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Depending on features of your device, description of optional functions in the form of additional sheets will be provided as a complement to this operating manual.

ZEUS

ZEUS
Enabling switch with operational unit

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1. About This Document

1.1 Function

This operating manual provides all necessary information for the assembly, installation, safe operation and disassembly of the enabling/operational unit ZEUS. The operating manual must always be readable and available during the operating life. Read the operating manual carefully before using the device. Always hand this operating manual over to future owners and users of the device. Add any supplement received from the manufacturer to the operating manual.

1.2 Safety instruction for the authorized skilled personnel.

The tasks described in this operating manual may only be carried out by trained skilled personnel authorized by the plant owner. You must read and understand the operating manual before starting the ZEUS. Familiarize yourself with the applicable rules and regulations relating to industrial safety and accident prevention. National and international legislation apply to assembly, installation and regular technical inspections.

1.3 Symbols



Caution

If the warnings are not observed, faults or malfunctions as well as injury to persons and/or damage of the machines can occur.



Information

Helpful additional information

1.4 Scope of application

The described products are designed to be a part of an overall system or machine for safety-related applications. They are manually-operated control devices that allow to work in special operating mode of the machines. The distributor of the plant or machine is responsible for ensuring the correct overall function of the system.

The enabling/operational unit has to be connected with the machine control in such a way that it meets the safety requirements of the current circuit acc. to VDI 2854 and/or EN 775. Under the conditions specified therein, the protection of the movable protection devices can be canceled by enabling signal. The authorized operating personnel can then enter the danger zone:

- For workflow inspection
- For maintenance works

1.5 Attention: Safety instructions

Observe the safety instructions in the operating manual, which are identified by an above symbol for caution or warning. Follow national installation, safety and accident prevention regulations. For additional technical information refer to SSP data sheets or visit our website at www.safety-products.de.

All information is supplied without liability. We reserve the right to make technical modifications for reasons of improvement. No remaining risks are known, if the safety notes and instructions regarding assembly, installation, operation and maintenance are followed.

1.6 Attention: Incorrect use

Danger to persons or damages to parts of machines or installations can arise as a result of inappropriate or incorrect use or manipulation of the enabling/operational unit.

All safety and accident prevention regulations, such as directives of the Employer's Liability Insurance Associations, safety-related requirements of the Association of German Engineers (VDI) (EN ISO 10218-1, VDI 2854), EN 60204, EN 12100, EN ISO 13849, EN 61062, DIN VDE 0106 Part 100 etc., that apply for the special application have to be followed.

No hazardous states are allowed to start using only the enabling/operational unit. The safety function of the enabling/operational unit may not be bypassed (bypass of the contacts), manipulated or otherwise rendered ineffective. The enabling signal must not be simulated by setting the enabling switch in enabling position (Level 2).

The enabling/operational unit may only be operated by authorized persons, which can recognize dangerous situations and initiate immediate countermeasures. It is prohibited to use with the enabling/operational unit spare parts or accessories, which have not been expressly approved by the manufacturer.

Each person that stays in the danger zone has to carry his own enabling/operational unit. A completely safety-related system usually consists of several signal units, sensors, evaluation units and concepts for safe disconnection procedures. The manufacturer of the machine or plant is responsible for ensuring the correct and safe overall function of the system. Before each use, the enabling/operational unit has to be checked for any damage and proper function (see "Commissioning").

The operator is responsible for the integration of the device in the safe overall system. For this, the overall system has to be validated, e.g. in accordance with EN ISO 13849-2.

In case that the simplified procedure is used according to section 6.3 of EN ISO 13849-1:2008, the Performance Level (PL) can potentially be reduced if several devices are connected in series.

For any remaining residual risks of the enabling/operational unit, the operator has to evaluate, record and introduce corresponding safety measures according to MRL 2006/42/EG. The installation, commissioning, electrical connection and operation may only be carried out by trained and authorized by the plant owner skilled personnel, which must have read and understood the operating manual and is familiar with the applicable regulations on industrial safety and accident prevention.

1.7 Liability Disclaimer

We accept no liability for damages or operational malfunctions resulting from improper installation or failure to comply with this operating manual. No other liability is accepted by the manufacturer for damages resulting from use of spare parts or accessories, which have not been approved by the manufacturer. Any unauthorized repairs, reconstructions and modifications are not permitted for safety reasons and rule out liability of the manufacturer for damages resulting from this.

