

Enabling Switches ZS



EUCHNER

More than safety.

EUCHNER

More than safety.



Headquarters in Leinfelden-Echterdingen



Logistics center in Leinfelden-Echterdingen



Production location in Unterböhringen

Internationally successful – the EUCHNER company

EUCHNER GmbH + Co. KG is a world-leading company in the area of industrial safety technology. EUCHNER has been developing and producing high-quality switching systems for mechanical and systems engineering for more than 60 years.

The medium-sized family-operated company based in Leinfelden, Germany, employs around 750 people around the world.

18 subsidiaries and other sales partners in Germany and abroad work for our international success on the market.

Quality and innovation – the EUCHNER products

A look into the past shows EUCHNER to be a company with a great inventive spirit. We take the technological and ecological challenges of the future as an incentive for extraordinary product developments.

EUCHNER safety switches monitor safety doors on machines and installations, help to minimize dangers and risks and thereby reliably protect people and processes. Today, our products range from electromechanical and electronic components to intelligent integrated safety solutions. Safety for people, machines and products is one of our dominant themes.

We define future safety technology with the highest quality standards and reliable technology. Extraordinary solutions ensure the great satisfaction of our customers. The product ranges are subdivided as follows:

- ▶ Transponder-coded Safety Switches
- ▶ Transponder-coded Safety Switches with guard locking
- ▶ Multifunctional Gate Box MGB
- ▶ Access management systems (Electronic-Key-System EKS)
- ▶ Electromechanical Safety Switches
- ▶ Magnetically coded Safety Switches
- ▶ Enabling Switches
- ▶ Safety Relays
- ▶ Emergency Stop Devices
- ▶ Hand-Held Pendant Stations and Handwheels
- ▶ Safety Switches with AS-Interface
- ▶ Joystick Switches
- ▶ Position Switches

 **made
in
Germany**

Enabling switches

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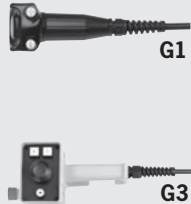

About this catalog



The Enabling Switch ZS catalog provides an overview of our two-stage enabling devices and three-stage enabling switches. Due to their robust and ergonomic design, these switches are the right choice for numerous applications.

You will find the technical data after the product overview. There is a reference to the page with the related technical data on the pages listing the products.

At the front of the catalog you will find useful information on the topic of enabling switches.

You will find the following series and accessories in this catalog:

| Enabling switches, 3-stage | | | | | |
|--|---|---|---|--|---|
| Enabling switches for building in | Hand-held enabling switches | | | | Accessories |
| ZSG, ZSE and ZXE | in housing ZSM or as kit | in housing G1 or as kit | in housing G1, G3 | in housing G2 | Cables, plug connectors, holders, blanking covers |
|  <p>ZSE</p> <p>ZXE</p> |  <p>ZSM</p> |  <p>ZSA</p> <p>G1</p> |  <p>ZSB</p> <p>G1</p> <p>G3</p> |  <p>ZSR</p> <p>G2</p> | |

| Enabling devices, 2-stage | |
|---|---|
| Enabling devices for building in | Hand-held enabling devices |
| <p>ZSG</p>  <p>ZSG</p> | <p>in housing G1 or as kit</p> <p>ZSA</p>  <p>G1</p> |

Standards and approvals

Standards

Enabling switches that are integrated into safety circuits have a safety function. For this reason they are assessed based on the Machinery Directive and the European standards. The Machinery Directive has been implemented in national law in the EU member states and, as a result, is binding for all manufacturers.

Detailed requirements for switches are defined in EN 60947 Part 5-1 (Specification for low-voltage switchgear and controlgear. Part 5-1: Control circuit devices and switching elements. Electromechanical control circuit devices).

If the requirements of these standards are met, conformity with the applicable laws and therefore with the Machinery Directive is assumed. EUCHNER enabling switches comply with the relevant standards for safety switchgear and therefore help you to comply with safety requirements during the design of your machinery.

User standards

As a user, you should take into consideration the following standards of relevance for enabling switches:

European and international standards

| standard | Title |
|-------------------------|--|
| EN 60 204 | Safety of machinery. Electrical equipment of machines |
| EN 775/ EN ISO 10218 | Robots for industrial environments - safety requirements (ISO 10218:1992, modified) |
| VDI 2853 | Sicherheitstechnische Anforderungen an Bau, Ausrüstung und Betrieb von Industrierobotern [Safety related requirements on design, configuration and operation of industrial robots] (withdrawn) |
| VDI 2854 | Sicherheitstechnische Anforderungen an automatisierte Fertigungssysteme (Safety related requirements on automated manufacturing systems) |

American standards

| standard | Title |
|---|---|
| ANSI B11-TR3-2000 | Risk Assessment and Risk Reduction - A Guide to Estimate, Evaluate and Reduce Risks Associated with Machine Tools |
| NFPA 79 (2002) | Electrical Standard for Industrial Machinery |
| OSHA 29 CFR 1910 Subpart O Subpart P Subpart S | Machinery and Machine Guarding Hand and Portable Power Tools and Other Hand-Held Equipment Electrical |



Please also observe any existing C standards!

Approvals

To demonstrate conformity, the Machinery Directive also includes the possibility of type examination. In addition to taking into account all relevant standards, EUCHNER commissions type examinations by a notified body. Many of the enabling switches listed in this catalog have been tested by an employers' liability insurance association (BG) and are given in the lists from the BG.

Furthermore, many enabling switches are listed by the Underwriters Laboratories (UL) and the Canadian Standards Association (CSA). These enabling switches can be used in countries in which this listing is required. The approval symbols on the individual pages of the catalog indicate which body tested the enabling switches.

With the aid of the approval symbols listed below you can quickly see which approvals are available for the related enabling switches:

| | |
|---|--|
|  | Switches with this symbol have the approval of the German Social Accident Insurance association (DGUV) – formerly the employers' liability insurance association (BG). |
|  | Switches with this symbol are approved by Underwriters Laboratories (UL, Canada and USA) |

Function and technology used in enabling switches

Task of enabling switches

Enabling switches are manually operated control devices that, together with other control switches, enable commands related to potentially hazardous conditions to be run, as long as the enabling switches are actuated continuously.

These switches are used wherever personnel must work directly in the danger area on machines and systems. This is necessary, e.g. during setting up, programming, testing or servicing work. As per annex 1 of the Machinery Directive, the protective action of movable safety guards can be disabled in these operating modes. The Machinery Directive places the condition that these operating modes must be secured using a lockable device (e.g. key-operated rotary switch) and machine operation is only allowed to be triggered by a second, separate action.

To enable the operator in the danger area of a machine to trigger a machine movement, an enabling device must also be actuated. The operator must also be able to stop the machine movement using the enabling device. This task is performed by the enabling switch.

Every person who is in the hazardous area must carry an enabling device so that suitable action can be taken in case of danger.

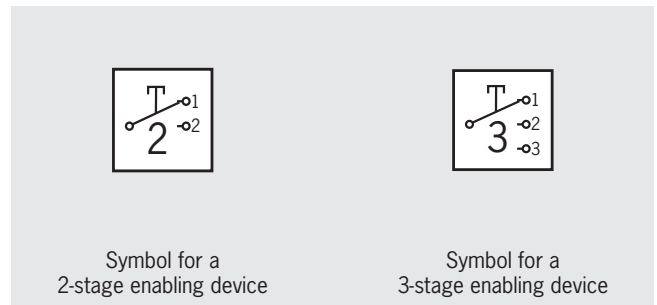
Two-stage enabling device or three-stage enabling switch?

The operator can only start a machine movement if he/she actuates the enabling device and keeps it in the actuated position. The movement is stopped again when the switch is released. This two-stage function (OFF-ON) is provided by all enabling switches.

However, experience shows that the operator often clenches the enabling device in an emergency.

In this case a three-stage enabling switch is better and is specifically requested in many C standards. This switch has three switch positions (OFF-ON-OFF) and, if the operator clenches the switch, it is actuated beyond the enabling position (middle position) and the machine is shut down as a result.

If a 2-stage enabling device is used, it must also be ensured that, in an emergency, the operator is in a position to activate an emergency stop device in close proximity (VDI 2853). To identify the type of enabling switch in the catalog, the following symbols are used:



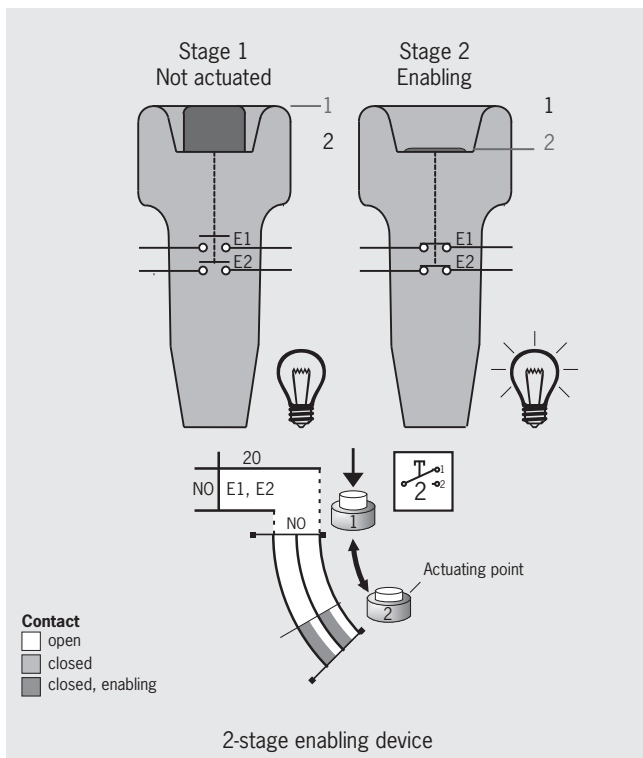
Large selection of switching elements

To be able to cover as many applications as possible, EUCHNER enabling switches can be fitted with various switching elements of single-channel or dual-channel design. Auxiliary contacts are also available, as are additional switches or displays.

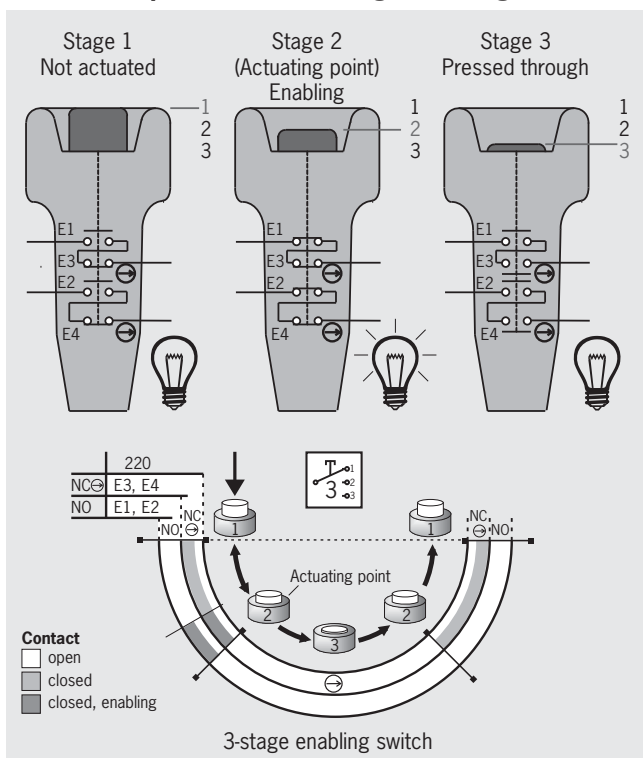
Positively driven contacts 

Positively driven contacts are used in many switching elements. These are special switching contacts that are designed to ensure the switching contacts are always reliably separated. Even if contacts are welded together, the connection is opened by the actuating force.

Function sequence of two-stage enabling device



Function sequence of three-stage enabling switch



As can be clearly seen in the figure, the enabling function can only be achieved at stage 2. This function is provided by the closing of the normally open contacts (NO = E1 and E2).
 If the button is released, that is back from stage 2 to stage 1, the normally open contacts are opened again. The 2-stage enabling devices and 3-stage enabling switches are identical in this function.

If, in this example, the button on a 3-stage enabling switch is pressed past the actuating point (stage 2) in panic (to stage 3), then not only the normally open contacts (NO) are reset, but also the safe positively driven contacts.

The patented switch system ensures that the enabling function does not become active at stage 2 on the resetting of the pushbutton from stage 3 to stage 1. In this example the enable can only be given if normally open and positively driven contacts are closed at the same time. This situation is only possible on actuation from stage 1 to stage 2. In the other direction, from stage 3 to stage 1, stage 2 is skipped and unintentional re-starting prevented.

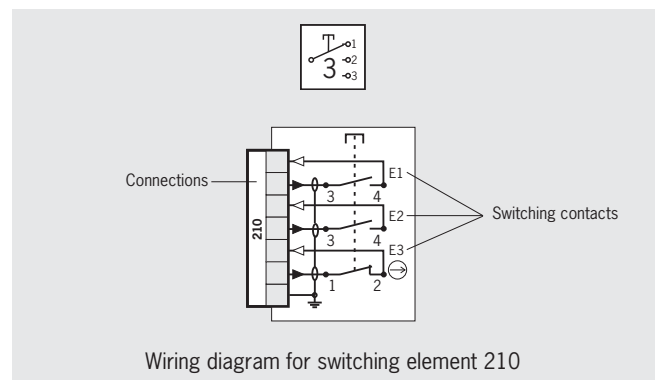
Once the pushbutton has reached stage 1, the function sequence can be started again.

Due to its design, the switch unit also provides a wear-free, constant actuating point (stage 2).

Reading travel diagrams and wiring diagrams

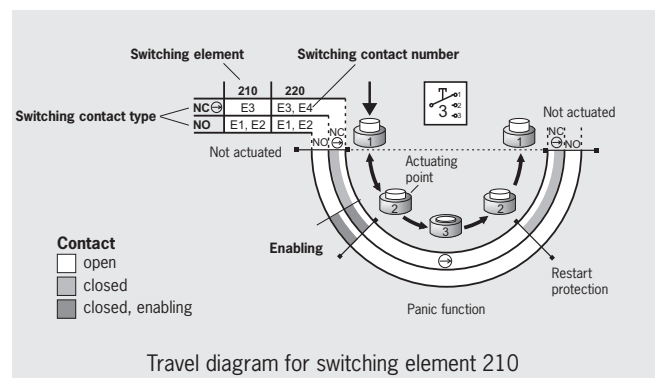
For each of the switching elements used, there is a travel diagram which, dependent of the enabling switch's switch stage, shows the switching states.

The following example is intended to explain these aspects:



The wiring diagram shows the switching element in the free position (enabling switch not actuated).

The switching element 210 has three switching contacts (E1, E2 and E3). The switching contact E3 is designed as a positively driven contact, the other two switching contacts as normally open contacts.



As in this example, in some cases several switching elements are combined in one travel diagram. Here, along with the switching element 210 with the switching contacts E1, E2 and E3, there is also the switching element 220 with the switching contacts E1 to E4.

The letters on the left beside the switching contact E3 define the switching contact type, in this case a positively driven contact (NC).

The following switching contact types are available:

- ▶ NO normally open contact
- ▶ NC normally closed contact
- ▶ NC ⊖ positively driven contact
- ▶ NO/NC three-point switch
(3-stage switching contact with normally open/normally closed function; switching stage dependent on the actuation travel)
- ▶ NO/NC ⊖ three-point switch
(like NO/NC but with positively driven contact)

The travel diagram shows the switching state of each switching contact for the three switch stages "Not actuated", "Enabling" and "Panic function" (pressed past actuating point). Gray areas mean "switch closed", white areas mean "switch open".

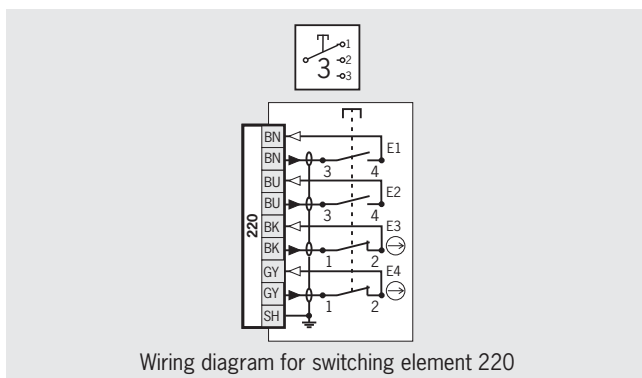
In the example for switching element 210 the sequence is as follows:

- ▶ In the not actuated state, the positively driven contact E3 is closed (gray area) and the two normally open contacts E1 and E2 are open.
- ▶ When the switch has reached stage 2, the normally open contacts E1 and E2 are closed, E3 remains closed. This is the enabling area.
- ▶ If the switch is released, the switching contacts return to their initial state.
- ▶ If the switch is pressed beyond the enabling area, all switching contacts are opened. This is the "panic function" area on the travel diagram.
- ▶ If the switch is now released again, the positively driven contact E3 is closed again, the switch system prevents the normally open contacts E1 and E2 closing again at the same time (restart protection).

An optimal sequence is provided by the series connection of E1 (normally open contact) and E3 (positively driven contact), as then enabling is only possible at the actuating point. On pressing through to stage 3, the safe positively driven contact opens the safety circuit. On this switching element E2 can be used as an auxiliary contact or 2nd channel.

Single-channel and dual-channel enabling switches

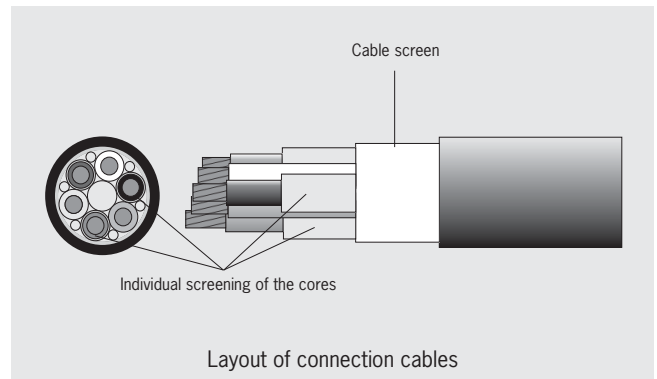
Often two positively driven contacts and normally open contacts are employed to increase safety using the principle of duplicated design (redundancy). This dual-channel design ensures that on the failure of one channel or on a fault in the control circuit (e.g. in the machine wiring), the safety function can still be provided with the aid of the second channel. An example is given in the wiring diagram for switching element 220:



The normally open contact E1 and the positively driven contact E3 as well as the normally open contact E2 and the positively driven contact E4 can be connected externally in series. In this way a dual-channel design is achieved.

Safety in case of faults

Along with the possibility of using positively driven contacts and the possible dual-channel layout of the design, the patented connection cables from EUCHNER provide additional protection on the occurrence of faults. Not only the outer screening of the cable, but also the individual screening of the cores enables, e.g. short circuits or cable breaks due to crushing, to be detected by a control system.



Protection against tampering

An enabling switch can only ensure that operation is free of hazards if it is not bypassed. To prevent tampering, our enabling switches are designed such that it is more difficult to bypass the safety function. The best tampering protection is, however, acceptance with the user.

Ergonomics

To achieve the related user acceptance of a manually operated control, the focus of EUCHNER enabling switches is on safe and balanced handling, even over extended periods (e.g. when observing manufacturing processes). Enabling switches manufactured by EUCHNER have a low weight, an ergonomic housing design and a light, stable actuating point. Both thumb-actuated switches and switches that can be actuated with several fingers in order to maintain the actuating force over an extended period are used.

By selecting a coiled cable with long cable ends, the weight of the switch is reduced as the heavy, spiral part of the cable lies on the floor and only the lighter, straight part needs to be held by the user.



Enabling switches for building in

The enabling devices in series ZSG and the enabling switches in series ZSE and ZXE can be integrated into any housings or control panels. As a result every customer can prepare a customized solution to suit his/her specific application.



Kits for enabling switches

Using enabling switch kits from EUCHNER you can assemble your own customized enabling switch ideally matched to your requirements. The kit is available for the housing G1 as a two or three-stage version and for the ZSM as a three-stage version. Various switching elements are available.

Hand-held enabling switches

The enabling switches in the series ZSM, ZSA, ZSB and ZSR are installed in a housing and are already pre-wired. Depending on version, the hand-held enabling switches feature protection class IP 67 or IP 65. In addition to the enabling function, EUCHNER enabling switches can be equipped with further command buttons (pushbutton, selector switch, key-operated rotary switch or emergency stop device) and LED displays. In this way work processes, such as axis selection and the movement of axes, can be performed directly at the machine using the enabling switch.



Electrical connection

Different cable lengths and cable types are available for the connection of the pre-assembled hand-held enabling switches.

Modern wiring concepts increasingly utilize plug-in connections. The enabling switch does not need to remain permanently connected, but is plugged in as required.

Furthermore, a switch with plug connectors can be easily replaced during servicing work. This configuration results in short downtimes.

The enabling switches ZSM, ZSA, ZSB and ZSR are available with various plug connectors. In addition to the related mating connectors, further accessories are available.

Marking of switching elements

The switching elements used in our enabling switches have a numbering system. A selection of switching elements is available depending on the series.

Explanation of symbols and notation

Symbols and specific notation related to the switches or the switching contact are used time and again in the catalog. The following example is intended to explain these aspects:

Notation

1 NC ⊖ + 1 NO

Explanation

Normally closed contacts are represented by NC, normally open contacts by NO. The number defines how many contacts are available. The symbol after the NC defines that the NC contact is a positively driven contact. This switch therefore has one normally closed contact and one normally open contact; the normally closed contact is a positively driven contact.

Acknowledgment of enabling

Vibration signal

The ZSM enabling switch is optionally equipped with a vibration motor. This permits acknowledgment of enabling, e.g. in a loud environment. The signal pulsates, similar to the vibration signal of cellular telephones.



LED

An LED can also be optionally used as visual acknowledgment. Several products are equipped accordingly.

Emergency stop/machine stop

All emergency-stop devices with red pushbutton must be active in the danger area. Since a plugged connection could be unplugged in certain circumstances, enabling switches with plug connectors are equipped only with a black/yellow machine stop. Otherwise, it must be ensured that confusion between effective and ineffective devices is ruled out.

Selection table for built-in enabling switches ZSE and ZXE

| Design | | | |
|---|---|------------------------------------|--|
| E | Built-in version (without cable) | | |
| | Function | | |
| | 3 | 3-stage (OFF - enabling - OFF) | |
| | | Connection | |
| | | C | Tab connector, screw terminal, flying lead |
|  Enabling switch ZXE |  Enabling switch ZSE | | |
| Design E ● | Stages 3 ● | Connection C ● | Page 10 - 12 |



Built-in enabling switches ZSE and ZXE

- ▶ 3-stage function
- ▶ Dual-channel version
- ▶ Optionally with 22.5 mm or 30.5 mm installation dimension
- ▶ Suitable, e.g., for installation in the hand-held pendant stations HBL or housing G2 or G3



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Hand-held pendant station HBL

See catalog for hand-held pendant stations.

