

Correct use

The enabling switches described are manually actuated command switches that make it possible to work in the danger zone of machines and installations.

Enabling switches represent part of a safety-related control system according to EN ISO 13849-1 or EN 62061 and fulfill a safety function. In conjunction with other safety functions, e.g. SLS = *Safely Limited Speed according to EN 61800-5-2*, the enabling switches can be used as part of an enabling system according to EN ISO 12100 for working with open guards or switched-off safety guards. The various safety guards must be activated via a control or operating mode selector that can be locked in every position or via an equivalent device.

The device possesses a three-position enabling switch according to EN 60947-5-8 or is a device for enabling control with three positions according to EN 60204-1. A dangerous movement is only allowed to be enabled in position 2 (center position). Authorized operating personnel can then enter the danger zone, e.g.:

- ▶ for setting up
- ▶ for observing work sequences
- ▶ for maintenance.

Before the device is used, a risk assessment must be performed on the machine, e.g. in accordance with the following standards:

- ▶ EN ISO 13849-1
- ▶ EN ISO 12100
- ▶ IEC 62061

Correct use includes observing the relevant requirements for installation and operation, particularly based on the following standards:

- ▶ EN ISO 13849-1
- ▶ EN 60204-1
- ▶ IEC 62061

Important!

- ▶ The user is responsible for the integration of the device in a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-2.
- ▶ The enabling switch user must assess and document remaining risks.
- ▶ If a data sheet is included with the product, the information on the data sheet applies.

Description of the safety function

If dual-channel evaluation of the enabling switch is used with monitoring for same contact state or antivalent contact state, category 3 as per EN ISO 13849-1 is achieved.

Devices from this series feature the following safety function:

Enable control (manually activated interlocking function in a control system according to EN 60204-1)

Safety function:

- ▶ If the enabling switch is not pressed (position 1), at least one of the contacts is open.
- ▶ If the enabling switch is pressed all the way down (position 3), at least one of the contacts is open.

Safety characteristic:

- ▶ B₁₀₀ (see section *Technical data*).

Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety regulations are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

General safety precautions

Enabling switches fulfill personnel protection functions. Incorrect installation or tampering can lead to fatal injuries to personnel.

Check the safe function of the guard particularly

- ▶ after any setup work
- ▶ after the replacement of a system component
- ▶ after an extended period without use
- ▶ after every fault.

Independent of these checks, the safe function of the guard should be checked at suitable intervals as part of the maintenance schedule.

- ▶ No commands for potentially hazardous conditions are allowed to be initiated with enabling switches alone.
- ▶ The safety function of enabling switches must not be bypassed (bridging of contacts), tampered with or otherwise rendered ineffective.
- ▶ The enabling switch must be protected against tampering by the operator.
- ▶ Enabling switches may be used only by authorized persons who can recognize hazards in time and who are able to take appropriate action immediately.
- ▶ Every person present in the danger zone must carry his/her own enabling switch on his/her person.
- ▶ Mounting, electrical connection and setup only by authorized personnel.

In the event of malfunctions or damage, the enabling switch must be replaced. The device may be repaired only by the manufacturer.

Important!

Prior to use, read the operating instructions and keep these in a safe place. Ensure the operating instructions are always available during mounting, setup and servicing. You should archive a printed copy of the operating instructions. You can download the operating instructions from www.euchner.com.

Function

Enabling switches are used as a manual interlocking device for a control system (enable control). In position 2, the enabling switch permits machine operation with a separate start control. In position 1 and in position 3, a stop function must be initiated by the machine control and machine operation prevented.

- ▶ Position 1: Off function, pushbutton not pressed
- ▶ Position 2: Enabling function (ON), pushbutton pressed to center position (actuating point)
- ▶ Position 3: Off function, pushbutton pressed to end stop

The enabling function is canceled by releasing the pushbutton or pressing it beyond the actuating point. The enabling function does not reactivate as it passes position 2 while returning from position 3 to position 1.

With versions ZXE-104833, ZXE-111276 and ZXE-120348, a click sounds during the change from position 1 to position 2 and during the return from position 2 to position 1.

Mounting

Important!

The enabling switch must be fitted in a suitable housing.