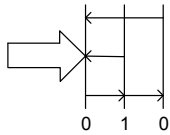
2. Product Description

2.1 Intended use

Users are operators, which have to work within the danger zone of the machine.
The device can only be used in industrial applications

2.2 Function

- Level 1: Off function, enabling switch not pressed
- Level 2: Enabling function, enabling switch pressed in the middle position (pressure point)
- Level 3: Off function, enabling switch pressed into the end stop.

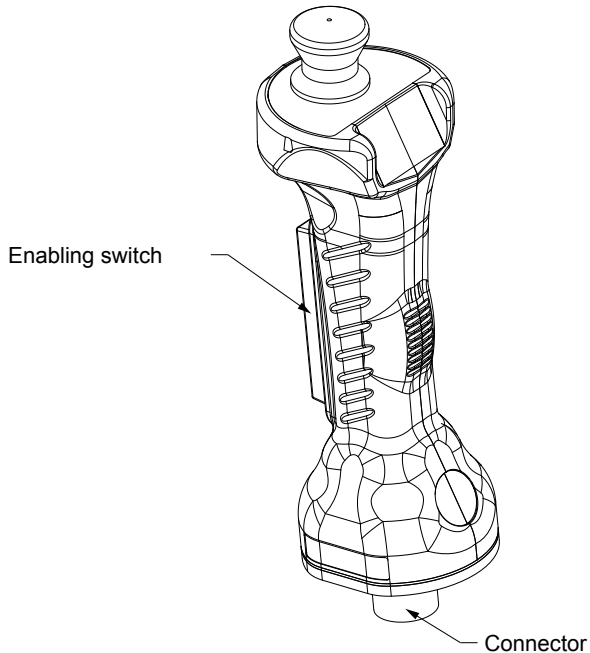


The enabling function is canceled by releasing of the enabling switch (Level 1) or pushing over the pressure point (Level 3). The enabling function does not work when returning from Level 3 to Level 1.

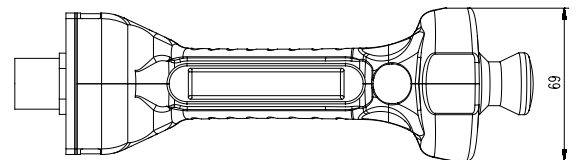
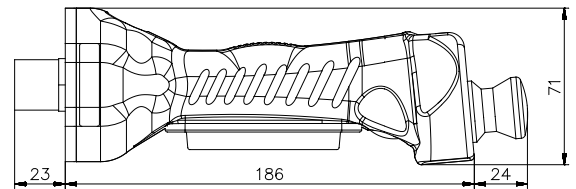
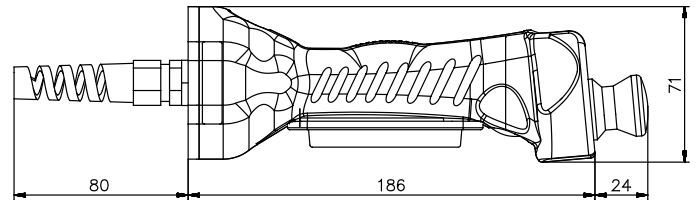
2.3 Design types

This operating manual is valid for the following design types:

ZEUS 00-xxxxxx	Enabling switch standard
ZEUS 10-xxxxxx	Enabling switch with emergency stop switch
ZEUS 20-xxxxxx	Enabling switch with stop switch
ZEUS 01-xxxxxx	Enabling switch standard with individual wiring
ZEUS 11-xxxxxx	Enabling switch with emergency stop switch and individual wiring
ZEUS 21-xxxxxx	Enabling switch with stop switch and individual wiring



2.4 Dimensions



2.5 Special design types

For special design types, that are not listed under 2.3 type code, the above and following information is accordingly applicable if they correspond to the standard design.

2.6 Intended use

ZEUS is a 3-level enabling switch with operational unit. The enabling/operational unit provides the highest safety (Cat. 4 / PLe) only with an application of an appropriate safety relay. The safety relays have to be equipped with a possibility for cross-circuit monitoring.

