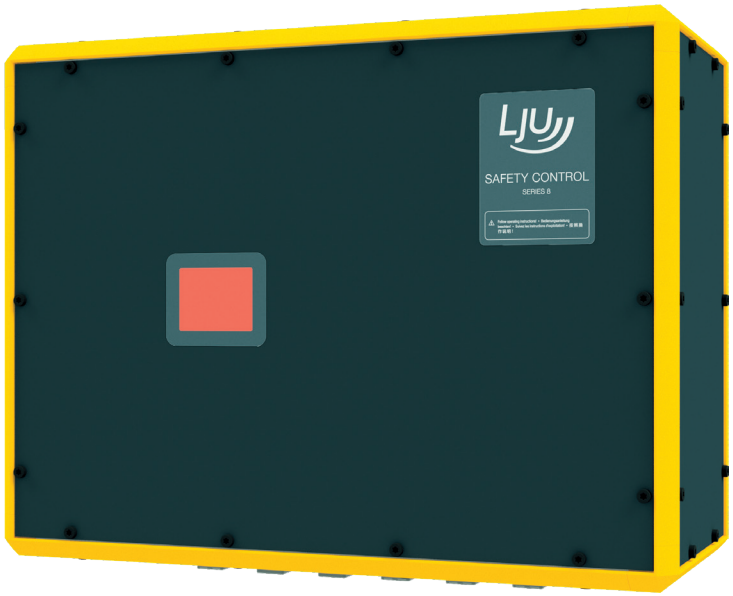
Controller description

SCS-8

Stationary safety controller



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Translation of the original
STB_0013, 5, en_GB

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1 Information on the description

1.1 Revision history

We reserve the right to make changes to the information present in this document, which result from our constant effort to improve our products.

Version	Date	Comment/reason for change
1	01.2021	Basic version
2	06.2021	Note fixing adapters added Device drawing updated
3	07.2021	4.4 Set WNRs removed, type label changed
4	11.2021	General updates Commissioning, service, maintenance changed
5	07.2022	Conductix-Wampfler layout

1.2 How to use and store the description

To work safely with the product, it is necessary to observe the safety notes and action instructions. All persons working with the product must have understood the user information in this description and apply it conscientiously. The operator must fulfil his duty of care and ensure that all persons working with the product have read and understood the user information and are implementing it.

This description forms part of the product and must be accessible to all persons working with the product at all times.

1.3 Applicable documents

If the device/system is part of a project-specific system layout, the documents found in the project documentation also apply.

The following documents are considered part of this documentation and provided as separate documents.

- *'ANS connection plan'* for the stationary safety controller SCS
- *'SMX100 error list'* for the BBH safety controller SMX100

The separate documentation for connected devices and components applies.

1.4 Copyright protection

The contents, texts, drawings, pictures and other illustrations of this description are protected by copyright and subject to intellectual property rights. Any misuse is punishable by law.

Reproduction in whole or in part of this description is only permitted within the limits of the legal provisions of the copyright law. Any modification or shortening of the text is prohibited without the explicit written consent of Conductix-Wampfler Automation GmbH.

1.5 Illustrations

The illustrations that accompany this description have been purposely selected. They are provided for basic understanding and may differ from the actual design. No claims shall be accepted for possible discrepancies.

1.6 Brands

The popular names, trade names, production descriptions, etc. used in this description may constitute trademarks even without special designations and as such may be subject to legal requirements.

2 Warranty and liability

2.1 Warranty

The warranty only covers production defects and faulty components.

The manufacturer assumes no responsibility for damages caused during transport or unpacking. In no case and under no circumstances will the manufacturer be liable for defects or damages caused by misuse, incorrect installation or inadequate environmental conditions or from dust or corrosive substances.

Consequential damages are excluded from the warranty.

Should you have further questions regarding the warranty, please contact the supplier.

2.2 Limitation of liability

All information and notes in this description have been compiled taking into account the applicable standards and regulations, the state of the art and our many years of knowledge and experience.

Conductix-Wampfler Automation GmbH assumes no liability for damage and malfunctions during operation due to:

- Failure to comply with the description
- Non-intended use
- Use by untrained personnel
- Unauthorised alteration or modification
- Use of the product, despite negative transport inspection

Furthermore, Conductix-Wampfler Automation GmbH's warranty obligation will cease to exist in case of a failure to comply with the description.

3 Safety instructions

This section contains information on all safety aspects for optimum protection of personnel and for safe operation without malfunctions.

To prevent dangers, these notes must be read and followed by personnel. Only then can safe operation be guaranteed.

Of course, all legally applicable general safety and accident prevention regulations must be complied with.

Conductix-Wampfler Automation GmbH assumes no liability for damage or accidents that were caused by non-observance of these safety notes.

3.1 Warning concept

This description contains notes that must be observed for your own personal safety and to avoid property damage. Notes regarding your personal safety are highlighted by a warning triangle; notes regarding property damage do not have a warning triangle.

When several hazard levels occur, the warning always refers to the highest level. If a warning of injury to persons is indicated with a warning triangle, the same warning might include an additional warning of property damage.

3.1.1 Arrangement of warnings

If warnings refer to an entire section, they are placed at the beginning of the section (e.g. chapter start).

If warnings refer to a specific action instruction, they are placed in front of the respective action instruction.

3.1.2 Structure of warnings

- **SIGNAL WORD**
- ↳ Type of danger and its source
- ↳ Possible consequences, if not observed
- ↳ Danger avoidance measures
- ↳ Preventive measures

3.1.3 Signal words

Warnings are indicated using signal words based on hazard levels.

Signal word	Meaning
 ⚠WARNING!	This combination of symbol and signal word indicates a possible dangerous situation that can result in death or serious injury if it is not avoided.
 NOTICE!	This combination of symbol and signal word indicates a possible dangerous situation that can result in material damage if it is not avoided.

3.1.4 Hazard symbols

Warnings of the groups 'danger' and 'warning' are content-based. They are presented with clear danger symbols.

Warnings of the 'caution' group do not have a specific danger symbol.

Warning signs	Type of danger
	Warning – high-voltage.
	Warning – danger zone.

3.1.5 Suggestions and recommendations

This symbol indicates important information to help you handle the product.

3.2 Intended use

The stationary safety controller (SCS) has been designed and constructed exclusively for the intended use described in the following:

The stationary safety controller (SCS) is a device for industrial and commercial systems which ensures that the system is in a safe condition by evaluating received safety commands from a system controller or directly connected safety sensors and subsequent fast and reliable transmission of the commands via an SPCC network (Safe Provider Consumer Communication) to terminal devices (e.g. transport vehicles) in the event of danger.

The use for intended purpose includes compliance with all of the information in this manual and the associated documents.

Any use apart from the intended purpose or other types of use are regarded as misuse.

3.3 Foreseeable incorrect use

Any use that goes beyond this description is forbidden.

⚠ WARNING!

Hazard from non-intended use!

Any use of the device other than and/or beyond the intended use can cause hazardous situations.

- Only use the device as intended.
- It is paramount to comply with all the specifications and permitted conditions at the place of use.
- Do not use the device in potentially explosive atmospheres.
- Do not operate the device in environments with harmful oils, gases, vapours, dusts, radiation, etc.

3.4 Modifications and alterations

For the purpose of avoiding hazards and for ensuring optimum performance, any modifications, additions, or alterations to the device require Conductix-Wampfler Automation GmbH's express consent.

3.5 Responsibility of the operator

The device is used in an industrial environment. The operator of the device is therefore subject to statutory obligations regarding work safety.

In addition to the work safety instructions in this description, the safety, accident prevention and environmental regulations applicable to the area where the device is used must be complied with.

The following applies in particular:

- The operator must familiarise with the applicable work safety regulations and must also determine the dangers that are posed by the particular work conditions at the location of use by means of a risk assessment. This must be realised in the form of operating instructions for operating the device.
- This description must be kept within easy reach of the device and be accessible to those persons charged with working both on and with the device at all times.
- The specifications of the description must be adhered to fully and unconditionally!
- The device may only be operated when in a perfect and operationally safe condition. The device must be checked for detectable defects prior to each time it is put into service.
- The system operator must ensure that the responsibilities for activities on the system are unambiguously defined and only adequately qualified personnel familiar with the operating and safety regulations are working on and with the device.

3.6 Personnel and qualifications

The product / system belonging to this description may only be handled by personnel qualified for the respective task. This is done taking into account the descriptions associated with the particular task, especially the safety and warning information contained therein.

Due to their training and experience, qualified personnel are able to recognize risks and avoid possible hazards when dealing with this product / system.

⚠ WARNING!

