



EN Operating instructions. pages 1 to 12
Original

Content

1 About this document

1.1 Function 1

1.2 Further applicable documents 1

1.3 Target group: authorised qualified personnel. 1

1.4 Explanation of the symbols used 1

1.5 Appropriate use 1

1.6 General safety instructions 2

1.7 Warning about misuse 2

1.8 Exclusion of liability 2

2 Product description

2.1 Ordering code 2

2.2 Purpose 2

2.3 Technical data 2

2.4 Safety classification 3

3 Mounting

3.1 General mounting instructions 4

3.2 Dimensions 4

3.3 Accessories 4

4 Electrical connection

4.1 General information for electrical connection. 5

4.2 Power supply and fuse protection 5

4.3 Internal fuse elements device ports 5

4.4 Earth concept and shielding. 5

4.5 Overview of connections and LED indicators 6

4.6 Connector configuration of device ports X0 – X7. 7

4.7 Connector configuration POWER I/O 7

4.8 Connector configuration PROFINET P1/P2. 7

4.9 Setting the F-address and factory reset. 7

5 Diagnostic functions

5.1 LED indicators, device ports X0 - X7 7

5.2 LED indicators, PROFINET ports P1/P2 8

5.3 Central LED indicators, SFB-PN 8

6 Set-up and maintenance

6.1 Functional testing. 8

6.2 Maintenance 8

7 Disassembly and disposal

7.1 Disassembly. 8

7.2 Disposal 8

8 Configuration

8.1 Configuration examples of the power supply 9

8.2 Wiring example of the safety switches. 10

9 EU Declaration of conformity

1. About this document

1.1 Function

These operating instructions provide all the information required for mounting, commissioning, safe operation and also disassembly of the safety fieldbox. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.

1.2 Further applicable documents

Enter search term "SFB-PN" in the Schmersal Online Catalogue at: products.schmersal.com.

- Manual: Safety Field Box SFB-PN
- Operating instructions: Safety Field Box SFB-PN
- GSDML File
- Manual: SFB Configuration Tool

1.3 Target group: authorised qualified personnel

All operations described in this operating instructions and in the manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and the manual and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

1.4 Explanation of the symbols used



Information, hint, note:

This symbol is used for identifying useful additional information.



Caution: Failure to comply with this warning notice could lead to failures or malfunctions.

Warning: Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

1.5 Appropriate use

The products described in these operating instructions are developed to execute safety-related functions as part of an entire plant or machine. It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire machine or plant.

The safety fieldbox must only be used according to the following versions or for applications that are approved by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

1.6 General safety instructions

The user must observe the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules.

The information contained in this operating instructions manual is provided without liability and is subject to technical modifications. There are no residual risks, provided that the safety instructions as well as the instructions regarding mounting, commissioning, operation and maintenance are observed.

1.7 Warning about misuse



In the event of improper or unintended use or tampering, use of the safety fieldbox could expose persons to danger or cause damage to the machine or system components.

1.8 Exclusion of liability

We shall accept no liability for damages and malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. The manufacturer shall accept no liability for damages resulting from the use of unauthorised spare parts or accessories.

For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden; the manufacturer shall accept no liability for damages resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

2. Product description

2.1 Ordering code

This operating instructions manual applies to the following types:

SFB-PN-IRT-8M12-IOP

Option	Description
SFB	Safety fieldbox
PN	PROFINET
IRT	Switch IRT-capable
8M12	8 device connectors for M12 connector, 8-pole
IOP	Device connection: IO parallel

2.2 Purpose

The SFB-PN-IRT-8M12-IOP safety fieldbox is designed for connection of up to 8 safety switchgear units with parallel IO signals to a PROFINET/PROFIsafe network.

A maximum of 4 BDF200-FB control panels can be connected.

The safety signals from the connected safety switchgear are forwarded to a safety controller via the safety field bus for evaluation.

For larger safety applications, multiple fieldboxes can be connected to the power supply and field bus in series.



The user must evaluate and design the safety chain in accordance with the relevant standards and the required safety level.

The non-safe IO signals of the connected devices are connected to the control system via the field bus.

Safety switchgear with parallel IO signals can be connected to device ports X0 - X7.

BDF200-FB control panels can only be connected to device ports X4 - X7.



Manual: Safety fieldbox SFB-PN

Further information on the commissioning of the safety SFB-PN fieldbox can be found in the manual.



GSDML file for safety fieldbox SFB-PN

The dual-language GSDML file for the SFB-PN can be found on the internet at products.schmersal.com after searching 'SFB-PN'. A GSDML file is also saved in the device. The file can be downloaded via the integrated web server (see 'Info' page).

2.3 Technical data

Standards: EN 61131-1, EN 61131-2, IEC 60947-5-3, EN ISO 13849-1, IEC 61508, IEC 62061

Time to readiness:	≤ 8 s
Worst Case Delay Time Input to DIN EN 61784-3-3:	≤ 20 ms
Worst Case Delay Time Output to DIN EN 61784-3-3:	≤ 50 ms
Device Watchdog Time to DIN EN 61784-3-3:	10 ms
Device Acknowledgement Time to DIN EN 61784-3-3:	≤ 25 ms

Materials:

- Enclosure:	polyamide / PA 6 GF
- Viewing window:	polyamide / PACM 12
- Encapsulation:	polyurethane / 2K PU
- Labelling plates:	polyamide / PA

Mechanical data

Electrical connection version:	Connector socket / connector
- Device ports X0 - X7:	M12/8-pole, A-coded
- Power I/O:	M12-POWER/4-pole, T-coded
- PROFINET P1/P2:	M12/4-pole, D-coded
M12 connector tightening torque:	max. 1.5 Nm
- Recommended for Schmersal cables:	1.0 Nm
Fixing screws:	2 x M6
- Tightening torque:	max. 3.0 Nm
Viewing window screws:	2 x Torx 10
- Tightening torque:	0.5 ... 0.6 Nm

Ambient conditions

Ambient temperature:	-25 °C ... +55 °C
Storage and transport temperature:	-25 °C ... +70 °C
Relative humidity:	10 % ... 95 %, non condensing
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	5 ... 10 Hz, amplitude 3.5 mm; 10 ... 150 Hz, amplitude 0.35 mm / 5 g

Protection type:	IP65/IP67 to IEC 60529
Protection class:	III
Insulation values to IEC 60664-1:	
- Rated insulation voltage U_i :	32 VDC
- Rated impulse withstand voltage U_{imp} :	0.8 kV
- Over-voltage category:	III
- Degree of pollution:	3

Electrical data - Power I/O

Supply voltage U_B :	24 VDC -15% / +10% (stabilised PELV mains unit)
Current consumption SFB:	200 mA
Rated operating voltage U_e :	24 VDC
Rated operating current I_e :	10 A (external fuse protection required)
Device fuse rating:	≤ 10 A slow blow when used to UL 61010



Adapters providing field wiring means are available from the manufacturer. Refer to manufacturer's information. Use power cables with minimum AWG14, 80°C, 24Vdc rating. UL 248 fuse (slow blow) or UL 489 Circuit breaker, rated max. 10 A or equivalent.