2.7 Technical data

Material	
- Housing	PA6.6 30% GF, color black
- Enabling switch	silicon/silicon-free
- Base plate	stainless steel 1.4301
Ambient conditions	
Storage temperature	-40°C to 80°C
Operating temperature	-5°C to 60°C
Protection class	IP65/IP67 acc. to IEC 529
Air and creepage distance acc. to IEC/EN 606641	
- Overvoltage category	3
- Degree of contamination	III
Dimensions (without connection cable)	
- Width	69 mm
- Depth	71 mm
- Height	186 mm
- Height (emergency stop)	24 mm
Weight (without connection line)	330 g
Operating voltage	24V DC ± 5%
Switching elements enabling switch	2 changeover contacts
Enabling switch	
Lifetime (reliability values acc. to ISO 13849-1)	
- Position 1>2>1	1,000,000 cycles
- Position 1>2>3>1	100,000 cycles
- B10d	100,000
Rated operating voltage Ue	DC: 30 V
Rated operating current Ie	DC: 1 A
Emergency stop switch / stop switch	
Lifetime (reliability values acc. to ISO 13849-1)	
- B10d	100,000
Rated operating voltage Ue	DC: 30 V
Rated operating current Ie	DC: 1 A
Switching capacity	AC: 10Ie / DC: 1.1Ie
Mechanical lifetime	50,000
Torque	max. 2.5 Nm
Terminal block	
Connection cross-section	0.14 - 0.34 mm²
Number per terminal connection	7
Terminal blocks	3
Degree of contamination	2
Rated operating voltage Ue	DC: 30 V
Rated current	DC: 1 A
Cable diameter	3.5 - 7 mm
Screwed connection	M12
Tensile strength of the connector	20 Nm



Note

Environment: Must not be operated outdoors or in a potentially explosive atmosphere

3. Installation

3.1 General installations notes

Always use support elements that are suitable for the expected ambient conditions. The installation may only be carried out by authorized skilled personnel.



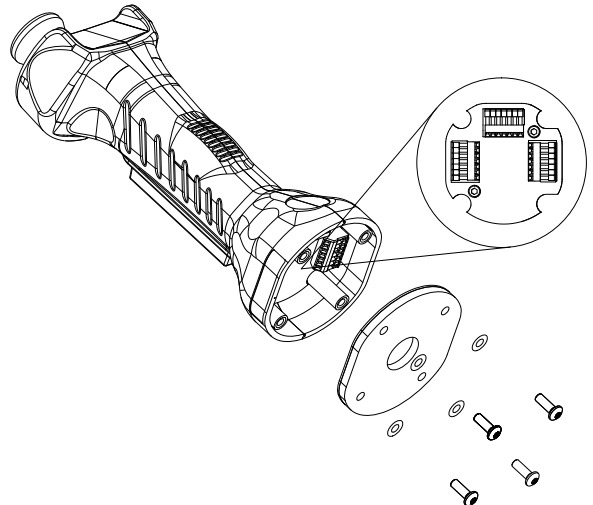
Note

The specified protection class is only guaranteed in case of careful observation of all installation instructions in this operating manual.

Optional safety functions in addition to the enabling switch							
Type (see base plate)		without emergency stop switch	emergency stop switch	stop switch	fixed cable	plug	opening of the base plate by the customer
ZEUS	00-xxxxxx	x			x		not allowed
	10-xxxxxx		x		x		
	20-xxxxxx			x	x	x	allowed
	01-xxxxxx	x					
	11-xxxxxx		x				
21-xxxxxx				x			

With the table you can find out the types with the base plate that can be opened and where you can wire the connection.

All functions described in this operating manual are safety-related. Non safety-related functions are described in corresponding additional sheets.



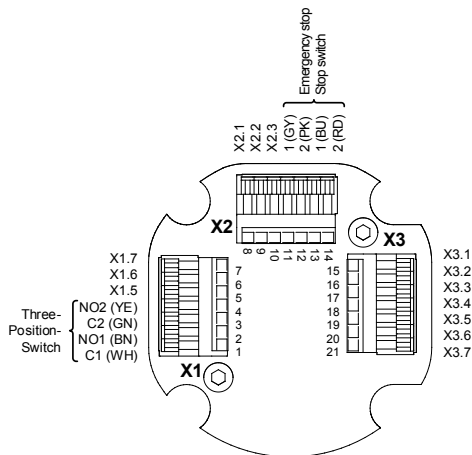
Information

The fastening bolts of the base plate have to be tightened to 0.5 Nm. If a corresponding tool is not available, make sure that during tightening of the base plate the seal is not compressed more than one third. The sealing of the base plate and the bolts have to be replaced after each opening.