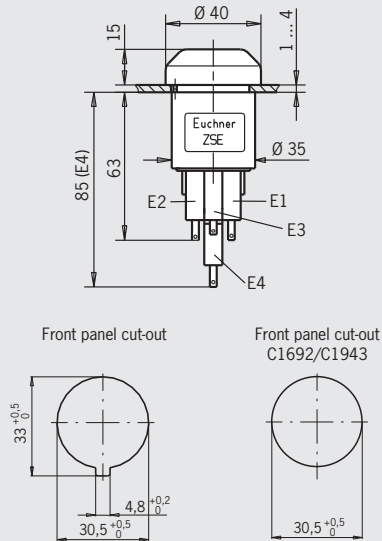
Switching elements (see also page 8)

- ▶ **111** 1 NO + 1 NC ⊕ + 1 NC
- ▶ **121** 1 NO + 2 NC ⊕ + 1 NC
- ▶ **210** 2 NO + 1 NC ⊕
- ▶ **220** 2 NO + 2 NC ⊕
- ▶ **2202** 2 NO/NC ¹⁾

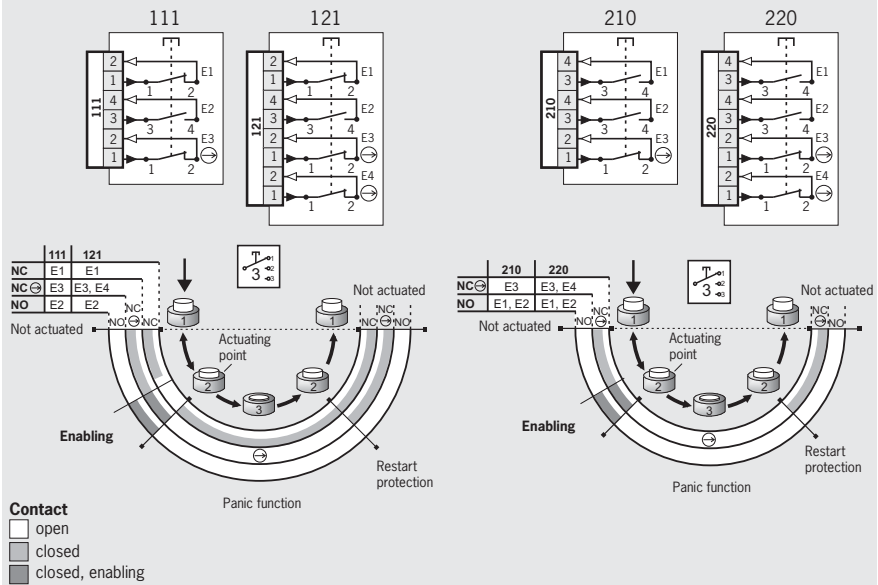
ZSE, 3-stage function

Tab connector

Dimension drawings



Wiring diagrams/function sequence



Ordering table

| Design | Connection | Version | Switching element | | | | |
|----------------------|---------------|--|-------------------------|-------------------------|--|--|-----------------------------|
| | | | 111: 1 NO+1 NC ⊕ +1 NC | 121: 1 NO+2 NC ⊕ +1 NC | 210: 2 NO+1 NC ⊕ | 220: 2 NO+2 NC ⊕ | 2202: 2 NO/NC ¹⁾ |
| Built-in 3-stage ZSE | Tab connector | | 052448 ZSE2-1 | 070782 ZSE2-3 | 052449 ZSE2-2 | 070762 ZSE2-4 | On request |
| | | Suitable, e.g., for hand-held pendant stations HBL | On request | On request | 070752 ²⁾ ZSE2-2C1692 | 083477 ²⁾ ZSE2-4C1943 | On request |

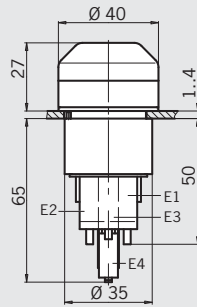
1) From position 1 to position 2 → NO contact; from position 2 to position 3 → NC contact.

2) No BG type examination

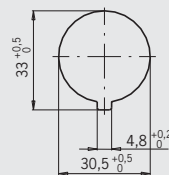
ZSE, 3-stage function

Tab connection, with spacer

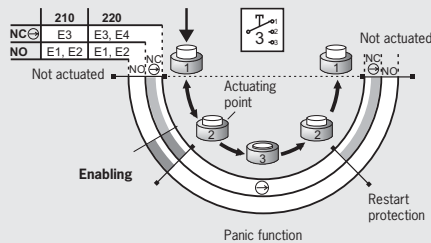
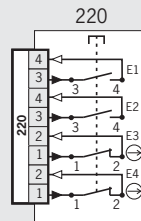
Dimension drawings



Front panel cut-out



Wiring diagrams/function sequence



- Contact**
- open
 - closed
 - closed, enabling

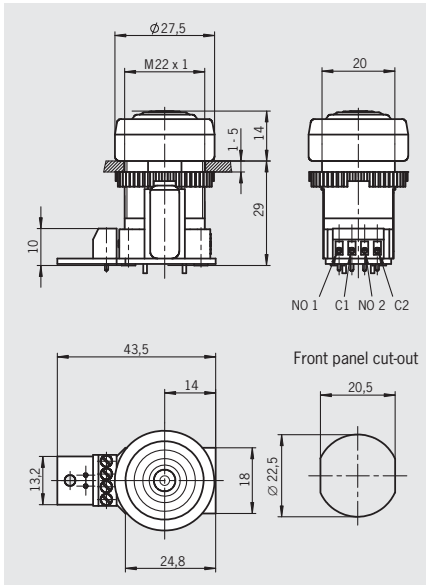
Ordering table

| Design | Connection | Version | Switching element | | | | |
|-----------------------------|----------------------|--|-------------------------------|--------------------------------|--------------------------|------------------------------|-----------------------------|
| | | | 111: 1 NO+1 NC \ominus +1NC | 121: 1 NO+2 NC \ominus +1 NC | 210: 2 NO+1 NC \ominus | 220: 2 NO+2 NC \ominus | 2202: 2 NO/NC ¹⁾ |
| Built-in 3-stage ZSE | Tab connector | With spacer for installation in housing G2 or G3 | On request | On request | On request | 091098 ZSE2-4C1801 | On request |

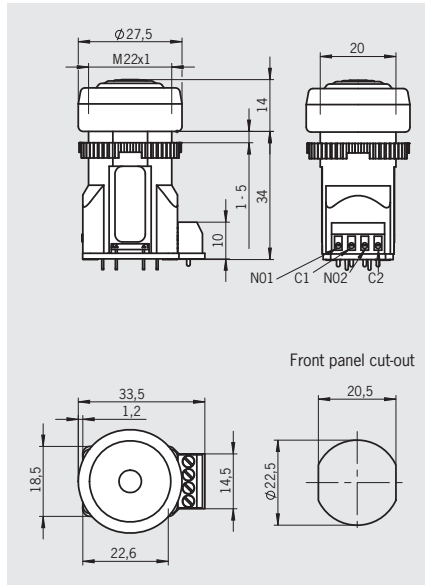
1) From position 1 to position 2 \Rightarrow NO contact; from position 2 to position 3 \Rightarrow NC contact.



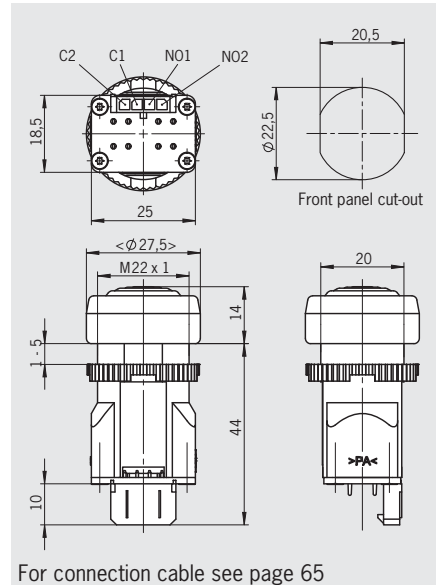
ZXE, 3-stage function Screw terminals



ZXE, 3-stage function Screw terminals, with click sound ¹⁾

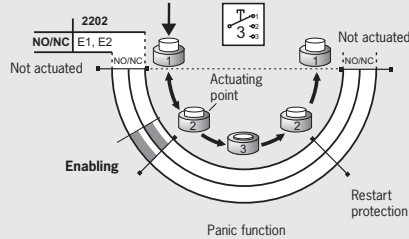
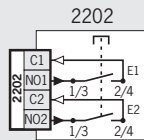


ZXE, 3-stage function Tab connectors, with click sound ¹⁾



For connection cable see page 65

Wiring diagrams/function sequence

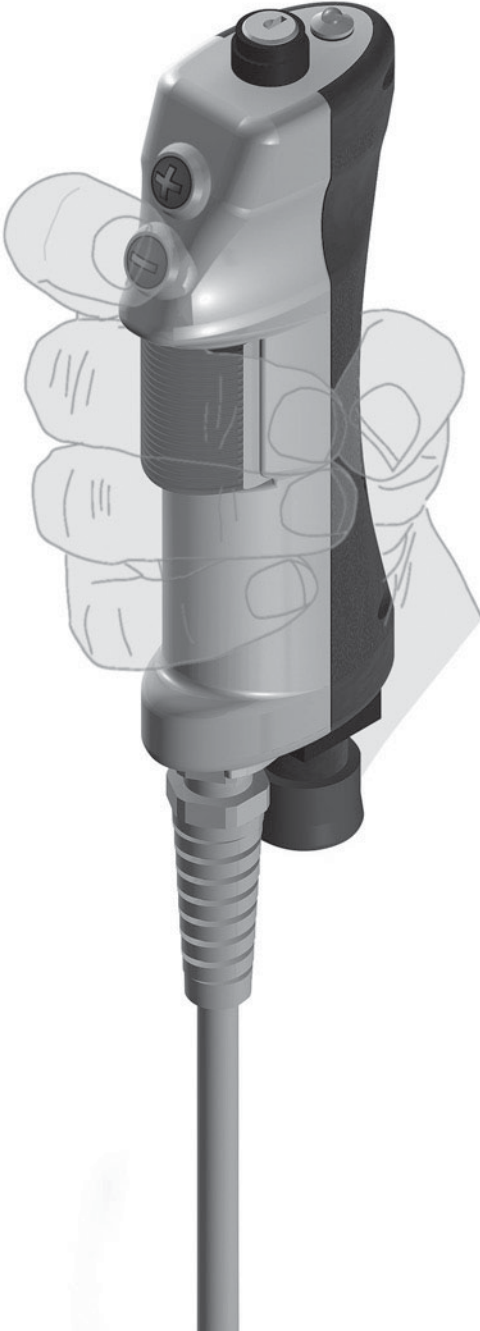


- Contact**
- open
 - closed
 - closed, enabling

Ordering table

| Design | Connection | Version | Switching element |
|----------------------------|-----------------|-------------------------------|-----------------------------|
| | | | 2202: 2 NO/NC ²⁾ |
| Built-in 3-stage ZXE | Screw terminals | Slow-action switching contact | 091336 ZXE-091336 |
| | | Snap-action switching contact | 104833 ZXE-104833 |
| | Tab connectors | Snap-action switching contact | 111276 ZXE-111276 |

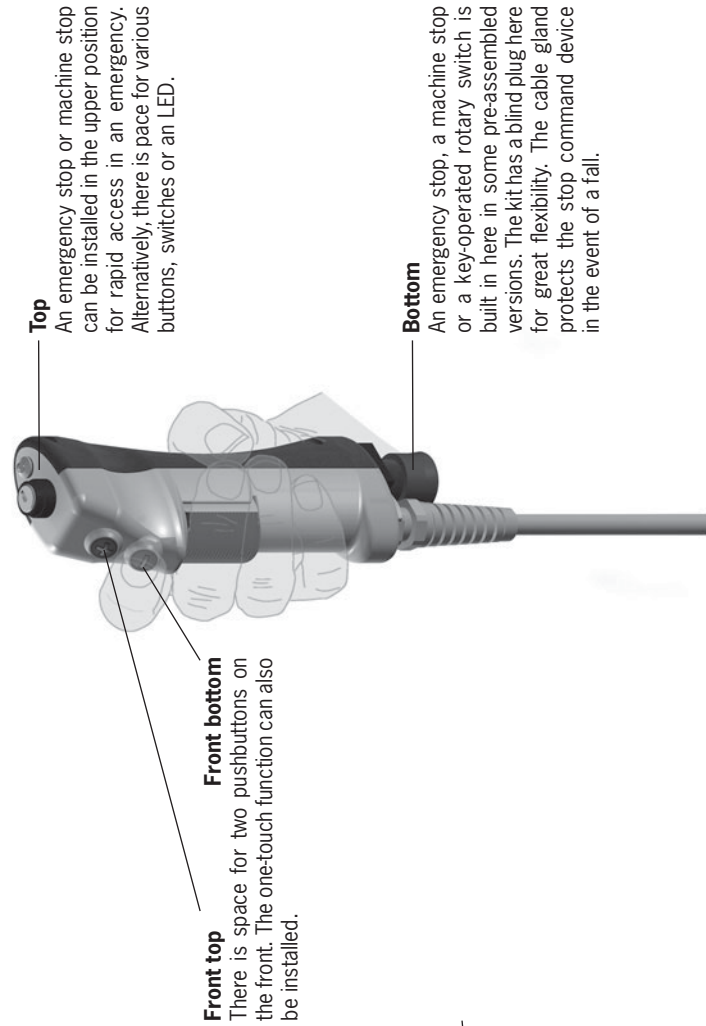
1) With version ZXE-104833 a click sounds during the change from stage 1 to stage 2 and during the return from stage 2 to stage 1.
2) From position 1 to position 2 ⇒ NO contact; from position 2 to position 3 ⇒ NC contact.



Article overview for enabling switch ZSM

| Page | 16 | 16 | 17 | 18 | 18 | 19 | 19 | 20 | 21 | 22 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | |
|----------------------------|-------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Plug connector | - | - | - | - | - | RC17 | HAN Q17 | - | - | - | - | - | RC12 | RC12 | RC12 | RC12 | - | |
| Cable length [m] | Coiled connection cable | - | - | 1.88-5 | - | - | 1.88-5 | 1.4-3.8 | - | 1.88-5 | - | - | 3-9 | 1.88-5 | 1.88-5 | - | - | |
| | Straight connection cable | 5 | 5 | - | 5 | 5 | - | 5 | - | 5 | 5 | - | - | - | 5 | 13 | 10 | |
| Vibration signal | ● | ● | - | ● | ● | - | ● | - | - | ● | ● | ● | ● | ● | - | - | ● | |
| ZS | 3 W | 3 W | 3 W | 2 NO | 2 NO | 2 NO | 2 NO | 3 W | 1 C + 1 NO | 2 NO | 2 NO | 2 NO | 2 NO | 2 NO | 2 NO | 2 NO | 2 NO | |
| Bottom Stop command device | Emergency stop red 2 NC ⊖ | - | - | - | - | ● | - | - | - | - | - | - | - | - | - | - | - | |
| | Machine stop black 2 NC ⊖ | - | - | - | ● | - | ● | - | - | - | - | - | - | - | - | - | - | |
| Key-operated rotary switch | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Front | One-touch function (joystick) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | Bottom pushbutton | white | white | white | ⊖ | ⊖ | ⊖ | ⊖ | - | ⊖ | ⊖ | ⊖ | ⊖ | ⊖ | ⊖ | ⊖ | ⊖ | |
| | Top pushbutton | - | - | - | ⊕ | ⊕ | ⊕ | ⊖ | - | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ | |
| Top Stop command device | Emergency stop red 2 NC ⊖ | - | ● | ● | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | Machine stop black 2 NC ⊖ | ● | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Top | LED indicator | ● | ● | - | ● | ● | ● | - | 2 x ● | ● | ● | ● | ● | ● | - | - | - | |
| | Pushbutton | - | - | - | - | - | ● Reset | - | - | - | - | - | - | - | - | - | - | |
| | Key-operated rotary switch | - | - | - | ● | ● | - | - | - | - | - | - | - | - | - | - | - | |
| | Selector switch | - | - | - | - | - | 3-stage 1 of 3 | - | - | - | - | - | - | - | - | - | - | 4-stage 1 of 4 |
| | Potentiometer | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | Order No./item | 102059 ZSM4201-102059 | 102966 ZSM4204-102966 | 105645 ZSM4204-105645 | 099715 ZSM2101-099715 | 103126 ZSM2101-103126 | 110317 ZSM2301-110317 | 105075 ZSM2301-105075 | 099713 ZSM4200-099713 | 111871 ZSM2300-111871 | 099714 ZSM2100-099714 | 109971 ZSM2300-109971 | 112803 ZSM2300-112803 | 111462 ZSM2300-111462 | 111594 ZSM2100-111594 | 099716 ZSM2300-099716 | 113290 ZSM2300-113290 | 100697 ZSM2200-100697 |

| | | | | | | | | | | | | | | | | |
|---------------------------------|---|-----------------------------------|---|-------|---|-------|---|---|---|---|---------------|------------|-----|---|---------|-----------|
| 106103 ZSM2100-106103 | - | 5-stage Gray code | - | - | ⊕ | ⊖ | - | - | - | - | 2 NO | - | 3 | - | - | 25 |
| 105308 ZSM2200-105308 | - | 12-stage Gray code | - | - | ⊕ | ⊖ | - | - | - | - | 3 NO | - | 5 | - | - | 26 |
| 103462 ZSM3100-103462 | - | 12-stage Gray code | - | - | ⊕ | ⊖ | - | - | - | - | 2 NO + 1 C | 1.88 - 5 | - | - | - | 26 |
| 112033 ZSM2200-112033 | - | 4-stage+ 12-stage Gray code | - | - | ⊕ | ⊖ | - | - | - | - | 2 NO | - | 1.5 | - | RC17 | 27 |
| 105362 ZSM2200-105362 | - | - | ● | - | - | - | - | - | - | - | 2 NO | - | 8 | - | - | 28 |
| 111914 ZSM2200-111914 | ● | - | - | - | - | Black | - | ● | - | - | 2 NO | - | 10 | - | - | 28 |
| 110338 ZSM2300-110338 | - | - | ● | - | ⊕ | ⊖ | - | - | - | - | 2 NO | 1.55 - 3.5 | - | - | RC12 | 29 |
| 106670 ZSM2300-106670 | - | - | ● | Reset | ⊖ | ⊕ | - | - | - | - | 2 NO | 1.25 - 3.1 | - | - | HAN Q17 | 30 |
| 106374 ZSM2300-106374 | - | - | - | Black | - | - | - | ● | - | - | 1 NO + 1 C | - | - | - | RC17 | 30 |



Enabling switch ZSM with upper stop command device



- ▶ 3-stage function
- ▶ Stop command device
- ▶ Vibration signal optional
- ▶ LED indicator optional
- ▶ Pushbutton
- ▶ Coiled connection cable optional

ZSM4201-102059, 3-stage function
Flying lead, machine stop

ZSM4204-102966, 3-stage function
Flying lead, emergency stop device

3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Stop command device

Two-channel emergency stop device (red, with pull-to-reset button) or machine stop (black, with pull-to-reset button) on the switch housing, for different wiring concepts.

Upper position for rapid access in an emergency

Vibration signal

The vibration signal is used for tactile feedback of the enabling position.

LED indicator

The LED indicator is used for visual feedback directly at the enabling switch.

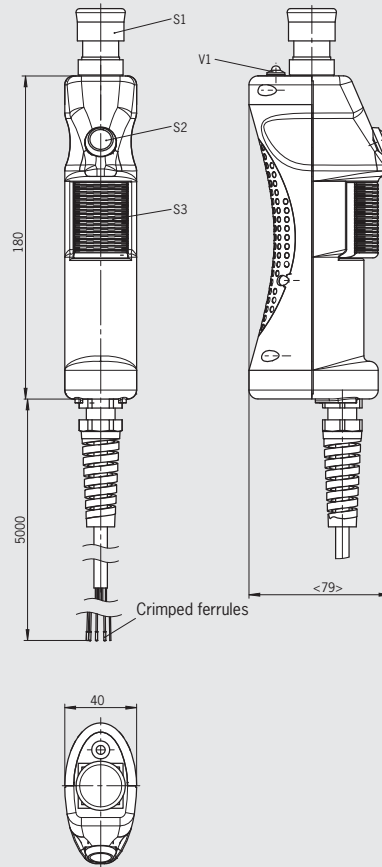
Pushbutton

Additional functions can be run directly at the enabling switch using the buttons.

Cable

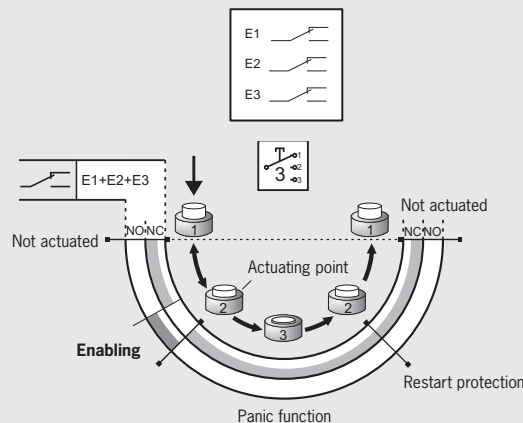
The high-quality connection cables are available in a straight or coiled version.