Electrical data - Device ports X0 - X7

Maximum cable length:	30 m
Safety inputs:	X1 and X2
Switching thresholds (acc. EN 61131, type 1):	-3 V ... 5 V (Low) 13 V ... 30 V (High)
Current consumption per input:	< 6 mA / 24 V
Permissible residual drive current:	< 1.0 mA
Accepted test pulse duration on input signal:	0.01 ms ... 1.0 ms
- With test pulse interval of:	20 ms ... 120 s
Classification:	ZVEI CB24I

Sink:	C1	Source:	C1	C2	C3
-------	----	---------	----	----	----

Test pulse outputs:	Y1 and Y2
Switching elements:	p-type, short-circuit proof
Rated operating voltage U_g :	24 VDC
Rated operating current I_g :	Y1: 15 mA Y2: 10 mA at 24 V/30 mA at GND
Leakage current I_r :	≤ 0.5 mA
Voltage drop U_d :	≤ 3 V
Test pulse duration:	≤ 1 ms
Test pulse interval:	500 ms
Classification:	ZVEI CB24I
Source:	C1
Sink:	C1

Digital output:	DO
Switching elements:	2 p-type, short-circuit proof
Utilisation category:	DC-12 / DC-13
Rated operating voltage U_g :	24 VDC
Rated operating current I_g :	0.8 A
Leakage current I_r :	≤ 0.5 mA
Voltage drop U_d :	≤ 1 V
Inductive load:	≤ 400 mH
Switching frequency output:	≤ 1 Hz
Test pulse duration:	≤ 1 ms
Test pulse interval:	15 ... 250 ms
Classification:	ZVEI CB24I
Source:	C1
Sink:	C1

Diagnostics input/FB interface:	DI
Switching thresholds:	-3 V ... 5 V (Low) 13 V ... 30 V (High)
Current consumption per input:	< 12 mA / 24 V
Permissible residual drive current:	< 1.0 mA
Input debounce filter:	10 ms
FB interface data transmission rate:	19.2 kBaud
Power supply devices:	A1 and A2
Rated operating voltage U_g :	24 VDC
Rated operating current I_g :	0.8 A
Device port line fuse:	1.5 A (integrated automatic resettable fuse)

Electrical data – PROFINET P1/P2	
Field bus protocol:	PROFINET / PROFIsafe
Specification:	V2.3, Conformance class C
- PROFINET:	MRP, fast start-up
- Supported options:	MRP, fast start-up
- PROFIsafe:	V2.4
Network load class, PROFINET:	3
Transmission rate:	100 Mbit/s Full Duplex
PROFINET addressing:	via DCP
Integrated switch:	Dual port, 100 Mbit/s, IRT-capable
Supported PROFINET services:	I&M0 to I&M3, SNMP, LLDP
Service interface:	Web interface HTTP

LED indications	
8 x LED green/red 'E':	Error LED, device port
8 x LED yellow 'I':	Input LED, device port
2 x LED green 'L':	Link LED, Ethernet port
2 x LED green 'A':	Activity LED, Ethernet port
1 x LED green/red 'SF':	System fault LED
1 x LED red 'BF':	Bus fault LED
1 x LED green/red 'Err':	Error LED, fieldbox
1 x LED green 'Pwr':	Power LED, fieldbox



All fieldboxes have a good resistance against chemicals and oil. When used in aggressive media (e.g. chemicals, oils, lubricants and coolants in high concentrations) the material resistance must in each case be checked in advance for the specific application.



The sum of the total current of the individual device ports X0 – X7 for outputs A1 (power supply to devices) and DO (digital output) should not exceed 850 mA.



Protection class IP67 is only reached if all M12 connectors and blanking plugs, as well as the viewing window are properly fastening with screws.

2.4 Safety classification

- Safety inputs, 2-channel:

Standards:	IEC 61508, IEC 62061, EN ISO 13849-1
PL:	e
Control Category:	4
DC:	99 %
PFH:	3.0×10^{-9} /h
PFD _{avg} :	2.6×10^{-4}
SIL:	suitable for SIL 3 applications
Mission time:	20 years
Response time of local safety input > PROFINET:	20 ms
The SFB fulfills the requirements as PDDb according to IEC 60947-5-3 in combination with magnetic sensors (2 NC contacts) up to PL e / SIL 3.	

- Safety inputs, 1-channel:

Standards:	IEC 61508, IEC 62061, EN ISO 13849-1
PL:	d
Control Category:	2
DC:	90 %
PFH:	2.3×10^{-7} /h
PFD _{avg} :	2.0×10^{-2}
SIL:	suitable for SIL 1 applications
Mission time:	20 years
Response time of local safety input > PROFINET:	20 ms
Test interval for error detection:	10 s

- Safety outputs, 1 wire (PL d):

Standards:	IEC 61508, IEC 62061, EN ISO 13849-1
PL:	d
Control Category:	2
DC:	90 %
PFH:	1.0×10^{-7} /h
PFD _{avg} :	8.8×10^{-3}
SIL:	suitable for SIL 2 applications
Mission time:	20 years
PROFINET reaction time > local safety output:	50 ms
Test interval for error detection:	adjusted F_WD_Time

- Safety outputs, 2 wires (PL d):

Standards:	IEC 61508, IEC 62061, EN ISO 13849-1
PL:	d
Control Category:	2
DC:	90 %
PFH:	1.0×10^{-7} /h
PFD _{avg} :	8.8×10^{-3}
SIL:	suitable for SIL 2 applications
Mission time:	20 years
PROFINET reaction time > local safety output:	50 ms
Test interval for error detection:	adjusted F_WD_Time



To achieve Cat. 2 / PL d / SIL 2 for the safe outputs of the SFB-PN when safe actuators are connected, cyclic diagnostics of the safety module and communication monitoring and the qualifier bit of the device ports must be integrated in the master PLC.

