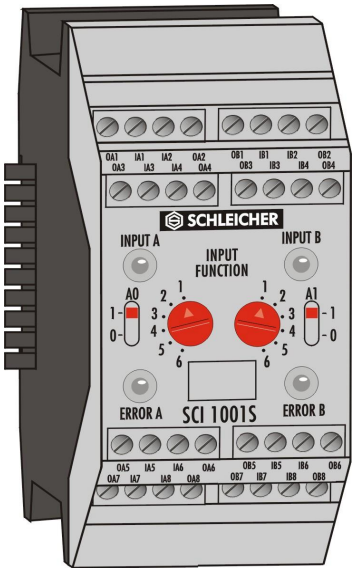
SAFETY CENTER Input Module

PI 0090-0302 E

SCI 1001S, SCI 1002S-xx
SCI 1001S-A, SCI 1002S-xx-A



EN 954-1	Safety Category	4

Input module for the modular **SAFETY CENTER** safety control unit for emergency-off, safety door applications and selenoid-operated switch monitoring.

- with / without disengagement delay for stop category 0 and 1
- two groups: A and B
- diagnostics through fieldbus
- category 4 according to EN 954-1

Equipment Description

A Safety Center consists of one basic module type SCB for a supply voltage of 24 VDC, at least one (maximum 4) input module(s) type SCI, and one bus coupler module (if necessary).
A connector is integrated into the enclosure to provide the connection between modules.
The SCI input modules are mounted in a 45 mm wide rack designed for 35 mm standard rails according to EN 50022.
Device types A are equipped with a plug-in screw-type terminal block.
The control has two groups, A and B, which can be operated as two independent devices.
The input circuit functions for groups A and B are set with a rotary switch at the SCI. Linking of the groups and the effect on the enable contact groups is performed in the SCB basic module.
The SCI is supplied with voltage through the internal Safety Center bus.

Features

- Device for category 4 acc. to EN 954-1.
- Rotary switch to set input function for each group (A and B).
- Up to 16 single-channel input circuits can be connected (8 per group).
- Up to 8 two-channel input circuits can be connected (4 per group).
- Two-channel input circuits for equivalent or non-equivalent switching.
- With or without bridge-fault detection.
- Two-channel wiring with three or four lines.
- With or without synchronous time monitoring
- Connection for emergency-off momentary contact switches, position switches, solenoid switches with reed contacts, signal transmitters with semiconductor outputs.
- Status indicator LEDs.
- Slide switch at the front panel for address settings.
- Plug-in connector for basic module or for the connection of other input modules.
- Plug-in connector for non-safe bus coupler module.

Functional Description

The SCI is designed as a 2-channel diversified structure with micro-controllers. The controllers monitor each other, control the timed outputs for the sensors, evaluate the information from the inputs, and forward this information through the internal bus to the basic module.
The modules are identified by setting addresses. Regular self-tests detect any internal errors.
All input circuits are connected through the signal transmitter between the output (Xn) and the associated input (In).
To detect external errors (e.g., bridge-faults) and internal errors (e.g., component failures), the Xn outputs periodically generate test signals, which are evaluated inside the device.
Bridge-faults are detected between adjoining circuits (terminals).

Proper Use / Intended Purpose

The SCI is the input module for the modular Safety Center control unit.
The Safety Center is used to monitor signal transmitters, e.g., emergency-off momentary contact switches, position switches etc., that are used as safety devices on machinery for the protection of people, material and equipment.
To achieve the protection function, safe outputs are switched on or off depending on the state of the signal transmitter. These safe outputs are turned off to avoid hazardous situations around the machinery. The control can be used for applications with stop categories 0 and 1 according to EN 60204-1.

Assembly

Place the SCI on the standard rail and lock it in. The standard rail must be connected with protective earth (PE) conductor. Connect the SCB basic module and the coupling module with the SCI using the side connectors. It is very important that a solid connection is ensured in the finished installation (e.g., using rail stop elements).
Then the SCI must be connected to the sensors.
The Safety Center must be installed in a control cabinet with a protection type of at least IP54.

Disassembly

See Safety Instructions!
For type A devices, pull out the plug-in terminals, or loosen the terminal screws. Push apart the modules on the standard rail until the module connector is accessible. Release the standard rail lock at the bottom of the device and remove the module.

Note

The safety category according to EN 954-1 depends on external wiring, the selected command source, and the local layout at the machinery.