Dimension drawing



For wiring diagram see page 70

Switching element/function sequence



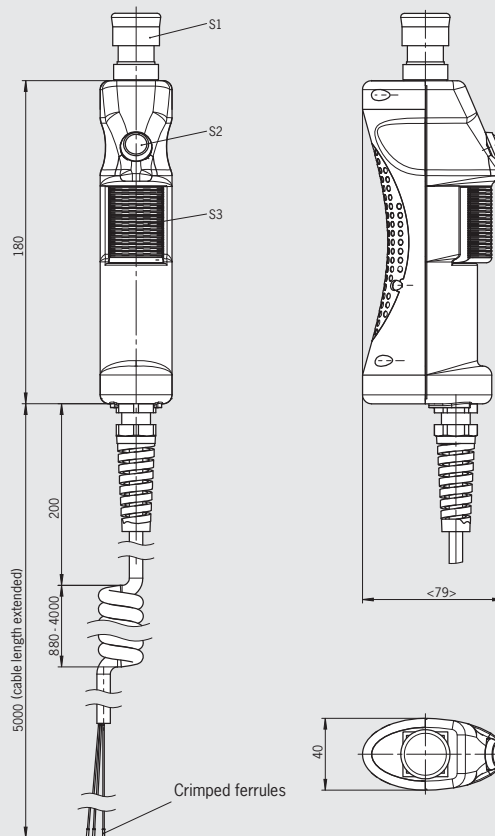
Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|--|-----------------|---|---------------------------------|
| ZSM | Flying lead 23 x 0.14 mm ² | 5 m Straight | Enabling switch with 3 changeover contacts (S3), black machine stop (S1), vibration signal, yellow LED indicator (V1), white pushbutton (S2) | 102059 ZSM4201-102059 |
| | | | Enabling switch with 3 changeover contacts (S3), red emergency stop device (S1), vibration signal, yellow LED indicator (V1), white pushbutton (S2) | 102966 ZSM4204-102966 |



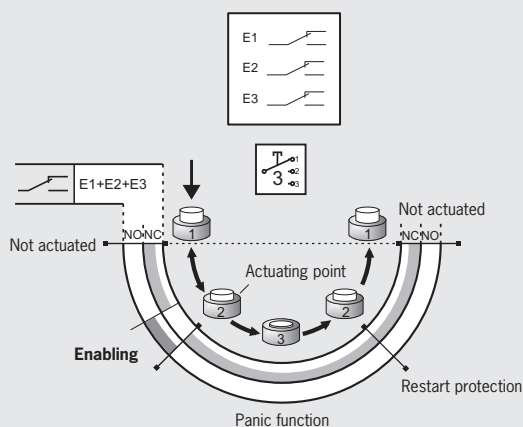
ZSM4204-105645, 3-stage function
Flying lead, emergency stop device

Dimension drawing



For wiring diagram see page 70

Switching element/function sequence



Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|--|------------------------|--|---------------------------------|
| ZSM | Flying lead 23 x 0.14 mm ² | 1.88 ... 5 m coiled | Enabling switch with 3 changeover contacts (S3), red emergency stop device (S1) white pushbutton (S2) | 105645 ZSM4204-105645 |

For technical data see page 71

Enabling switch ZSM with lower stop command device



- ▶ 3-stage function
- ▶ Stop command device
- ▶ Vibration signal optional
- ▶ LED indicator
- ▶ Reset button optional
- ▶ + and – buttons
- ▶ Selector switch optional
- ▶ Key-operated rotary switch optional
- ▶ Coiled connection cable optional
- ▶ Plug connector optional

ZSM2101-099715, 3-stage function
Flying lead, machine stop

ZSM2101-103126, 3-stage function
Flying lead, emergency stop device

3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Stop command device

Two-channel emergency stop device (red, with pull-to-reset button) or machine stop (black, with pull-to-reset button) on the switch housing, for different wiring concepts. Lower position, protected by anti-kink cable gland in case of a fall.

Vibration signal

The vibration signal is used for tactile feedback of the enabling position.

LED indicator

The LED indicator is used for visual feedback directly at the enabling switch.

Reset button

Button for reset function directly from the enabling switch. Laser inscription on the button head: **C** (cancel).

+ and – buttons

These buttons can be configured individually. For example for moving axes in the positive or negative direction.

Selector switch

As required, the adjustable detent positions can, e.g., be used for axis, speed or range selection.

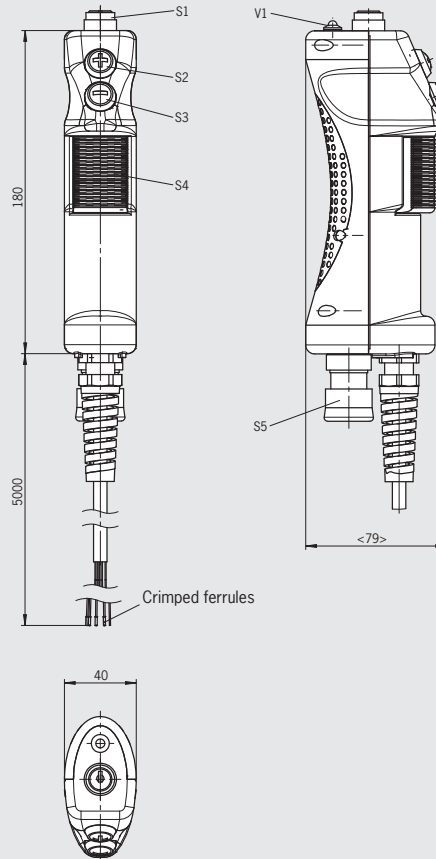
Key-operated rotary switch

For individual use, e.g. as operating mode selector switch.

Cable

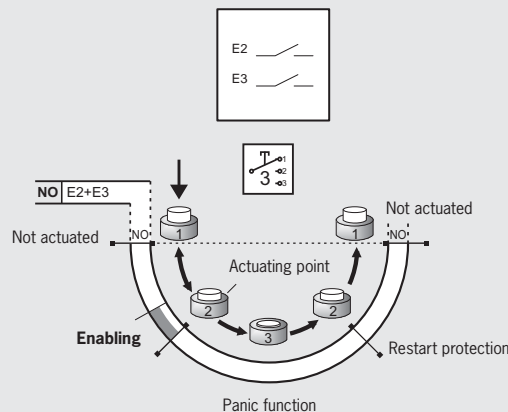
The high-quality connection cables are available in a straight or coiled version.

Dimension drawing



For wiring diagram see page 71

Switching element/function sequence



Ordering table

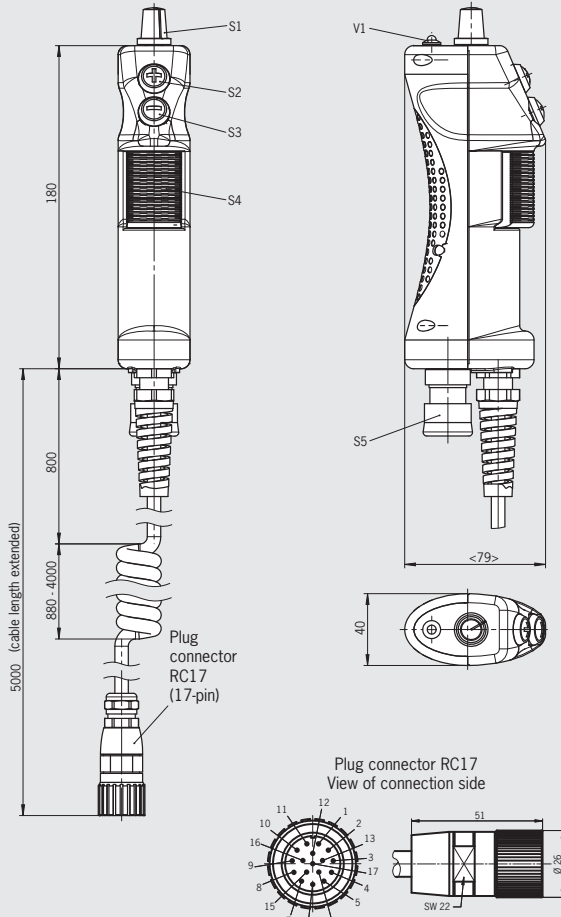
| Design | Connection | Cable length | Version | Order No./item |
|--------|--|-----------------|--|---------------------------------|
| ZSM | Flying lead 23 x 0.14 mm ² | 5 m Straight | Enabling switch with 2 NO contacts (S4), black machine stop (S5), vibration signal, yellow LED indicator (V1), +/- buttons (S2/S3), key-operated rotary switch (S1) | 099715 ZSM2101-099715 |
| | | | Enabling switch with 2 NO contacts (S4), red emergency stop device (S5), vibration signal, yellow LED indicator (V1), +/- buttons (S2/S3), key-operated rotary switch (S1) | 103126 ZSM2101-103126 |



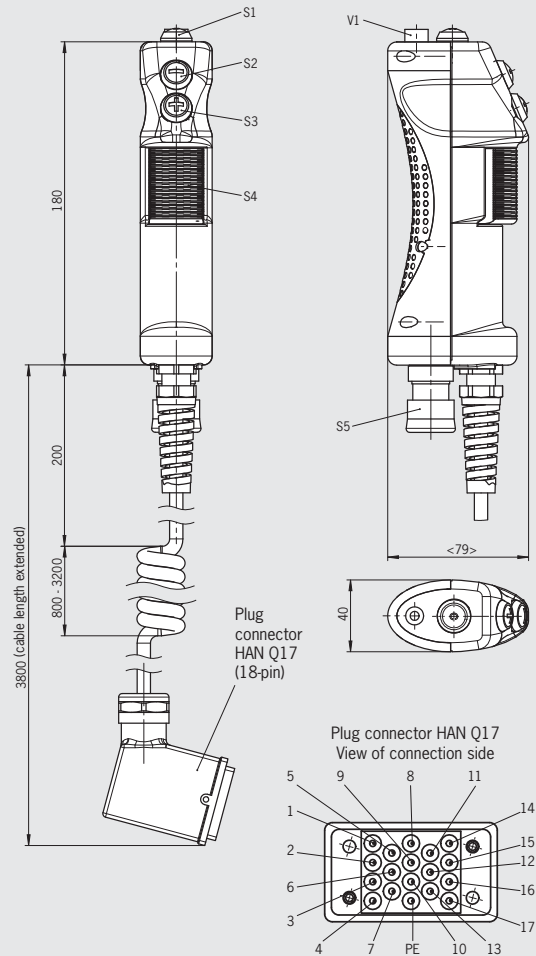
ZSM2301-110317, 3-stage function Plug connector RC17, machine stop

ZSM2301-105075, 3-stage function Plug connector HAN Q17, machine stop

Dimension drawing

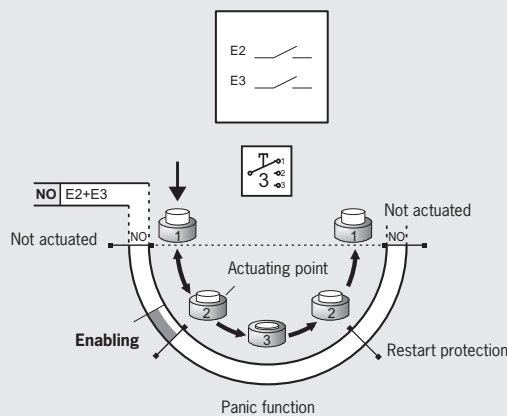


For wiring diagram see page 71
For mating connectors see page 65



For wiring diagram see page 71

Switching element/function sequence



Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|--|-------------------------|--|---------------------------------|
| ZSM | RC17 Plug connector (17-pin) | 1.88 ... 5 m coiled | Enabling switch with 2 NO contacts (S4), black machine stop (S5), yellow LED indicator (V1), +/- buttons (S2/S3), selector switch, 3-stage 1 from 3 (S1) | 110317 ZSM2301-110317 |
| | HAN Q17 Plug connector (18-pin) | 1.4 ... 3.8 m coiled | Enabling switch with 2 NO contacts (S4), black machine stop (S5), vibration signal, red/green LED indicator (V1), buttons +/- (S3/S2), reset button (S1) | 105075 ZSM2301-105075 |

For technical data see page 71

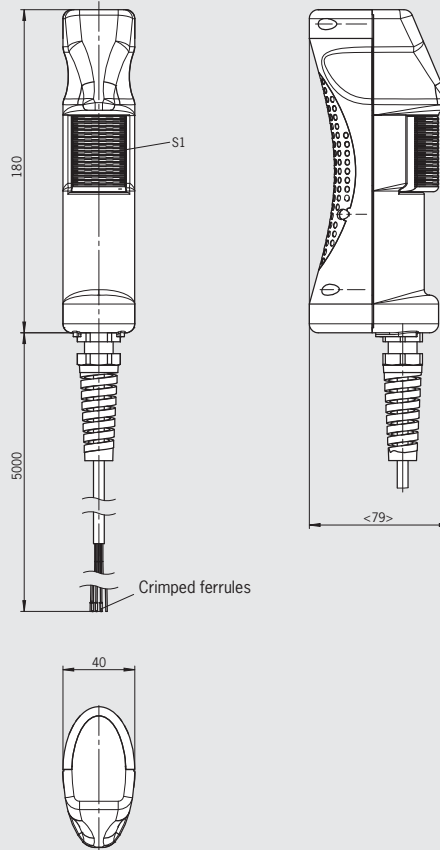


Enabling switch ZSM without stop command device

- ▶ 3-stage function
- ▶ Vibration signal optional
- ▶ LED indicator optional
- ▶ + and - buttons optional
- ▶ Plug connector optional

ZSM4200-099713, 3-stage function Flying lead

Dimension drawing



For wiring diagram see page 72

3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Vibration signal

The vibration signal is used for tactile feedback of the enabling position.

LED indicator

The LED indicator is used for visual feedback directly at the enabling switch.

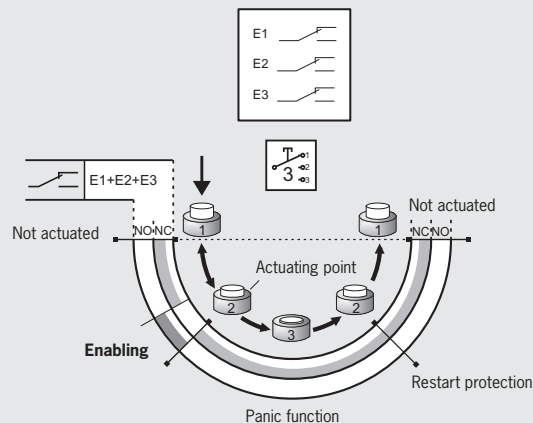
+ and - buttons

These buttons can be configured individually. For example for moving axes in the positive or negative direction.

Cable

The high-quality connection cables are available in a straight or coiled version.

Switching element/function sequence



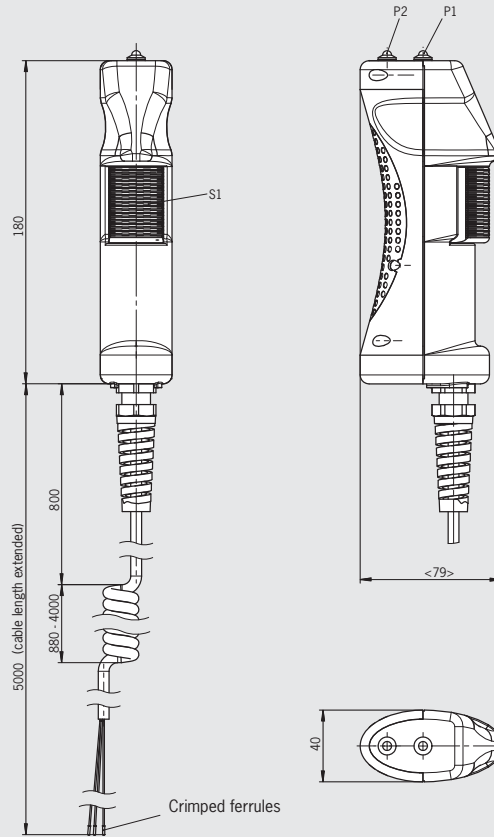
Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|--|-----------------|---|---------------------------------|
| ZSM | Flying lead 12 x 0.14 mm ² | 5 m Straight | Enabling switch with 3 changeover contacts (S1) | 099713 ZSM4200-099713 |



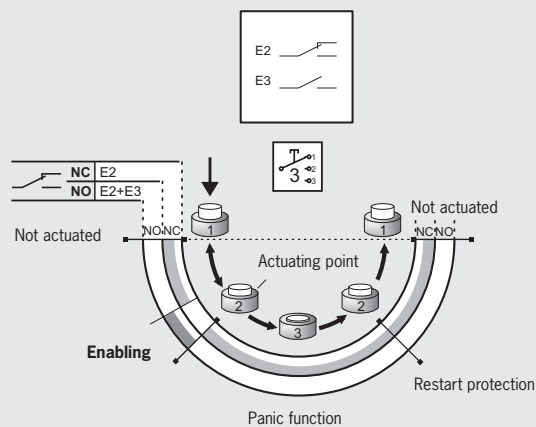
ZSM2300-111871, 3-stage function
Flying lead

Dimension drawing



For wiring diagram see page 72

Switching element/function sequence



Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|--|------------------------|---|---------------------------------|
| ZSM | Flying lead 12 x 0.14 mm ² | 1.88 ... 5 m coiled | Enabling switch with 1 changeover contact and one NO contact (S1), 2 green (P1) and yellow (P2) LED indicators | 111871 ZSM2300-111871 |

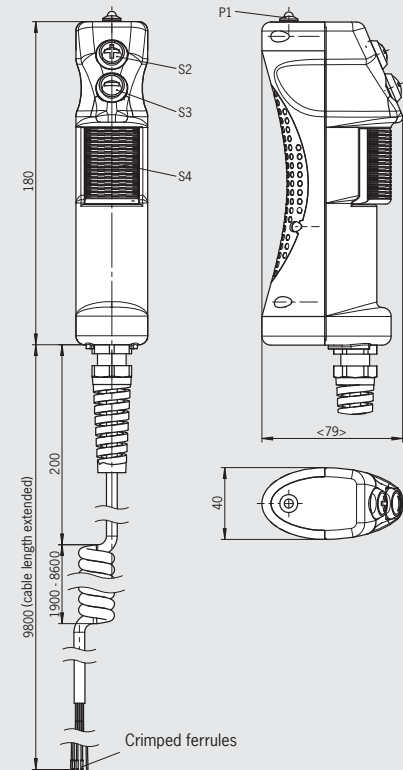


ZSM2100-112803, 3-stage function Flying lead

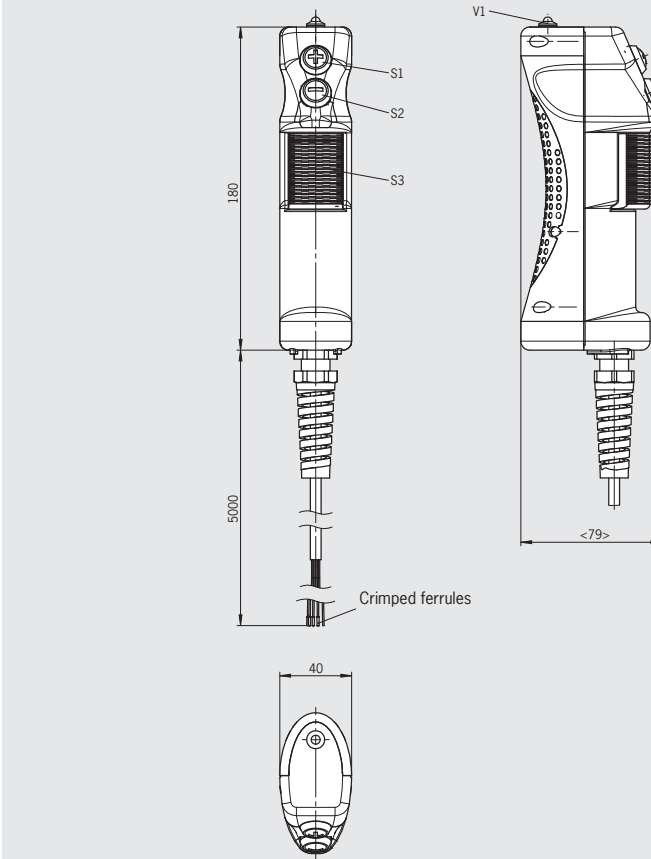
ZSM2100-099714, 3-stage function Flying lead

ZSM2300-109971, 3-stage function Flying lead

Dimension drawing

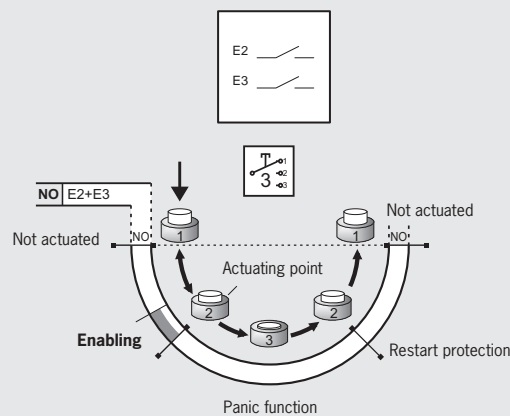


For wiring diagram see page 72



For wiring diagram see page 72

Switching element/function sequence



Ordering table

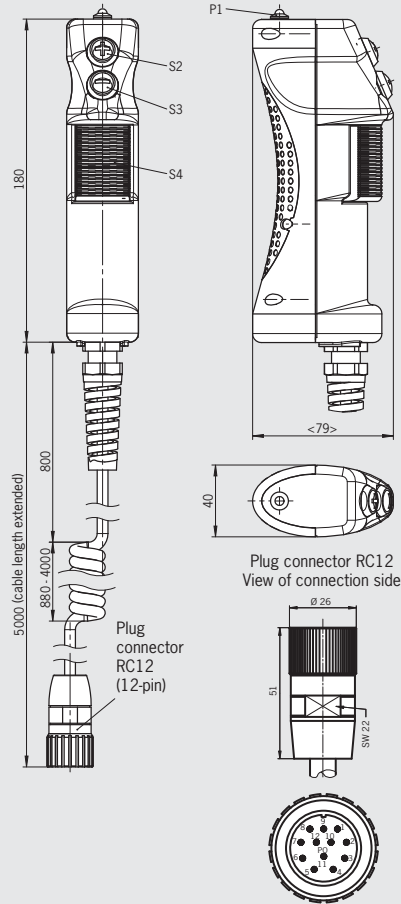
| Design | Connection | Cable length | Version | Order No./item |
|--------|--|---------------------|---|---------------------------------|
| ZSM | Flying lead 12 x 0.14 mm ² | 3 ... 9 m coiled | Enabling switch with 2 NO contacts (S3), vibration signal, yellow LED indicator (V1), buttons +/- (S1/S2), alternative wiring | 112803 ZSM2300-112803 |
| | | 5 m Straight | Enabling switch with 2 NO contacts (S3), vibration signal, yellow LED indicators (V1), buttons +/- (S1/S2) | 099714 ZSM2100-099714 |
| | | | Enabling switch with 2 NO contacts (S3), vibration signal, yellow LED indicator (V1), buttons +/- (S1/S2), alternative wiring | 109971 ZSM2300-109971 |



ZSM2300-111462, 3-stage function
Plug connector RC12

ZSM2100-111594, 3-stage function
Plug connector RC12

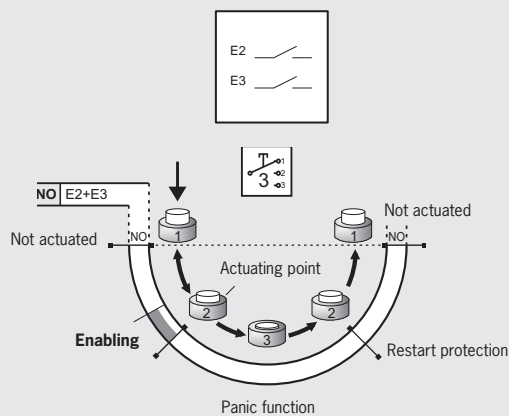
Dimension drawing



For wiring diagram see page 73
For mating connectors see page 65

Please turn over

Switching element/function sequence



Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|------------|---|------------------------|---|---------------------------------|
| ZSM | RC12 Plug connector (12-pin) | 1.88 ... 5 m coiled | Enabling switch with 2 NO contacts (S3), vibration signal, yellow LED indicator (P1), buttons +/- (S1/S2) | 111462 ZSM2300-111462 |
| | | | Enabling switch with 2 NO contacts (S3), vibration signal, yellow LED indicator (P1), buttons +/- (S1/S2), alternative wiring | 111594 ZSM2100-111594 |

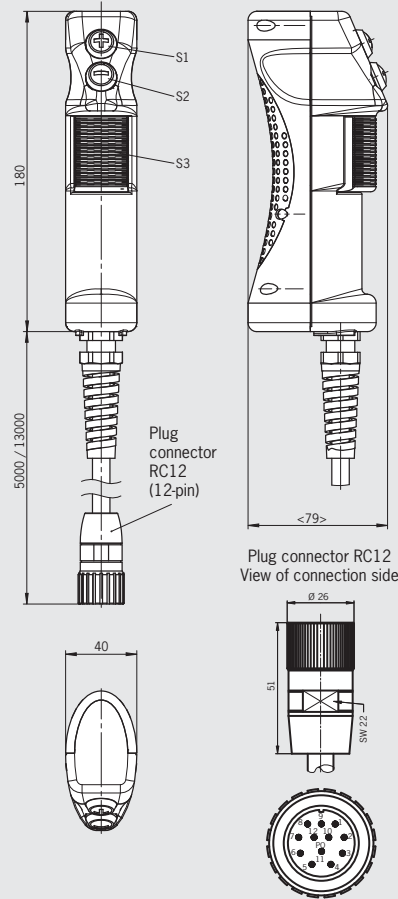
For technical data see page 71



ZSM2300-099716, 3-stage function
Plug connector RC12

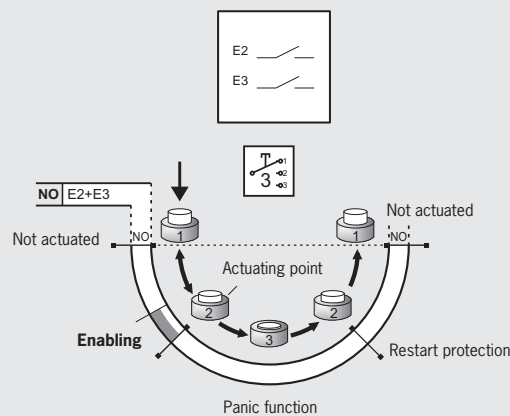
ZSM2300-113290, 3-stage function
Plug connector RC12

Dimension drawing



For wiring diagram see page 73
For mating connectors see page 65

Switching element/function sequence



Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|------------------------------------|------------------|--|---------------------------------|
| ZSM | RC12 Plug connector (12-pin) | 5 m Straight | Enabling switch with 2 NO contacts (S3), buttons +/- (S1/S2) | 099716 ZSM2300-099716 |
| | | 13 m Straight | Enabling switch with 2 NO contacts (S3), buttons +/- (S1/S2) | 113290 ZSM2300-113290 |

Enabling switch ZSM without stop command device



- ▶ 3-stage function
- ▶ Vibration signal optional
- ▶ LED indicator optional
- ▶ + and - buttons
- ▶ Selector switch
- ▶ Coiled connection cable optional

ZSM2200-100697, 3-stage function
Flying lead, selector switch

ZSM2100-106103, 3-stage function
Flying lead, selector switch

3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Vibration signal

The vibration signal is used for tactile feedback of the enabling position.