In case of a failure in the SFB-PN, the master PLC must stop all hazardous machine functions via a separate shutdown path. (OTE acc. to ISO 13849).
The machine functions must be protected against restarting. The control of the unlocking function of solenoid interlocks with the safety outputs of the SFB-PN is possible without further measures.

Safety response times, SFB

The overall reponse time of a safety function is made up of the following:

- Response time of the connected safety switchgear
- Delay time of the safety fieldbox SFB-PN (WCDT_Input ≤ 20 ms)
- PROFINET/PROFIsafe transmission time
- Cycle time F runtime group F-PLC
- Response time of safety shut-off element (actuator)



In addition to the maximum response time of the SFB-PN, the response times of the connected safety switchgear, the transmission time from PROFINET and the response times of additional PROFIsafe components (if applicable) must be taken into consideration.



The maximum acceptable response times of the safety functions are defined in the risk analysis of the machine.

3. Mounting



The field box must be installed in a way that only authorised specialist personnel can access it.

3.1 General mounting instructions

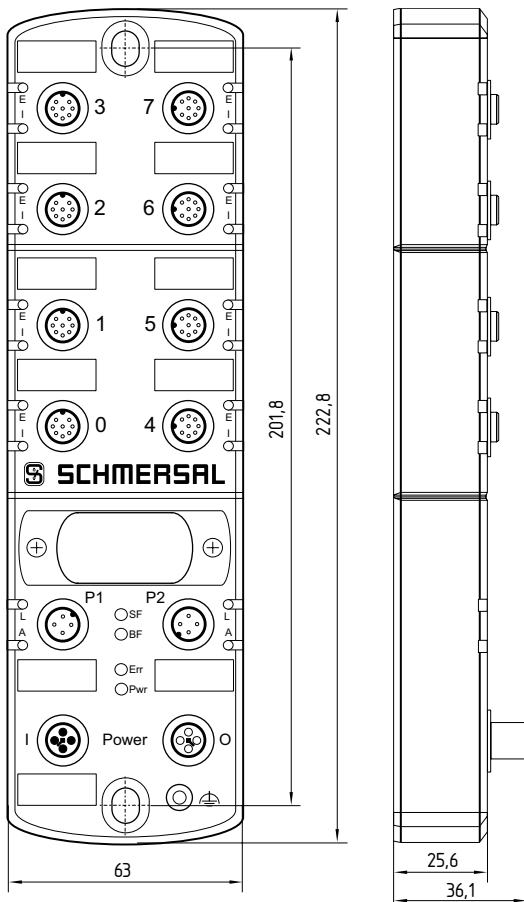
Fasten fieldbox with two M6-screws on a flat mounting surface, for mechanically strain-free installation. The maximum tightening torque is 3.0 Nm. Any mounting position.



Do not install fieldbox outside closed room.

3.2 Dimensions

All measurements in mm.



3.3 Accessories

3.3.1 Cables

Device connection - Cable M12, 8 poles, straight, A-coded		
0.5 m	Connecting cable, male / female connectors	101217786
1.0 m	Connecting cable, male / female connectors	101217787
1.5 m	Connecting cable, male / female connectors	101217788
2.5 m	Connecting cable, male / female connectors	101217789
3.5 m	Connecting cable, male / female connectors	103013428
5.0 m	Connecting cable, male / female connectors	101217790
7.5 m	Connecting cable, male / female connectors	103013429

Power - Cable M12, 4 poles, straight, T-coded		
5.0 m	Pre-wired cable, female connector	103013430
10.0 m	Pre-wired cable, female connector	103013431
3.0 m	Connecting cable, male / female connectors	103013432
5.0 m	Connecting cable, male / female connectors	103013433
7.5 m	Connecting cable, male / female connectors	103013434

Ethernet - Cable M12, 4 poles, straight, D-coded, shielded		
5.0 m	Connecting cable, RJ45 to connector M12	103013435
7.5 m	Connecting cable, RJ45 to connector M12	103013436
10.0 m	Connecting cable, RJ45 to connector M12	103013437
3.0 m	Connecting cable, male / male connectors	103013438
5.0 m	Connecting cable, male / male connectors	103013439
7.5 m	Connecting cable, male / male connectors	103013440

3.3.2 Adapter cables

M12-Adapter cables, 8 poles to 4 poles		
2.5 m	VFB-SK8P/4P-M12-S-G-2.5M-BK-2-X-A-4	103032864
5.0 m	VFB-SK8P/4P-M12-S-G-5M-BK-2-X-A-4	103032865

Y-Adapter cables for Schmersal AOPD		
1.0 m	SFB-Y-SLCG-COM-8P-S-G-1M-BK-2-X-A-4	103032866
1.0 m	SFB-Y-SLCG-8P-S-G-1M-BK-2-X-A-4	103032867

3.3.3 Colour codes of the Schmersal cables

M12, 4-pole			M12, 8-pole		
PIN	Conductor colour		PIN	Conductor colour	
1	BN	Brown	1	WH	White
2	WH	White	2	BN	Brown
3	BU	Blue	3	GN	Green
4	BK	Black	4	YE	Yellow
-	-	-	5	GY	Grey
-	-	-	6	PK	Pink
-	-	-	7	BU	Blue
-	-	-	8	RD	Red

3.3.4 Further accessories

Sealing stickers for inspection window, 4 pcs	103013919
Protective caps for M12 sockets, 10 pcs	103013920
Labels, frame 4 x 5 pcs	103035090

4. Electrical connection

4.1 General information for electrical connection

To supply the safety fieldbox, M12 power connectors, cables with a cross-section of max. 1.5 mm² can be connected to the fieldbox.



