SiMo Test sX

Signal monitoring test - Description
A002

Intelligent Traffic Systems

SIEMENS

Contents

1.   Introduction

This document is intended to acquaint you with the signal monitoring test for the sX controller.

Scope of use

The signal monitoring test (hereinafter called the "SiMo test") is used to verify the function of the signal monitors of the sX system. The test procedure is logged and saved in a PDF file.

Signal monitoring

The signal monitor is an integral part of the controller. Its primary task is to prevent electrical faults in the controller or the outdoor equipment from affecting the signaling in such a way as to constitute a hazard to traffic.

As you will know, the DIN/VDE 0832 standard and RiLSA, the directive governing traffic signal systems, decree that signaling states that are liable to represent a hazard to traffic must lead to the system being immediately switched off. Conversely, a system should not be switched off merely because it is in a (non-hazardous) fault state, because inactive traffic signal systems are in themselves a hazard.

Fault states

The controller's signal monitor recognizes and reports all fault states and assigns them to one of four categories:

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> Faults in the outdoor installation or in the signal monitor's hardware or software may cause the system to be switched off (outdoor installation dark) and a message sent (fatal and emergency-off faults).

■   Non-hazardous fault states such as the failure of a green lamp produce a fault message; the system continues to operate with no interruption (secondary alarm).

■ Hazardous fault states cause the system to be switched off (the outdoor installation flashes to signal a fault) and a message sent (primary alarm).

■ Faults in the outdoor installation or in the signal monitor's hardware or software cause the entire system to be switched off. In this situation the outdoor installation is dark, while the LEDs and screen inside the controller remain operative (system fault).

■ If the signal monitor detects that one or more signals remain active on a system that has been switched dark due to a system fault, then it actuates the fault-current switch (emergency off fault).

1.1. Performance features

■ Manual test mode with logging

■ Logging of all fault messages

■ Semi-automatic test of lamp failures

■ Automatic test of conflicts from the intergreen time matrix.

1.2. System requirements

There are no great requirements for hardware and software. Even the operating system (OS) is irrelevant as long as it supports an HTML5-browser.

It is possible to use the web service GUI for PCs, laptops, tablets or smartphones.

Please note that the Windows-native Internet Explorer does not support HTML5 prior to version 10, this browser is not supported in general. It is possible to install other browsers.

■ HTML5 Web Browser (Mozilla Firefox or Google Chrome)

■ LAN adapter or wireless network adapter

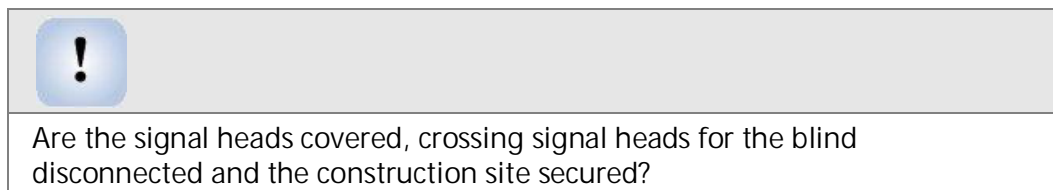■ The settings for the Ethernet connection are to be configured.
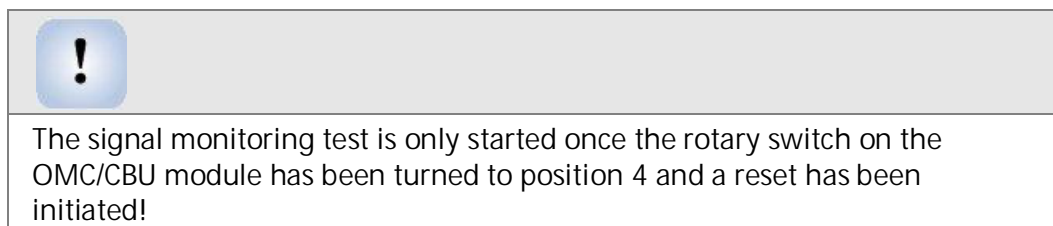
2.   User interface

2.1.   Main window

The main window of the signal monitoring test is shown after selecting the tab "Commissioning" and pressing the button "Signal monitoring test".