3.2 Terminal assignment for individual assembly



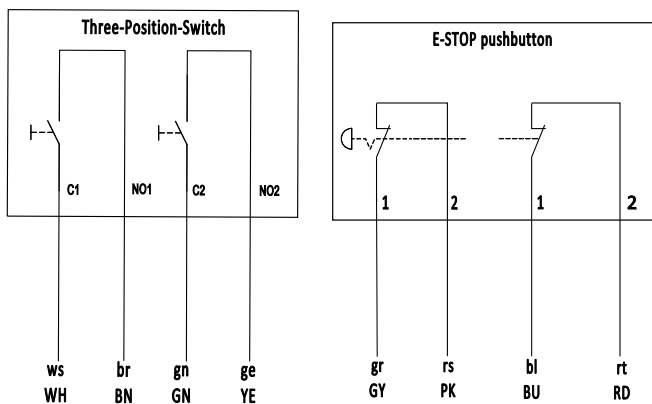
Note
For the individual wiring, only cables can be used that comply with the requirements described in 3.3.



Information
The wiring of the connection cable must be made according to the illustration.

3.3 Connection assignment of pre-assembled connections

Example for an enabling/operational unit with a connection cable.
(Types 00-XXXXXX, 10-XXXXXX, 20-XXXXXX)



Cable to be used

Design	VDE 0812
Conductor	fine strands of bare copper wire
Core insulation	PVC based
Outer sheath	PVC based
Electrical properties at 20°C	
Conductor resistance	max. 138 Ω/km
Specific vertical resistance	> 20 G Ω x cm
Inductance	0.65 mH/km
Operating peak voltage	350 V
Test voltage	1200 V
Minimum bend radius	10 x Ø of the cable

4. Electrical connection

4.1 General notes for electrical connection

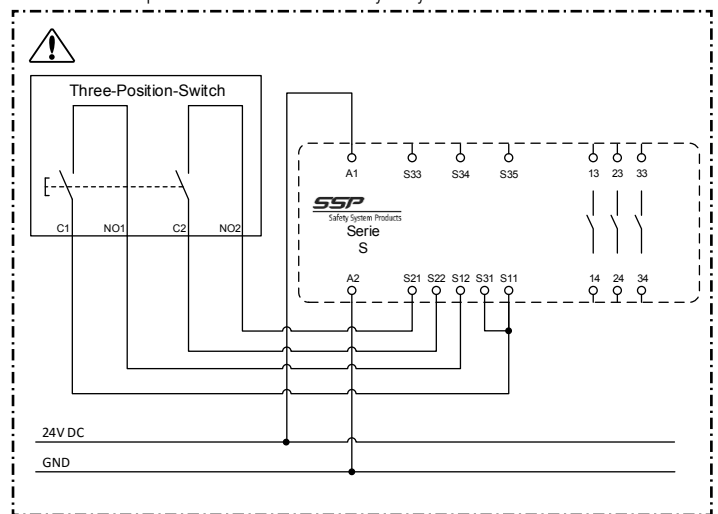
During plant set-up, cables and lines (exceptive protective conductors) are used, that can be touched without opening or removing of a cover or that are routed on an extraneous conductive components. These cables and lines need double or reinforced insulation between wire and surface or a metal sheath with a sufficient current-carrying capacity to prevent against short circuit between wire and sheath. Danger of squeezing or cutting of the connection cable has to be eliminated by appropriate routing, e.g. in a protective hose.



Note
The illustrated examples are only suggestions. The user has the responsibility to design the overall system in compliance with applicable rules and regulations. A safety relay or safety PLC are not scope of supply.