Injury hazard from insufficient qualification!

Improper handling can cause substantial bodily harm or material damage.

3.7 Special hazards

⚠ WARNING!

Live parts

If the device is installed in switch cabinets, there is an immediate danger to life in the event of contact with live parts.

- Switch off the power supply for the switch cabinet when performing any work on the device, and safeguard it against being switched on again.
- Work on electrical components may only be carried out by qualified electricians or persons instructed and supervised by a qualified electrician in accordance with the electrical engineering regulations.

3.8 Safety devices

⚠ WARNING!

Danger to life from non-functioning safety devices!

Security devices ensure a maximum degree of safety during operation. Safety can only be guaranteed if the safety devices are intact.

- Never override safety devices.
- Before starting work, check whether the safety devices are fully functional.
- Report any faulty safety devices immediately.
- Get faulty safety devices repaired immediately.

Connected safety equipment

For further detailed information about which safety devices are connected to the controller, please refer to the connection diagram of the controller.

4 Product description

4.1 Function

The stationary safety controller (SCS) transmits safety-related commands to machinery and devices for safe operation of a system (e.g. to transport vehicles, lifting tables etc.). In order to implement and guarantee safe functions, a compact, TÜV-certified programmable safety controller from BBH PRODUCTS is installed in the SCS as a safety module.

Events from a system controller (PLC) and/or from safety sensors which are directly connected to the SCS are evaluated by the SCS, processed and transmitted to the terminal devices via a safe Ethernet-based network with SPCC (Safe Provider Consumer Communication).
System-dependent safety conditions can be realised in this way by using a stationary safety controller (SCS) which do not necessarily require a *'hard'* shut-off of a system area. A system area can be put into a safe condition e.g. by stopping or also by slowing down all vehicles in the area to a safe speed. The area does not have to be restarted, and vehicles in the area remain online.

Externally actuated peripherals (e.g. signal lights) can optionally be actuated directly by the SCS. Devices to be actuated are connected to safe outputs of the SCS to do this.

Command specification by the PLC

The system controller transmits a safety-related event via a safe protocol (e.g. CIP Safety) to the SCS.

This event is received by the SCS, processed immediately and a command is generated. The command is output in real time via the SPCC interface of the SCS, transmitted to all terminal devices in the safety-related system area via the connected SPCC network and executed immediately by terminal devices.

⇨ The system area is in a safe condition.

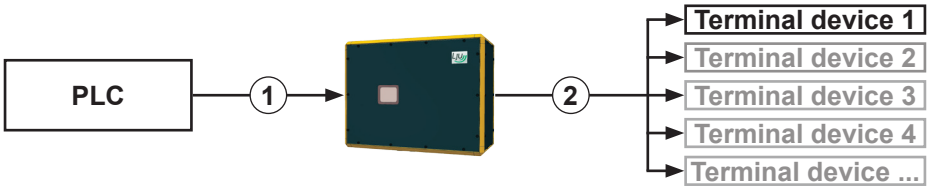


Fig. 1: Command specification by the PLC

1 Field bus with safe protocol, e.g. CIP Safety
2 SPCC network (Safe Provider Consumer Communication), e.g. WiFi access point with safe communication

Evaluation of connected sensors

A safety switch (such as a light barrier) connected to the safe inputs of the SCS is triggered.

This event is processed immediately in the SCS and a command is generated. The command is output in real time via the SPCC interface of the SCS, transmitted to all terminal devices in the safety-related system area via the connected SPCC network and executed immediately by terminal devices.

⇨ The system area is in a safe condition.

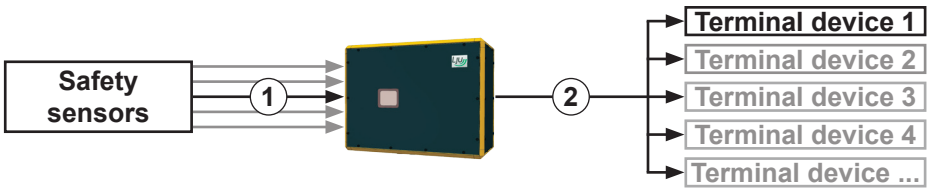


Fig. 2: Evaluation of connected safety sensors

1 Connection of external safety sensors to safe digital inputs
2 SPCC network (Safe Provider Consumer Communication), e.g. WiFi access point with safe communication

4.2 Structure

The stationary safety controller SCS is a compact individual device. The most important components of the SCS are shown in the figure below.

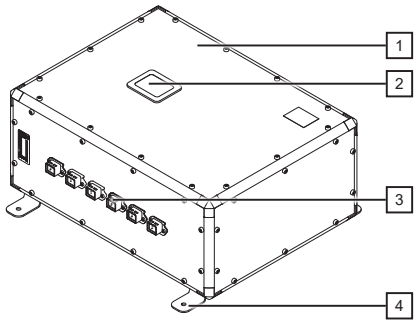


Fig. 3: SCS-8 basic device

1 Housing with internal electronics and safety module SMX100
2 Display window
3 The electrical connections are led out of the device in the form of industrial plug-in connectors/PushPull female connectors
4 4 × mounting brackets (pre-installed, can be rotated by 90 °)

4.3 Type label

The following figure shows the layout of a device type label.

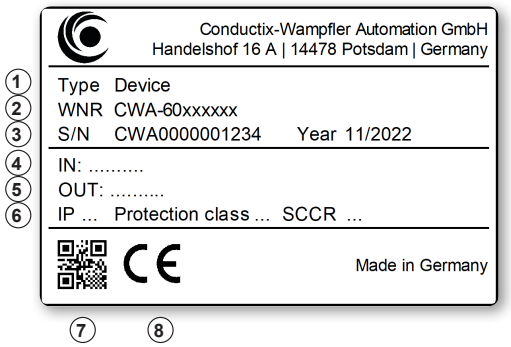


Fig. 4: Device type label

1 Model name
2 WNR item number
3 Serial number, year of construction
4 Input data
5 Output data
6 Protection type, protection class, short-circuit current
7 QR-Code (serial number)
8 CE marking

4.4 Scope of delivery

Content

The SCS sets are delivered with the following content:

- 1 × SCS main device
- 4 × mounting brackets (pre-installed on device)
- 1 × connector set comprising
  - 1 × PushPull HARTING HPP V4 Power plug 48 V/12 A 4p
  - 2 × PushPull HARTING HPP V4 Signal 10-pole plug
  - 3 × PushPull HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC

HPP V4 Power plug
48V/12A 4p

HPP V4 Signal
10-pole plug

HPP V4 RJ45
10G Cat6 plug 8p IDC

5 Transport and storage

5.1 Transport

NOTICE!

Transport

Incorrect or improper transport may cause damage to the device.

- Only trained personnel are allowed to transport the device.
- If necessary, use suitable transport aids.
- Transport the devices with utmost care.
- Observe the symbols on the packaging.
- Do not remove packaging and transport securing devices until you are ready to start with the installation.

5.2 Transport inspection

Check the delivery for completeness and transport damage upon receipt.

Proceed as follows in case of any apparent damage:

- Refuse to accept the delivery or accept it only conditionally. Take note of the extent of the damage and write it down on the carrier's transport documents or delivery note.
- Initiate a complaints process and report the incident to the supplier. If Conductix-Wampfler Automation is your direct supplier you will find our contact information in this document.
  ↳ *Chapter 'Customer service and addresses' on page 73*

Claims for damages

Claim any defect as soon as it becomes apparent. Damages can only be claimed within the applicable claim periods.

5.3 Storage

NOTICE!

Storage

Incorrect or improper storage may cause damage to the device.

- Cover connections with protective caps during storage.
- Avoid mechanical stress and vibrations.
- Store in a dry and dust-free location.
- Regularly check the condition of the stored device.
- Keep environmental conditions as specified in the technical information.
- Keep the storage temperature as specified in the technical information.

6 Mechanical installation

Objective

This section provides details on the mechanical installation. Electrical installation is possible following successful mechanical installation.

Responsible party

The system integrator (e.g. system builder, operator) is responsible for trouble-free and safe installation. As the contact person, he responds to all the fitter's queries regarding safe-to-use equipment; e.g.:

- Fire protection
- Electrical equipment
- Ladders and scaffolding
- Requirements for assembly tools
- Lifting and transportation

Required personnel

Due to their training and experience, only qualified and appropriately instructed personnel are able to correctly assess the respective initial situation, identify risks and avoid hazards.

Personnel required for installation:

- Adequately qualified fitter

Required personal protective equipment

The person responsible must ensure that the personnel under his responsibility are wearing the required personal protective equipment. The required personal protective equipment satisfies the requirements for the work to be carried out and all the requirements demanded by the scope of work.