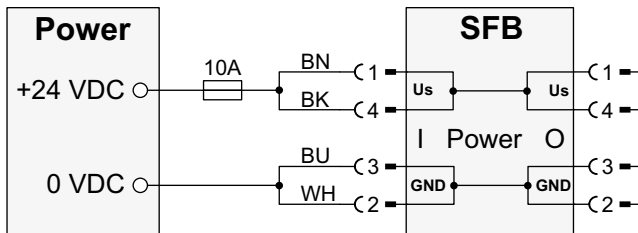
The electrical connection may only be carried out by authorised personnel in a de-energised condition.



In case of a fault, a voltage of up to 60 V can be applied to the device ports.

4.2 Power supply and fuse protection

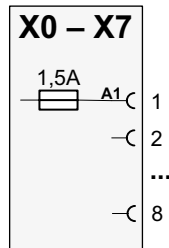
Secure the supply voltage of the safety fieldbox with a 10 A fuse. In order to increase the cable cross section for the supply voltage of the fieldbox, both connections from Us and GND must be connected in parallel. Pins 1 + 4 and 2 + 3 in the fieldbox are bridged.



4.3 Internal fuse elements device ports

The device ports X0 - X7 are designed for 0.8 A continuous current and equipped in each case with an auto-resettable fuse of 1.5 A for line protection. If the fuse element is triggered, the red LED on the device port flashes with 4 pulses.

After eliminating the overload at one of the device ports, the fuse resets itself after a short cool-down phase.



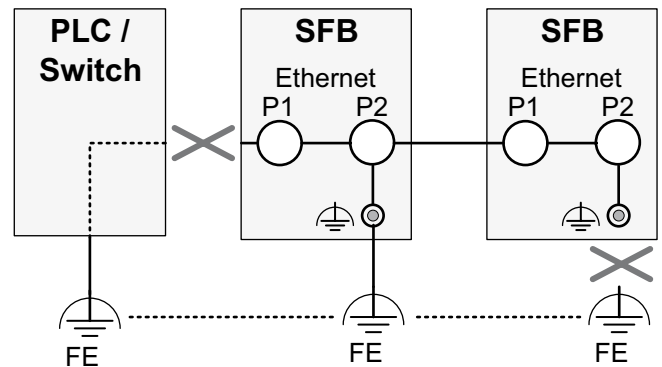
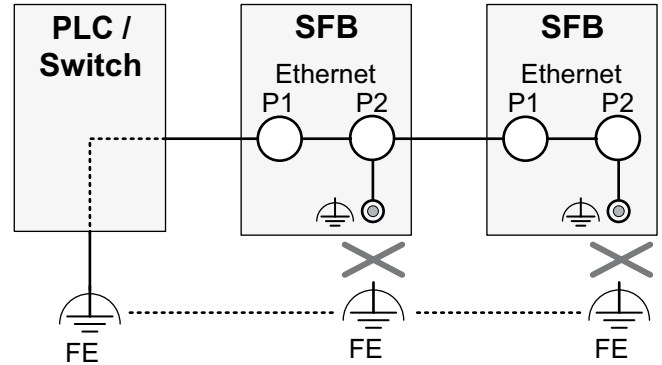
4.4 Earth concept and shielding

A functional earth is connected for fault-free operation of the safety fieldbox. Earth loops must be avoided when connecting the functional earth.

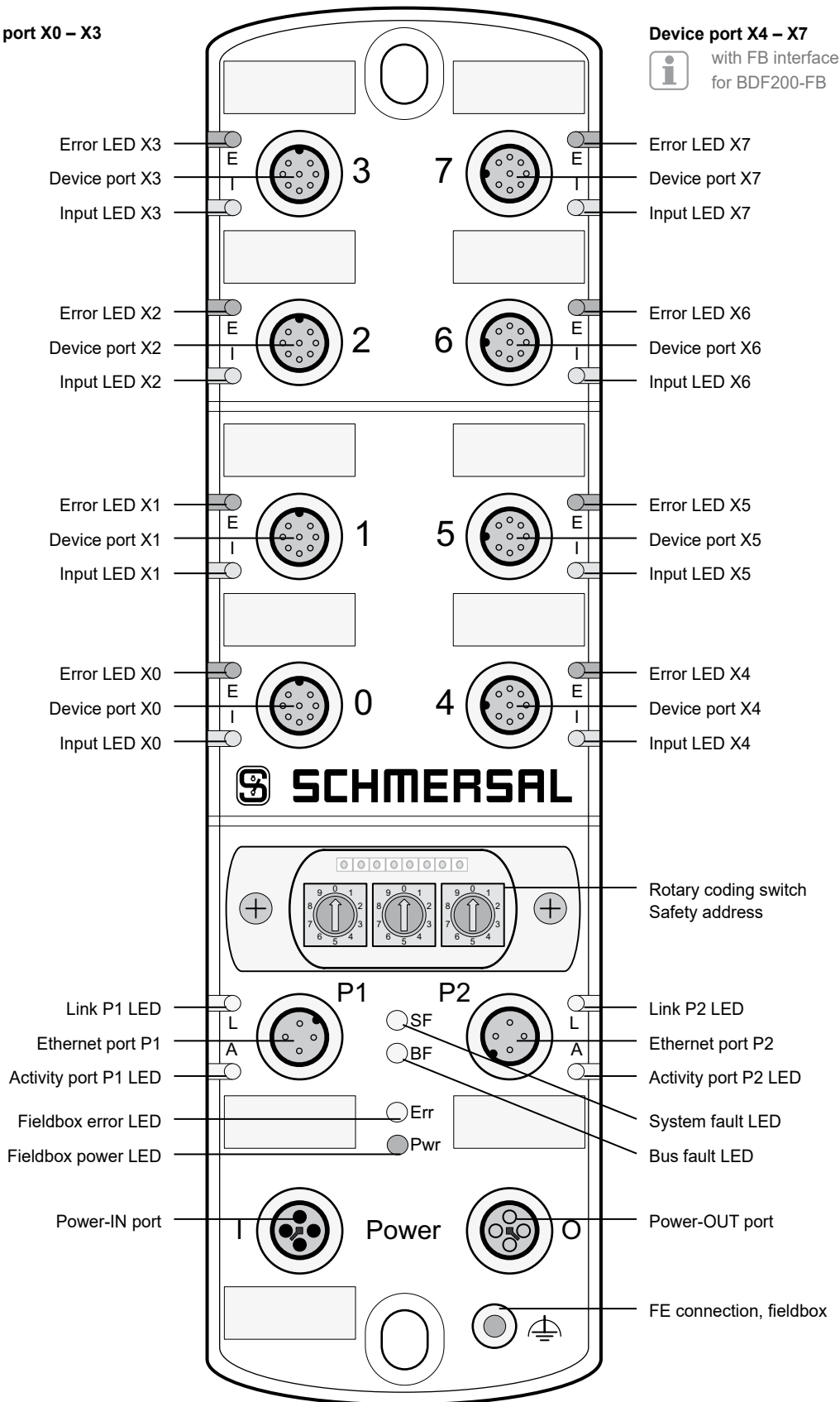
The FE functional earth is normally connected via the switch. In the event of EMC problems, the fieldbox can be earthed via the separate FE connection.