Before the main window is activated the following warning message must be confirmed:

!
Are the signal heads covered, crossing signal heads for the blind disconnected and the construction site secured?

By acknowledging this message the tester confirms that he or she has carried out all the prescribed and necessary security measures at the test system before activating it for signal monitoring test operation.

!
The signal monitoring test is only started once the rotary switch on the OMC/CBU module has been turned to position 4 and a reset has been initiated!

The following buttons are then available:

Button	Description
Manual test	You use this button to call up the dialog for operating the manual signal monitoring test.
Lamp failures	You use this button to call up the test dialog for the lamp test.
Color conflicts	You use this button to call up the test dialog for a test of specific color conflicts from the intergreen time matrix (ZZ matrix).
Simulation Terminal	You use this button to call up the window for the simulation terminal
Settings	You use this button to call up the settings dialog for the signal monitoring test

Button	Description
New protocol	Deletes the current protocol
Finalize protocol	Terminates the current protocol and offers the option of saving it as a PDF file on the PC

The current CBU status is shown in the main window as follows:

Symbol	Description
✅	OK, the controller is in a live state
❌	Shutdown, the controller failed due to a signal monitoring fault

2.2.   Settings

You can use the "Settings" button in the main window to access the general settings dialog for the signal monitoring test.

In the Time monitoring tab you set up which time monitoring features are to be activated at the start and when you call up the tests.

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You will find more information about time monitoring in the chapter on Manual tests.

2.3.   Signal monitor messages

All the signal monitoring messages that are received are displayed in the tab "Signal monitoring messages" in the main window.

Signal monitoring messages contain the following information:

Column	Description
Date	Internal CHX timestamp of the fault message
Time	Internal CHX timestamp of the fault message
Type	Type of fault (secondary, primary, system, fatal)
Source	Internal source of error (CHX or CMU)

Column	Description
Current state	Designates the fault
Text	Text shown on the display and command unit (NLS text)
CVSpy text	Fault string as it appears on the terminal; it can be copied and pasted into CVSpy.

3.   Functions offered by the signal monitoring test

3.1.   Protocol

- The protocol contains all relevant information about the controller and the version of signal monitor being used.

- All fault messages are logged as they are received.

3.1.1.   Layout of the protocol information

During the signal monitoring test the log is displayed in the "Protocol" tab. The printout is not formatted until the log is stored.

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> A log entry terminates with OK if the initiated test operation led to the expected result.
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> Example: A signal pattern is initiated with a green # dark conflict, SG 1 # SG4. As a result the controller switches of with a color conflict fault. The corresponding log entry is marked OK because this is the expected fault message.

3.1.2.   Printout

- When the data is printed or stored the details of the controller are included in the log.

- Each page is given a header and footer containing the principal controller parameters.

- The first page contains all the relevant version information.

3.1.3.   Contents of the log

- Information about the current test

- Activated signal groups

- Reported signal group no.

- Error type

- Conflict checked against the expected conflict.

Column	Description
Activated SG	The signal groups that were activated for the test. The manual test always activates all the SGs.
reported: int. SG # SG	Logical numbers of the reported signal group
External SG # SG	Name(s) of the reported signal groups
Type / Designation	Type of alarm and designation
Confl. / Res.	Conflict designation and status of the expected result In the case of the manual test there cannot be an expected result.

3.2.   Manual test

The manual test provides an interface that enables you to activate all the configured signal groups with the available color combinations.

- All the logical signal groups and their chambers are displayed.

- The partial intersection assignment is displayed.