Personal protective equipment that fulfils its intended purpose:

- protects its wearer from injury;
- reduces the seriousness and severity of potential injuries.

Wear:

- Work protection clothing
- Safety shoes
- Protective gloves
- Protective goggles

Safety in the work area

- Note the safety signs in the area around the system.
- Pay attention to the safety notes in additional applicable documentation (supplier documents).

Work safety

Pay attention to company and task-specific work safety regulations, as well as the country-specific legal and safety regulations applicable at the location of use.

Wear additional protective equipment

As an employee, you wear protective equipment supplied by the area supervisor. If work tasks have been delegated only temporarily, then you also wear any protective equipment that has become additionally required.

Special hazards

⚠ WARNING!

Live parts

If the device is installed in switch cabinets, there is an immediate danger to life in the event of contact with live parts.

- Switch off the power supply for the switch cabinet when performing any work on the device, and safeguard it against being switched on again.
- Work on electrical components may only be carried out by qualified electricians or persons instructed and supervised by a qualified electrician in accordance with the electrical engineering regulations.

6.1 Installation location and position

Installation location

The SCS has been designed for decentralised installation within the system. This means that the SCS must be installed close to the area to be monitored.

Please note the following points regarding the installation location of the SCS:

- Install the SCS in the planned location.
  This can be found in the project-specific system layout.
- The installation location should be chosen in such way that no damage can be caused to the SCS by outside influences (such as material handling vehicles) and that the installed SCS is not an accident or hazard source.
- Please adhere to the cable lengths.
- Install the SCS in such way that it can be quickly accessed at all times.
  Installation recommendation:
  - □ Accessible without additional aids
  - □ Installation height = eye level

Installation position

The recommended installation position is horizontal.

- The electrical connections of the device point downwards.

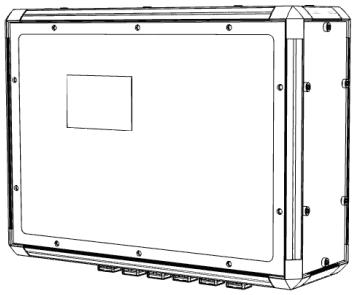


Fig. 5: Recommended installation position

6.2 Installation

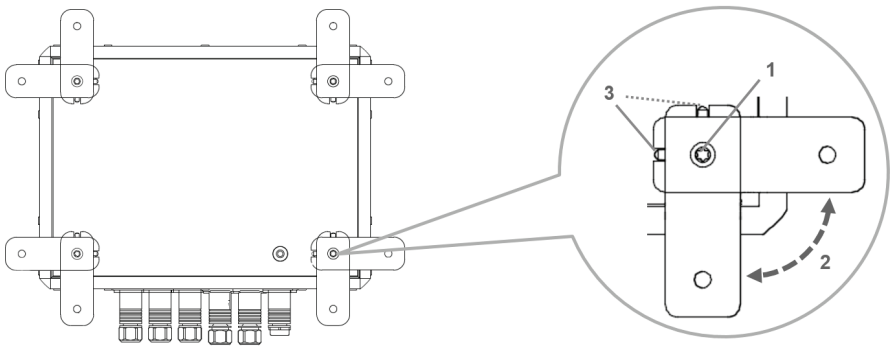
The device must be installed on a sufficiently dimensioned support structure (e.g. a wall or rack) using four mounting brackets pre-installed on the device, which can be rotated by 90 °.

Installing the device

Special tool: ■ Torx TX30 torque screwdriver

Install the device as follows:

1. Adjust the position of the mounting brackets.



- Slacken the 4 Torx screws M6 (1) which secure the mounting brackets to the rear of the device until the mounting brackets can be freely rotated.
- Rotate the mounting brackets to position (2) and lay them flat against the back of the device. Make sure that the locking tabs (3) of the mounting brackets are in the provided latches on the rear of the device.
- Finally, retighten the screws with maximum torque of 6 Nm.

2. Attach the device.

- Attach and secure the device to the support structure with suitable screws.

Mounting dimensions

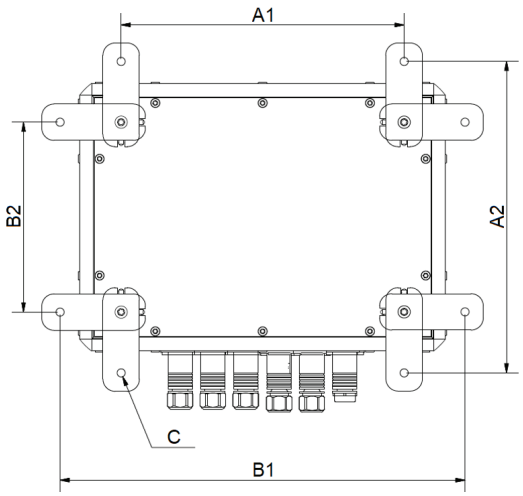


Fig. 6: Mounting dimensions

A1	325 mm
A2	325 mm
B1	425 mm
B2	225 mm
C	∅ 6.6 mm

Alternative attachment points

If the attachment points do not match those of the carrier unit, then other adapters are available for fixing upon request.

Detailed device drawing

Chapter 'Device drawing' on page 70

7 Electrical installation

Objective

This section provides details on the electrical installation. Commissioning is possible following successful electrical installation.

Responsible party

The system integrator (e.g. system builder, operator) is responsible for trouble-free and safe electrical installation. As the contact person, he responds to all the fitter's queries regarding safe-to-use equipment; e.g.:

- Fire protection
- Electrical equipment
- Ladders and scaffolding
- Requirements for assembly tools

Required personnel

Due to their training and experience, only qualified and appropriately instructed personnel are able to correctly assess the respective initial situation, identify risks and avoid hazards.

Personnel required for electrical installation:

- Qualified electrician
- Adequately qualified fitter under the direction and supervision of a qualified electrician

Required personal protective equipment

The person responsible must ensure that the personnel under his responsibility are wearing the required personal protective equipment. The required personal protective equipment satisfies the requirements for the work to be carried out and all the requirements demanded by the scope of work.

Personal protective equipment that fulfils its intended purpose:

- protects its wearer from injury;
- reduces the seriousness and severity of potential injuries.

Wear:

- Work protection clothing
- Safety shoes
- Protective gloves
- Protective goggles

Safety in the work area

- Note the safety signs in the area around the system.
- Pay attention to the safety notes in additional applicable documentation (supplier documents).

Work safety

Pay attention to company and task-specific work safety regulations, as well as the country-specific legal and safety regulations applicable at the location of use.

Wear additional protective equipment

As an employee, you wear protective equipment supplied by the area supervisor. If work tasks have been delegated only temporarily, then you also wear any protective equipment that has become additionally required.

Special hazards

⚠ WARNING!

Live parts

If the device is installed in switch cabinets, there is an immediate danger to life in the event of contact with live parts.

- Switch off the power supply for the switch cabinet when performing any work on the device, and safeguard it against being switched on again.
- Work on electrical components may only be carried out by qualified electricians or persons instructed and supervised by a qualified electrician in accordance with the electrical engineering regulations.

7.1 Requirements for the voltage supply

7.1.1 General requirements

NOTICE!

"PE" power contacts and PE connections

"PE" power contacts and PE- connections may not be used for other potentials.

"PE" and "0V" must be on the same potential (connected in the control cabinet).

NOTICE!

Wiring in the control cabinet

The wiring in the control cabinet must be laid out in accordance with the EN 60204-1:2006 standard regarding Protective Extra Low Voltage (PELV).

EN 60204-1:2006 Section 6.4.2:b): *One end of the electrical circuit or a point of the energy source of this electrical circuit must be connected to the protective earth system.*

NOTICE!

Interruption of the power supply / switching off

The devices should **only** be switched off by isolating the 24 V supply!

Do not isolate the earth connection to switch off devices! Current might still flow through the screen, depending on the device.

NOTICE!

Devices that have their own power supply

The potential for "PE" and "GND" of connected devices that have their own power supply (e.g. a panel) must be identical to that of the system devices (no potential difference). Otherwise, the devices and peripherals could get damaged.

7.1.2 UL requirements

NOTICE!

Requirements for the supply voltage

- Voltage source corresponds to NEC class 2
- Voltage source is isolated
- Voltage source with a fuse of max. 4 A according to UL248

NOTICE!

Connecting voltage sources

A voltage source corresponding to NEC class 2 may not be connected in series or in parallel with another voltage source corresponding to NEC class 2!

NOTICE!

Connecting devices with voltage sources

Do not connect devices to unlimited voltage sources!