- ▶ Screw the knurled nut on the enabling switch down as far as possible and slide enabling switch without protective cap through the front panel cut-out from the rear.
- ▶ Screw protective cap onto the front of the enabling switch to the end stop.
- ▶ Screw the knurled nut against the control panel and tighten.
- ▶ During installation it must be ensured that all three switch positions can be reached unhindered.
- ▶ The control element must be securely fastened, but must not be placed under stress by the fastening.
- ▶ The device must be installed so that tampering is not possible by simple mechanical measures (clamping, adhesive tape, etc.).

Electrical connection

⚠ WARNING

There will be no safety function if installed or connected incorrectly. This situation can result in serious accidents and injuries or even fatality.

- ▶ Installation and electrical connection must be performed only by qualified personnel.
- ▶ All electrical outputs must have an adequate protective circuit for inductive loads. The outputs must be protected with a free-wheeling diode for this purpose. RC interference suppression units must not be used.

Connecting enabling switch

Selecting contacts or contact combinations

Always use a dual-channel, safe input to connect an enabling switch to a safety evaluation unit. Use the recommended contact combination (for example, see Figure 2).

If you use your own contact combination, please pay attention to the following notes:

Connect the enabling switch such that

- ▶ Two independent switching contacts or contact combinations are used.
- ▶ The switching contacts or contact combinations are either antivalent (one normally open contact and one normally closed contact) or equivalent (two normally closed contacts).

The parameters for this connection must be configured in the safe evaluation unit to suit the switching contacts chosen and their wiring. For this purpose use the appropriate parameters:

- ▶ Dual-channel equivalent evaluation
Both contacts are closed at the same time in the enabling position (position 2)
- ▶ Dual-channel antivalent evaluation
One contact is open in the enabling position (position 2), the second closed
- ▶ Discrepancy time
Activate the discrepancy monitoring. Because the two contacts never switch exactly simultaneously, you must specify a time within which simultaneity applies. A time of 3 s has proven appropriate for electromechanical contacts.

- ▶ Resetting after fault detection

Select the parameter such that after a fault the enabling switch is automatically reset if both contacts were in the open position (for equivalent contacts) or one contact was open and the other closed (for antivalent contacts) and they are then placed again in the correct position for enabling.

This action can be achieved by releasing and pressing again the enabling switch.

This automatic reset is important above all if an enabling switch is to be used for an extended period. Often position 2 (enabling) is left only a little due to fatigue of the operator's hand or thumb. In this situation, only one of the contacts signals a release, the other remains in the enabling position. The control system interprets this situation as an enabling switch fault. Now it is helpful if it is possible to continue working by simply releasing and pressing again.

Should this not be possible, to some extent the fault can also be automatically acknowledged by the control system by means of the programming. In any case, please ensure that release is detected unambiguously first (both contacts in position 1 again) to rule out any faults in the wiring!

Functional check

⚠ WARNING

Danger of fatal injury as a result of faults in installation and functional check.

- ▶ Before carrying out the functional check, make sure that there are no persons in the danger zone.
- ▶ Observe the valid accident prevention regulations.

Check the enabling switch by means of a functional check (enabling function only in position 2). Check that there is no enable function in position 2 after reaching position 3 and releasing again.

Inspection and service

⚠ WARNING

Danger of severe injuries due to the loss of the safety function.

- ▶ If damage or wear is found, the complete device must be replaced. Replacement of individual parts or assemblies is not permitted. The device may be repaired only by the manufacturer.
- ▶ Check the device for proper function at regular intervals and after every fault.

Inspection of the following is necessary to ensure trouble-free long-term operation:

- ▶ correct switching function
- ▶ damage, heavy contamination, dirt and wear
- ▶ sealing of cable entry
- ▶ loose cable connections or plug connectors.

Information: The year of manufacture can be seen in the bottom, right corner of the type label.

Disposal

Pay attention to the applicable national regulations and laws during disposal.

EC declaration of conformity

The declaration of conformity is part of the operating instructions, and it is included as a separate sheet with the unit.