LED indicator

The LED indicator is used for visual feedback directly at the enabling switch.

+ and - buttons

These buttons can be configured individually. For example for moving axes in the positive or negative direction.

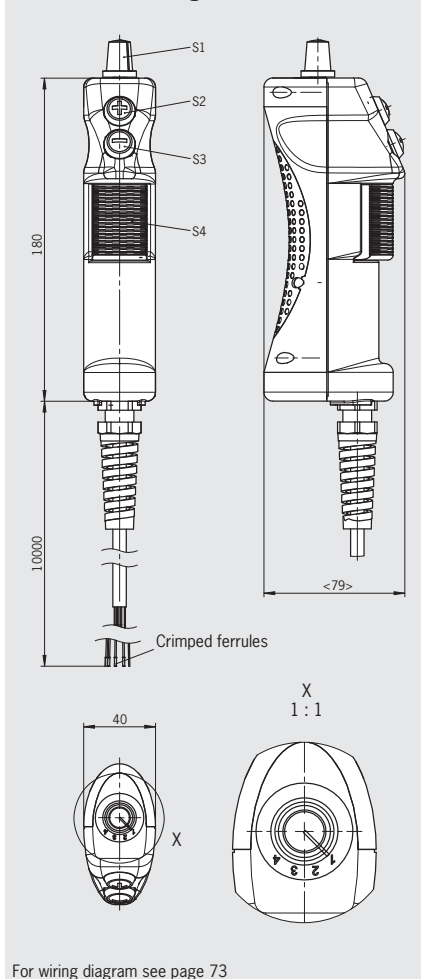
Selector switch

As required, the adjustable detent positions can, e.g., be used for axis, speed or range selection.

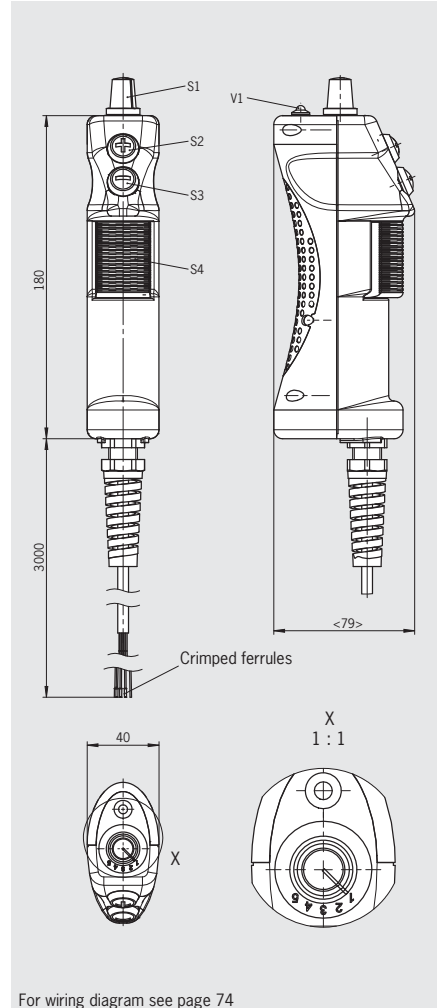
Cable

The high-quality connection cables are available in a straight or coiled version.

Dimension drawing



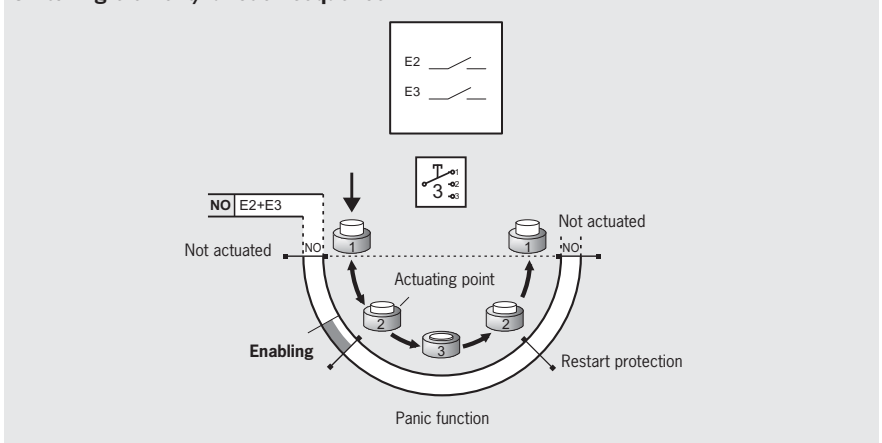
For wiring diagram see page 73



For wiring diagram see page 74

Please turn over

Switching element/function sequence



Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|--|------------------|---|---------------------------------|
| ZSM | Flying lead 23 x 0.14 mm ² | 10 m Straight | Enabling switch with 2 NO contacts (S4), vibration signal, buttons +/- (S2/S3), selector switch 4-stage 1 from 4 (S1) | 100697 ZSM2200-100697 |
| | Flying lead 12 x 0.14 mm ² | 3 m Straight | Enabling switch with 2 NO contacts (S4), yellow LED indicator (V1), buttons +/- (S2/S3), selector switch 5-stage Gray code (S1) | 106103 ZSM2100-106103 |

For technical data see page 71



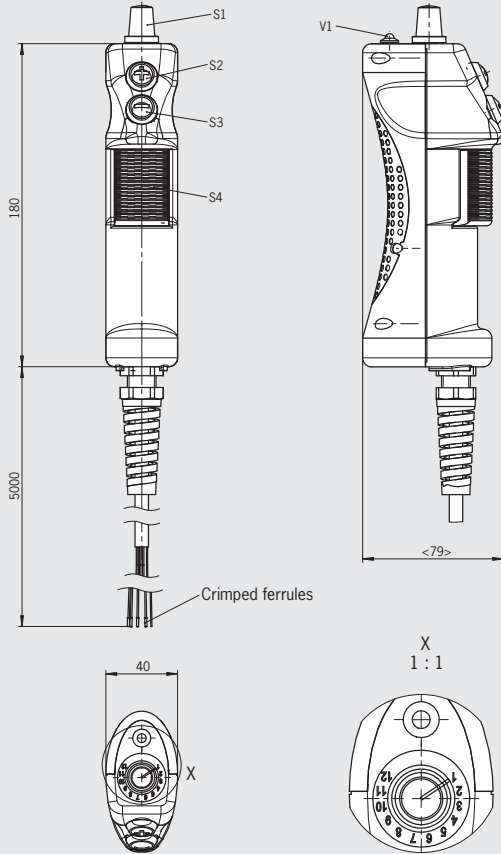
ZSM2200-105308, 3-stage function

Flying lead, selector switch

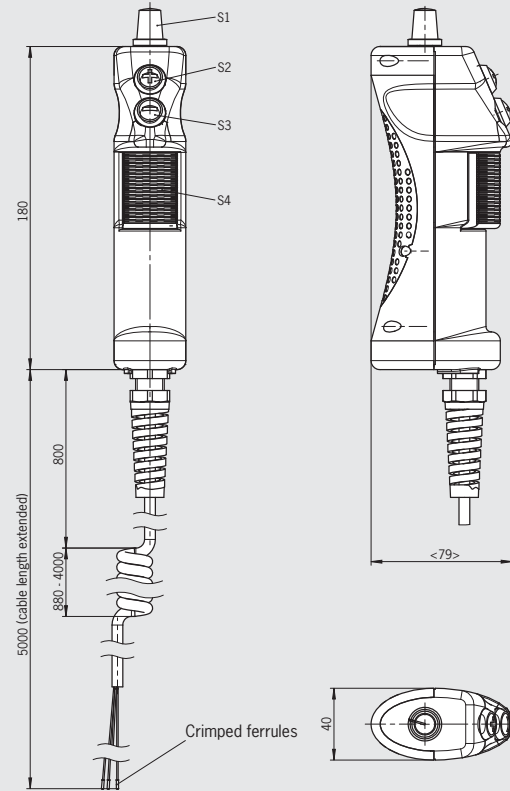
ZSM3100-103462, 3-stage function

Flying lead, selector switch

Dimension drawing

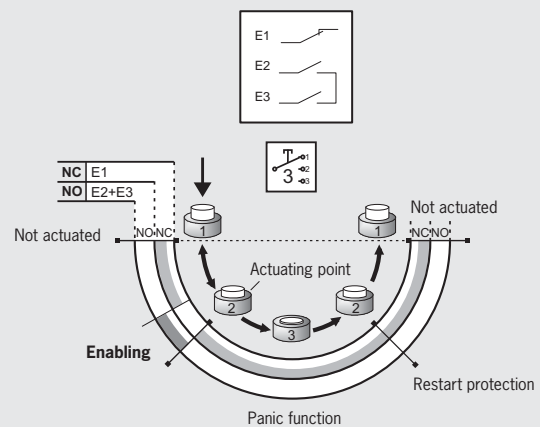
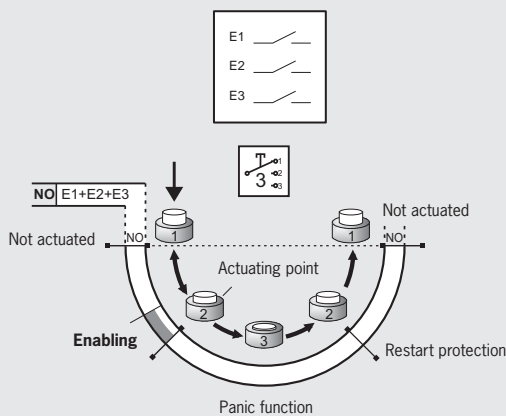


For wiring diagram see page 74



For wiring diagram see page 74

Switching element/function sequence



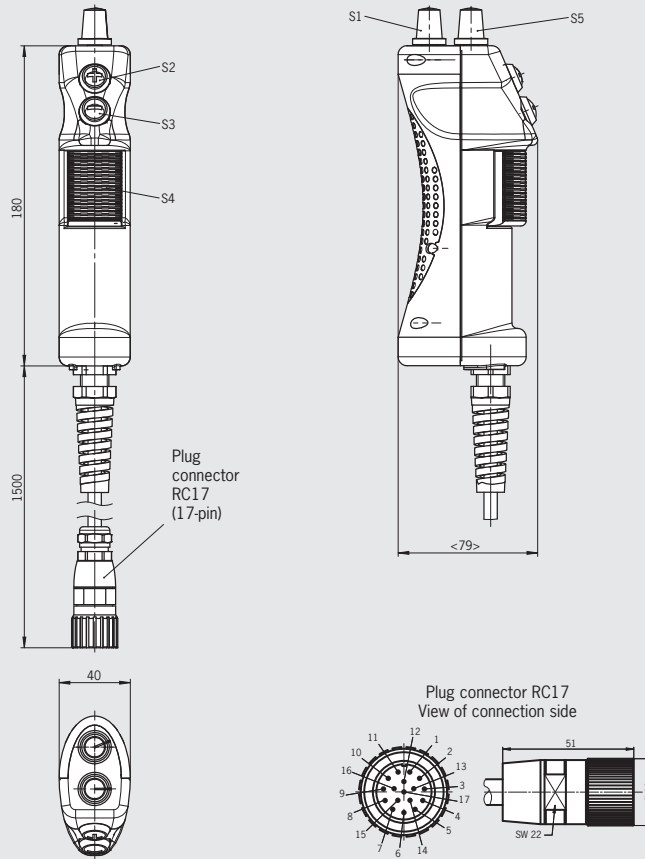
Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|--|------------------------|--|---------------------------------|
| ZSM | Flying lead 23 x 0.14 mm ² | 5 m Straight | Enabling switch with 3 NO contacts (S4), yellow LED indicator (V1), buttons +/- (S2/S3), selector switch 12-stage Gray code (S1) | 105308 ZSM2200-105308 |
| | Flying lead 12 x 0.14 mm ² | 1.88 ... 5 m coiled | Enabling switch with 1 NC contact and 2 NO contacts (S4), buttons +/- (S2/S3), selector switch 12-stage Gray code (S1) | 103462 ZSM3100-103462 |



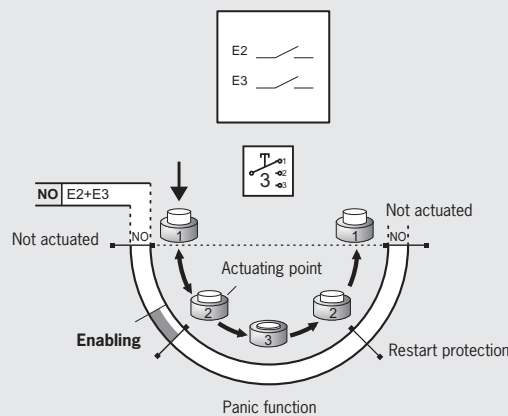
ZSM2200-112033, 3-stage function
 Plug connector RC17, 2-stage switch

Dimension drawing



For wiring diagram see page 74
 For mating connectors see page 65

Switching element/function sequence



Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|------------------------------------|-------------------|---|---------------------------------|
| ZSM | RC17 Plug connector (17-pin) | 1.5 m Straight | Enabling switch with 2 NO contacts (S4), vibration signal, buttons +/- (S2/S3), selector switch 4-stage Gray code (S1), selector switch 12-stage Gray code (S5) | 112033 ZSM2200-112033 |

For technical data see page 71

Enabling switch ZSM without stop command device



- ▶ 3-stage function
- ▶ Vibration signal optional
- ▶ LED indicator optional
- ▶ Reset button optional
- ▶ + and – buttons optional
- ▶ Pushbutton optional
- ▶ Key-operated rotary switch optional
- ▶ Mini joystick optional
- ▶ Coiled connection cable optional
- ▶ Plug connector optional

3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Vibration signal

The vibration signal is used for tactile feedback of the enabling position.

LED indicator

The LED indicator is used for visual feedback directly at the enabling switch.

Reset button

Button for reset function directly from the enabling switch. Laser inscription on the button head: **C** (cancel).

+ and – buttons

These buttons can be configured individually. For example for moving axes in the positive or negative direction.

Pushbutton

Additional functions can be run directly at the enabling switch using the buttons.

Key-operated rotary switch

For individual use, e.g. as operating mode selector switch.

Rotary potentiometer

For individual use, e.g. for adjusting the speed.

One-touch function (joystick)

The four contacts are connected to a common pin. This permits a one-touch function irrespective of the actuating direction.

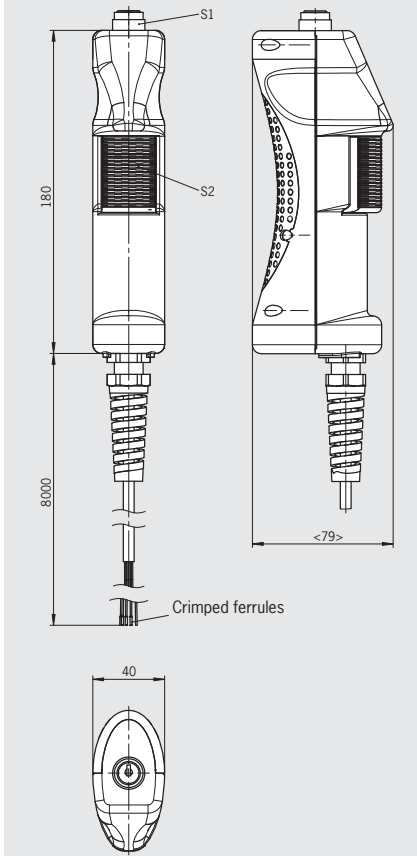
Cable

The high-quality connection cables are available in a straight or coiled version.

ZSM2200-105362, 3-stage function

Flying lead, key-operated rotary switch

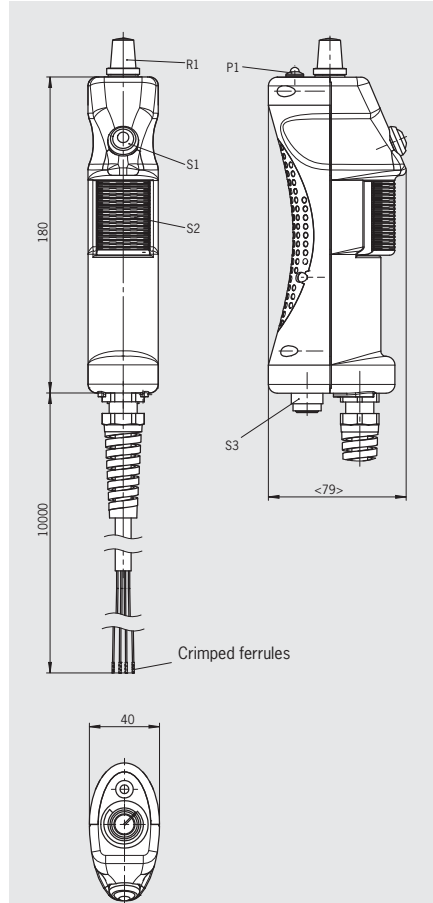
Dimension drawing



For wiring diagram see page 75

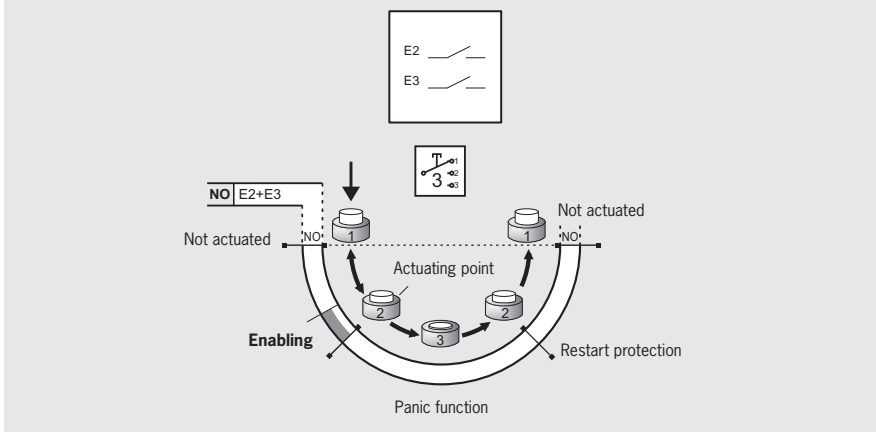
ZSM2200-111914, 3-stage function

Flying lead, key-operated rotary switch, potentiometer



For wiring diagram see page 75

Switching element/function sequence



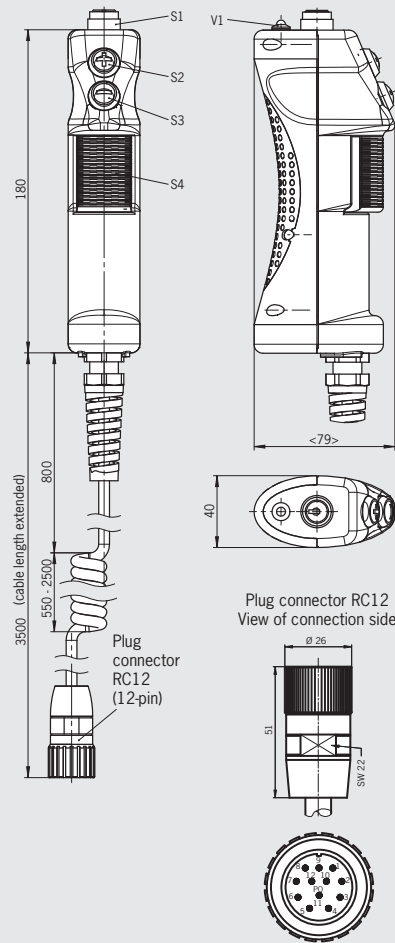
Ordering table

| Design | Connection | Cable length | Version | Order No./item |
|--------|--|------------------|--|---------------------------------|
| ZSM | Flying lead 12 x 0.14 mm ² | 8 m Straight | Enabling switch with 2 NO contacts (S2), vibration signal, key-operated rotary switch (S1) | 105362 ZSM2200-105362 |
| | RC12 Plug connector (12-pin) | 10 m Straight | Enabling switch with 2 NO contacts (S4), rotary potentiometer 4.7 kΩ (R1), yellow LED indicator (P1), black pushbutton (S1), key-operated rotary switch (S3) | 111914 ZSM2200-111914 |