7.1.3 Connection according to low-voltage directive

NOTICE!

Connection according to low-voltage directive

In order to comply with the low-voltage directive, the devices must be powered by a safety extra low voltage (SELV) or protective extra low voltage (PELV) compatible power source.

7.2 Connection overview

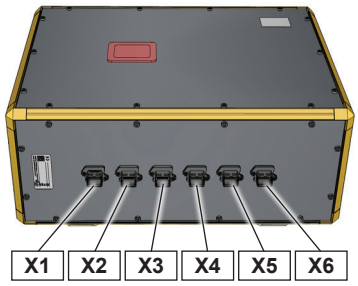


Fig. 7: SCS-8 connection overview

Connection	Designation	Connection type	Description
X1	*[Power]*	PushPull power Female connector	Power supply input
X2	*[Safety IN]*	PushPull signal Female connector	■ Safe digital inputs
X3	*[Safety IN/OUT]*	PushPull signal Female connector	■ Safe digital inputs ■ Safe digital outputs ■ Safe relay outputs ■ Unsafe auxiliary outputs
X4	*[Service]*	PushPull RJ45 Female connector	LAN connection for service and configuration
X5	*[Field bus]*	PushPull RJ45 Female connector	Interface for safe field bus
X6	*[SPCC]*	PushPull RJ45 Female connector	SPCC interface (Safe Provider Consumer Communication)

7.3 Electrical connection procedure

NOTICE!

Damage to the device

Improper device connection may result in damage.

- De-energise the device prior to working on it!

NOTICE!

Malfunctions due to improper device connection

Improper device connection may lead to malfunctions during operation.

- Always follow the connection instructions.

Perform the following steps to make the electrical connection of the SCS:

1. Earth the SCS.
2. Connect the power supply.
3. Connect sensors and external peripherals to be actuated.
   - Connect the sensors to the SCS via safe digital inputs.
   - Connect external peripherals to be actuated to the SCS via safe outputs and auxiliary contacts.
4. Incorporate SCS in a local network.
5. Connect SCS to the system controller (SPC) via a safe field bus interface.
6. Connect the SPCC network (Safe Provider Consumer Communication) to the SCS.

Connection diagram

A detailed connection diagram [ANS] is enclosed as a separate document.

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7.4 Earthing the SCS

The device must be earthed in order to operate correctly. To do this, connect the PE connection on the rear of the device to the system PE in accordance with EN 60204-1.

The PE connection is marked by the symbol for protective earth ⏚.

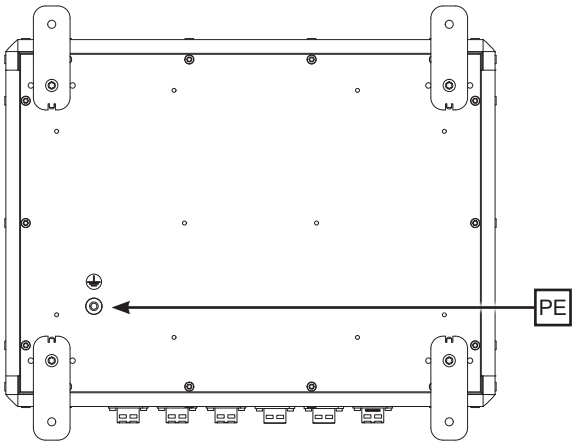


Fig. 8: PE connection

Threaded hole	M6, 16 mm deep
Tightening torque	6 Nm max.
Cable type	Green/yellow insulated single-core wire
Wire cross-section	2.5 mm^2 min.

7.5 Connecting the power supply to X1

NOTICE!

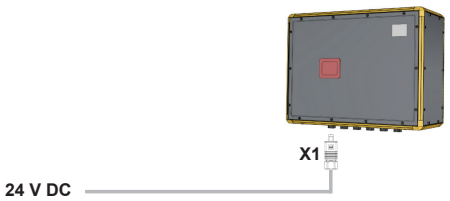
Requirements for the power supply unit

- 24 V DC / 3 A (-15 %, +20 %)
- Fuse protection min. 30 V DC, max. 3.15 A

Connect the power supply to connection X1 *[Power]* of the SCS as follows:

1. Fit the supplied PushPull power connector to the power supply connecting cable.
2. Connect the PushPull power connector for the power supply to X1 *[Power]*.

   The PushPull connector must engage audibly.

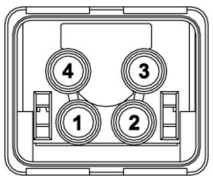


⇨ Provided that there is a proper connection and the power supply is switched on, the indicator on the front of the device will illuminate. The SCS is switched on.

Cable requirements for power supply

Cable type	2 × 1.5 mm²
Cable recommendation	LAPP Ölflex-FD Classic 110 2×1.5 mm²

X1 pin assignments

		Pin	Signal
HARTING PushPull power 4-pin female connector		1	L+
		2	L-
		3	*Not used*
		4	*Not used*
Plug (supplied)	HARTING HPP V4 power plug 48 V/12 A 4p		

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7.6 Connect sensors and external peripherals to X2 and X3.

The SCS can evaluate safety sensors in a project-dependent way and transmit commands to terminal devices (such as transport vehicles) via the X6 SPCC interface independently of a system controller.

The connection to the safety sensors is made at safe inputs of X2 *[Safety IN]* and X3 *[Safety IN/OUT]*.

External peripherals (such as signalling devices) can be connected to safe outputs of X3 *[Safety IN/OUT]*.

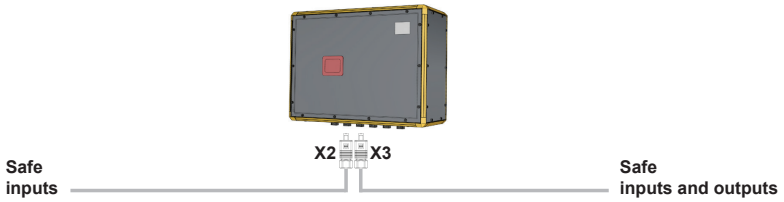
Connect the sensors and the external peripherals to be actuated to connections X2 *[Safety IN]* and X3 *[Safety IN/OUT]* of the SCS as follows:

1. Fit the supplied PushPull signal connectors to the connecting cables for the sensors to be evaluated or for the peripherals to be actuated.

   Note: If several devices are attached to a connector, suitable terminal boxes must be used.

2. Connect the PushPull signal connectors to the respective connections X2 *[Safety IN]* and X3 *[Safety IN/OUT]*.

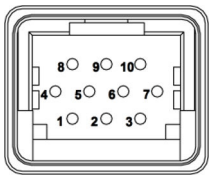
   The PushPull connectors must engage audibly.



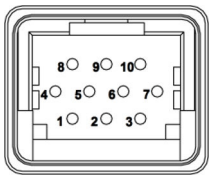
PushPull signal connector cable requirement

Cable type	max. 10 x 0.5 mm^2
Cable recommendation	flexible, shielded

X2 pin assignment

		Pin	Signal
HARTING PushPull signal 10-pin female connector		1	L+ (+24 VDC)
		2	L- (0 VDC)
		3	T1 (clock 1)
		4	T2 (clock 2)
		5	Safe digital input I 01
		6	Safe digital input I 02
		7	Safe digital input I 03
		8	Safe digital input I 04
		9	Safe digital input I 05
		10	Safe digital input I 06
		SH	PE / shield
Plug (supplied)	HARTING HPP V4 signal 10-pin plug		

X3 pin assignment

		Pin	Signal
HARTING PushPull signal 10-pin female connector		1	Safe digital input I 07
		2	Safe digital input I 08
		3	Safe digital input I 09
		4	Safe digital input I 10
		5	Safe digital output | 01
		6	Safe digital output | 02
		7	Safe relay output NO
		8	
		9	Unsafe auxiliary outputs
		10	
		SH	PE / shield
Plug (supplied)	HARTING HPP V4 signal 10-pin plug		

7.7 Connecting a local network to X4

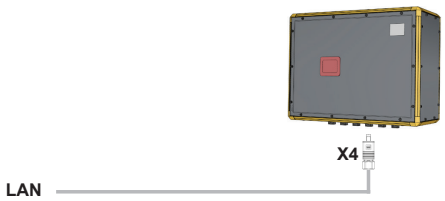
To achieve the full scope of functionality, it is recommended to incorporate the SCS in a local network. This makes it possible to configure, manage and maintain the SCS remotely.

A PC can be connected directly to this connection for configuration purposes.