SAFETY CENTER Input Module

PI 0090-0302 E

SCI 1001S, SCI 1002S-xx
SCI 1001S-A, SCI 1002S-xx-A

Input Function

When setting input functions using the rotary switch, the Safety Center must be turned off; i.e., no operating voltage may be applied to A1/A2 of the SCB basic module. To activate the new operating mode for program execution after the adjustment, press the ENTER key of the SCB for at least 2 seconds while turning on the operating voltage. When you release the ENTER key, the set operating mode will be active (saved).

Caution

The selected functions are activated only, if the SCI switch settings shown below are set while pressing the SBC module ENTER key during the startup phase.

The input functions for group A or B of the SCI 1001S are set in blocks through two rotary switches, whereby each group is assigned one switch.

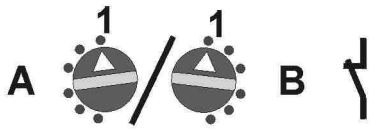
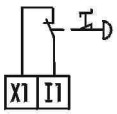
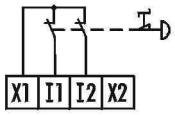
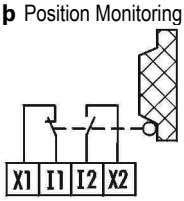
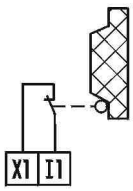
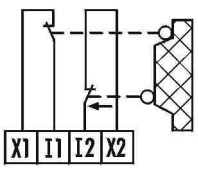
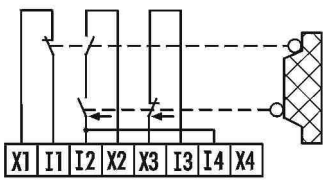
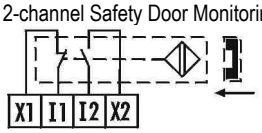
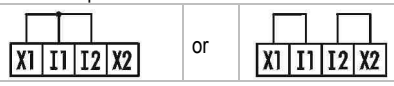
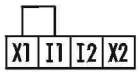
The input functions for both groups A and B of the SCI 1002S-xx have been preset at the factory. Two digits appended to the device name identify the input function type. The first digit stands for the input function of group A, and the second digit identifies the input function for group B.

The SC INPUT FUNCTION selection defines a logical operation of the proper levels at the SC inputs, that allow the generation of a safe output signal.

	Input Circuit Terminal Pairs			
	Group A		Group B	
	Channel 1	Channel 2	Channel 1	Channel 2
1-channel	XA1-IA1 XA2-IA2 XA3-IA3 XA4-IA4 XA5-IA5 XA6-IA6 XA7-IA7 XA8-IA8		XB1-IB1 XB2-IB2 XB3-IB3 XB4-IB4 XB5-IB5 XB6-IB6 XB7-IB7 XB8-IB8	
2-channel	XA1-IA1 XA3-IA3 XA5-IA5 XA7-IA7	XA2-IA2 XA4-IA4 XA6-IA6 XA8-IA8	XB1-IB1 XB3-IB3 XB5-IB5 XB7-IB7	XB2-IB2 XB4-IB4 XB6-IB6 XB8-IB8

The SCI terminals are divided in 8 terminal pairs for group A (XA1-IA1 ... XA8-IA8) and 8 terminal pairs for group B (XB1-IB1 ... XB8-IB8).
The connection of the input circuits with the terminals is represented for both groups as X1-I1, X2-I2 ... :

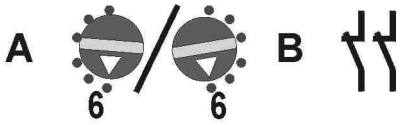
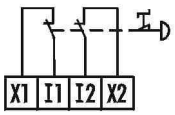
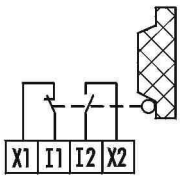
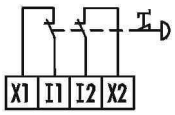
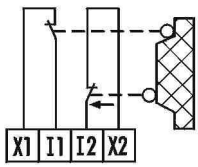
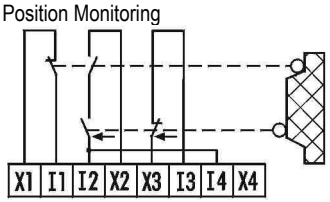
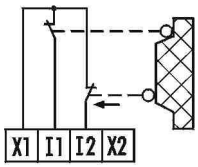
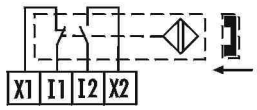
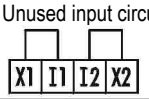
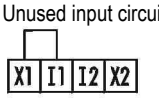
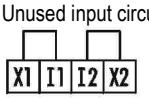
INPUT FUNCTION