An earth strap is available as an accessory.

Wiring examples for avoidance of earth loops:



4.5 Overview of connections and LED indicators



4.6 Connector configuration of device ports X0 – X7

Version: M12 socket, 8-pin, A-coded

PIN	Colour*	Signal	Description of fieldbox signals
1	WH	A1	+ 24 VDC device supply
2	BN	Y1	Test pulse output 1, safety channel 1 supply
3	GN	A2	0 VDC device supply
4	YE	X1	Safety input 1
5	GY	DI	Diagnostic input
6	PK	Y2	Test pulse output 2, safety channel 2 supply
7	BU	X2	Safety input 2
8	RD	DO	Safe output

X4 – X7 additional with FB interface for BDF200-FB



The default setting is used for safety switchgear with electronic OSSDs. If safety switchgear with dry contacts are used, cross fault monitoring must be activated. For safety switchgear with electronic OSSDs, cross fault detection of the device connection cable must be carried out by the safety switchgear.

4.7 Connector configuration POWER I/O

Version: M12 power connector/socket, 4-pin, T-coded

PIN	Colour*	Signal	Description of fieldbox signals
1	BN	Us	+ 24 VDC SFB supply (= PIN 4)
2	WH	GND	0 VDC SFB supply (= PIN 3)
3	BU	GND	0 VDC SFB supply (= PIN 2)
4	BK	Us	+ 24 VDC SFB supply (= PIN 1)

4.8 Connector configuration PROFINET P1/P2

Version: M12 socket, 4-pin, D-coded

PIN	Colour*	Signal	Description of fieldbox signals
1	YE	TD+	Transmit-Data +
2	WH	RD+	Receive-Data +
3	OG	TD-	Transmit-Data -
4	BU	RD-	Receive-Data -
Flange		FE	Ethernet shielding

* Colour code of SCHMERSAL M12 cables

4.9 Setting the F-address and factory reset

Carefully remove the viewing window. (Screws Torx 10)



The screws in the viewing window are not secured.
Keep the screws safe so that they do not get lost.

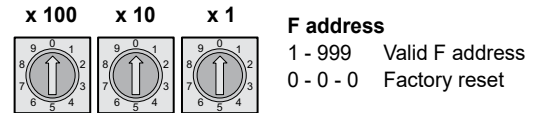


Caution!
Electrostatically sensitive components.
Do not touch the printed circuit board directly.



When you open the inspection window, ensure that no moisture or excessive humidity penetrates into the fieldbox.

The 3 rotary coding switches behind the viewing window can be used to set the safety address and to carry out a factory reset of the SFB.



Setting of the F address

- Remove power from the SFB
- Set the desired F address in the range 1 - 999
- Resupply power to the SFB

Carrying out an SFB factory reset:

- Remove power from the SFB
 - Setting of F address 0 – 0 – 0
 - Resupply power to the SFB
 - After 15 seconds, switch off the power of the SFB-PN again
- The IP address and the PROFINET name are deleted during a factory reset.

5. Diagnostic functions

5.1 LED indicators, device ports X0 - X7

There are 2 LED indicators on each device port. A green/red error LED and a yellow input LED to display the switching condition at the safety inputs.

Error LED (E)

The error LED may exhibit the following display and flashing pattern:

LED display	Description
GREEN ON	No fault at device port
GREEN Flashes	Device port fault can be acknowledged
RED 1 impulse	Safety input cross-fault
RED 2 impulses	Safety input fault
RED 3 impulses	Test pulse output fault
RED 4 impulses	Device supply overload
RED 5 impulses	Digital output overload
RED 6 impulses	Digital output fault
RED 7 impulses	FB interface fault (only device ports 4-7)

Input LED (I)

The input LED may exhibit the following display and flashing pattern:

LED display	Description
YELLOW OFF	Both safety inputs LOW
YELLOW ON	Both safety inputs HIGH
YELLOW Flashes	Only one safety input HIGH, or discrepancy/stable time fault

5.2 LED indicators, PROFINET ports P1/P2

There are 2 LED indicators at the Ethernet ports.
A green link LED and yellow activity LED.

LED link (L)

The link LED may exhibit the following display and flashing pattern:

LED display	Description
GREEN ON	Connection to Ethernet active

LED Activity (A)

The activity LED may exhibit the following display and flashing pattern:

LED display	Description
YELLOW Flashes	Ethernet data transmission active

5.3 Central LED indicators, SFB-PN

There are 4 LEDs for central diagnostics of the fieldbox. A green/red LED indicator for a system fault, a red LED for bus fault, a green/red error LED and a green power LED.

System fault LED (SF)

The system fault LED may exhibit the following display and flashing pattern:

LED display	Description
RED ON	Module error or device port error
GREEN Flashes	FLASH signal for identifying the fieldbox

Bus fault LED (BF)

The bus fault LED may exhibit the following display and flashing pattern:

LED display	Description
RED ON	No or slow connection
RED Flashes	Connection but no data transmission

Fieldbox error LED (Err)

The error LED may exhibit the following display and flashing pattern:

LED display	Description
GREEN ON	Field box in RUN
GREEN Flashes	Module fault can be acknowledged
RED ON	Internal field box fault
RED 3 Hz	F_WD_Time SFB-PN exceeded
RED 1 impulse	Internal over temperature fault
RED 2 impulses	Invalid F address fault
RED 3 impulses	Invalid F_iPar_CRC fault
RED 4 impulses	Acknowledge impulse length fault
RED 5 impulses	Test pulse output overload fault
RED 6 impulses	Overvoltage fieldbox U > 29 V

Fieldbox power LED (Pwr)

The power LED may exhibit the following display and flashing pattern:

LED display	Description
GREEN ON	Supply voltage of fieldbox OKAY
GREEN 1 Hz	Low voltage warning U < 20 V
GREEN 3 Hz	Low voltage fault U < 17 V
GREEN OFF	Fieldbox switched off U < 12 V

6. Set-up and maintenance

6.1 Functional testing

A check must be carried out to ensure that the projected safety function is effective.