To connect a local network to connector X4 *[Service]* of the SCS, proceed as follows:

1. Fit the supplied PushPull RJ45 plug to the network cable for the local network.
2. Connect the RJ45 PushPull connector for the local network to X4 *[Service]* of the SCS.

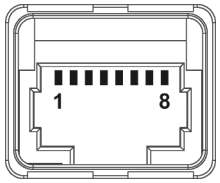
   The PushPull connector must engage audibly.



Network cable line regulation

Cable type	Network cable min. Cat. 5 in accordance with DIN EN 50173-1
Cable length	100 m max.

X4 / X5 / X6 pin assignment

		Pin	Signal
HARTING PushPull RJ45 8-pin female connector Cat.6		1	TD + (Transmit +)
		2	TD - (Transmit -)
		3	RD + (Receive +)
		4	*Not used*
		5	*Not used*
		6	RD - (Receive -)
		7	*Not used*
		8	*Not used*
Plug (supplied)	HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC		

RJ45 PushPull connector pin assignment

		Pin	Signal
HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC		1	TD + (Transmit +)
		2	TD - (Transmit -)
		3	RD + (Receive +)
		4	*Not used*
		5	*Not used*
		6	RD - (Receive -)
		7	*Not used*
		8	*Not used*

Wiring information:

- Follow the manufacturer's instructions enclosed with the connector!
- **Note the pin arrangement in the connector!** Pre-sort the wires to the correct position before inserting them into the connector's cable manager.
- Insert the wires for pins 6, 3, 4, 5 into the bottom row of the cable manager.
- Insert the wires for pins 8, 7, 2, 1 into the top row of the cable manager.

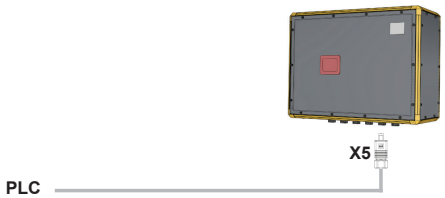
7.8 Connecting system controller (PLC) to X5

Depending on the project, an external system controller (PLC) which communicates with the SCS via a secure protocol is connected to the field bus interface X5 *[Field bus]*.

Connect an external PLC to connection X5 *[Field bus]* of the SCS as follows:

1. Fit the supplied PushPull RJ45 connector to the network cable for the PLC.
2. Connect the PushPull RJ45 connector for the external PLC to X5 *[Field bus]*.

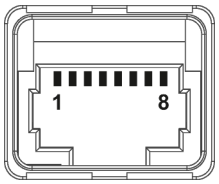
   The PushPull connector must engage audibly.



Network cable line regulation

Cable type	Network cable min. Cat. 5 in accordance with DIN EN 50173-1
Cable length	100 m max.

X4 / X5 / X6 pin assignment

		Pin	Signal
HARTING PushPull RJ45 8-pin female connector Cat.6		1	TD + (Transmit +)
		2	TD - (Transmit -)
		3	RD + (Receive +)
		4	*Not used*
		5	*Not used*
		6	RD - (Receive -)
		7	*Not used*
		8	*Not used*
Plug (supplied)	HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC		

RJ45 PushPull connector pin assignment

		Pin	Signal
HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC		1	TD + (Transmit +)
		2	TD - (Transmit -)
		3	RD + (Receive +)
		4	*Not used*
		5	*Not used*
		6	RD - (Receive -)
		7	*Not used*
		8	*Not used*

Wiring information:

- Follow the manufacturer's instructions enclosed with the connector!
- **Note the pin arrangement in the connector!** Pre-sort the wires to the correct position before inserting them into the connector's cable manager.
- Insert the wires for pins 6, 3, 4, 5 into the bottom row of the cable manager.
- Insert the wires for pins 8, 7, 2, 1 into the top row of the cable manager.

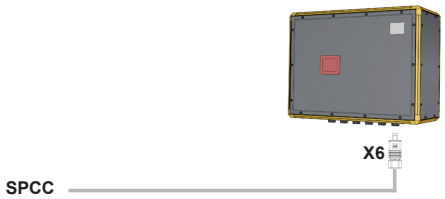
7.9 Connecting the SPCC network to X6

An Ethernet-based network with secure communication (SPCC network) via which commands are transmitted to the terminal devices is connected to the SPCC interface X6 *[SPCC]* (Safe Provider Consumer Communication).

Connect an SPCC network to connection X6 *[SPCC]* of the SCS as follows:

1. Fit the supplied PushPull RJ45 connector to the network cable for the SPCC network.
2. Connect the PushPull RJ45 connector for the SPCC network to X6 *[SPCC]*.

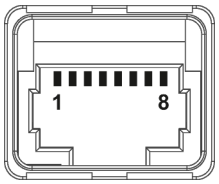
   The PushPull connector must engage audibly.



Network cable line regulation

Cable type	Network cable min. Cat. 5 in accordance with DIN EN 50173-1
Cable length	100 m max.

X4 / X5 / X6 pin assignment

		Pin	Signal
HARTING PushPull RJ45 8-pin female connector Cat.6		1	TD + (Transmit +)
		2	TD - (Transmit -)
		3	RD + (Receive +)
		4	*Not used*
		5	*Not used*
		6	RD - (Receive -)
		7	*Not used*
		8	*Not used*
Plug (supplied)	HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC		

RJ45 PushPull connector pin assignment

		Pin	Signal
HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC		1	TD + (Transmit +)
		2	TD - (Transmit -)
		3	RD + (Receive +)
		4	*Not used*
		5	*Not used*
		6	RD - (Receive -)
		7	*Not used*
		8	*Not used*

Wiring information:

- Follow the manufacturer's instructions enclosed with the connector!
- **Note the pin arrangement in the connector!** Pre-sort the wires to the correct position before inserting them into the connector's cable manager.
- Insert the wires for pins 6, 3, 4, 5 into the bottom row of the cable manager.
- Insert the wires for pins 8, 7, 2, 1 into the top row of the cable manager.

8 Commissioning

Objective

This section provides details on correct commissioning. Daily operation can start following successful commissioning.

Responsible party

The system integrator (e.g. system builder, operator) is responsible for trouble-free and safe commissioning. As the contact person, he responds to all the commissioner's queries regarding safe-to-use equipment; e.g.:

- Fire protection
- Electrical equipment
- Ladders and scaffolding

Required personnel

Due to their training and experience, only qualified and appropriately instructed personnel are able to correctly assess the respective initial situation, identify risks and avoid hazards.

Personnel required for commissioning:

- Staff of Conductix-Wampfler Automation GmbH
- Sufficiently trained specialist personnel

Required personal protective equipment

The person responsible must ensure that the personnel under his responsibility are wearing the required personal protective equipment. The required personal protective equipment satisfies the requirements for the work to be carried out and all the requirements demanded by the scope of work.

Personal protective equipment that fulfils its intended purpose:

- protects its wearer from injury;
- reduces the seriousness and severity of potential injuries.

Wear:

- Work protection clothing
- Safety shoes
- Protective gloves
- Protective goggles

Safety in the work area

- Note the safety signs in the area around the system.
- Pay attention to the safety notes in additional applicable documentation (supplier documents).

Work safety

Pay attention to company and task-specific work safety regulations, as well as the country-specific legal and safety regulations applicable at the location of use.

Wear additional protective equipment

As an employee, you wear protective equipment supplied by the area supervisor. If work tasks have been delegated only temporarily, then you also wear any protective equipment that has become additionally required.

Special hazards

⚠ WARNING!

Live parts

If the device is installed in switch cabinets, there is an immediate danger to life in the event of contact with live parts.

- Switch off the power supply for the switch cabinet when performing any work on the device, and safeguard it against being switched on again.
- Work on electrical components may only be carried out by qualified electricians or persons instructed and supervised by a qualified electrician in accordance with the electrical engineering regulations.

8.1 Commissioning the SCS

⚠ WARNING!

Danger due to erroneous configuration and programming

If the safety controller is commissioned without valid configuration, programming and validation of the safety functions or changes are made to the configuration or the programming at a later date, there is a direct risk to life.

- The safety controller may only be configured, programmed and commissioned by specially trained experts who have been authorised by the system manufacturer or the system operator.

The commissioning and the associated implementation of the required safety functions takes place by means of system-specific configuration, programming, verification and validation of the safety module SMX (safety controller from BBH PRODUCTS) in the device.

Configuration, programming, verification and validation of the BBH safety controller take place using SafePLC software.

- **Configuration and programming**
  The BBH safety controller has projekt-dependent configuration and function-dependent programming. Parameters are set and hardware is logically linked together.
- **Verification**
  All settings and links are checked for correctness and logic, saved in a configuration file and a program file and then transmitted to the BBH safety controller.
- **Validation**
  In order to complete the commissioning, all parameters and links for safeguarding the programmed safety functions are re-checked, approved and documented in a validation report.