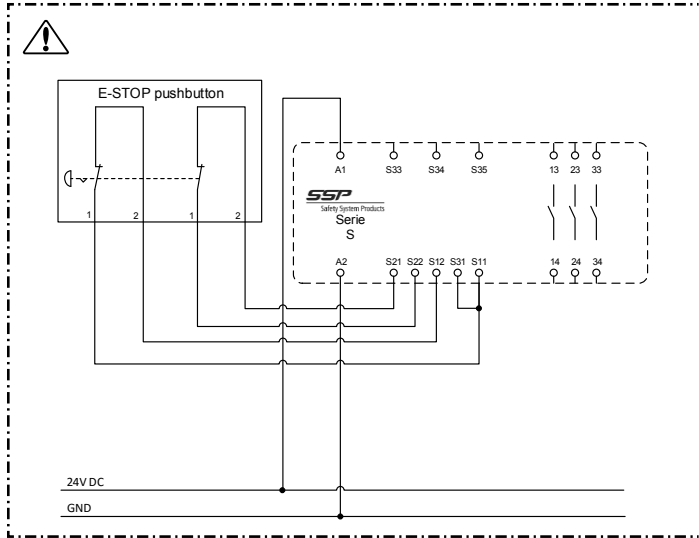
4.2 Connection examples

Connection example 1: ZEUS 00 with SSP safety relay S series

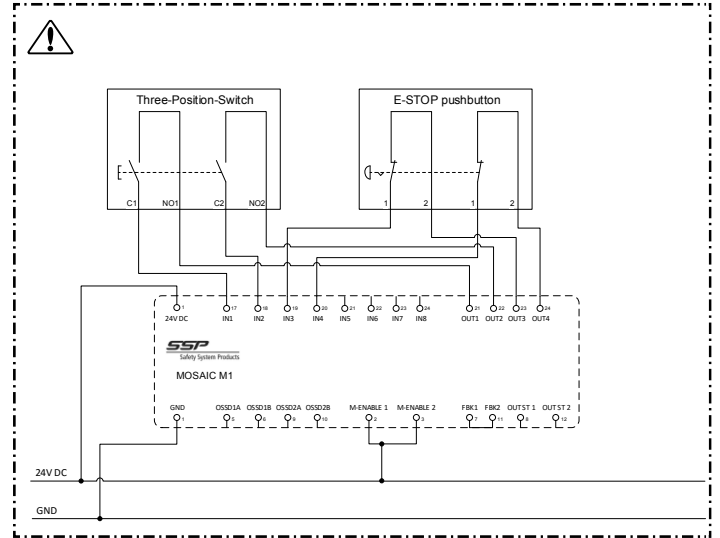


Information
ZEUS provides the highest safety (Cat. 4/PLe) acc. to EN ISO 13849-1 only with an application of an appropriate safety relay, such as S-series.

Connection example 2: ZEUS 10 with SSP safety relay S series



Connection example 3: ZEUS 10 with safety PLC MOSAIC M1



Information

ZEUS with emergency stop provides the highest safety (Cat. 4/PLe) acc. to EN ISO 13849-1 only with an application of an appropriate safety relay, such as S-series.



Information

ZEUS with emergency stop provides the highest safety (Cat. 4/PLe) acc. to EN ISO 13849-1 only with an application of an appropriate safety relay/PLC, such as MOSAIC M1.

In a safety circuit, both contacts of the enabling switch have to be evaluated separately (2-channel design). In this process, cross circuits and short circuits are identified by the safety relay.

For the application and use that meet the requirements, a voltage supply with the attribute SELV/PELV has to be used.

Danger of squeezing or cutting of the connection cable has to be eliminated by means of appropriate measures:

- Protection of the cable by appropriate routing, e.g. in a protective hose.
- Cross-circuit monitoring with an evaluation device
- Use of cables with separately shielded wires. These shields have to be connected with the protective conductor system of the machine or plant. Therewith the wiring short circuits are detected and the control unit is immediately switched off by the activated protection against short circuit.

The electrical connection should only be performed in a de-energized state by authorized skilled personnel. After connection, remove debris such as cable residues from the contact element.

5. Commissioning and Maintenance

5.1 Function check

Check the enabling/operational unit before each commissioning. Ensure the following before you start:

- Function of the enabling switch (enabling function in Level 2 and forced disconnection in Level 3)
- The cable entry and connections are not damaged
- The housing and the rubber cap of the enabling switch are not damaged
- Depending on the design: Check of the integrated functions, such as emergency stop button or stop button



Note

Damaged or defective devices must not be put into operation!

5.2 Maintenance

No maintenance is required. Regular inspections of the electric and mechanic function carried out by authorized personnel are necessary to ensure trouble-free long-term operation. Remove contamination on a regular basis. Do not use any abrasive cleaning agents, only use a moist cloth.

Check at regular intervals if the enabling switch (grip switch) is firmly seated.

In case of malfunction or damage the enabling switch has to be replaced.

According to intensity of use of the components, replace the enabling/operational unit.

Repairs must only be carried out by the manufacturer.

6. Disassembly and Disposal

6.1 Removal

Disassembly of the enabling/operational unit ZEUS should only be performed in a de-energized state.

6.2 Disposal

The enabling/operational unit ZEUS must be disposed of properly in accordance with national and local regulations.

7. Equipment

7.1 Equipment for ZEUS

Item	Denomination	Item number
Brackets		
Holding bracket for ZEUS	ZEUS H	SP-X-85-800-00
Safe Control Technology		
Basic device for emergency off and safety door applications S series		SP-S-00-001-02
Basic device for emergency off and safety door applications T series		SP-S-00-002-02
Safety PLC	MOSAIC M1	SP-R-11-000-00

8. Declaration of Conformity

8.1 EC conformity regulations



Note

Signed EC Declaration of Conformity is available at the SSP website:
www.safety-products.de



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