The safety functions, configuration of the safety fieldbox and correct installation must be checked by a responsible safety specialist/safety representative.

6.2 Maintenance

The safety fieldbox operates error-free if installed and used properly.

7. Disassembly and disposal

7.1 Disassembly

Only disassemble the safety fieldbox if it is in de-energized state.

7.2 Disposal

Dispose of the safety fieldbox properly in accordance with national regulations and laws.

8. Configuration

8.1 Configuration examples of the power supply

If the power supply of each fieldbox is separated and in a star configuration, the maximum cable length of a fieldbox series is limited only by the maximum permissible cable length of the field bus used.

If the power supply from fieldbox to fieldbox is looped through, the following maximum configurations apply.

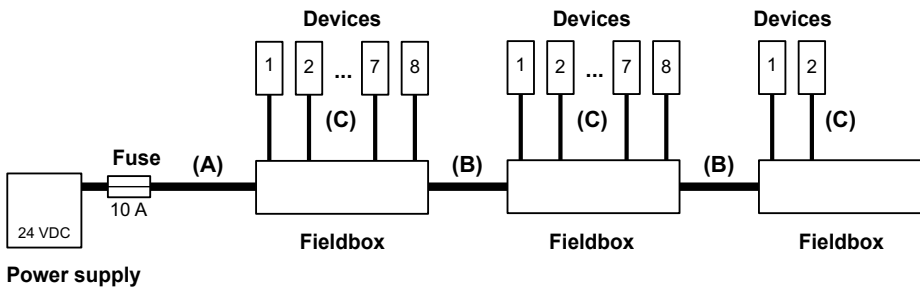
3 different configurations are shown respectively for the different SCHMERSAL safety switchgear. One configuration with long cable lengths (maximum), one configuration with medium cable lengths (medium) and one configuration with shorter cable lengths (small).

The following assumptions are made for the configuration examples listed in the table:

- The examples represent maximum configurations. If individual cable lengths are shortened, larger systems are possible.
- 2 x 1.5 mm² power supply wiring and 10 A fuse protection.
- Use of SCHMERSAL cables.
- The cable lengths listed in the table between the power supply and the first fieldbox as well as the individual fieldboxes are the maximum lengths. Reducing the individual cable lengths is not critical.
- For interlocks, these designs are based on simultaneous activation of all lock and unlock functions. In the event of delayed activation of the lock and unlock function, larger systems are possible.

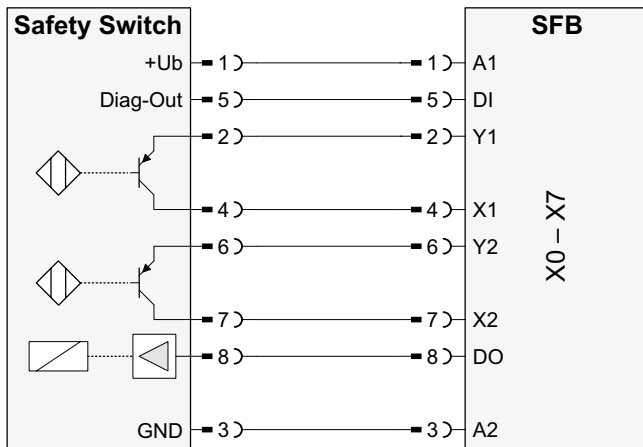
Device / configuration version	Max. number of devices	Equals number of fieldboxes	Length of the cable (A) up to the first fieldbox	Length of the cables (B) between the fieldboxes	Length of stub cables (C) for device connection
AZM 201 / Maximum	16	2	10.0 m	10.0 m	7.5 m
AZM 201 / Medium	20	2,5	7.5 m	7.5 m	5.0 m
AZM 201 / Small	24	3	7.5 m	5 m	3.5 m
MZM 100 / Maximum	20	2,5	10.0 m	10.0 m	7.5 m
MZM 100 / Medium	24	3	7.5 m	7.5 m	5.0 m
MZM 100 / Small	28	3,5	7.5 m	5 m	3.5 m
AZM 300 / Maximum	28	3,5	10.0 m	10.0 m	7.5 m
AZM 300 / Medium	32	4	7.5 m	7.5 m	5.0 m
AZM 300 / Small	40	5	7.5 m	5 m	3.5 m
AZM 400 / Maximum	16	2	10.0 m	10.0 m	7.5 m
AZM 400 / Medium	16	2	7.5 m	7.5 m	5.0 m
AZM 400 / Small	16	2	7.5 m	5 m	3.5 m
AZM 1xx / Maximum	20	2,5	10.0 m	10.0 m	7.5 m
AZM 1xx / Medium	24	3	7.5 m	7.5 m	5.0 m
AZM 1xx / Small	28	3,5	7.5 m	5 m	3.5 m
RSS & CSS / Maximum	48	6	10.0 m	10.0 m	7.5 m
RSS & CSS / Medium	56	7	7.5 m	7.5 m	5.0 m
RSS & CSS / Small	64	8	7.5 m	5 m	3.5 m
Mixed / Maximum	24	3	10.0 m	10.0 m	7.5 m
Mixed / Medium	28	3,5	7.5 m	7.5 m	5.0 m
Mixed / Small	32	4	7.5 m	5 m	3.5 m

Mixed fitting of fieldbox: 2 x AZM 201, 2 x MZM 100, 2 x AZM 300 and 2 x RSS / CSS