8.1.1 Commissioning by Conductix-Wampfler Automation GmbH

If the safety control system is configured, programmed and commissioned by Conductix-Wampfler Automation GmbH, it is handed over with a valid safety project after commissioning. This means that

- A system-specific safety project has been created and saved in a project file.
- A valid safety project is uploaded to the safety control system.
- Safe operation is guaranteed.

Note

If the safety control system has been commissioned by Conductix-Wampfler Automation GmbH and changes are subsequently made to the configuration or programming, then the person who made the changes shall be responsible and liable for the correct function and safe operation of the safety control system.

8.1.2 Commissioning by the customer/system manufacturer

If the safety control system is commissioned by the customer/system manufacturer, a valid safety project must be loaded in the safety control system before commissioning.

Chapter 'Transferring a safety project' on page 49

Note

A valid safety project was created by Conductix-Wampfler Automation GmbH following initial commissioning and handed over to the customer/system manufacturer, but it can also be requested subsequently through our customer service.

8.2 Transferring a safety project

For commissioning and updating purposes or after replacing the safety control system, it is necessary to transfer a valid safety project to the safety control system.

Note

The following instructions describe how to transfer a safety project using the software 'SafePLC²' from a project file.

It is not possible to modify the project.

Requirement

The following is required to transfer the safety project:

- Service computer with SafePLC software installed *'SafePLC²'* from BBH PRODUCTS
- Project file *.slp2
- Network cable
- Optional adapter (depending on the type of service interface)
  ↳ see ANS connection diagram

Program overview

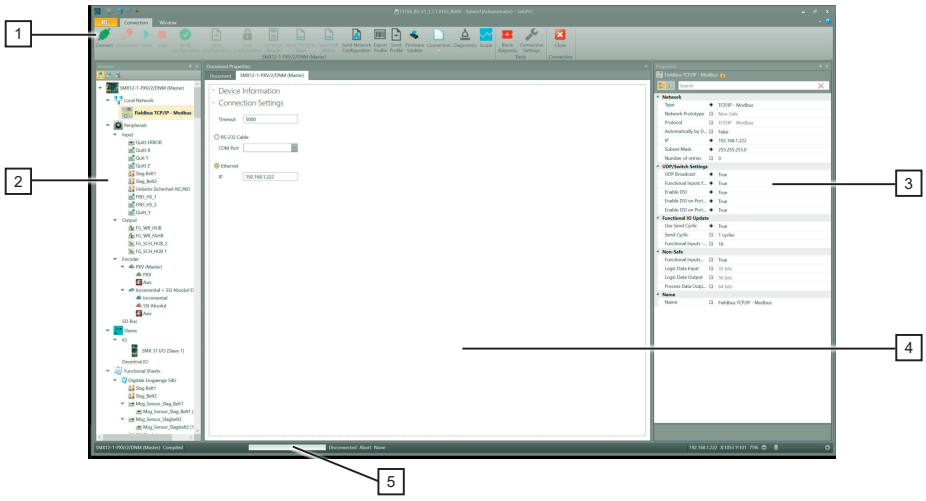


Fig. 9: SafePLC² - program overview

1 Menu bar
2 Project browser
3 Properties window
4 Work area
5 Progress indicator

Procedure

⚠ WARNING!

Unexpected movements

Unexpected movements of vehicles and machines in the system area can lead to serious injuries and material damage.

Make sure that no vehicles and machines in the immediate vicinity can perform unexpected movements or start up automatically while work is carried out on the safety control system.

- Stop vehicles and machines in the system area.
- Secure vehicles and machines to prevent them from starting up and restarting automatically.

Transfer the safety project to the safety control system as follows:

1. Connect the service computer to the service interface of the safety control system.
   ↳ see ANS connection diagram
2. Open the project file with the SafePLC software and confirm the message *'Dongle not found'*.
3. Query the IP address in the project.
   - Select the fieldbus interface under item *[Local Network]* in the project browser and open the properties by clicking the left mouse button.
   - You can find the *[IP]* in the Properties window.
4. Connect the SafePLC software to the safety control system.
   - Press the button *[Device Interface]* in the menu bar.
   - Press the button *[Connection Settings]* in the menu bar.
   - As an interface, select *[Ethernet]* and enter the IP address.
   - Press the button *[Connect]* in the menu bar and, in the dialogue that then appears, enter the *[SMX Serial no.]* of the safety control system as a password.
     ↳ You can find the "SMX Serial no." on the additional sticker on the underside of the device of the safety control system.
   - Confirm the alert message *'Differing configuration'*.

   ⇨ The SafePLC software is connected to the safety control system.
5. Stop the monitoring program in the safety control system.
   - Press the button *[Stop]* in the menu bar.

   ⇨ The monitoring program is stopped.
   [5] is shown in the safety control system display.

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6. Transfer the new safety configuration to the safety control system.

- Press the button *[Send Configuration]* in the menu bar.

⇨ The security configuration is transferred.
Wait until the configuration has been completely transferred.
↳Observe the progress bar at the bottom of the program window.

7. Transfer the new network configuration to the safety control system.

- Press the button *[Send Network Configuration]* in the menu bar.

⇨ The network configuration is transferred.
Wait until the configuration has been completely transferred.
↳Observe the progress bar at the bottom of the program window.

8. Verify the new configuration.

- Press the button *[Verify Configuration]* in the menu bar.

⇨ The configuration of the safety project is compared with the project in the safety control system. If the configurations match, start the safety control system.

9. Start the safety control system.

- Press the button *[Start]* in the menu bar.

⇨ The safety control system is started and runs through a start-up sequence.
The safety control system is ready for operation when *[4]* is shown in the display.

10. Disconnect the connection to the safety control system.

- Press the button *[Disconnect]* in the menu bar.
- Close the SafePLC software.
- Disconnect the cable connection from the service computer to the safety control system.

11. Check the safety control system for correct functioning and finally return the system to normal/automatic mode.

9 Operation

Special hazards

⚠ WARNING!

Operation only with valid configuration and programming

If the safety controller is operated without system-specific and function-dependent configuration, programming and validation of the safety functions, there is a direct risk to life.

- Check the safety controller for valid configuration, programming and validation of the safety functions before operation.

⚠ WARNING!

Danger to life from non-functioning safety devices!

Security devices ensure a maximum degree of safety during operation. Safety can only be guaranteed if the safety devices are intact.

- Never override safety devices.
- Before starting work, check whether the safety devices are fully functional.
- Report any faulty safety devices immediately.
- Get faulty safety devices repaired immediately.

9.1 Switching the SCS on and off

9.1.1 Switching the SCS on

→ To switch on the SCS, switch on the external power supply for the SCS.

⇨ The configuration is loaded and the monitoring program is started.

The SCS is ready for operation if [4] appears on the display.

9.1.2 Switching the SCS off

→ To switch off the SCS, switch off the external power supply for the SCS.

A hard power-off of the SCS is also possible. No data is lost.

9.2 Operation

The safety controller does not have any control elements.

If the safety controller is operating normally without errors, all safety functions are active in accordance with the programmed logic.

9.3 Displays

Individual operating statuses are displayed alphanumerically using the 7-segment display of the BBH safety controller and can be read off in the display window of the safety controller.

9.3.1 Start displays

A start sequence is run through during the starting procedure.
[1], [2] and [4] appear in sequence in the display window:

Fig. 10: Start displays

Display	Designation	Description
[1]	*STARTUP*	System start with checking and loading of the configuration/firmware data
[2]	*SENDCONFIG*	Distribution of the configuration/firmware data and re-checking of this data. Then range checking of the configuration data is carried out.
[4]	*RUN*	System started, safety controller operating normally without errors

9.3.2 Operating display

If the safety controller is operating normally without errors, [4] appears in the display window:

Fig. 11: Display during normal operation

Display	Designation	Description
[4]	*RUN*	Safety controller operating normally without errors. All safety functions are active in accordance with the programmed logic.

9.3.3 Error indicators

In the event of an error, the error type is displayed as a letter in the display window, followed by the four individual digits of the error code. The error is displayed repeatedly until the cause has been remedied and the error has been acknowledged.

Fig. 12: Error display example 'F1003'

Display	Designation	Description
[F]	Error type	**F** *[Fatal Error]* - serious exception error **A** *[Alarm]* - functional error **E** *[ECS Alarm]* - sensor alarm message
[1][0][0][3]	Four-digit error code	Coded error or alarm message

Detailed information about error types and error codes as well as information about the error causes and troubleshooting can be found in the 'SMX100 error list'.