 o Bridge-fault detection o Synchronous time monitoring **Max. 8 Input circuits A and B**	 o Bridge-fault detection þ Synchronous time monitoring **Max. 4 two-channel input circuits in groups A and B**	 þ Bridge-fault detection þ Synchronous time monitoring **Max. 4 two-channel input circuits in groups A and B**
1-channel Emergency-Off Circuit 	2-channel Emergency-Off Circuit 	1-channel Sliding Safety Grid Monitoring þ Position Monitoring  (Sliding safety grid closed)
1-channel Sliding Safety Grid Monitoring  (Sliding safety grid closed)	2-channel Sliding Safety Grid Monitoring  (Sliding safety grid closed)	2-channel Sliding Safety Grid Monitoring þ Position Monitoring  (Sliding safety grid closed)
		2-channel Safety Door Monitoring  (Solenoid-operated switch, operated))
Unused input circuits 	Unused input circuits 	Unused input circuits 

SAFETY CENTER Input Module

PI 0090-0302 E

SCI 1001S, SCI 1002S-xx
SCI 1001S-A, SCI 1002S-xx-A

INPUT FUNCTION		
 þ Bridge-fault detection þ Synchronous time monitoring Max. 4 input circuits A and B	 þ Bridge-fault detection o Synchronous time monitoring Max. 4 two-channel input circuits in groups A and B	 þ Bridge-fault detection o Synchronous time monitoring Max. 4 two-channel input circuits in groups A and B
2-channel Emergency-Off Circuit 	1-channel Sliding Safety Grid Monitoring Position Monitoring  (Sliding safety grid closed)	2-channel Emergency-Off Circuit 
2-channel Sliding Safety Grid Monitoring  (Sliding safety grid closed)	2-channel Sliding Safety Grid Monitoring Position Monitoring  (Sliding safety grid closed)	2-channel Sliding Safety Grid Monitoring  (Sliding safety grid closed)
	2-channel Safety Door Monitoring with coded solenoid switch  (Solenoid-operated switch, operated)	
Unused input circuits 	Unused input circuits 	Unused input circuits 

LED Indicators

INPUT A **INPUT B**	green	permanent light	All inputs of group A or B are in their “healthy” state
ERROR A **ERROR B**	red	permanent light	System error in group A or B
		blinking	Error in or inbetween the input circuits of groups A or B (bridge-fault error, synchro-nous time error or sequence error)

Address Settings SCI 1001S, SCI 1002S-xx

		A0	A1
Module address: The module address identifies the SCI input module through the SCB basic module. **Every SCI in a Safety Center must have a unique address.**	0		
	1		
	2		
	3		

SAFETY CENTER Input Module

PI 0090-0302 E

SCI 1001S, SCI 1002S-xx
SCI 1001S-A, SCI 1002S-xx-A

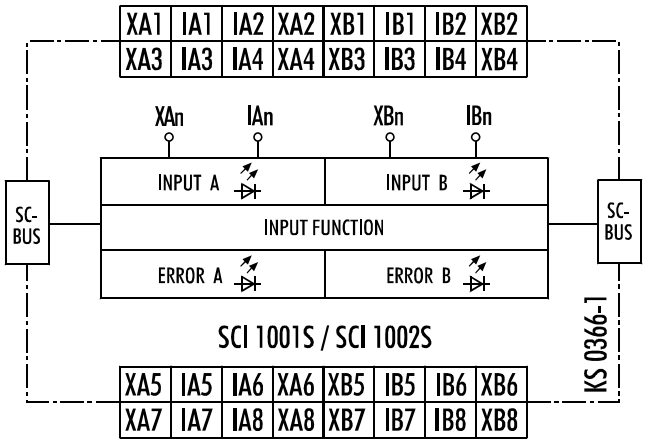
Troubleshooting; Overall System Safety Center (SCI, SCB)

If random or systematic system errors are detected within the SC system or in its control, the SC will shut down. In this case, all safe output circuits (enable current paths) will open and the ERROR LED of the SCB or SCI will light up. This type of shutdown may be corrected either by turning the power off and on again, or by correcting an error in the control.
For details on error causes, error messages and remedies, please refer to the Safety Center Basic Module Operating Instructions.