ZSM2300-110338, 3-stage function
 Plug connector RC12, key operated switch

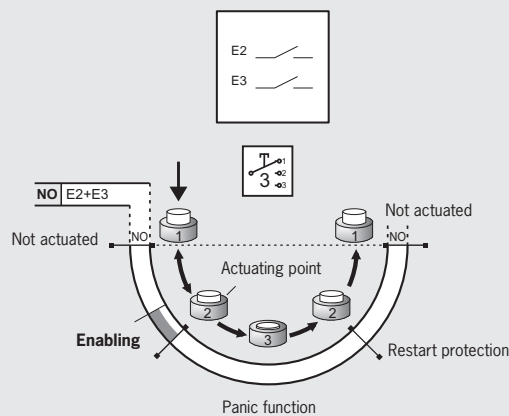
Dimension drawing



For wiring diagram see page 75
 For mating connectors see page 65

Please turn over

Switching element/function sequence



Ordering table

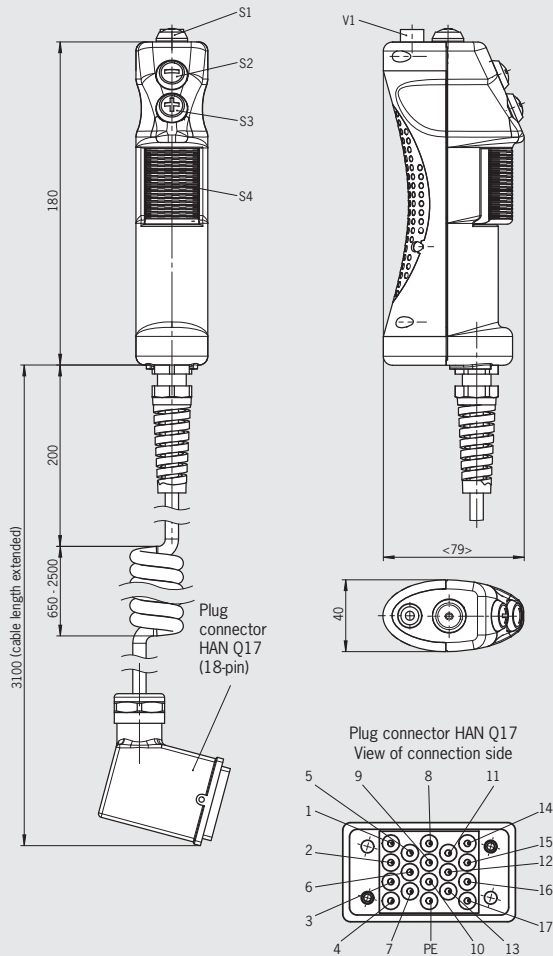
| Design | Connection | Cable length | Version | Order No./item |
|--------|------------------------------------|--------------------------|---|---------------------------------|
| ZSM | RC12 Plug connector (12-pin) | 1.55 ... 3.5 m coiled | Enabling switch with 2 NO contacts (S4), yellow LED indicator (V1), buttons +/- (S2/S3), key-operated rotary switch (S1) | 110338 ZSM2300-110338 |

For technical data see page 71



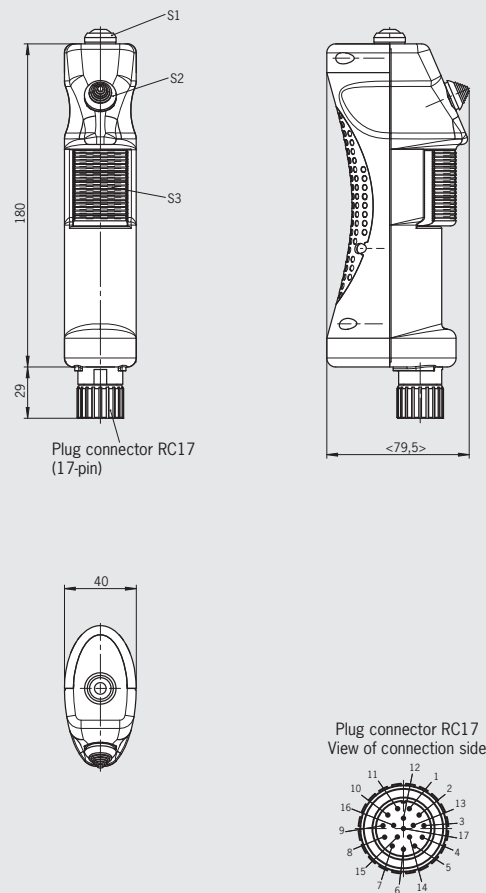
ZSM2300-106670, 3-stage function Plug connector HAN Q17, reset button

Dimension drawing



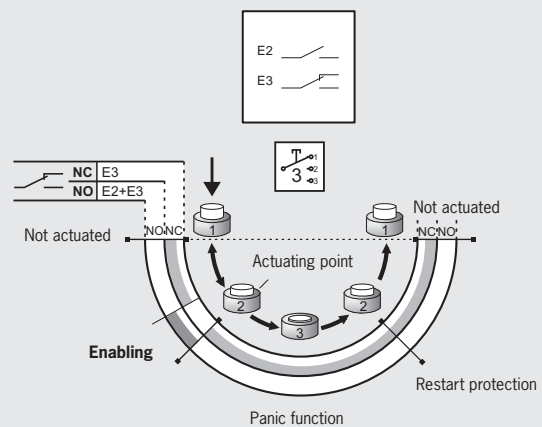
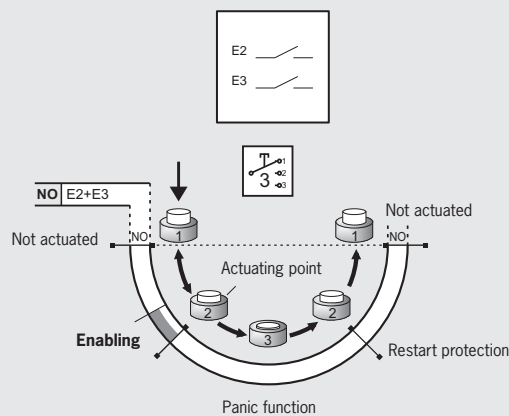
For wiring diagram see page 75

ZSM2300-106374, 3-stage function Plug connector RC17, one-touch function (joystick)



For wiring diagram see page 76
For mating connectors see page 65
For connection cable see page 67

Switching element/function sequence

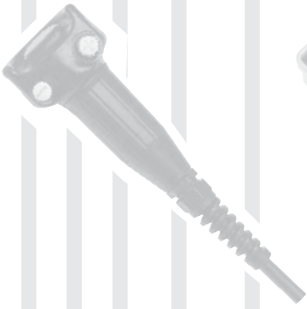


Ordering table

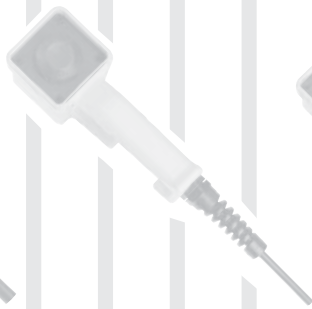
| Design | Connection | Cable lengths | Version | Order No./item |
|--------|---------------------------------------|--------------------------|--|---------------------------------|
| ZSM | HAN Q17 Plug connector (18-pin) | 1.25 ... 3.1 m coiled | Enabling switch with 2 NO contacts (S4), vibration signal, yellow LED indicator (V1), buttons +/- (S3/S2), reset-button (S1) | 106670 ZSM2300-106670 |
| | RC17 Plug connector (17-pin) | without cable | Enabling switch with 1 NO contact and 1 changeover contact (S3), one-touch function (S2), black pushbutton (S1) | 106374 ZSM2300-106374 |

Selection table for enabling switches ZSA, ZSB and ZSR

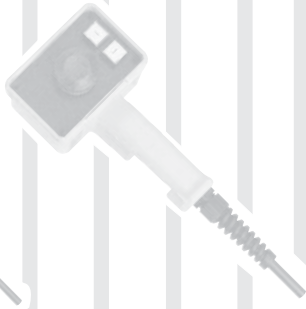
| Design | | | | | | | | | | | | |
|---------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| G1 | Housing G1 (black) | | | | | | | | | | | |
| G2 | Housing G2 (yellow) | | | | | | | | | | | |
| G3 | Housing G3 (yellow) | | | | | | | | | | | |
| Function | | | | | | | | | | | | |
| 3 | 3-stage (OFF - enabling - OFF) | | | | | | | | | | | |
| Connection | | | | | | | | | | | | |
| c | Tab connector, screw terminal, flying lead | | | | | | | | | | | |
| SS4 | Plug connector 3-pin + PE | | | | | | | | | | | |
| SVM5 | Plug connector M12 5-pin | | | | | | | | | | | |
| C16 | Plug connector 6-pin + PE | | | | | | | | | | | |
| HAN10 | Plug connector 10-pin + PE | | | | | | | | | | | |
| RC12 | Plug connector 11-pin + PE | | | | | | | | | | | |
| BS12 | Plug connector 12-pin | | | | | | | | | | | |
| RC17 | Plug connector 17-pin | | | | | | | | | | | |
| UT23 | Plug connector 23-pin | | | | | | | | | | | |
| Additional elements | | | | | | | | | | | | |
| Z | Additional elements, e.g. buttons, LEDs, key-operated rotary switches, selector switches, etc. | | | | | | | | | | | |



**Enabling switch ZSB
Housing G1**



**Enabling switch ZSR
Housing G2**



**Enabling switch ZSB
Housing G3**

| | | | Stages | Connection | | | | | | | | | | Z | Page |
|----|----|----|--------|------------|-----|------|-----|-------|------|------|------|------|---|---------|------|
| G1 | G2 | G3 | 3 | c | SS4 | SVM5 | C16 | HAN10 | RC12 | BS12 | RC17 | UT23 | | | |
| ● | | | ● | ● | | | | | | | | | | 32 - 34 | |
| ● | | | ● | | ● | ● | | | | | | | | 35 | |
| ● | | | ● | | | | ● | ● | ● | | | | | 36 | |
| ● | | | ● | | | | | | | | | ● | | 37 | |
| ● | | | ● | | | | | | ● | | ● | | | 38 | |
| ● | | | ● | ● | | | | | | | | | ● | 39 | |
| ● | | | ● | | | | | | ● | ● | ● | | ● | 40 | |
| | ● | | ● | ● | | | | | | | | | | 41/42 | |
| | | ● | ● | ● | | | | | | | | | ● | 43 | |
| | | ● | ● | ● | | | | | ● | | | | ● | 44 | |
| | | ● | ● | ● | | | | | | | | | ● | 45 | |
| | | ● | ● | ● | | | | | | | ● | | ● | 46/47 | |



Enabling switch ZSA

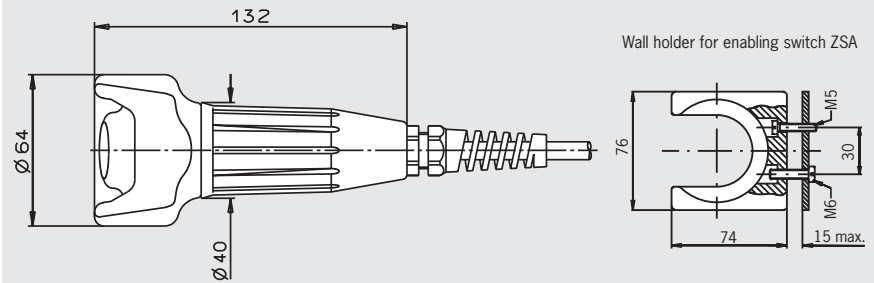
- ▶ Housing G1
- ▶ 3-stage function
- ▶ Single or dual-channel version
- ▶ Connection cable straight or coiled
- ▶ Wall holder optional



ZSA, 3-stage function

Flying lead

Dimension drawings



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

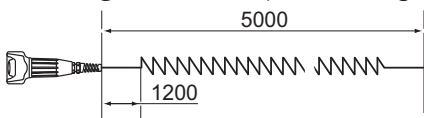
Cable

The high-quality connection cables (individual screening of the safety contacts) are available straight or coiled.

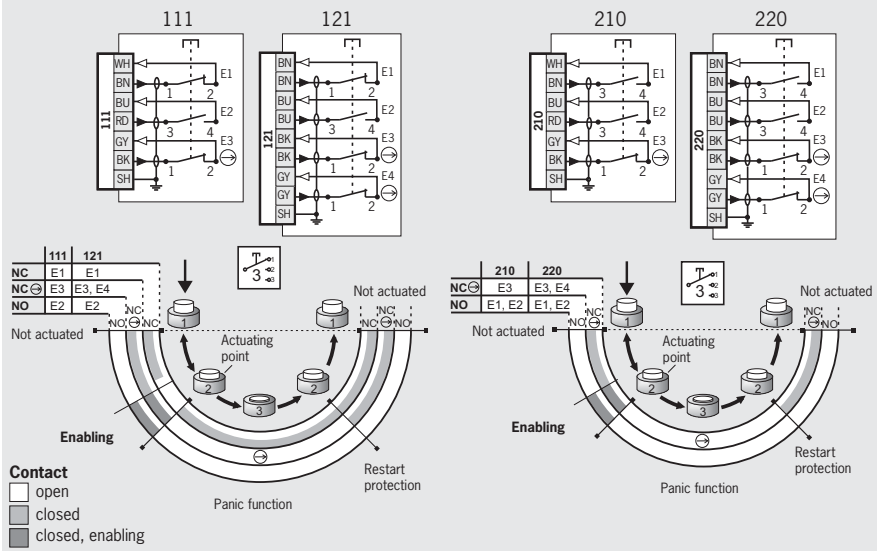
Switching elements (see also page 8)

- ▶ **111** 1 NO + 1 NC ⊕ + 1 NC
- ▶ **121** 1 NO + 2 NC ⊕ + 1 NC
- ▶ **210** 2 NO + 1 NC ⊕
- ▶ **220** 2 NO + 2 NC ⊕

Cable lengths (coiled cable pulled out straight)



Wiring diagrams/function sequence



Ordering table

| Design | Connection/ cross-section | Cable length | Version | Switching element | | | |
|---------------|---|----------------|---|----------------------------------|-----------------------------|----------------------------------|-----------------------------|
| | | | | 111: 1 NO + 1 NC ⊕ + 1 NC | 121: 1 NO + 2 NC ⊕ + 1 NC | 210: 2 NO + 1 NC ⊕ | 220: 2 NO + 2 NC ⊕ |
| G1 3-stage | Flying lead 6 x 0.34 mm ² | 1.5 m straight | incl. wall holder | 057089 ZSA2A1L15AC1689 | - | On request | - |
| | | 2 m straight | | - | - | 099371 ZSA2A2G02A | - |
| | | 2.5 m straight | incl. wall holder | 072728 ZSA2A1L25AC1689 | - | On request | - |
| | | 5 m straight | | 055402 ZSA2A1G05A | - | 055406 ZSA2A2G05A | - |
| | | 5 m coiled | | 055404 ZSA2A1S05A | - | 055408 ZSA2A2S05A | - |
| | | 10 m straight | | 055403 ZSA2A1G10A | - | 055407 ZSA2A2G10A | - |
| | | 15 m straight | | On request | - | 057007 ZSA2A2G15A | - |
| | | 20 m straight | | On request | - | 075807 ZSA2A2G20A | - |
| | | 25 m straight | | On request | - | 078939 ZSA2A2G25A | - |
| | | G1 3-stage | Flying lead 8 x 0.34 mm ² | 2.5 m straight | incl. wall holder | - | On request |
| 5 m straight | | | | - | 070784 ZSA2A3G05A | - | 070764 ZSA2A4G05A |
| 5 m coiled | | | | - | 070786 ZSA2A3S05A | 057010 ZSA2A2S05AC1643 | 070766 ZSA2A4S05A |
| 10 m straight | | | | - | 070785 ZSA2A3G10A | - | 070765 ZSA2A4G10A |
| 20 m straight | | | | - | On request | - | 073300 ZSA2A4G20A |



Enabling switch ZSA

- ▶ Housing G1
- ▶ 3-stage function
- ▶ Single or dual-channel version
- ▶ Connection cable straight or coiled
- ▶ Plug connector optional
- ▶ Direct connection to safety switch optional
- ▶ Wall holder optional
- ▶ Increased actuating force optional



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence)

Cable

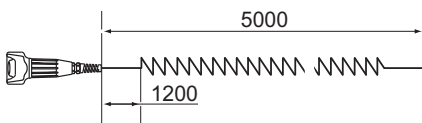
The high-quality connection cables (individual screening of the safety contacts) are available straight or coiled.

Suitable for direct connection to safety switch
This enabling switch can be connected directly to a safety switch (TZ...C1662) (see catalog for safety switches with metal housing).

Switching elements (see also page 8)

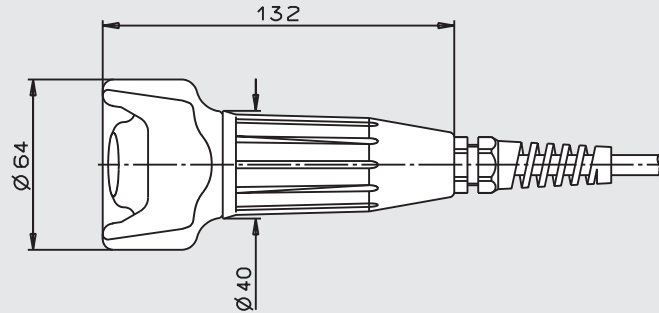
- ▶ **1110** 1 NO/NC ¹⁾
- ▶ **1210** 1 NO/NC ¹⁾ + 1 NO
- ▶ **2210** 1 NO/NC ¹⁾
- 1 NO (additional monitoring contact)
- ▶ **2220** 2 NO/NC ¹⁾

Cable lengths (coiled cable pulled out straight)

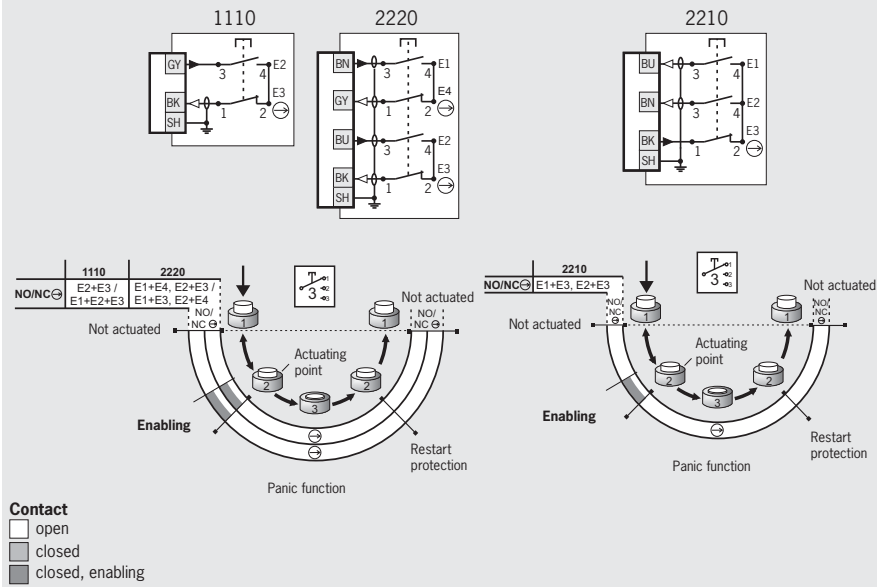


ZSA, 3-stage function Flying lead

Dimension drawings



Wiring diagrams/function sequence



Ordering table

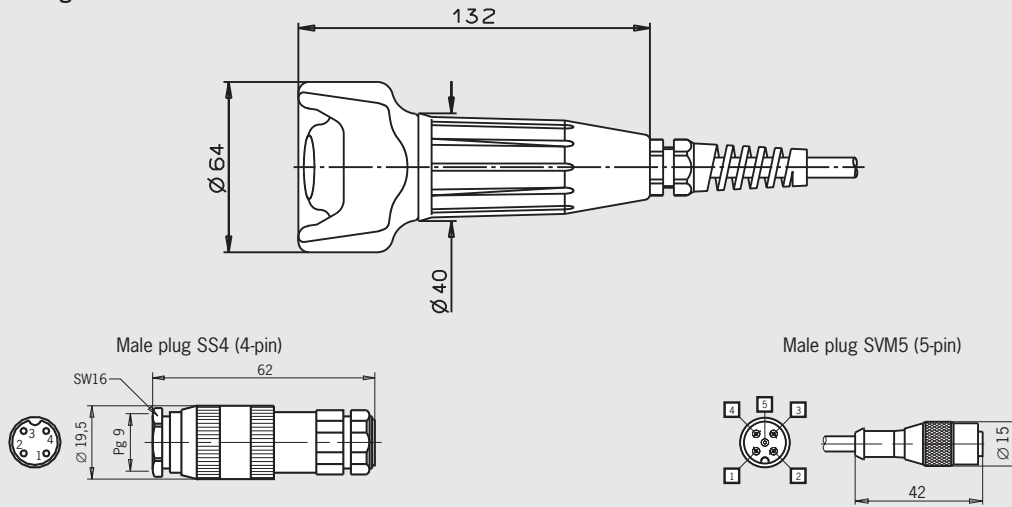
| Design | Connection/ cross-section | Cable length | Version | Switching element | | |
|---------------|---|---------------|---------------------------|-----------------------------|------------------------------------|-----------------------------|
| | | | | 1110: 1 NO/NC ¹⁾ | 2210: 1 NO/NC ¹⁾ + 1 NO | 2220: 2 NO/NC ¹⁾ |
| G1 3-stage | Flying lead 8 x 0.34 mm ² | 5 m straight | | On request | On request | 072961 ZSA2B4G05A |
| | | 5 m coiled | | On request | On request | 085118 ZSA2B4S05A |
| | | 10 m straight | Increased actuating force | - | On request | On request |
| | Flying lead 3 x 0.75 mm ² | 5 m straight | | On request | 055410 ZSA2B2G05A | - |
| | | 10 m straight | | On request | 055411 ZSA2B2G10A | - |

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.