The error list is enclosed with this description as a separate document.

10 Faults, maintenance, service

Personnel

Maintenance, cleaning and servicing must only be performed by trained and qualified personnel. Personnel who are to be trained or instructed are only allowed to perform activities under the constant supervision of a trained and qualified individual.

Special hazards

⚠ WARNING!

Live parts

If the device is installed in switch cabinets, there is an immediate danger to life in the event of contact with live parts.

- Switch off the power supply for the switch cabinet when performing any work on the device, and safeguard it against being switched on again.
- Work on electrical components may only be carried out by qualified electricians or persons instructed and supervised by a qualified electrician in accordance with the electrical engineering regulations.

10.1 Faults

Faults are displayed as error and alarm messages in the display window of the SCS:

- **F** *[Fatal Error]* – serious exception error
- **A** *[Alarm]* – functional error
- **E** *[ECS Alarm]* - sensor alarm message

see also ↬ *Chapter 'Displays' on page 55*

Error and alarm messages are also output to a connected and configured system controller via the field bus interface of the SCS.

Detailed information about error types and error codes as well as information about the error causes and troubleshooting can be found in the 'SMX100 error list'.

↬ *The error list is enclosed with this description as a separate document.*

10.2 Function testing

In order to provide safety, the user must carry out regularly a function test of the safety functions.

Function testing:

- Test the modules used in the parametrisation of the BBH safety controller (inputs, outputs, monitoring functions and logic modules) with regard to their functionality or shut-off.
- Every change made to the system requires adaptation of the safety functions!
  Check whether the modules used in the parametrisation still comply with the requirements of the current system specification.

Prescribed interval

- 12 months

Detailed information can be found in the 'SMX100 programming manual' for the BBH safety controller SMX100.
Download: www.bbh-products.de

10.3 Maintenance and cleaning

10.3.1 Maintenance

NOTICE!

Mechanical loads may lead to device failure.

- Check the device for damage at regular intervals.
- Opening the device for testing purposes is not intended.

Service the device as follows:

- **Brackets**
  - □ Check for loose connections.
- **Connections**
  - □ Check for loose connections.
  - □ Check cable insulation.
  - □ Cover any ports not being used.
- **Indicators**
  - □ Remove soiling.
- **Recommended maintenance interval**
  - □ 6 months

10.3.2 Cleaning

NOTICE!

Damage to the device due to improper cleaning

- Do not use any cleaning agents, such as methylated spirits, or other cleaners!
- Do not clean with sharp objects!

Clean the device as follows:

- **Device**
  - □ Clean with dry cloths only.
- **Recommended cleaning intervals**
  - □ 6 months

10.4 Removing/replacing the SCS

10.4.1 Removing the SCS

Remove the safety controller as follows:

1. Switch off the safety controller.
   - To do this, switch off the power supply for the safety controller.
2. Disconnect all electrical plug-in connectors from the safetay controller.
3. Dismantle the safety controller.
4. If the safety controller is subsequently going to be disposed of, pay attention to the disposal information.
   Chapter 'Disposal' on page 63

10.4.2 Replacing the SCS

⚠ WARNING!

Commissioning only with valid configuration and programming

If the safety controller is commissioned without valid configuration, programming and validation of the safety functions, there is a direct risk to life.

- The safety controller may only be commissioned by specially trained experts who have been authorised by the system manufacturer or the system operator.
- Check the safety controller for valid configuration, programming and validation of the safety functions before commissioning.
- A safety controller is configured, programmed and validated in a system-specific way. All settings are saved in a configuration file and a program file. Following repair or replacement of the controller, the saved configuration and the saved program must be re-transmitted to the controller.

Note

A valid safety project was created by Conductix-Wampfler Automation GmbH following initial commissioning and handed over to the customer/ system manufacturer, but it can also be requested subsequently through our customer service.

Replace the safety controller as follows:

1. Switch off the safety controller.
   - To do this, switch off the power supply for the safety controller.
2. Disconnect all electrical plug-in connectors from the safety controller.
3. Dismantle the safety controller.
4. Check the new safety controller for transport damage.
5. Check the device type of the new safety controller.
6. Mechanically install the new safety controller.
   ↳ *Chapter 'Mechanical installation' on page 23*
7. Make the electrical connections of the new safety controller.
   ↳ *Chapter 'Electrical installation' on page 29*
   Pay attention to the connection plan ANS!
8. Commission the new safety controller.
   ↳ *Chapter 'Commissioning' on page 45*
   Ensure that the system-specific safety project is valid!

10.5 Opening the SCS

In general, opening the safety controller is neither necessary nor intended. If the safety controller needs to be opened, please pay attention to the following instructions.

Removing the front panel

Special tool:
- Torx TX10 torque screwdriver

1. Switch off the power supply to the safety controller.
2. Unscrew all fixing screws of the front panel using the Torx screwdriver, and carefully remove the front panel.

Fitting the front panel

Special tool:
- Torx TX10 torque screwdriver

1. Fit the front panel to the safety controller and align it correctly.

   Pay attention to the position of the display window!
2. Fit the front panel using the fastening screws. Tighten the screws with a max. torque of 1.5 Nm.

10.6 Repairing the SCS

If you need to repair the device, please refer to your closest service partner or contact Conductix-Wampfler Automation GmbH directly.

Chapter 'Customer service and addresses' on page 73

Repairs

Faulty devices may only be repaired by Conductix-Wampfler staff or specialists trained by Conductix-Wampfler.

In the event of repairs by unauthorised persons, all warranty claims against Conductix-Wampfler Automation GmbH are invalidated.

11 Disposal

If no return or disposal agreements exist, the individual components are to be properly dismantled and then separated and disposed of pursuant to current regulations or taken for recycling.

The device comprises electric and electronic components. Separate and dispose of them according to applicable provisions.

Follow the hazardous materials directive, in particular the regulations on handling hazardous materials.

♲ Materials designated for recycling are to be disposed of as per the respective recycling procedure.

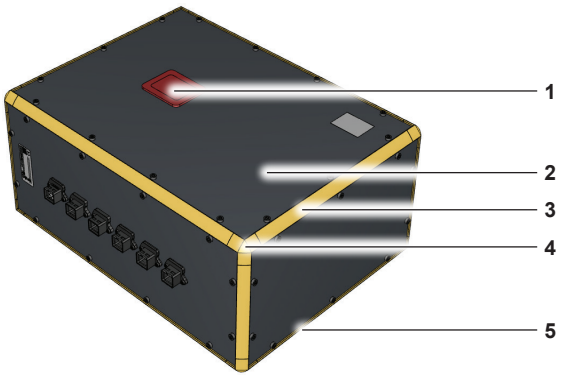
12 Technical Data

12.1 General information

Installation data

Place of installation	Decentralised, at the planned location in the facility
Fixing	4 × Mounting bracket (rotating) Fixing hole ∅ 6.6 mm
Housing dimensions W × H × D	400 mm × 300 mm × 171 mm
Installation surface	min. 470 mm × 370 mm
Weight	6.7 kg
Protection class	IP 54

Material



No.	Designation	Material
1	Display window	Plastic
2	Front and side panels	Aluminium
3	Edge profile	Aluminium with plastic cover ABS
4	Profile corner	ABS plastic
5	Mounting panel	Aluminium

Ambient conditions

Ambient temperature	+10 to +45 °C
Storage temperature	-10 to +50 °C
Relative humidity	< 80 % non-condensing

12.2 Electrical data

Electrical connection data

Supply voltage	24 V DC (-15 %, +20 %)
Current consumption *	3 A
External fuse protection *	min. 30 V DC, max. 3.15 A
Power consumption *	72 W
Reverse polarity protection	Yes
Protection class	III

* without additional consumers

Inputs/outputs

Digital inputs	Quantity: 10 Nominal data: 24 V DC / 20 mA
Digital outputs	Quantity: 2 Nominal data: 24 V DC / 2 A
Relay outputs	Quantity: 2 Nominal data: 24 V DC / 2 A
Auxiliary outputs	Quantity: 2 Nominal data: 24 V DC / 250 mA

Interfaces

Service interface	Ethernet interface Protocol: TCP/IP Transmission rates: 10/100/1000 Mbps
Field bus interface	Ethernet-based interface Available interfaces: PROFINET, EtherCAT, EtherNet/IP, Modbus TCP
SPCC interface	Ethernet-based communication interface Safe Provider Consumer Communication

