are displayed, you can extend the remaining time of the display by pressing the button "WECHSEL" (switch over). Press the button "WECHSEL" again to continue the test.

3.3.8 Display of "WECHSEL ?" (switch over)

The word "WECHSEL?" (switch over) appears on display B. Different test steps are carried out depending if the button "WECHSEL" is pressed while the word "WECHSEL?" appears on the display.

3.3.9 Button "WECHSEL" (switch over)

Pressing "WECHSEL" in chapter 3.3.8 Display of "WECHSEL ?"

After the testing with right rotation follows testing with left rotation and vice versa. Afterwards the inspection continues with 3.3.4 Sample Value Determination.

No pressing of "WECHSEL"

The inspection repeats 3.3.5 Specification of Measuring Results or continues. There will be no change in the rotation of the motor-driven relay.

The trailing factor (AFA) is recalculated. The inspection continues until the word "WECHSEL?" appears on display B. As long as the button "WECHSEL" is not pressed, the test procedure Sample value determination - Recalculating trailing factor - Displaying "WECHSEL" - is repeated 9 times.

After the completion of the 9th measurement, display B shows in its right upper corner "MESSUNG 9" (measurement 9) and below "WECHSEL?" (switch over) in turn with "MESSUNG ZU ENDE" (end of measurement).

The inspection has been finished.

Press "WECHSEL" as long as it is shown on display B and the inspection is repeated or continued beginning with 3.3.4 Sample Value Determination. The rotation direction of the motor-driven relay changes.

The test is restarted beginning with 3.3.1 Relay Type Identification by pressing the buttons "STOP" and then "START".

3.4 Button "STOP" (Two-layer and three-layer motor-driven relay)

The test can be cancelled at any time by pressing the button "STOP". The displays show the content as it was at the time of cancelling.

The test can be restarted beginning with 3.2.1 or 3.3.1 Relay Type Identification by pressing the button "START".

3.5 Display "Abfallzeit >180 MS" (Trailing time > 180 MS; two-layer motor-driven relay)

At the end of 3.2.5 Specification of Measuring Results, the trailing time of the motor-driven relay is measured and compared to the nominal value of 180 ms. Using this method, a potential "sticking" of the motor-driven relay might be detected. If the nominal value was exceeded, display A shows "Abfallzeit >180 MS" (trailing time >180 MS).

4 Interpretation of Test Results

The aim of the test is to obtain those data, which are required by the inspection sheet of the motor-driven relay.

These are

- Auxiliary phase voltage,
- Auxiliary phase current,
- Limit attraction voltage of the track phase,
- Limit attraction current of the track phase,
- Limit trailing voltage of the track phase,
- Limit trailing current of the track phase, and
- Trailing factor.

Most important is the determination of the trailing factor. If a relay has a trailing factor of less than 0.65¹, it is not secure that the track circuit always generates a consistent occupy message until the next inspection within one year. Therefore, several measurements or the test steps "specification of measuring results" (display "FEINMESSUNG" = precision measurement) should always be carried out to determine the trailing factor. The lowest trailing factor is valid.

If the displayed minimum value exceeds 0.70², at least 3 measurements shall be taken.

If the displayed minimum value is less than 0.70², at least 5 measurements shall be taken.

The number of measurements taken equals the number of test steps "specification of measuring results".

Note: Variations in the trailing factor of 0.05 for the same motor-driven relay are to be considered as normal.

When testing a relay, which was not used over a longer period of time, the trailing factor measured at first may be slightly lower. These measurements results may be ignored. When using the relay in a track circuit, it is ensured that it is used at least every 24 hours.

¹ This value applies for Deutsche Bahn AG.

For information on exceptions, which may affect other users, please refer to the adjusting guidelines of the respective track circuits.

² This value applies for Deutsche Bahn AG.

For exceptions, which may affect other users, the following applies:

If the displayed minimum value exceeds the minimum trailing factor +0.05, at least 3 measurements shall be taken.

If the displayed minimum value is less than the minimum trailing factor +0.05, at least 5 measurements shall be taken.