ZSA, 3-stage function Plug connectors

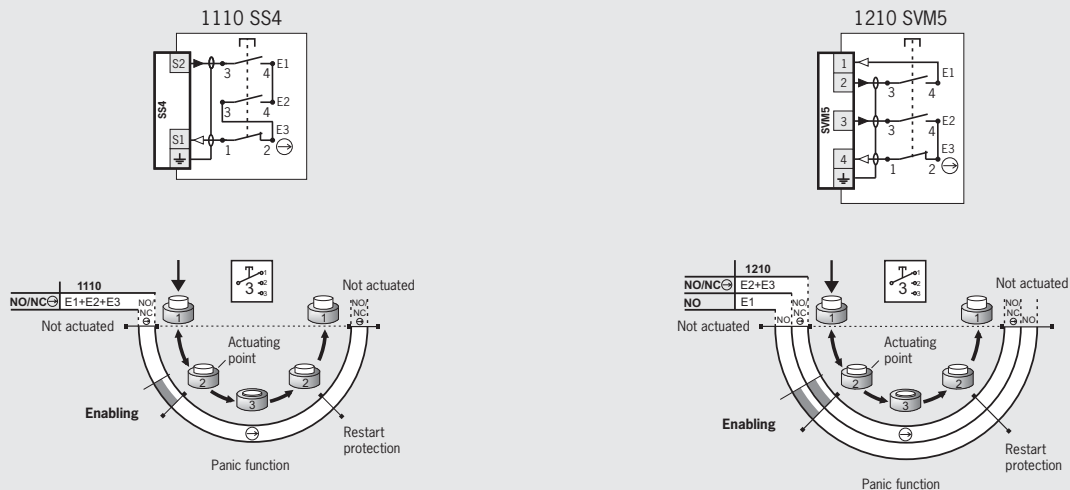
Dimension drawings



For mating connectors see page 64

View of connection side

Wiring diagrams/function sequence



Contact
 open
 closed
 closed, enabling

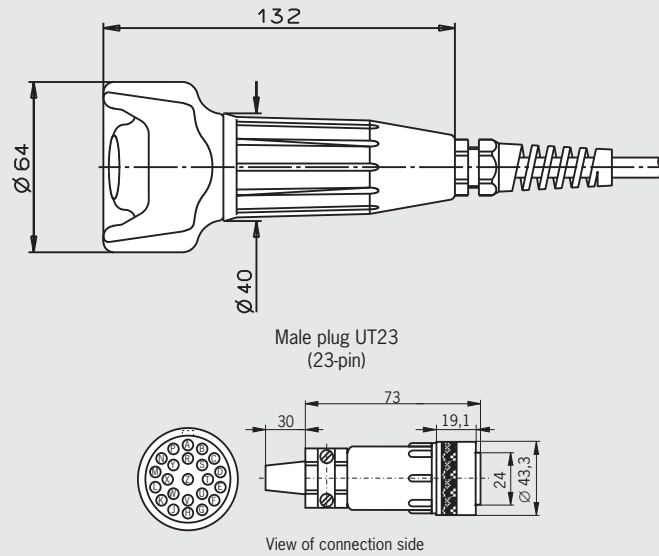
Ordering table

| Design | Connection | Cable length | Version | Switching element | |
|---------------|------------------------------------|---------------|--|-----------------------------------|----------------------------------|
| | | | | 1110: 1 NO/NC \ominus 1) | 1210: 1 NO/NC \ominus 1) +1 NO |
| G1 3-stage | SS4 Plug connectors (4-pin) | 5 m straight | Direct connection to TZ...C1662 with plug BD4 | 057097 ZSA2B2G05B-C1662 | - |
| | | 10 m straight | Direct connection to TZ...C1662 with plug BD4 | - | - |
| | SVM5 Plug connectors (5-pin) | 15 m straight | | On request | 072870 ZSA2B2G15CC1926 |
| | | 25 m straight | | On request | - |

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

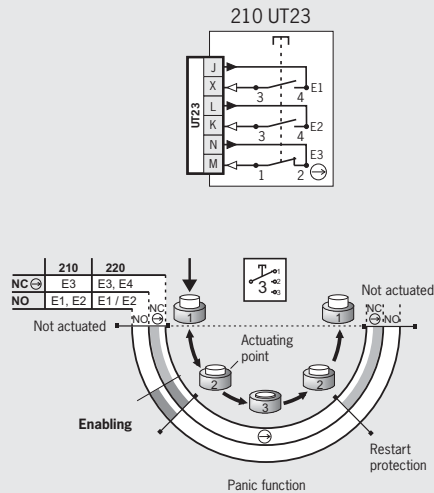
ZSA, 3-stage function Plug connectors

Dimension drawings



For mating connectors see page 66

Wiring diagrams/function sequence



Contact
 open
 closed
 closed, enabling

Ordering table

| Design | Connection | Cable length | Switching element | |
|---------------|-------------------------------------|----------------|----------------------------------|------------------|
| | | | 210: 2 NO + 1 NC | 220: 2 NO + 2 NC |
| G1 3-stage | UT23 Plug connectors (23-pin) | 1.2 m straight | 070731 ZSA2A2L12CC1725 | On request |



Enabling switches ZSA and ZSB

- ▶ Housing G1
- ▶ 3-stage function
- ▶ Dual-channel version
- ▶ Straight connection cable
- ▶ Plug connector optional
- ▶ LED and/or buttons optional



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Cable

The high quality connection cables (individual screening of the safety contacts) are available straight.

LEDs

The LEDs are used for visual feedback direct at the enabling switch.

+ and – buttons

These buttons can be configured individually. For example, for moving axes in positive or negative direction.

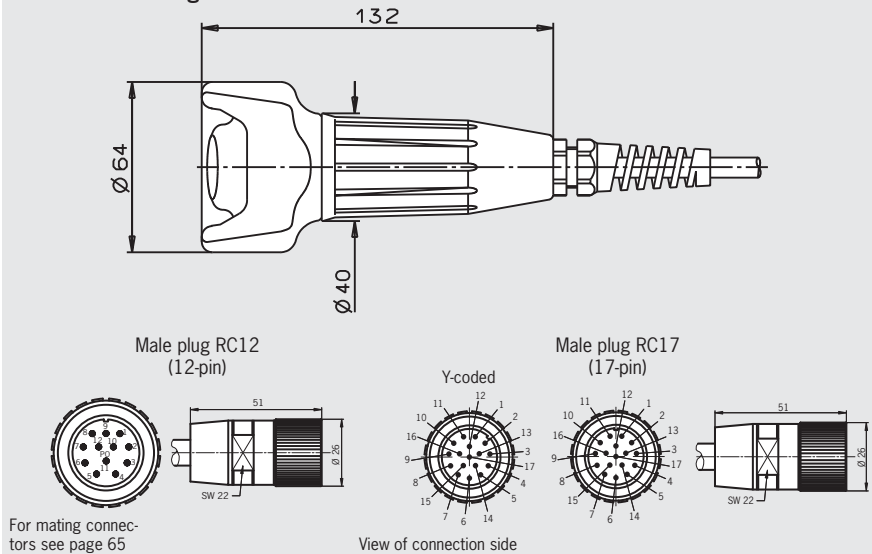
Switching elements (see also page 8)

- ▶ **210** 2 NO + 1 NC ⊖
- ▶ **220** 2 NO + 2 NC ⊖
- ▶ **2220** 2 NO/NC ⊖ ¹⁾

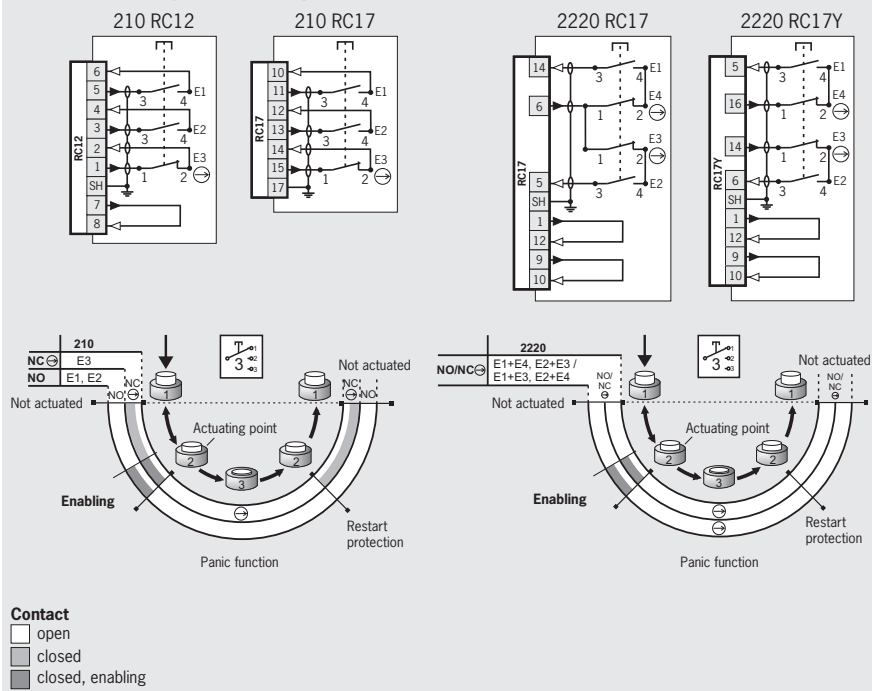
ZSA, 3-stage function

Plug connectors

Dimension drawings



Wiring diagrams/function sequence



Ordering table

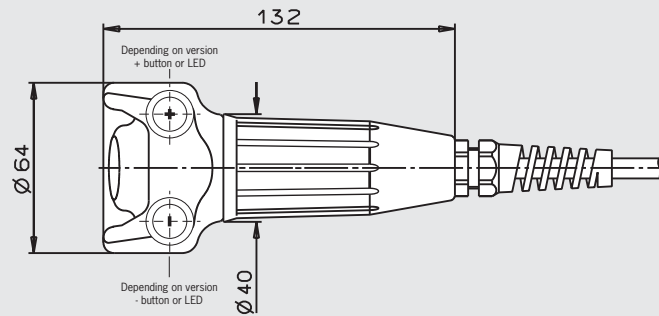
| Design | Connection | Cable length | Version | Switching element | |
|---------------|---|--------------|---|---------------------------------|-----------------------------------|
| | | | | 210: 2 NO + 1 NC ⊖ | 2220: 2 NO/NC ⊖ ¹⁾ |
| G1 3-stage | RC12 Plug connectors (12-pin) | 5 m straight | Screen on connector housing | 073289 ZSA2AG05CC1770 | On request |
| | RC17 Plug connectors (17-pin) | 5 m straight | Suitable for Siemens panel PP031 (1-channel), screen on connector housing | 070741 ZSA2AG05CC1714 | On request |
| | | | Suitable for Siemens panel PP012 and PP031 (2-channel), screen on connector housing | On request | 092738 ZSA2A4G05C-C2041 |
| | RC17 Plug connectors Y-coded (17-pin) | 5 m straight | | On request | 091547 ZSA2A4G05C-C2032 |

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

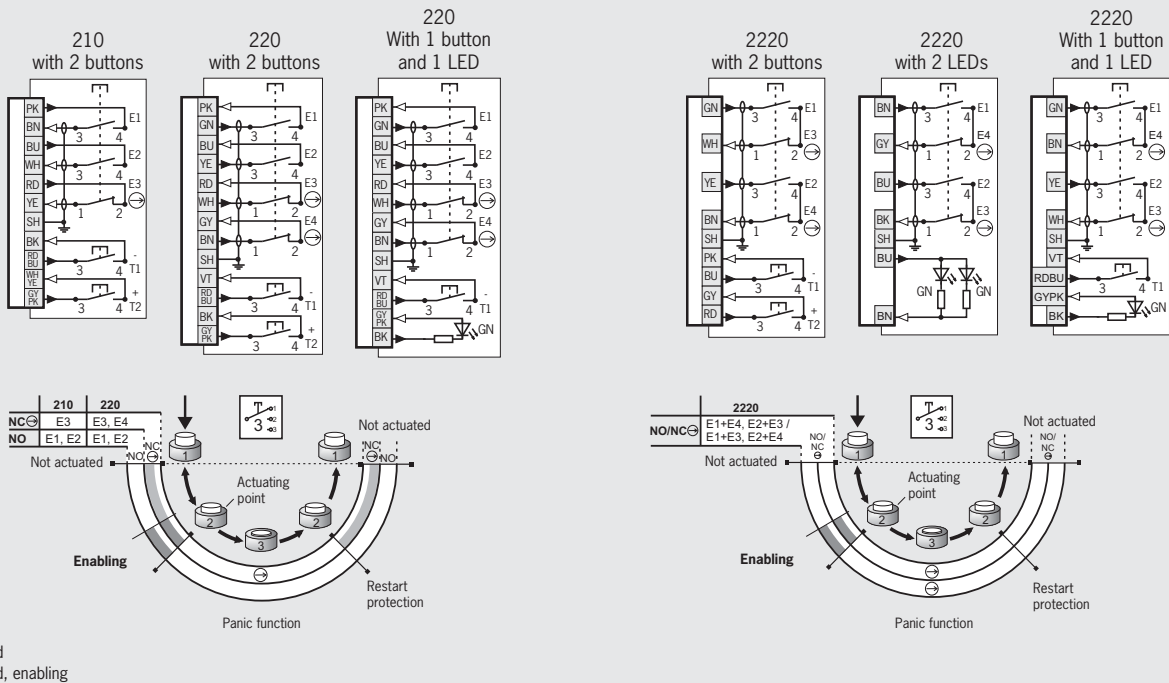


ZSB, 3-stage function Flying lead

Dimension drawings



Wiring diagrams/function sequence



Ordering table

| Design | Connection/ cross-section | Cable length | Version | Switching element | | |
|---------------|--|---------------|----------------------|-----------------------------|---|--|
| | | | | 210: 2 NO + 1 NC \ominus | 220: 2 NO + 2 NC \ominus | 2220: 2 NO/NC \ominus 1) |
| G1 3-stage | Flying lead 8 x 0.34 mm ² | 10 m straight | 2 LEDs (gn) | On request | On request | 086707 ^{2) 3)} ZSA086707C1983 |
| | | 15 m straight | 2 LEDs (gn) | On request | On request | 072969 ^{2) 3)} ZSA072969C1983 |
| | Flying lead 8 x 0.5 mm ² + 8 x 0.14 mm ² | 5 m straight | 1 button, 1 LED (gn) | On request | 085126 ^{2) 3)} ZSB085126 | 106112 ZSB2B4G05A-C2277 |
| | | 5 m straight | 2 buttons (+ and -) | 073260 ZSB2A2G05A | 083317 ^{2) 3)} ZSB083317 | 092378 ^{2) 3)} ZSB092378 |
| | | 10 m straight | 2 buttons (+ and -) | 073261 ZSB2A2G10A | On request | On request |
| | | 15 m straight | 2 buttons (+ and -) | 095612 ZSB2A2G15A | On request | On request |
| | | 20 m straight | 2 buttons (+ and -) | On request | 096900 ³⁾ ZSB096900 | On request |
| | | 8 m coiled | 2 buttons (+ and -) | On request | 103161 ³⁾ ZSB103161 | On request |
| | | 22 m coiled | 2 buttons (+ and -) | On request | On request | 109136 ZSB2B4S22A |

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.
2) No BG type examination
3) No cULus type examination



Enabling switch ZSR

- ▶ 3-stage function
- ▶ Single or dual-channel version
- ▶ Housing G2
- ▶ Straight connection cable
- ▶ Plug connector optional
- ▶ Including holder



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

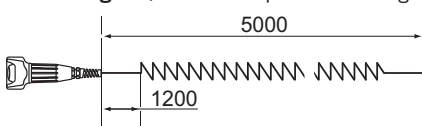
Cable

The high quality connection cables (individual screening of the safety contacts) are available straight.

Switching elements (see also page 8)

- ▶ **111** 1 NO + 1 NC ⊕ + 1 NC
- ▶ **210** 2 NO + 1 NC ⊕
- ▶ **220** 2 NO + 2 NC ⊕
- ▶ **1110** 1 NO/NC ⊕¹⁾
- ▶ **2210** 1 NO/NC ⊕¹⁾
1 NO (additional monitoring contact)

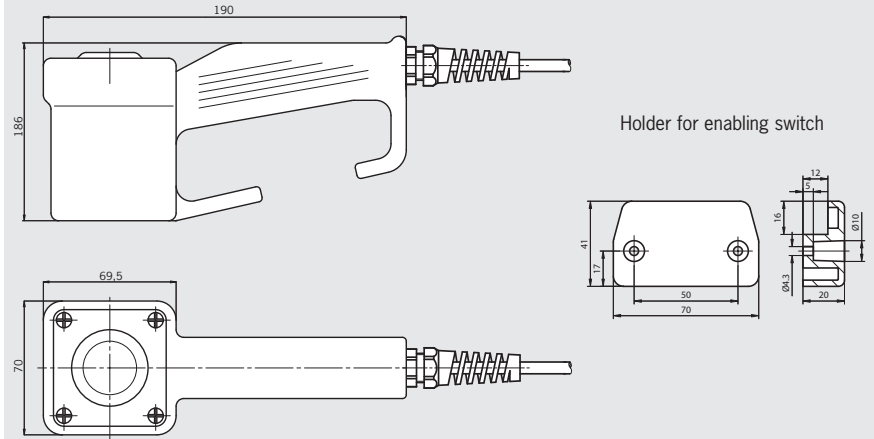
Cable lengths (coiled cable pulled out straight)



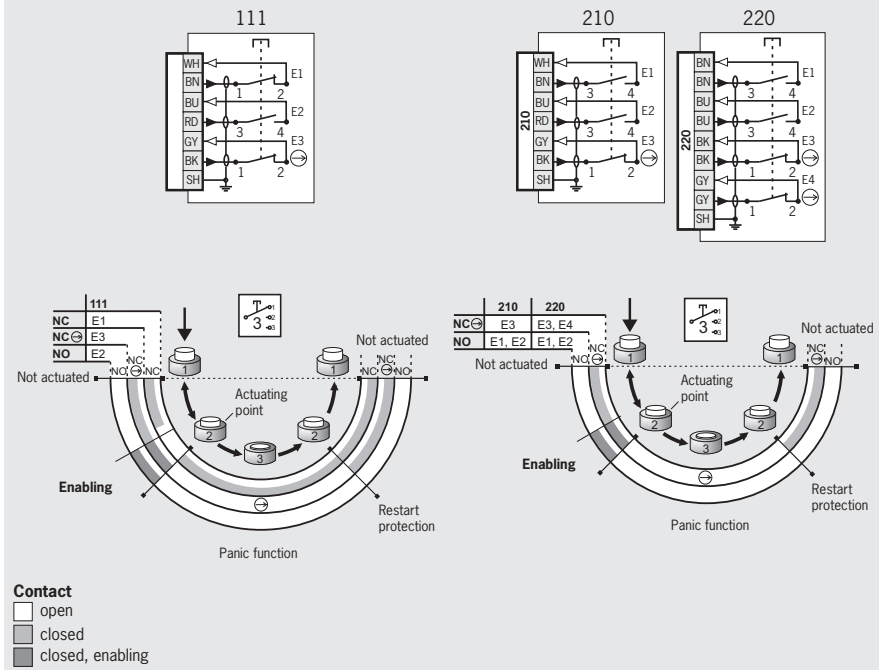
ZSR, 3-stage function

Flying lead

Dimension drawings



Wiring diagrams/function sequence



Ordering table

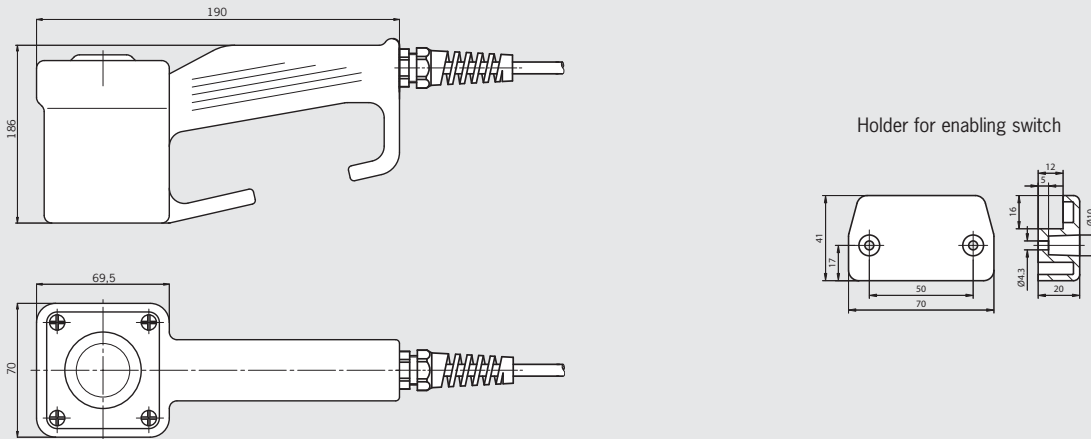
| Design | Connection/ cross-section | Cable length | Switching element | | |
|---------------|---|---------------|-----------------------------|-----------------------------|-----------------------------|
| | | | 111: 1 NO + 1 NC ⊕ + 1 NC | 210: 2 NO + 1 NC ⊕ | 220: 2 NO + 2 NC ⊕ |
| G2 3-stage | Flying lead 6 x 0.34 mm ² | 5 m straight | 055423 ZSR2A1G05A | 055427 ZSR2A2G05A | - |
| | | 10 m straight | 055424 ZSR2A1G10A | 055428 ZSR2A2G10A | - |
| | | 5 m coiled | 055425 ZSR2A1S05A | 055429 ZSR2A2S05A | - |
| | Flying lead 8 x 0.34 mm ² | 5 m straight | - | - | 097609 ZSR2A4G05A |
| | | 5 m coiled | - | - | 104085 ZSR2A4S05A |

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

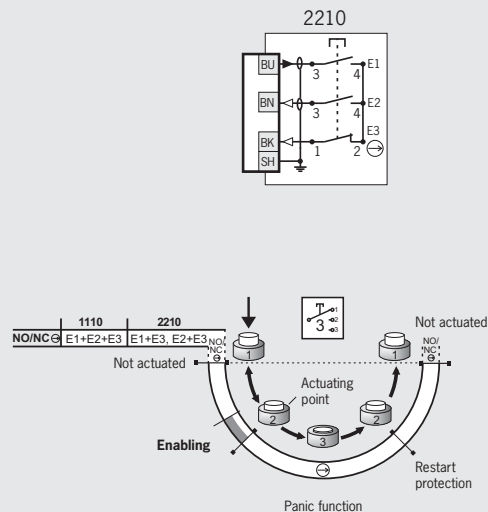


ZSR, 3-stage function Flying lead

Dimension drawings



Wiring diagrams/function sequence



Contact
 open
 closed
 closed, enabling

Ordering table

| Design | Connection/ cross-section | Cable length | Switching element | |
|---------------|---|---------------|-----------------------------|------------------------------------|
| | | | 1110: 1 NO/NC ¹⁾ | 2210: 1 NO/NC ¹⁾ + 1 NO |
| G2 3-stage | Flying lead 3 x 0.75 mm ² | 5 m straight | On request | 055431 ZSR2B2G05A |
| | | 10 m straight | On request | 055432 ZSR2B2G10A |

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

Enabling switch ZSB

- ▶ 3-stage function
- ▶ Dual-channel version
- ▶ Housing G3
- ▶ Coiled connection cable
- ▶ Two illuminated buttons
- ▶ Including holder



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Cable

The high-quality connection cables (individual screening of the safety contacts) are available coiled.

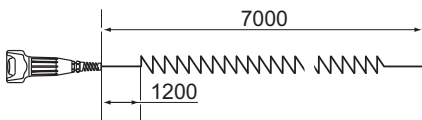
Illuminated + and - buttons

These buttons can be configured individually. For example, for moving axes in positive or negative direction.