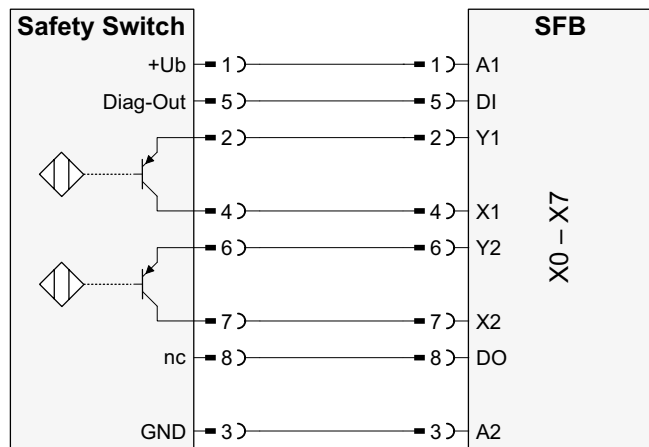
8.2 Wiring example of the safety switches

Electronic interlock, interlock function via 1 wire



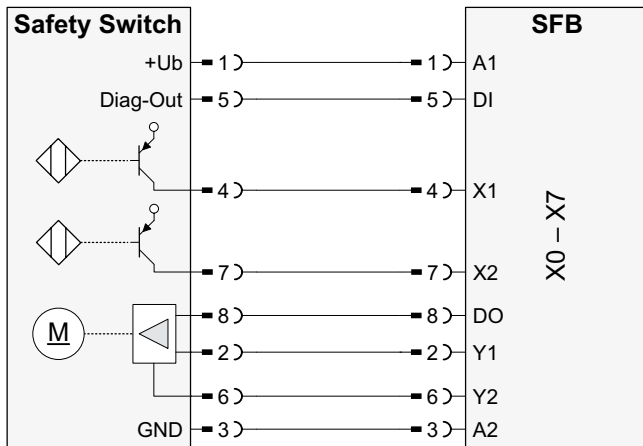
SCHMERSAL devices: MZM 100, AZM 201, AZM 300, ...

Electronic sensor, 8-pin



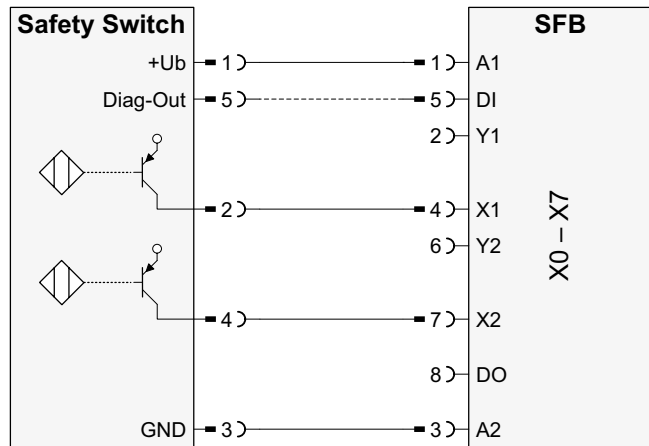
SCHMERSAL devices: CSS series, RSS series, ...

Electronic interlock, interlock function via 2 wires



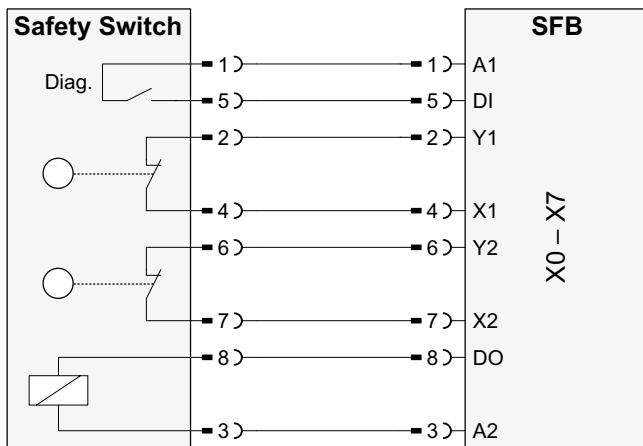
SCHMERSAL devices: AZM 400, ...

Electronic sensor, 4/5-pin



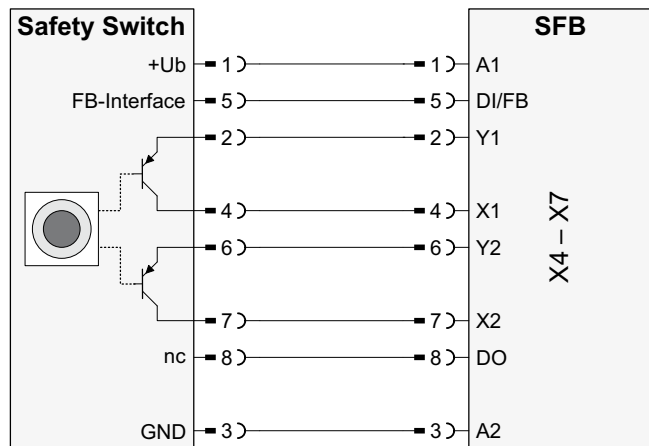
Different safety switchgear

Electromechanical interlock, interlock function via 1 wire



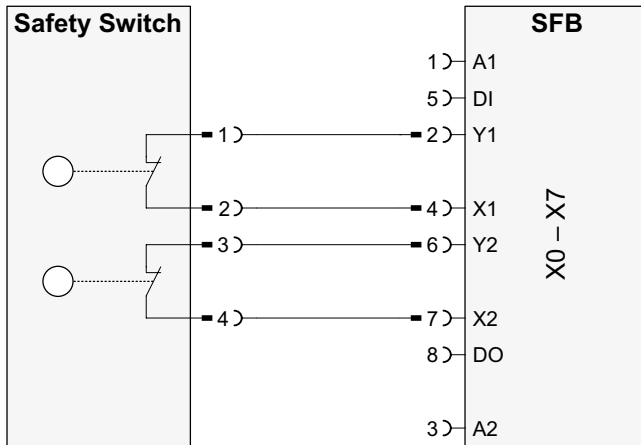
SCHMERSAL devices: AZM 161-FB, AZM 170-FB, ...

Electronic E-STOP, BDF 200 FB, FB interface



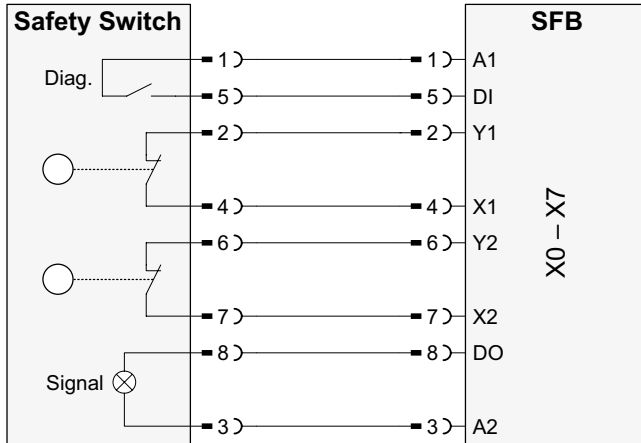
SCHMERSAL devices: BDF 200-FB, ...

