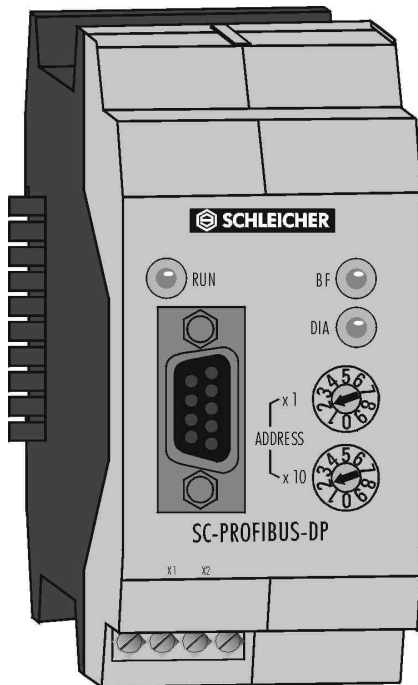




SAFETY CENTER Bus Coupler Module

SC-PROFIBUS-DP-A

PI 0091-0502 E



EN 954-1 Safety Category 4

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

- diagnostics through PROFIBUS-DP fieldbus (EN 50170)
- baud rate up to 12 Mbit/s
- maximum 27 bytes SC system information
- 2 outputs for remote start of the SC system

Equipment Description

The SC-PROFIBUS-DP bus coupler module is mounted in a 45 mm wide rack designed for 35 mm standard rails according to EN 50022. The device is equipped with a plug-in screw-type terminal block.

Power is supplied through the internal SC bus.

Features

- Not a safety-related bus coupler.
- Operation with one Master.
- SC-PROFIBUS-DP can be shut down during bus operation. The operation of other Slaves can be continued.
- Slave addresses can be entered from 00 – 99.
- Each bus coupler module has a device-specific identification number.
- Transfers max. 27 bytes SC System information.
- 2 outputs (short-circuit-proof) for Safety Center control (remote start).

Functional Description

The SC-PROFIBUS-DP bus coupler module provides the user with 27 bytes (depending on configuration and number of SCI) SC system information from the Safety Center. This information can be transferred through the PROFIBUS-DP to other bus subscribers (e.g., PLC). The system information includes input levels for all SC modules, error messages and status information.

Proper Use / Intended Purpose

The SC-PROFIBUS-DP is the bus for the PROFIBUS-DP fieldbus in 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.

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 housing to provide the connection between modules.

Assembly

Place the SC-PROFIBUS-DP on the standard rail and lock it in. The standard rail must be connected with protection earth (PE) conductor. Connect the basic module and the input modules with the SC-PROFIBUS-DP. It is very important that a solid connection is ensured in the finished installation (e.g., using rail stop elements).

Then the SC-PROFIBUS-DP must be connected to the fieldbus and the basic module (if applicable).

The Safety Center must be installed in a control cabinet with a protection type of at least IP54.

Disassembly

See Safety Instructions!

Remove the wires by pulling out the plug-in terminal and the fieldbus cable. 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.



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Configuration SC-PROFIBUS-DP

- Read in GSD file using configurator or programming system The GSD file are downloadable from www.schleicher-de.com.
- Configure PROFIBUS-DP master system, define baud rate, specify bus address for PROFIBUS-DP master.
- Design I/O configuration of bus node and define bus address.
- Define input / output address of bus node.
- Set the defined bus node address at the SC-PROFIBUS-DP.
- Transfer configuration into PROFIBUS-DP master.
- Program master control, read input data, write output data.
- Start up system.

SC-System Bytes Overview

GSD-Module	System Bytes		possible DP-Configuration					
	In	Out	1	2	3	4	5	6
SCB basic	BAD	PBOUT	x	x	x	x	x	x
SCB expansion	BKD	--		x	x	x	x	x
	BSD	--						
SCI (Adr. 0)	EED0_A	--						
	EED0_B	--						
	EFD0_A	--			x	x	x	x
	EFD0_B	--						
	EKD0_A	--						
	EKD0_B	--						
SCI (Adr. 1)	EED1_A	--						
	EED1_B	--						
	EFD1_A	--				x	x	x
	EFD1_B	--						
	EKD1_A	--						
	EKD1_B	--						
SCI (Adr. 2)	EED2_A	--						
	EED2_B	--						
	EFD2_A	--					x	x
	EFD2_B	--						
	EKD2_A	--						
	EKD2_B	--						
SCI (Adr. 3)	EED3_A	--						
	EED3_B	--						
	EFD3_A	--						
	EFD3_B	--						
	EKD3_A	--						
	EKD3_B	--						x

External Diagnosis

The external diagnosis can be triggered in two ways:

1. if one or more error bit(s) (BAD, bit 0-5), then the external diagnosis appears automatically.
2. by setting bit 7 of the output data PBOUT.

In both cases the complete 27 byte input data will be transferred.