- All the available color combinations are displayed.
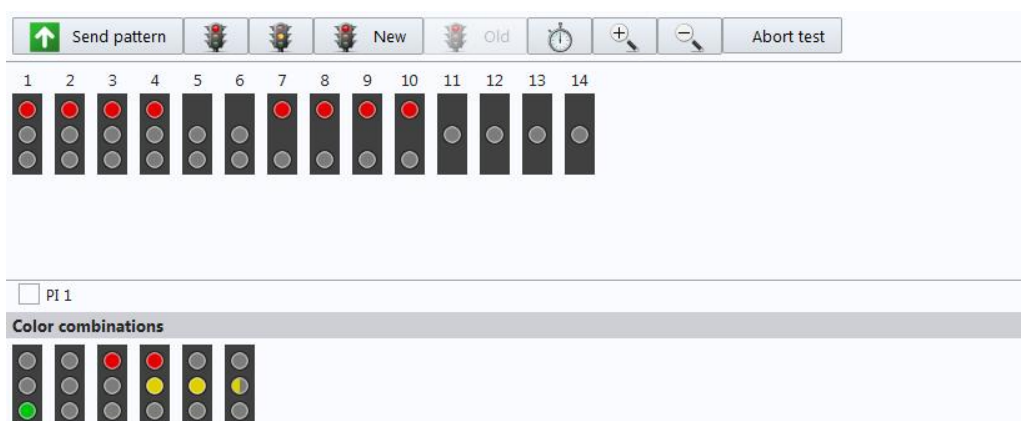
3.2.1.   Buttons (icons) in the manual test

| Symbol	Name	Description
⬆	Send pattern	Sends the current pattern to the controller Shortcut key s or right mouse button
🚦	Set start pattern	Sets the specified start pattern and immediately sends it to the controller
🚦	Set flashing pattern	Sets the provided dark-flashing pattern and sends it immediately to the controller
🚦 New	Set current pattern as start pattern	Accepts the current pattern as the start pattern
🚦 Old	Set old pattern as start pattern	Sets up the configured "all red" pattern as the start pattern
⏱	Set time monitors	Sets the time monitors in the manual test See the corresponding subentry "Set time monitors" for further information.
⊕	Enlarge signal groups	Enlarges the depiction of the displayed signal groups
⊖	Signal groups Zooming out	Reduces the depicted size of the displayed Signal groups
Abort test	Terminate	Terminates the manual test

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> If a new start pattern is set via the "New" button it is identified in the status information with the red-colored text "Changed to all-red pattern".
> After pressing the "Old" button the old start pattern is reset and the identifier deleted.
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> If the color-conflict test is started with the changed all-red pattern, this pattern is taken into consideration for the conflicts to be tested.

3.2.2.   Setting signal patterns (sometimes called 'pictures')

The desired color combination for a signal group can be set up in a number of ways:

- by clicking on the appropriate chambers,

- by clicking on the signal group number to select one or more signal groups and clicking on the color combination to transfer it/them

- or by clicking on the button for a particular pattern (start pattern / dark-flashing)

- by clicking the right pop-up menu on a chamber
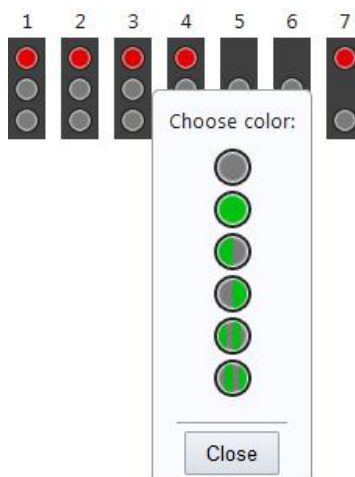
3.2.3.   Setting time monitoring