Electromechanical switches/sensors, 2-channel, 4-pin



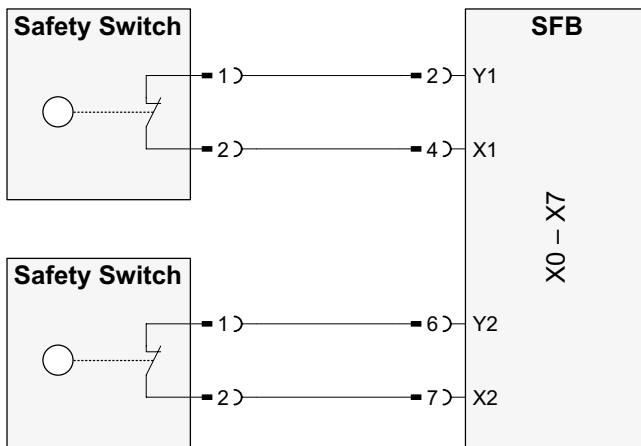
SCHMERSAL devices: BNS series, TESK, ...

Electromechanical switches, 2-channel, 8-pin



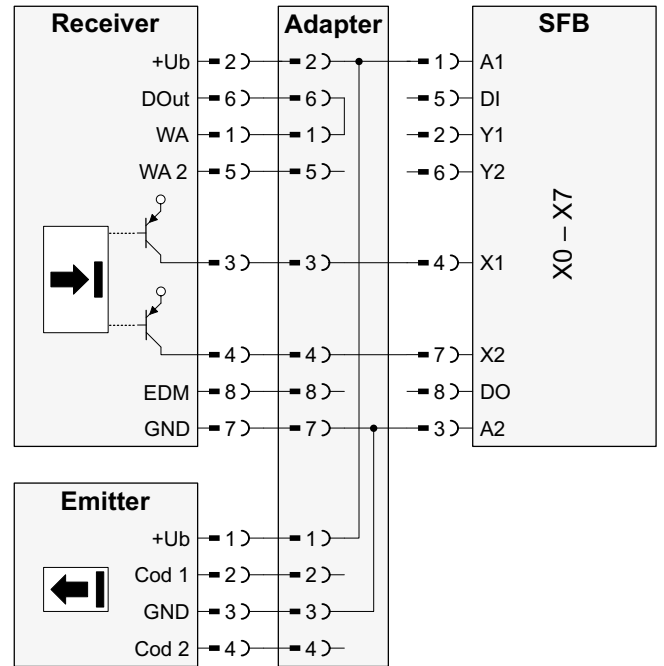
SCHMERSAL devices: BDF100-NH(K), AZ series, PS series, ZQ series, ...

2 electromechanical switches, 1-channel, forcibly interrupted



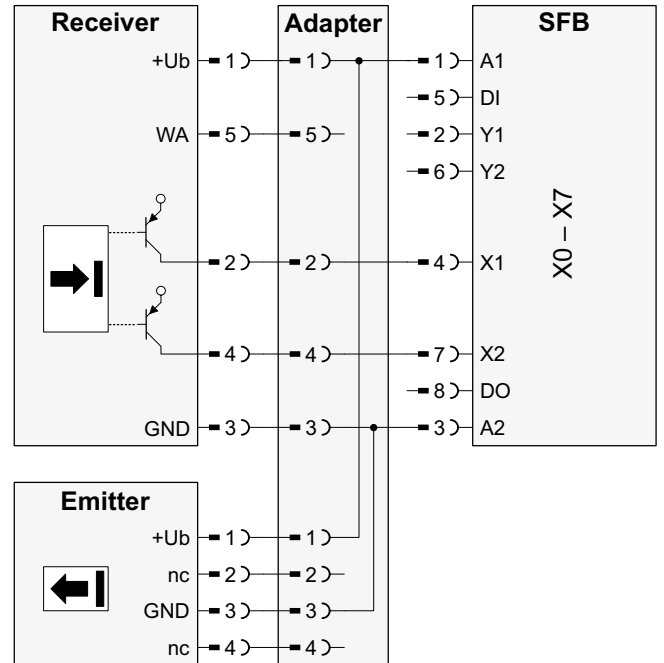
Different safety switchgear

Optoelectronic AOPD, 8 pole



SCHMERSAL devices: SLC 440, SLG 440, ...

Optoelectronic AOPD, 5 pole



SCHMERSAL devices: SLC 440 COM, SLG 440 COM, SLB 440, ...



Other wiring examples can be found in the 'Safety SFB-PN fieldbox manual' on the internet at products.schmersal.com.

9. EU Declaration of conformity

EU Declaration of conformity



Original
K.A. Schmersal GmbH & Co. KG
Möddinghofe 30
42279 Wuppertal
Germany
Internet: www.schmersal.com

We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

Name of the component: SFB

Type: See ordering code

Description of the component: Safety fieldbox (IO module with fieldbox interface)

Relevant Directives: 2006/42/EC Machinery Directive
2014/30/EU EMC-Directive
2011/65/EU RoHS-Directive

Applied standards: IEC 61131 part 2:2017,
DIN EN 60947-5-3:2014,
EN ISO 13849-1:2015,
IEC 61508 parts 1-7:2010,
EN 62061:2005 + AC:2010 + A1:2013 + A2:2015

Notified body for the prototype test: TÜV Rheinland Industrie Service GmbH
Am Grauen Stein, 51105 Köln
ID n°: 0035

EC-prototype test certificate: 01/205/5764.00/20

Person authorised for the compilation of the technical documentation: Oliver Wacker
Möddinghofe 30
42279 Wuppertal

Place and date of issue: Wuppertal, February 28, 2020

Authorised signature
Philip Schmersal
Managing Director

SFB-PN-IOP-B-EN



The currently valid declaration of conformity can be downloaded from the internet at products.schmersal.com.