The EC declaration of conformity can also be found at: www.euchner.com

Service

If servicing is required, please contact:

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany

Service telephone:
+49 711 7597-500

E-mail:
support@euchner.de

Internet:
www.euchner.com

Technical data

Parameter	Value
Housing material	Polyamide, color black
Protective cap material	CR, color black
Weight	Approx. 30 g
Degree of protection	Front IP65 Connections IP00
Mechanical life, min.	
Position 1-2-1	1x10 ⁶ cycles
Position 1-2-3-1	1x10 ⁶ cycles
Ambient temperature	-5 ... +60 °C
Degree of contamination (external, acc. to EN 60947-1)	3 (industrial)
Installation orientation	Any
Impact strength	> 100 N
Switching elements	
ZXE-091336/ZXE-104833/ ZXE-111276	2 NO contacts
ZXE-120348	1 NO contact + 1 NC contact
Connection	Screw terminal, 4-pin/ Tab connector, 4-pin
Tightening torque, max., for the terminal screws	0.15 Nm
Connection cross-section *	Single conductor 0.33 ... 1.5 mm ² , AWG 22 ... 16 Multiple conductor 0.33 ... 0.75 mm ² , AWG 22 ... 18
Insulation stripping length *	5 mm
Rated impulse withstand voltage	U _{imp} = 1.5 kV
Rated insulation voltage	U _i = 30 V
Conditional short-circuit current	100 A
Utilization category acc. to EN 60947-5-2	DC-13 0.1 A 24 V
Breaking capacity, max.	250 mW
Switching current, max.	100 mA
Switching current, min.	5 mA
External fuse U (+LA) / U (+LB)	100 mA medium slow-blow
Reliability values acc. to EN ISO 13849-1	
B ₁₀₀	0.75 x 10 ⁶