Clicking on the ⏱ button opens up a submenu in which you can set up appropriate time monitoring features. The currently active time settings are ticked.
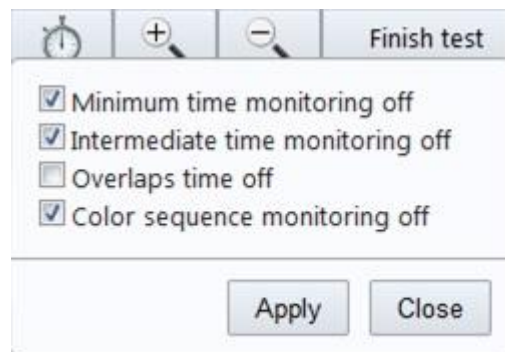
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The default setting that is set at the start of the signal monitoring test and when you start or leave the manual test can be modified under Settings (for more about this, see Settings).

Monitoring	Description
Min time monitoring off	Minimum time monitoring is turned off.
Intergreen time monitoring off	Intergreen time monitoring (ZZ) is turned off.
Overlapping time monitoring off	Overlapping time does not elapse; overlapping time fault is issued immediately. Overlapping time ON (checkbox not active); the overlapping time first elapses and then the overlapping fault is issued.
Sequence color monitoring off	Color sequence monitoring is turned off.

3.2.4. Logging

All the signal groups that are not showing the start pattern are recorded in the log (protocol) as soon as the pattern has been sent to the controller. Any faults occurring are also recorded as appropriate.

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> In the case of the manual test, fault messages are always reported as though all the SGs were addressed. The fault message is not evaluated.

3.3. Lamp failures

The lamp test logs lamp failures; this is done by activating lamp monitoring and initiating all the configured lamp failures.
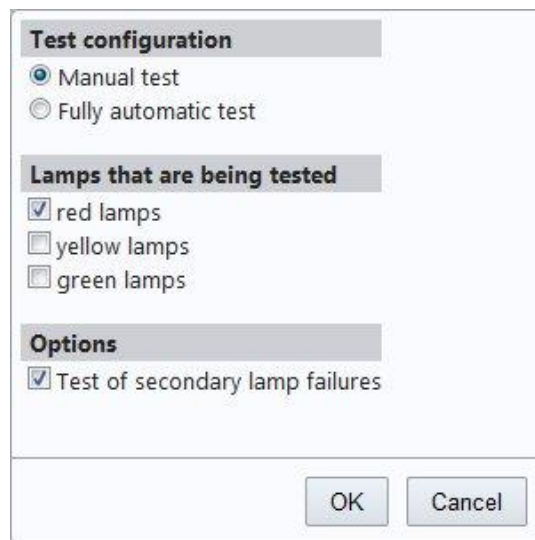
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> Failures for which a signal pattern cannot be automatically
> initiated will have to be tested manually afterwards. This is noted accordingly in the log.

The signal monitoring test switches the system to the all-red pattern and either prompts the user to generate lamp failures. This is done by switching to a signal pattern that includes the lamp that is to be tested. If the signal pattern leads to an impermissible state, then the lamp will have to be tested subsequently by hand.

The lamp failures are generated by interruption of the power circuit.

Before starting the test you will need to configure it:

Test configuration
- ⦿ Manual test
- ○ Fully automatic test

Lamps that are being tested
- ☑ red lamps
- ☐ yellow lamps
- ☐ green lamps

Options
- ☑ Test of secondary lamp failures

[OK]   [Cancel]

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> The lamp failure to be tested can be skipped by pressing the "Skip failure" button; this failure is then entered into the log with the message "not tested".

The test can be terminated at any time using the "Abort test" button.

3.3.1.   Manual test

The signal monitoring test switches the system to the all-red pattern and waits for fault messages. When a primary or secondary fault is reported, it waits for a period of two seconds and then automatically attempts to switch via the off-flashing pattern to the configured all-red pattern. If the expected fault is reported, then the next failure is displayed.

The following additional configuration options are available for these tests:

■ As well as red lamps this test can also check yellow ('amber') and green lamps.

■ You can also initiate and log all types of secondary lamp failures (button: Check secondary lamps)

3.3.2.   Fully automatic test

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> This test can only be started if the simulation terminal is not open.