Output Data

One byte digital output data is transmitted. Only inputs (SA4 resp. SB4) of the SCB (SC basic module) can be connected to this outputs. All other loads are not permitted. Mind: A H/L-signal to the SA4 resp. SB4 starts the SCB.

byte structure **PBOUT**

bit	7	6	5	4	3	2	1	0
	0	x	x	x	x	x	0	0

- bit 0 ⇒ output X1
- bit 1 ⇒ output X2
- bit 2 to bit 6 ⇒ not used
- bit 7 ⇒ external diagnosis



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Input Data

Max 27 byte input data are transmitted.

byte structure **BAD**

bit	7	6	5	4	3	2	1	0	
	0	0	0	0	0	0	0	0	
bit 0-3	⇒ error Input Module address 0-3								
bit 4	⇒ error Basic Module								
bit 5	⇒ error feedback circuit								
bit 6	⇒ 0 = enable current paths of group A open 1 = enable current paths of group A closed								
bit 7	⇒ 0 = enable current paths of group B open 1 = enable current paths of group B closed								

byte structure **BKD**

bit	7	6	5	4	3	2	1	0	
	0	0	1	0	0	0	0	0	20h ⇒ 0 s
	0	0	0	1	0	0	0	0	10h ⇒ 0.5 s or 5 s
	0	0	0	0	1	0	0	0	08h ⇒ 1.0 s or 10 s
	0	0	0	0	0	1	0	0	04h ⇒ 1.5 s or 15 s
	0	0	0	0	0	0	1	0	02h ⇒ 2.0 s or 20 s
	0	0	0	0	0	0	0	1	01h ⇒ 3.0 s or 30 s

byte structure **BSD**

bit	7	6	5	4	3	2	1	0	
	0	0	0	0	0	0	0	0	
bit 0	⇒ level to terminal SA4 of the SCB								
bit 1	⇒ operation 1: AB 0: A/B								
bit 2	⇒ level to terminal YA2 of the SCB								
bit 3	⇒ level to terminal YA3 of the SCB								
bit 4	⇒ level to terminal SB4 of the SCB								
bit 5	⇒ enter button 1: inactive 0: active								
bit 6	⇒ level to terminal YB2 of the SCB								
bit 7	⇒ level to terminal YB3 of the SCB								

byte structure **EED**

input	8	7	6	5	4	3	2	1	
	0	0	0	0	0	0	0	0	⇒ 8
	0 ⇒ L level								
	1 ⇒ H level								

byte structure **EFD**

input pairs	8+7	6+5	4+3	2+1	
	0	0	0	0	⇒ 4
	00 ⇒ no error				
	01 ⇒ synchronous timeout				
	10 ⇒ sequence error				
	11 ⇒ bridge-fault (in case of bridge-fault all data pairs are set to 11)				

byte structure **EKD**

bit	7	6	5	4	3	2	1	0	
	0	0	1	0	0	0	0	0	20h ⇒ switch position 1
	0	0	0	1	0	0	0	0	10h ⇒ switch position 2
	0	0	0	0	1	0	0	0	08h ⇒ switch position 3
	0	0	0	0	0	1	0	0	04h ⇒ switch position 4
	0	0	0	0	0	0	1	0	02h ⇒ switch position 5
	0	0	0	0	0	0	0	1	01h ⇒ switch position 6



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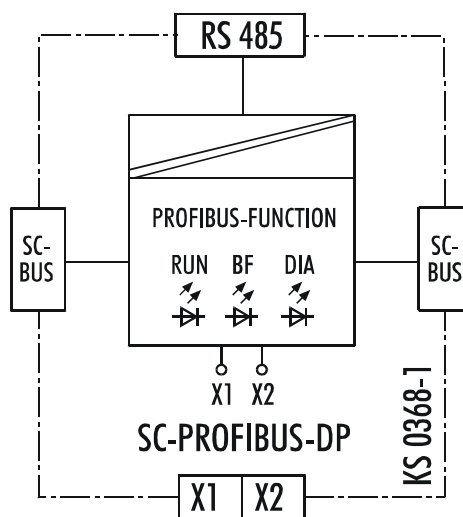
1	SHLD	6	5V-EXT
2	nc	7	nc
3	B = RxD/TxD-P	8	A = RxD/TxD-N
4	CNTR-P	9	CNTR-N (GND-EXT)
5	GND-EXT		

RUN	green	processor is running
BF	red	no bus connection
DIA	red	diagnostic message

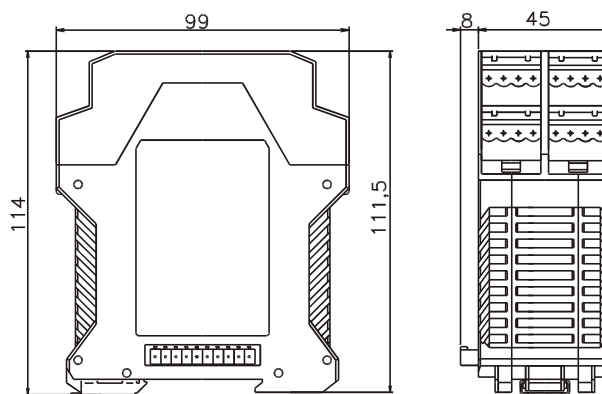
Specifications

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 circuit / interface	yes
Output Circuits X1, X2	
semiconductor	short-circuit-proof
rated output voltage	24 VDC
rated current	10 mA
Interfaces	
interface level	RS 485
connection technology	9-pin D-Sub female connector
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	0.18 kg
size HxWxD	99 x 53 x 117
Removable Terminals X1, X2	
1-wire or fine wire	1 x 0.14 mm ² to 2.5 mm ² 2 x 0.14 mm ² to 0.75 mm ²
fine wire with wire-end sleeve acc. to DIN 46228	1 x 0.25 mm ² to 2.5 mm ² 2 x 0.25 mm ² to 0.5 mm ²
max. torque for UL and CSA approbations	0.5 to 0.6 Nm Use only copper wire AWG 18-16
max. torque	5.25 lbs-in

Connection Diagram



Dimensional Diagram S9-3 device type -A



Subject to changes

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