* Irrelevant for ZXE-111276

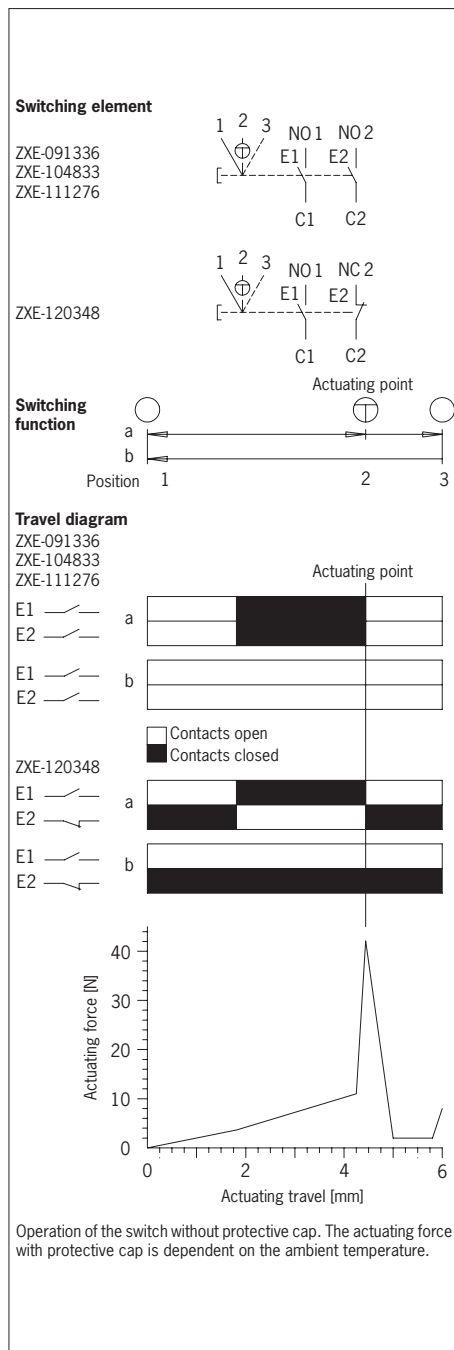


Figure 1: Function of the switching element

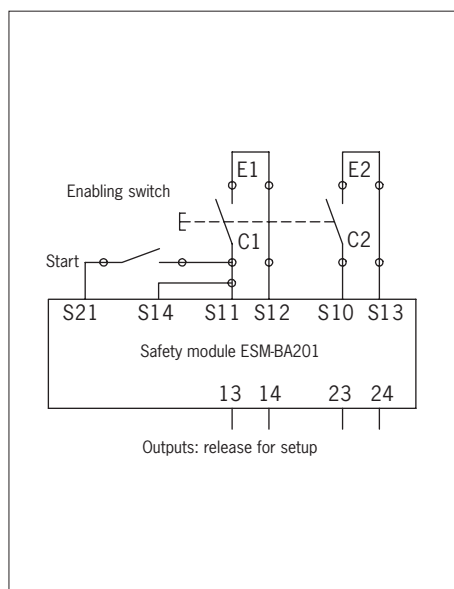


Figure 2: Application example

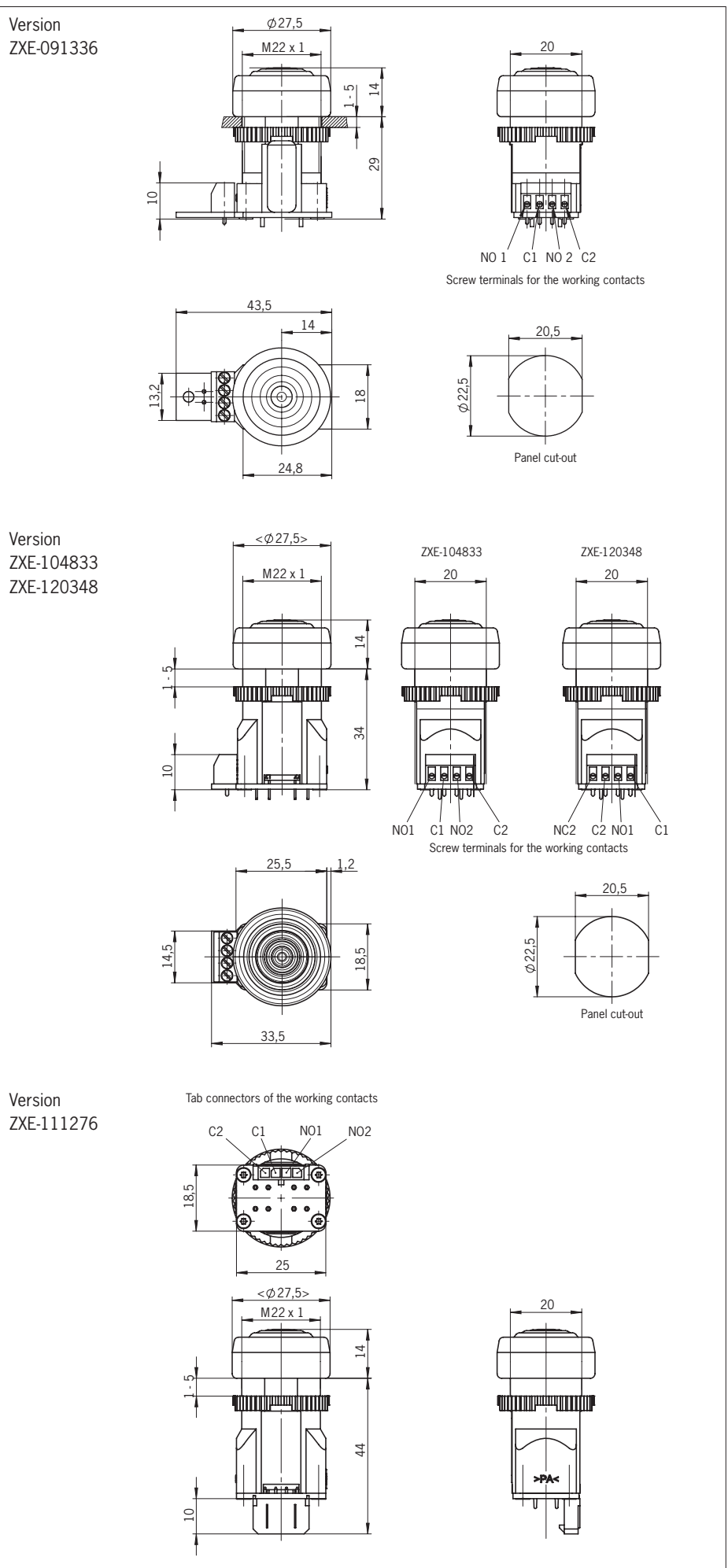


Figure 3: Dimension drawing for enabling switch ZXE