The signal monitoring test switches the system to the all-red pattern and generates the displayed lamp failures itself. This is done by switching to a signal pattern that includes the lamp that is to be tested. If the signal pattern leads to an impermissible state, then the lamp will have to be tested subsequently by hand.

Lamp failures are either generated by interrupting the circuit or simulated using the simulation terminal.

The following additional configuration options are available for these tests:

■   This test can be used to test only red lamps.

■   You can also initiate and log all types of secondary lamp failures (button: Check secondary lamps)

3.4.   Color conflicts

> **i**
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> This test can only be started if the simulation terminal is not open.

The signal monitoring test works through the intergreen matrix (ZZ matrix) and initiates all the conflicts specified by RiLSA.

The following conflicts become activated:

■   Green against dark

■   Dark against green

- Green against yellow

- Yellow against green

- Green against green

- Yellow-green against green

- Green against yellow-green

- Red-yellow against green

- Green against red-yellow.

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> The conflicts are tested as specified in the intergreen time matrix for which the chambers and color combinations are configured for the corresponding signal group.

The activated conflict is displayed in the test window:

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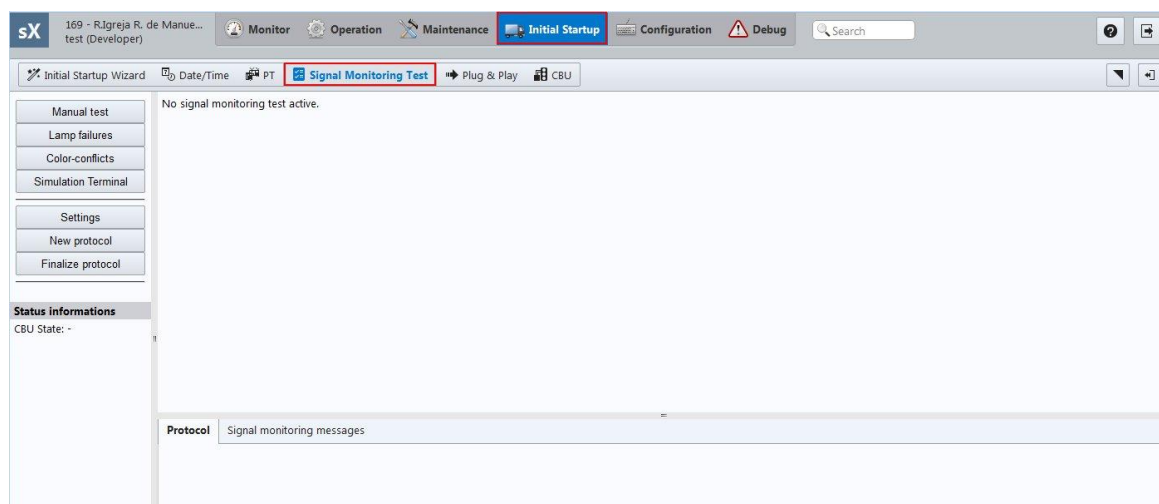
Conflicts with overlaps are removed from the test with a corresponding
note in the log.

The test can be terminated at any time using the "Abort test" button.

3.5.   Simulation Terminal

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The simulation terminal can only be opened if the sX (CBU) is in simulation
mode.

The simulation terminal displays the current state of the signal groups.

■   You can choose between a signal group-related display and a physical
display.