Switching elements (see also page 8)

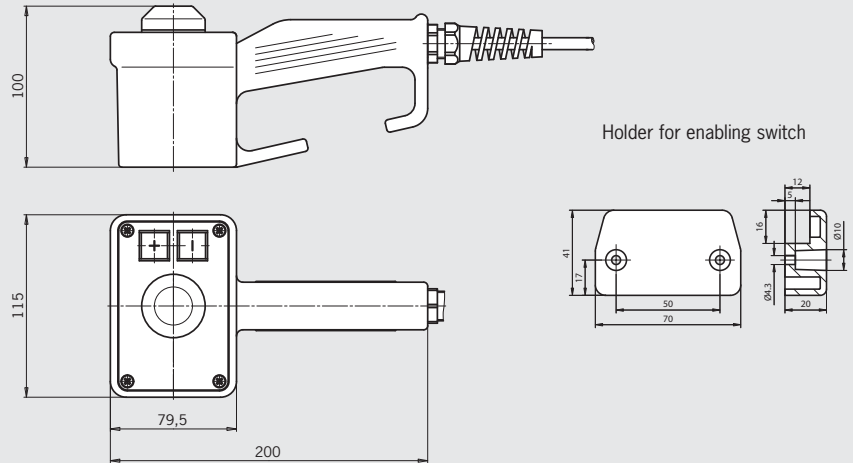
- ▶ **210** 2 NO + 1 NC

Cable lengths (coiled cable pulled out straight)

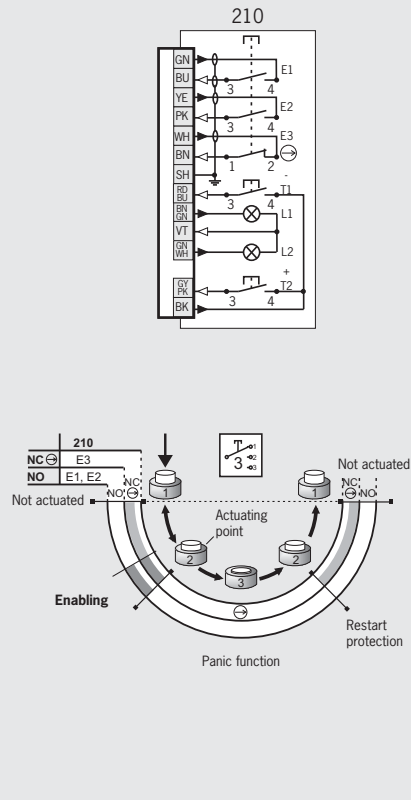


ZSB, 3-stage function Flying lead

Dimension drawings



Wiring diagrams/function sequence



Ordering table

| Design | Connection/ cross-section | Cable length | Version | Switching element |
|---------------|--|--------------|---------------------------------|----------------------------|
| | | | | 210: 2 NO + 1 NC |
| G3 3-stage | Flying lead 8 x 0.5 mm ² + 8 x 0.14 mm ² | 7 m coiled | 2 illuminated buttons (+ and -) | 054784 ZSB054784 |

Enabling switch ZSB

- ▶ 3-stage function
- ▶ Dual-channel version
- ▶ Housing G3
- ▶ Connection cable straight or coiled
- ▶ Plug connectors
- ▶ Two illuminated buttons



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Cable

The high-quality connection cables (individual screening of the safety contacts) are available straight or coiled.

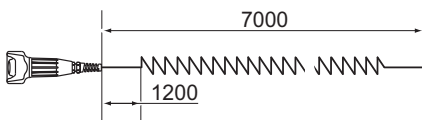
Illuminated + and - buttons

These buttons can be configured individually. For example, for moving axes in positive or negative direction.

Switching elements (see also page 8)

- ▶ 220 2 NO + 2 NC ⊖
- ▶ 2220 2 NO/NC ⊖¹⁾

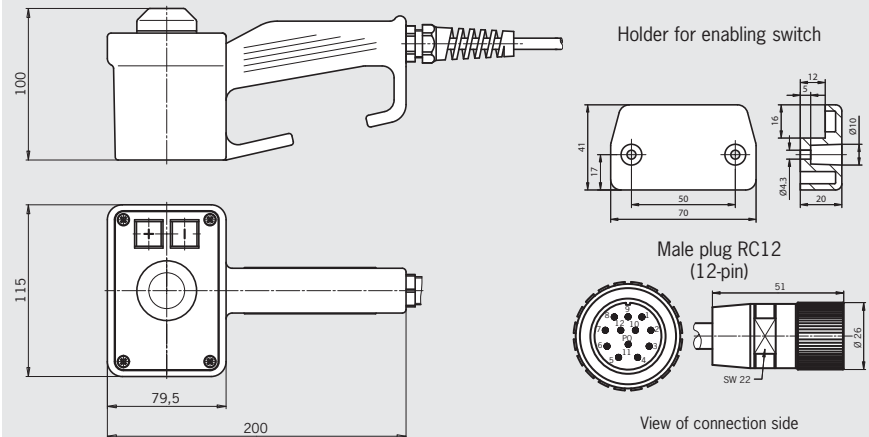
Cable lengths (coiled cable pulled out straight)



ZSB, 3-stage function

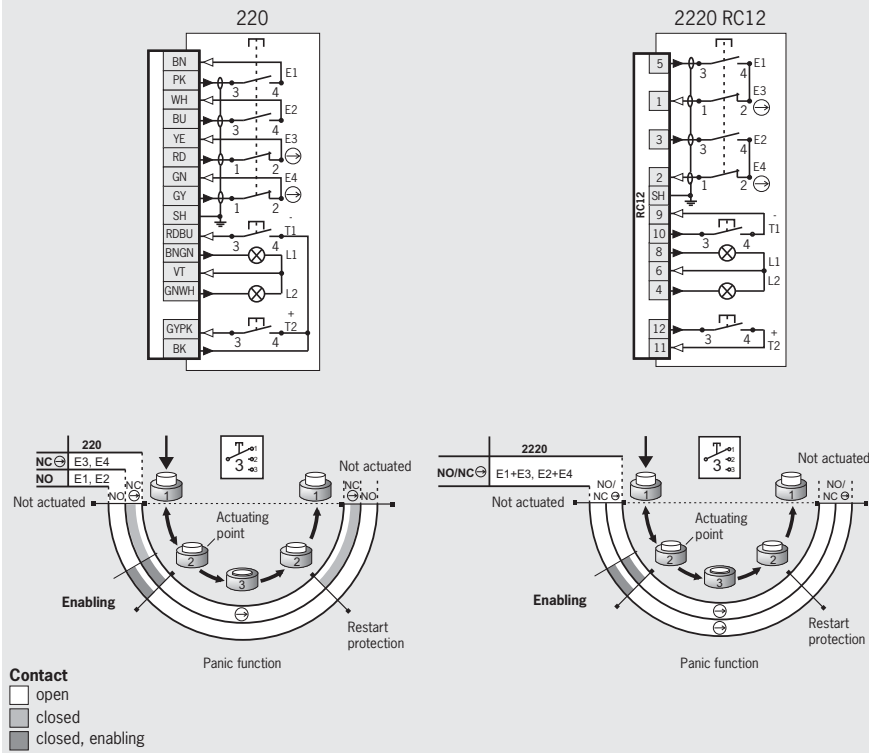
Plug connectors

Dimension drawings



For mating connectors see page 65

Wiring diagrams/function sequence



Ordering table

| Design | Connection/ cross-section | Cable length | Version | Switching element | |
|---------------|---|---------------|---------------------------------|----------------------------|-------------------------------|
| | | | | 220: 2 NO + 2 NC ⊖ | 2220: 2 NO/NC ⊖ ¹⁾ |
| G3 3-stage | Flying lead 4 x 0.5 mm ² + 4 x 0.5 mm ² + 8 x 0.14 mm ² | 7 m coiled | 2 illuminated buttons (+ and -) | 100570 ZSB100570 | On request |
| | RC12 Plug connectors (12-pin) | 5 m straight | 2 illuminated buttons (+ and -) | - | 077029 ZSB077029 |
| | | 12 m straight | 2 illuminated buttons (+ and -) | - | 085058 ZSB085058 |

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

Enabling switch ZSB

- ▶ 3-stage function
- ▶ Dual-channel version
- ▶ Housing G3
- ▶ Connection cable straight or coiled
- ▶ Plug connectors
- ▶ Two illuminated buttons
- ▶ Key-operated rotary switch or selector switch optional
- ▶ Including holder



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Cable

The high-quality connection cables (individual screening of the safety contacts) are available straight or coiled.

Illuminated + and - buttons

These buttons can be configured individually. For example, for moving axes in positive or negative direction.

Key-operated rotary switch

For individual use, e.g. as operating mode selector switch.

Selector switch (12-stage)

For the selection of different axes or ranges. All outputs are open between the switch positions on the selector switch (break-before-make switching!).

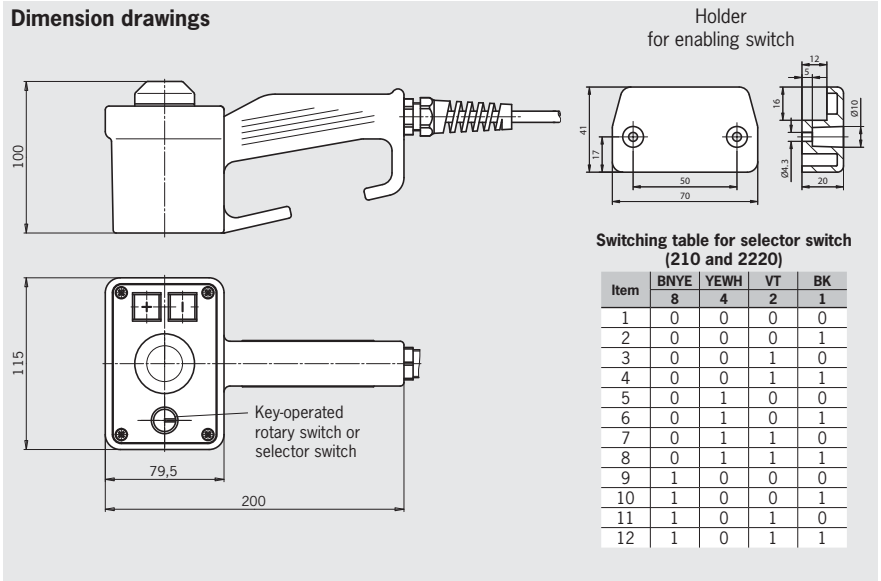
Switching elements (see also page 8)

- ▶ 210 2 NO + 1 NC ⊖
- ▶ 2220 2 NO/NC ⊖¹⁾

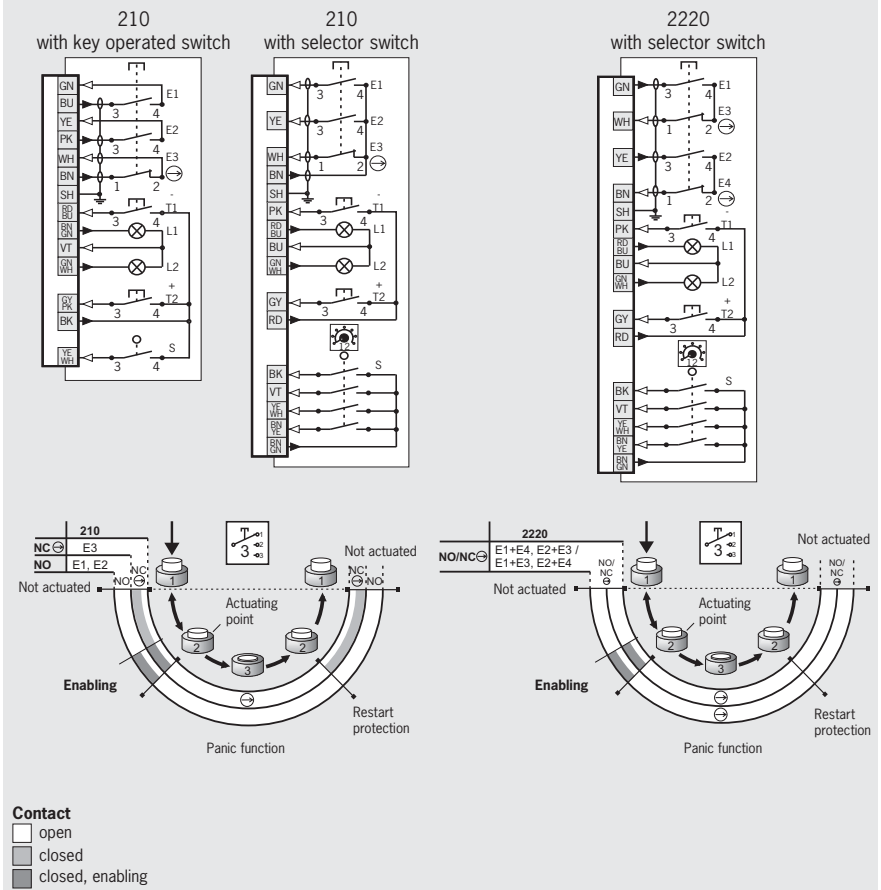
ZSB, 3-stage function

Flying lead, key operated rotary switch or selector switch

Dimension drawings



Wiring diagrams/function sequence



Ordering table

| Design | Connection/ cross-section | Cable length | Version | Switching element | |
|---------------|--|---------------|--|----------------------------|-------------------------------|
| | | | | 210: 2 NO + 1 NC ⊖ | 2220: 2 NO/NC ⊖ ¹⁾ |
| G3 3-stage | Flying lead 8 x 0.5 mm ² + 8 x 0.14 mm ² | 3 m straight | 2 illuminated buttons (+ and -), 1 key-operated rotary switch | 077027 ZSB077027 | On request |
| | | 10 m straight | 2 illuminated buttons (+ and -), 1 selector switch | 070894 ZSB070894 | 087821 ZSB087821 |

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

Enabling switch ZSB

- ▶ 3-stage function
- ▶ Dual-channel version
- ▶ Housing G3
- ▶ Straight connection cable
- ▶ Plug connectors
- ▶ Two illuminated buttons
- ▶ Key-operated rotary switch
- ▶ Including holder



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Cable

The high quality connection cables (individual screening of the safety contacts) are available straight.

Illuminated + and - buttons

These buttons can be configured individually. For example, for moving axes in positive or negative direction.

Key-operated rotary switch

For individual use, e.g. as operating mode selector switch.

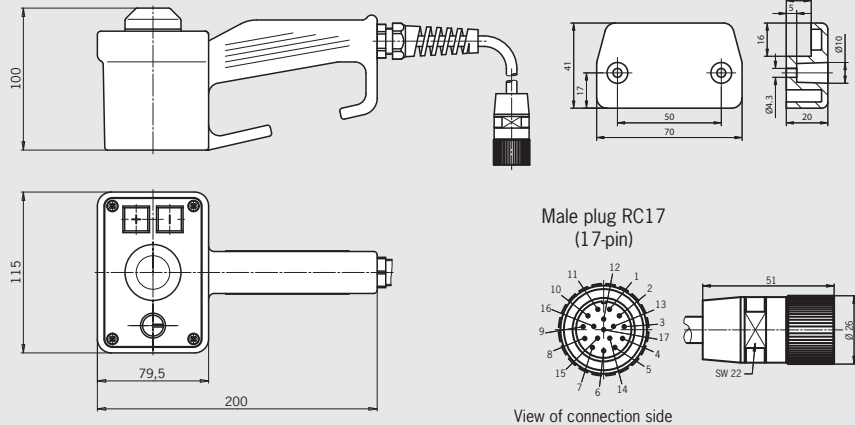
Switching elements (see also page 8)

- ▶ 210 2 NO + 1 NC ⊖

ZSB, 3-stage function

Plug connector, key-operated rotary switch

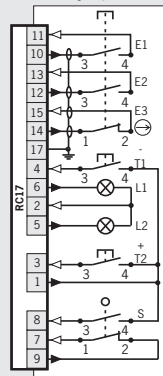
Dimension drawings



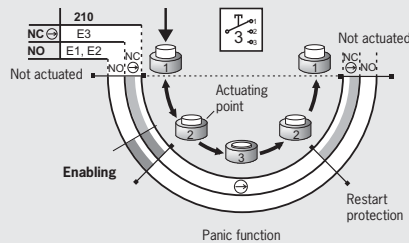
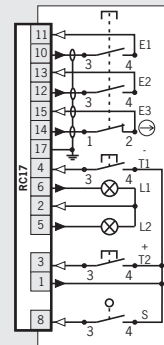
For mating connectors see page 65

Wiring diagrams/function sequence

210 with key operated switch



210 with E2-closing



Contact
 open
 closed
 closed, enabling

Ordering table

| Design | Connection | Cable length | Version | Switching element |
|---------------|-------------------------------------|---------------|--|----------------------------|
| | | | | 210: 2 NO + 1 NC ⊖ |
| G3 3-stage | RC17 Plug connectors (17-pin) | 3 m straight | 2 illuminated buttons (+ and -), 1 key-operated rotary switch (1 NO) | 070904 ZSB070904 |
| | | 5 m straight | 2 illuminated buttons (+ and -), 1 key-operated rotary switch (1 NO) | 072645 ZSB072645 |
| | | 12 m straight | 2 illuminated buttons (+ and -), 1 key-operated rotary switch (1 NO) | 072403 ZSB072403 |
| | | 12 m straight | 2 illuminated buttons (+ and -), 1 key-operated rotary switch (1 NO, 1 NC) | 090262 ZSB090262 |

1) No key available

Enabling switch ZSB

- ▶ 3-stage function
- ▶ Dual-channel version
- ▶ Housing G3
- ▶ Straight connection cable
- ▶ Plug connectors
- ▶ Two illuminated buttons
- ▶ Key-operated rotary switch
- ▶ Emergency stop device
- ▶ Including holder



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Cable

The high quality connection cables (individual screening of the safety contacts) are available straight.

Illuminated + and - buttons

These buttons can be configured individually. For example, for moving axes in positive or negative direction.

Key-operated rotary switch

For individual use, e.g. as operating mode selector switch.

Emergency stop device

Enabling switch with dual-channel emergency stop device on the switch housing, for various wiring concepts. Red emergency stop button.

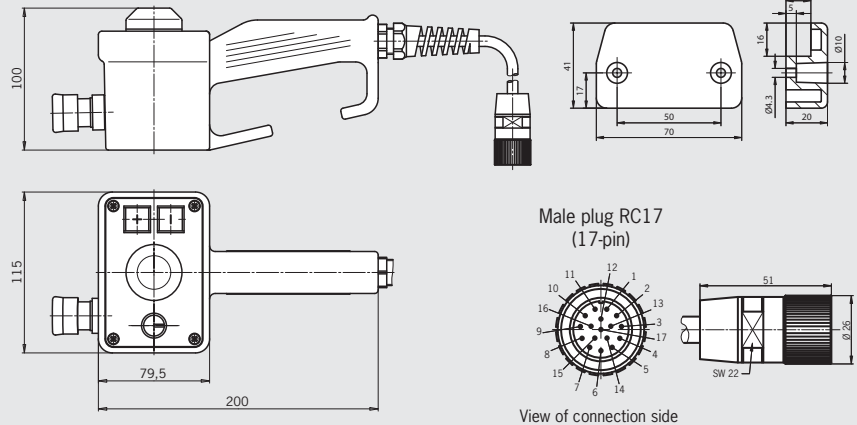
Switching elements (see also page 8)

- ▶ 2220 2 NO/NC ⊖¹⁾

ZSB, 3-stage function

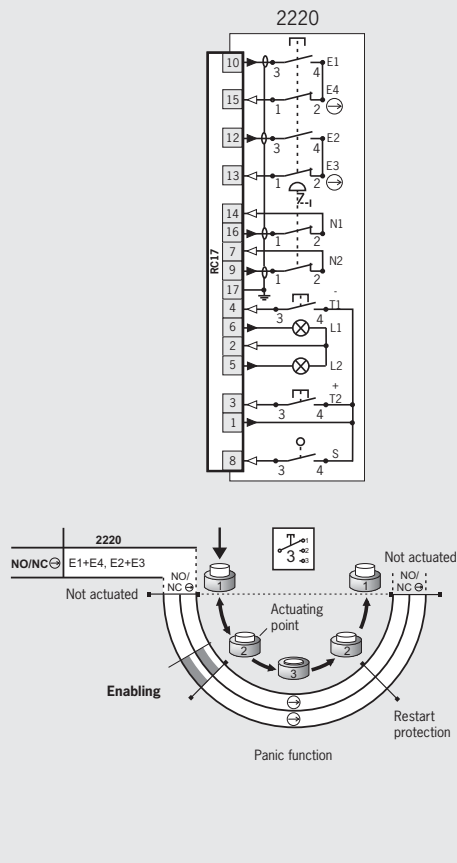
Plug connector, key-operated rotary switch, emergency stop device

Dimension drawings



For mating connectors see page 65

Wiring diagrams/function sequence




Ordering table


| Design | Connection | Cable length | Version | Switching element |
|---------------|-------------------------------------|--------------|---|-------------------------------|
| | | | | 2220: 2 NO/NC ⊖ ¹⁾ |
| G3 3-stage | RC17 Plug connectors (17-pin) | 5 m straight | 2 illuminated buttons (+ and -), 1 key-operated rotary switch (1 NO), 1 emergency stop device | 090489 ZSB090489 |

Selection table for enabling devices ZSG and ZSA

| Design | |
|------------|--|
| E | Built-in version (without cable) |
| G1 | Housing G1 (black) |
| Function | |
| 3 | 3-stage (OFF - enabling - OFF) |
| Connection | |
| C | Tab connector, screw terminal, flying lead |



**Enabling switch ZSG
Housing G3**



**Enabling switch ZSA
Housing G1**

| Design | Stages | Connection | Page | |
|--------|--------|------------|------|----|
| E | G1 | 2 | C | 50 |
| ● | ● | ● | ● | 51 |

Built-in enabling device ZSG

- ▶ 2-stage function
- ▶ Dual-channel version
- ▶ Suitable, e.g., for hand-held pendant stations HBL



2-stage function ²⁾

Enabling function is active in the second stage (pressed position). When the button is released, the enabling is removed (see function sequence).

Hand-held pendant station HBL

See catalog for hand-held pendant stations.

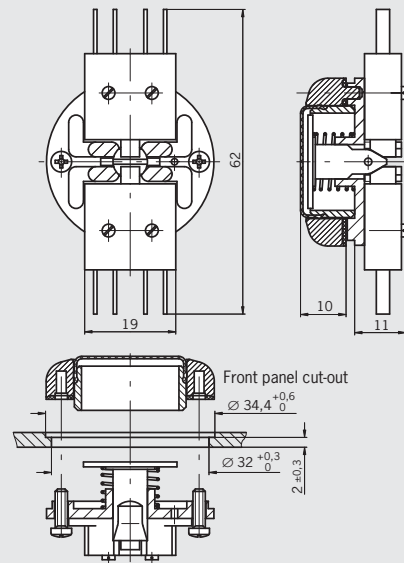
Switching elements (see also page 8)

- ▶ 20 2 NO

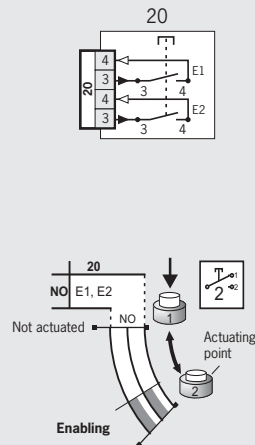
ZSG, 2-stage function ²⁾

Tab connector

Dimension drawings



Wiring diagrams/function sequence



Contact
 open
 closed
 closed, enabling

Ordering table

| Design | Connection | Version | Switching element |
|------------------------------------|---------------|--|-------------------------|
| | | | 20: 2NO |
| Built-in 2-stage ²⁾ ZSG | Tab connector | Suitable, e.g., for hand-held pendant stations HBL | 070793 ZSG1-2 |

1) Only closed in middle position, a normally open contact and a normally closed contact are combined internally.