12.3 Technical safety key data

Safety module of the SCS

Method	Freely programmable and configurable modular safety controller
Manufacturer	BBH PRODUCTS GmbH
Type	SMX 100-1/2/DNM
Safety key data	PI in accordance with EN 13849: PL e SIL in accordance with EN 61508: SIL 3
Display	7-segment LED, single-digit

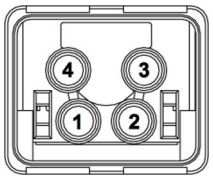
Safety module of the SCS

Manufacturer's address	BBH PRODUCTS GmbH Böttgerstraße 40 92637 Weiden, Germany
Website	*www.bbh-products.de*

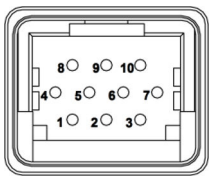
Detailed key data for the safety controller which is used can be found in the manufacturer's manuals and data sheets.
www.bbh-products.de

12.4 Pin configuration

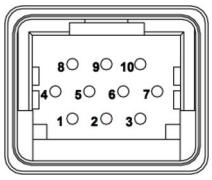
X1 pin assignment

		Pin	Signal
HARTING PushPull Power 4-pin female connector		1	L+
		2	L-
		3	*Not used*
		4	*Not used*
Plug (supplied)	HARTING HPP V4 power plug 48 V/12 A 4p		

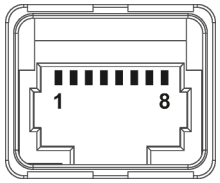
X2 pin assignment

		Pin	Signal
HARTING PushPull signal 10-pin female connector		1	L+ (+24 VDC)
		2	L- (0 VDC)
		3	T1 (clock 1)
		4	T2 (clock 2)
		5	Safe digital input I 01
		6	Safe digital input I 02
		7	Safe digital input I 03
		8	Safe digital input I 04
		9	Safe digital input I 05
		10	Safe digital input I 06
		SH	PE / shield
Plug (supplied)	HARTING HPP V4 signal 10-pin plug		

X3 pin assignment

		Pin	Signal
HARTING PushPull signal 10-pin female connector		1	Safe digital input I 07
		2	Safe digital input I 08
		3	Safe digital input I 09
		4	Safe digital input I 10
		5	Safe digital output | 01
		6	Safe digital output | 02
		7	Safe relay output NO
		8	
		9	Unsafe auxiliary outputs
		10	
		SH	PE / shield
Plug (supplied)	HARTING HPP V4 signal 10-pin plug		

X4 / X5 / X6 pin assignment

		Pin	Signal
HARTING PushPull RJ45 8-pin female connector Cat.6		1	TD + (Transmit +)
		2	TD - (Transmit -)
		3	RD + (Receive +)
		4	*Not used*
		5	*Not used*
		6	RD - (Receive -)
		7	*Not used*
		8	*Not used*
Plug (supplied)	HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC		

RJ45 PushPull connector pin assignment

		Pin	Signal
HARTING HPP V4 RJ45 10G Cat6 plug 8p IDC		1	TD + (Transmit +)
		2	TD - (Transmit -)
		3	RD + (Receive +)
		4	*Not used*
		5	*Not used*
		6	RD - (Receive -)
		7	*Not used*
		8	*Not used*

Wiring information:

- Follow the manufacturer's instructions enclosed with the connector!
- **Note the pin arrangement in the connector!** Pre-sort the wires to the correct position before inserting them into the connector's cable manager.
- Insert the wires for pins 6, 3, 4, 5 into the bottom row of the cable manager.
- Insert the wires for pins 8, 7, 2, 1 into the top row of the cable manager.

12.5 Cables

Cable requirements for power supply

Cable type	2 × 1.5 mm^2
Cable recommendation	LAPP Ölflex-FD Classic 110 2×1.5 mm^2

PushPull signal connector cable requirement

Cable type	max. 10 x 0.5 mm^2
Cable recommendation	flexible, shielded

Network cable line regulation

Cable type	Network cable min. Cat. 5 in accordance with DIN EN 50173-1
Cable length	100 m max.

12.6 Approvals and standards

Conformity

Devices made by Conductix-Wampfler Automation GmbH have been designed to comply with EU directives. Please contact Conductix-Wampfler Automation GmbH if you wish to obtain a copy of the EU Declaration of Conformity.

12.7 Device drawing

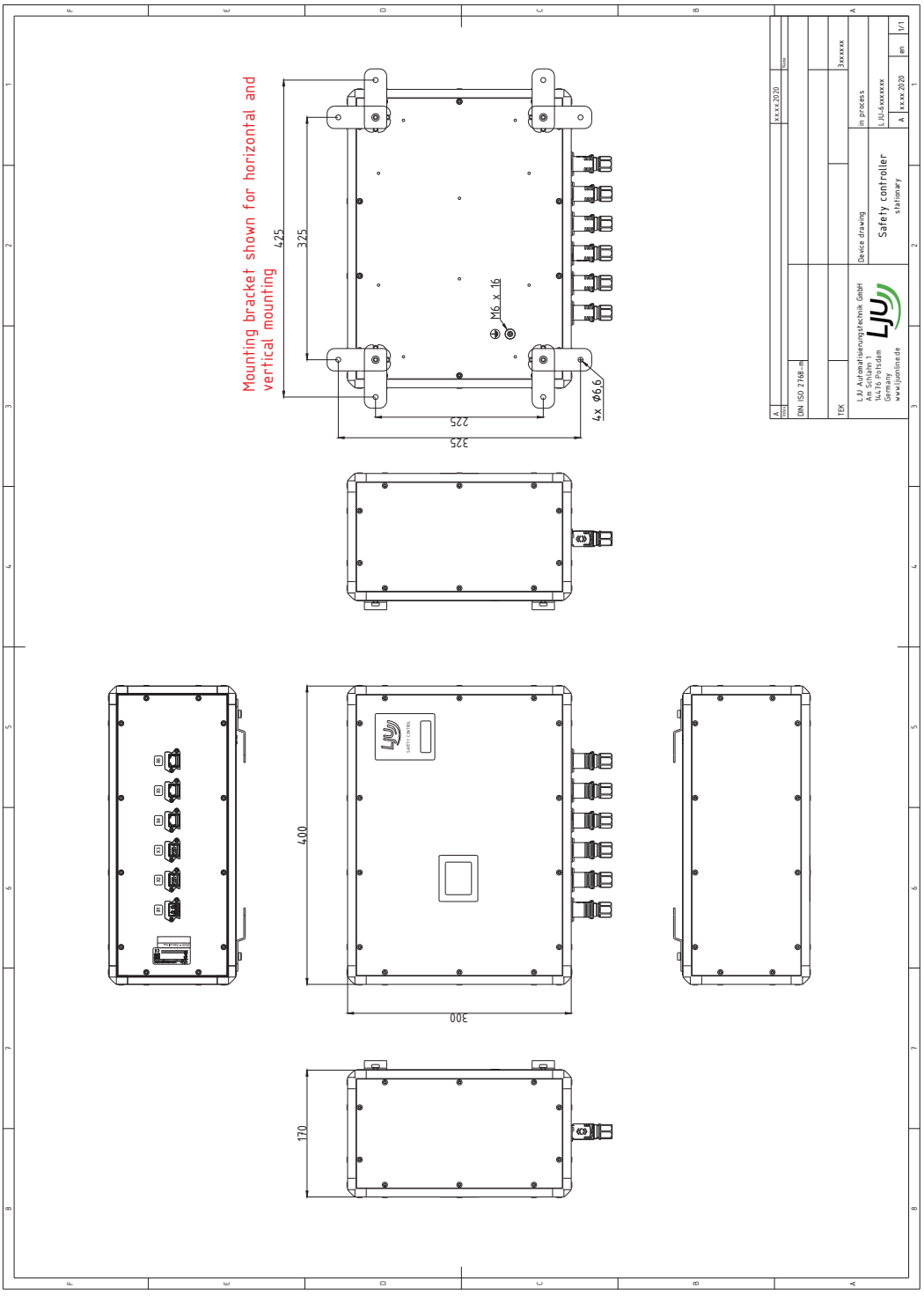


Fig. 13: Gerätezeichnung SCS-8

12.8 Connection diagram

Connection diagram

A detailed connection diagram [ANS] is enclosed as a separate document.

13 Customer service and addresses

Customer service

Our service team is available to provide technical information.

- **Conductix-Wampfler Automation - Service**
  Phone: +49 331 887344-15 | Fax: +49 331 887344-19
  E-mail: service.potsdam@conductix.com

Service forms

Service forms are available for download under www.conductix.com.

Please send completed service forms to service.potsdam@conductix.com.

Further contacts

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- *www.conductix.com*

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