Symbol	Name	Description
⊕	Enlarge pattern	Enlarges the depiction of the displayed signal groups/channels
⊖	Reduce pattern	Reduces the representation of the displayed signal groups/channels
🚦	Set and send the original pattern	Sets the original pattern and sends this to the control unit so that the representation can be set to a live state again.
↻	Reset failures	Previously set lamp failures are removed
Logical Physical		Switchover of the output for logical or physical representation
Terminate		Closes the simulation terminal window

3.5.1.   Physical representation (channels)

In the physical representation the outputs are displayed in relation to the individual lamp switches.
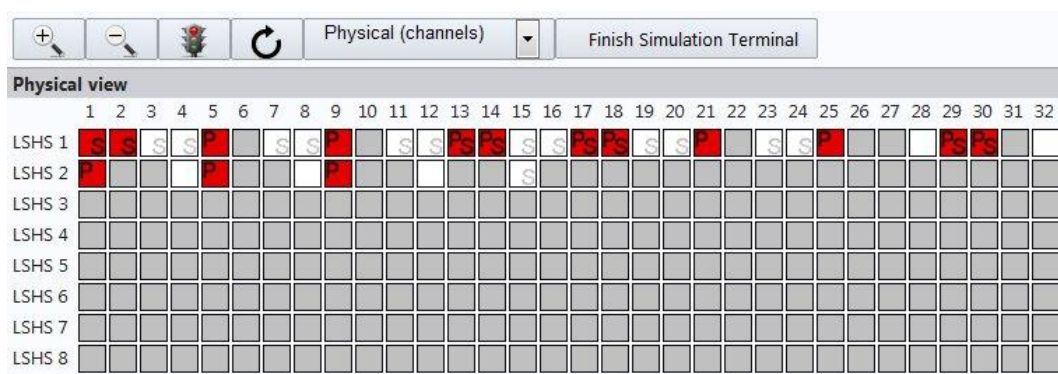
- Inactive channels are shown in gray.

- By "clicking" on a red channel, a lamp failure can be simulated

- A simulated lamp failure is indicated by the following symbols

3.5.1.1.   Display of the monitored lamps

The following symbols are shown for monitoring functions:

Symbol	Description
P	The lamp is monitored primarily
S	The lamp is monitored secondarily

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> -By holding the mouse above the lamps, the SG name as well as the channel number is shown.

3.5.2. Logical representation (signal groups)

In the signal group representation the outputs are displayed in relation to the signal groups and individual signal heads.
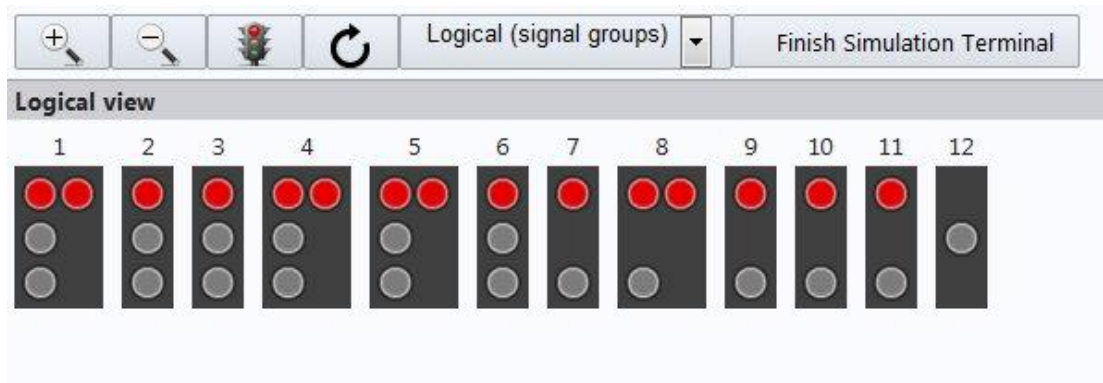
> **i**
>
> - By "clicking" on a red chamber, a lamp failure can be simulated
>
> -By holding the mouse above the chamber, the SG name as well as the channel number is shown,
>
> - A simulated lamp failure is indicated by the following symbols ⊕

More information
 can be obtained from:

Siemens AG
Mobility Division
Mobility Management

Otto-Hahn-Ring 6
81739 Munich, Germany

The information in this guide contains
performance attributes that can
change with further development of
the products. Features are only
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