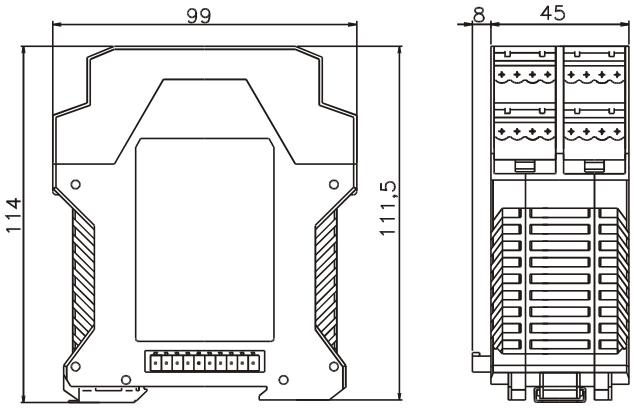
Specifications

Supply Circuit	
rated voltage U_N, DC	24 VDC (through SC-Bus)
residual ripple	2.4 Vpp
rated power	3.5 W
operating range, U_{bmin}, U_{bmax}	0.85 to 1.1 U_N
Electrical Safety	
air and leakage paths	DIN VDE 0110 –1: 1997-04
over-voltage category	III
contamination level	2 internal, 3 external
rated voltage	24 V
housing / terminals protection type (DIN EN 60529: 2000-09)	IP 40/ IP 20
DC isolation supply citcuit / input circuit	no
Input Circuits	
short-circuit-proof outputs	yes
rated output voltage	20 VDC
rated current per input	8 mA
min. input voltage (High)	15 VDC
max. input voltage (Low)	5 VDC
min. ON period t_{ON}	200 ms
min. OFF period t_{OFF}	50 ms
synchronous monitoring time t_S	∞ / 1 sec (selectable)
max. control line resistance	50 Ohm
max. connected capacity	300 nF
test signal	ground switching
Test pulse duration t_{TI}	10 ms
Test cycle time t_{TZ}	50 ms
Climatic Conditions	
ambient operating temperature	-25 to +50 °C
storage temperature	-25 to +70 °C
relative humidity	30 to 95 %, non-condensing
climatic application class (DIN 40040)	H V F
Dimensions	
weight	0.25 kg
size HxWxD	99 x 53x 111.5
Terminal Data	
1-wire or fine wire	1 x 0.14 mm² to 2.5 mm² 2 x 0.14 mm² to 0.75 mm²
fine wire with wire-end sleeve acc. to DIN 46228	1 x 0.25 mm² to 2.5 mm² 2 x 0.25 mm² to 0.5 mm²
max. torque	0.5 to 0.6 Nm
for UL and CSA approbations max. torque	Use only copper wire AWG 18-16 5.25 lbs-in

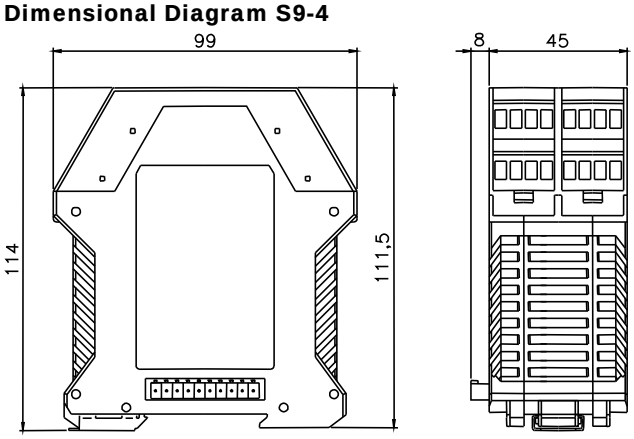
Connection Diagram



Dimensional Diagram S9-3 für A



Dimensional Diagram S9-4



Subject to changes

SCHLEICHER GmbH & Co.
RELAIS-WERKE KG
Pichelswerderstraße 3-5
D-13597 Berlin
Germany

Phone ++49.30.33005.0
Fax ++49.30.33005.344
Hotline ++49.30.33005.304
Internet: http://www.schleicher-de.com
email: info@schleicher-de.com