2) As per VDI 2854, a device comparable to an emergency stop device must be fitted!



Enabling devices ZSA

- ▶ Housing G1
- ▶ 2-stage function
- ▶ Single or dual-channel version
- ▶ Connection cable straight or coiled
- ▶ Wall holder optional



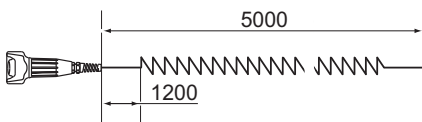
2-stage function ¹⁾
Enabling function is active in the second stage (pressed position). When the button is released, the enabling is removed (see function sequence).

Cable
The high-quality connection cables (individual screening of the safety contacts) are available straight or coiled.

Switching elements (see also page 8)

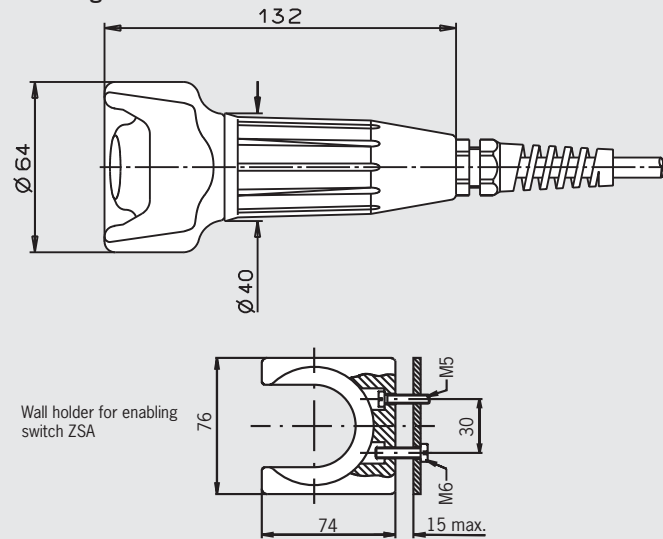
- ▶ **10** 1 NO
- ▶ **20** 2 NO
- ▶ **21** 2 NO + 1 NC

Cable lengths (coiled cable pulled out straight)

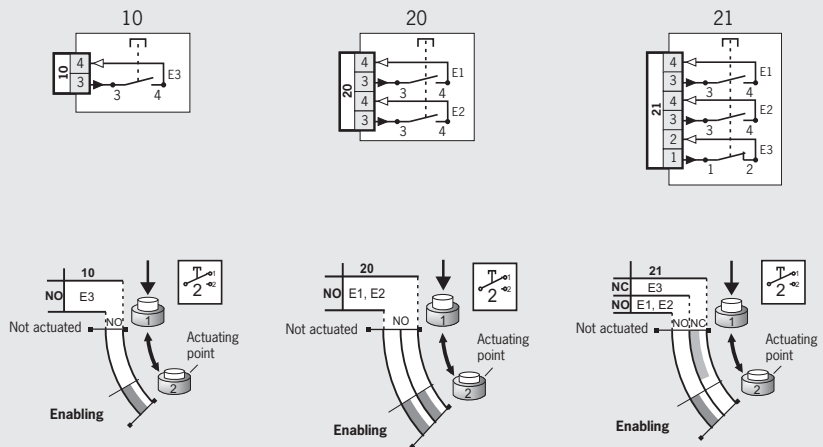


ZSA, 2-stage function ¹⁾ Flying lead

Dimension drawings



Wiring diagrams/function sequence



Contact
 open
 closed
 closed, enabling

Ordering table

| Design | Connection/ cross-section | Cable length | Version | Switching element | | |
|-----------------------------|---|----------------|-------------------|----------------------------------|----------------------------------|----------------------------------|
| | | | | 10: 1NO | 20: 2NO | 21: 2 NO + 1 NC |
| G1 2-stage ¹⁾ | Flying lead 6 x 0.34 mm ² | 2.5 m straight | Incl. wall holder | On request | 082557 ZSA1A2L25AC1909 | On request |
| | | 5 m coiled | | On request | On request | 094321 ZSA1A2S05A |
| | Flying lead 3 x 0.75 mm ² | 1 m straight | Incl. wall holder | - | - | 104231 ZSA1A2G01AC2246 |
| | | 5 m straight | | 082524 ZSA1A5G05AC1917 | - | - |
| | | 7 m straight | | - | 097909 ZSA1A2G07A | - |
| | | 10 m straight | | 095144 ZSA1A5G10AC1917 | - | - |

1) As per VDI 2854, a device comparable to an emergency stop device must be fitted!

Kits for enabling switches/enabling devices

Kit for enabling switch ZSM

Kit for enabling switch ZSA

Kit for enabling device ZSA

| Kit Enabling switch ZSM | Kit Enabling switch ZSA | Kit Enabling device ZSA | Page |
|----------------------------|----------------------------|----------------------------|---------|
| • | | | 54 - 58 |
| | • | | 59 |
| | | • | 60 |

ZSM housing

- ▶ 3-stage function
- ▶ + and – buttons optional
- ▶ Hole for lower stop command device
- ▶ Cable gland included

3-stage function

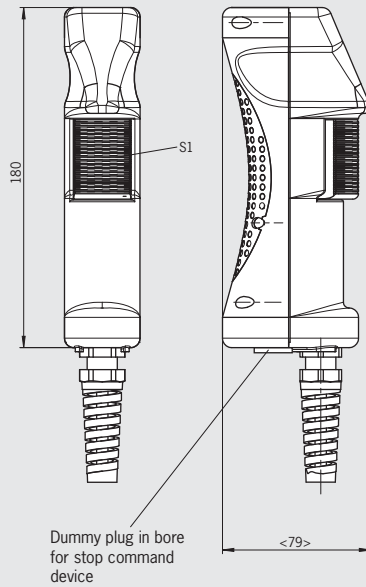
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

+ and – buttons

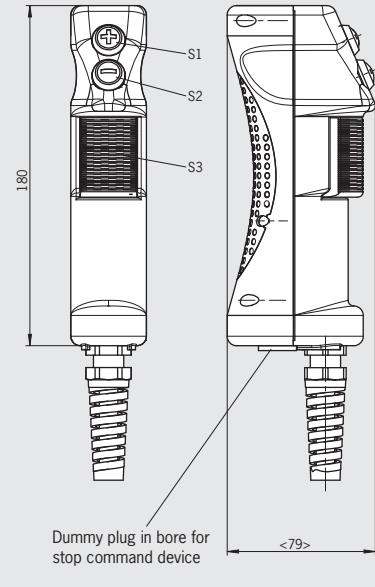
These buttons can be individually assigned, e.g. to move axes in positive or negative direction.

ZSM4200-106104, 3-stage function

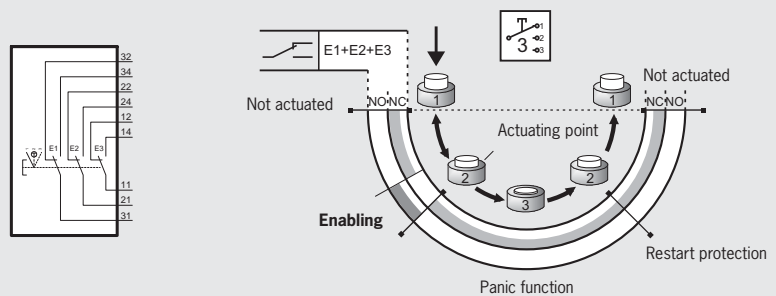
Dimension drawing



ZSM4200-106105, 3-stage function + and – buttons



Wiring diagram/function sequence



Ordering table

| Design | Version | Order No./item |
|--------|---|---------------------------------|
| ZSM | Enabling switch with 3 changeover contacts (S1), cable gland included | 106104 ZSM4200-106104 |
| | Enabling switch with 3 changeover contacts (S3), +/- buttons with one NO contact each (S1/S2), cable gland included | 106105 ZSM4200-106105 |

Accessories for installation in ZSM housing

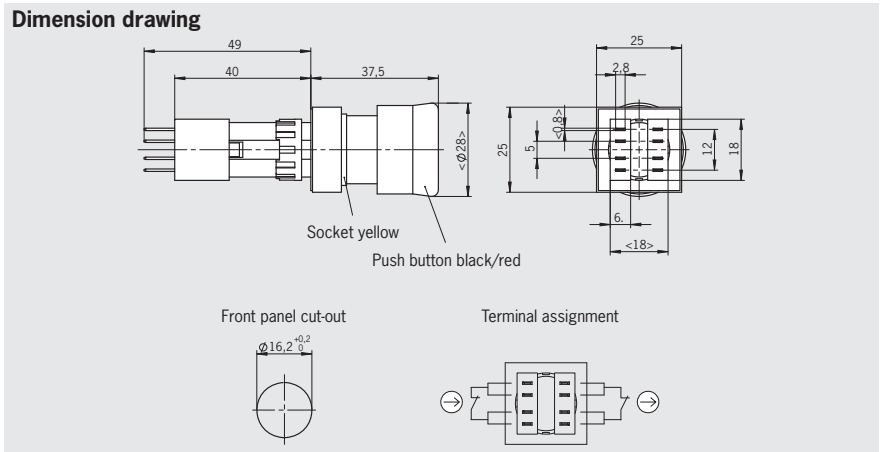
- ▶ Machine stop
- ▶ Emergency stop device

Machine stop

Machine stop (black, with pull-to-reset button) for installation in housing ZSM, for different wiring concepts.

Emergency stop device

Two-channel emergency stop device (red, with pull-to-reset button) for installation in ZSM housing, for different wiring concepts.



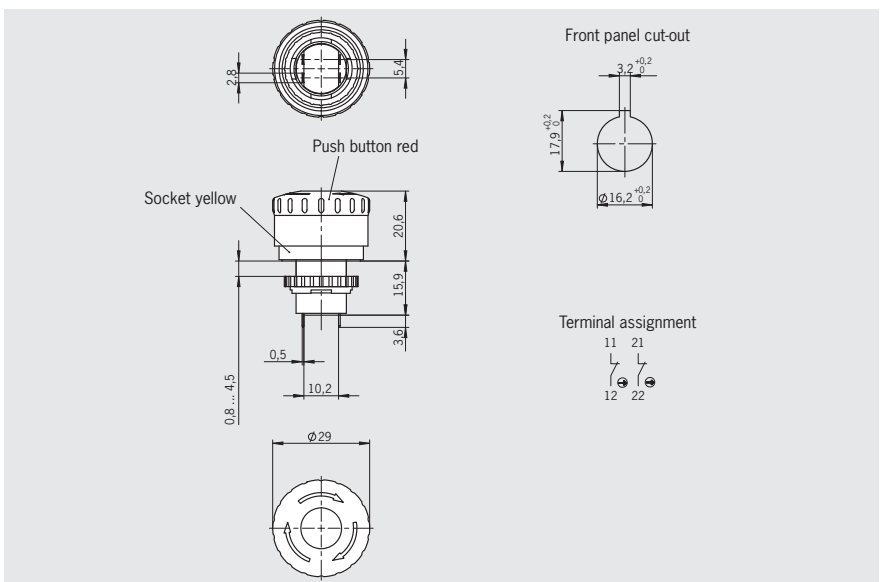
| Parameter | Value |
|--|--|
| Color of actuating head | black/red |
| Color of bottom shell | yellow |
| Reset | Pull-to-reset button |
| Degree of protection | IP 65 |
| Max. number of switching elements | 2 |
| Contact element | 2 x positively driven contact |
| Utilization category acc. to IEC 947-5-1 | DC-13 I _e 3 A U _e 24 V |

Ordering table

| Designation | Version | Order No./item |
|-----------------------|---|---------------------------------------|
| Machine stop | Installation \varnothing 16 mm, palm button black \varnothing 28 mm | 106434 Machine stop 16 mm |
| Emergency stop device | Installation \varnothing 16 mm, palm button red \varnothing 28 mm | 096298 Emergency stop 16 mm |

Emergency stop device with small installation depth

Two-channel emergency stop device (red, with pull-to-reset button and turn-to-reset button) for installation in ZSM housing, for different wiring concepts.



| Parameter | Value |
|--|---|
| Color of actuating head | red |
| Color of bottom shell | yellow |
| Reset | Pull-to-reset button and turn-to-reset button |
| Degree of protection | IP 65 |
| Number of switching elements | 2 |
| Contact element | 2 x positively driven contact |
| Utilization category acc. to IEC 947-5-1 | DC-13 I _e 3 A U _e 24 V |

Ordering table

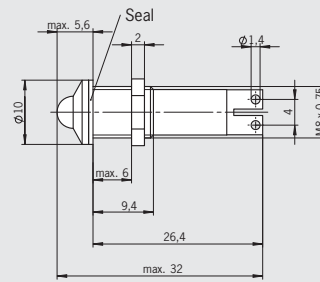
| Designation | Version | Order No./item |
|---|---|-----------------------------------|
| Emergency stop device with small installation depth | Installation \varnothing 16 mm, palm button red \varnothing 29 mm | 106435 ES-XA1E-BV3UU02R |

- ▶ LED indicator
- ▶ Female plug RC17
- ▶ Male flange connector RC17

LED indicator

The LED indicator is used for visual feedback directly at the enabling switch.

Dimension drawing



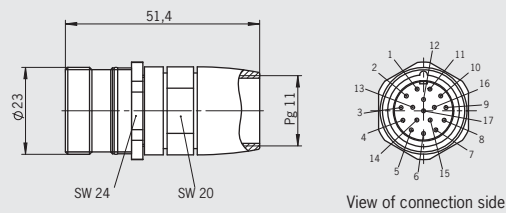
| Parameter | Value |
|-------------------|---------------|
| Housing | Chrome-plated |
| Operating voltage | 24 V |
| Color | yellow |

Ordering table

| Designation | Version | Order No./item |
|---------------|--------------|---|
| LED indicator | Color yellow | 106347 LED indicator GE 106347 |

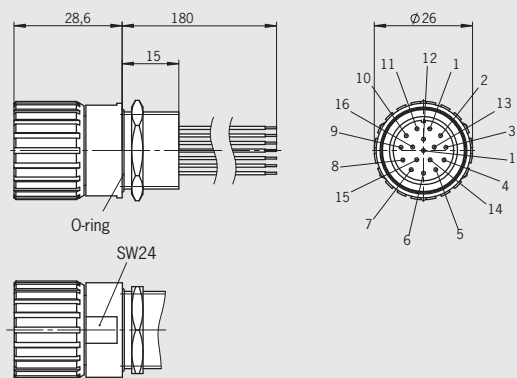
Female plug RC17

Female connector for hand-held enabling switches.



Male flange connector RC17

For connection, e.g. to enabling switches, pre-assembled.

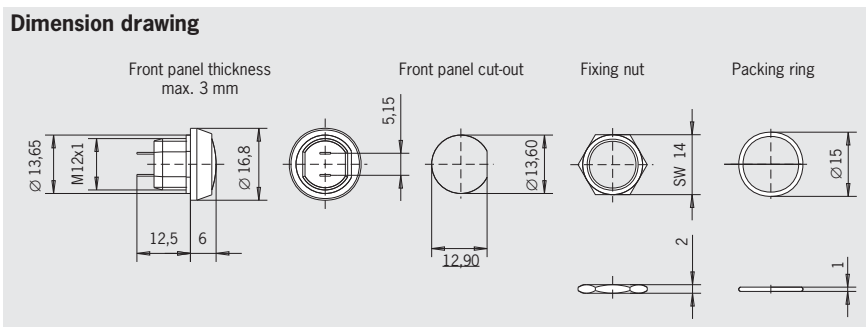


| Parameter | Value |
|---|--|
| Housing material | Metal |
| Number of pins | 12 (screen on the housing) |
| | Male plug Flange connector |
| Cable diameter max. | 10 mm |
| Connection | Crimp contacts 0.14 ... 0.56 mm ² Soldered connections 1.0 mm ² |
| Nominal voltage max. | 230 V AC/DC |
| Degree of protection acc. to IEC 60529 (inserted) | IP 67 |

Ordering table

| Item | Connection | Version | Order No./item |
|----------------|---------------|--|---|
| RC17 17-pin | Crimp contact | Female connector | 106349 Female connector 17-pin |
| | | Male flange connector with wires, pre-assembled | 106360 Male flange connector 17-pin |

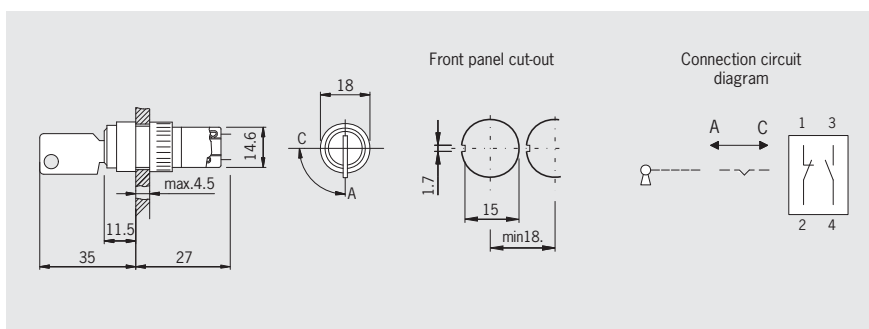
- ▶ Pushbutton
- ▶ Key-operated switch



| Parameter | Value |
|--|---------------------------------------|
| Ambient temperature | -25 ... +70 °C |
| Front degree of protection (integrated in front plate) | IP 67 |
| Switching principle | Button, snap-action switching element |
| Switching elements | 1 NO contacts |
| Switching voltage | DC 30 V |
| Switching current max. | 100 mA |
| Connection | Soldered connection |

Ordering table

| Designation | Button color | Order No. |
|-------------|--------------|---------------|
| Pushbutton | Black | 083640 |
| | red | 086753 |
| | green | 086754 |
| | blue | 086757 |
| | white | 086755 |
| | yellow | 086756 |



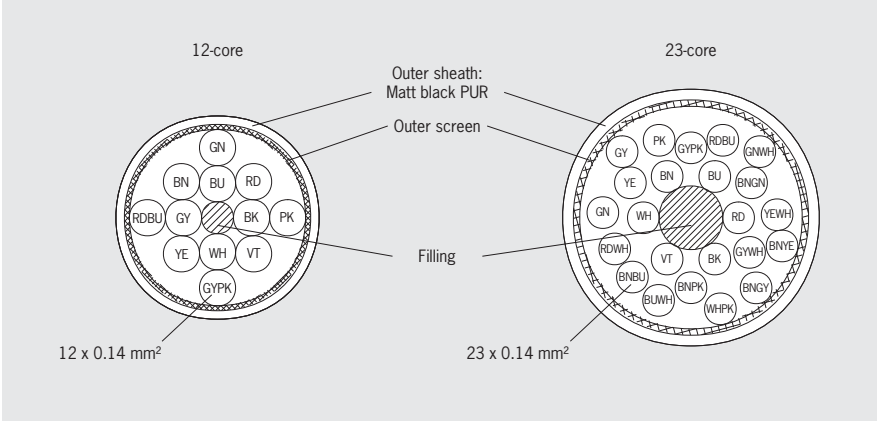
| Parameter | Value |
|---|-------------------------------|
| Ambient temperature | -25 ... +55 °C |
| Front degree of protection (integrated in front panel) / NEMA | IP 65 / 250-12 |
| Switching principle | Snap-action switching element |
| Switching elements | 1 NC contact, 1 NO contact |
| Switching voltage | AC/DC 30 V |
| Switching current max. | 250 mA |
| Connection | Soldered connection |

Ordering table

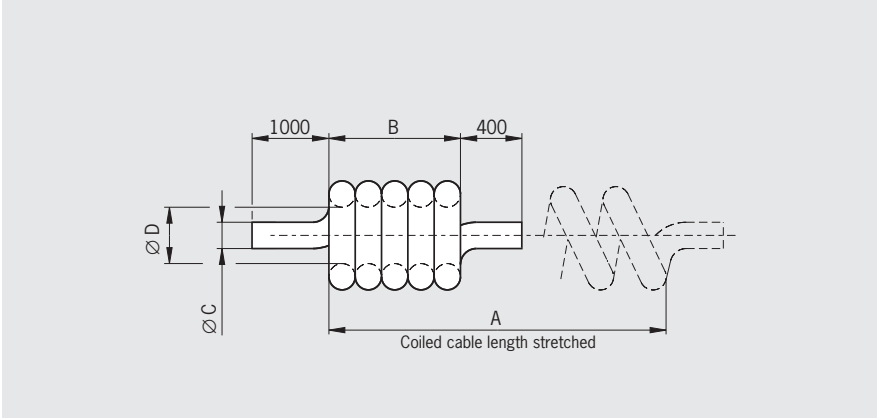
| Designation | Version | Order No. |
|---------------------|---------------------------------|---------------|
| Key-operated switch | Key removable in both positions | 083639 |

► Connection cable coiled and straight

View of cable cross-section



Dimensions of coiled design



| Parameter | Value |
|----------------------------|---|
| Cable resistance | ≤ 145 Ω/km |
| Test voltage core/core | 1.0 kV _{rms} |
| Test voltage core / screen | 1.0 kV _{rms} |
| Insulation resistance | ≥ 200 |
| Operating temperature | -10 ... +70 °C |
| Bending radius | once ≥ 10 x cable diameter several times ≥ 15 x cable diameter |

Ordering table

| Item | Cable length [mm] | A [mm] | B [mm] | Ø C [mm] | Ø D [mm] | Order No. |
|-------------------------|-------------------|---------------|----------|-----------|----------|---------------|
| 12-core, coiled cable | 3,900 | approx. 2,500 | 550 ± 20 | 6 ± 3 | 8 ± 2 | 086721 |
| 12-core, coiled cable | 5,400 | approx. 4,000 | 880 ± 20 | 6 ± 3 | 8 ± 2 | 086722 |
| 12-core, straight cable | 3,500 | – | – | – | – | 087379 |
| 12-core, straight cable | 5,000 | – | – | – | – | 087380 |
| 12-core, straight cable | 10,000 | – | – | – | – | 087381 |
| 23-core, coiled cable | 3,900 | approx. 2,500 | 550 ± 20 | 7.5 ± 0.3 | 10 ± 2 | 087408 |
| 23-core, coiled cable | 5,400 | approx. 4,000 | 880 ± 20 | 7.5 ± 0.3 | 10 ± 2 | 087409 |
| 23-core, straight cable | 3,500 | – | – | – | – | 087382 |
| 23-core, straight cable | 5,000 | – | – | – | – | 087383 |
| 23-core, straight cable | 10,000 | – | – | – | – | 087384 |



Enabling switch kit ZSA and ZSA with built-in plug connector

- ▶ Housing G1
- ▶ 3-stage function
- ▶ Single or dual-channel version
- ▶ Kit without connection cable



3-stage function

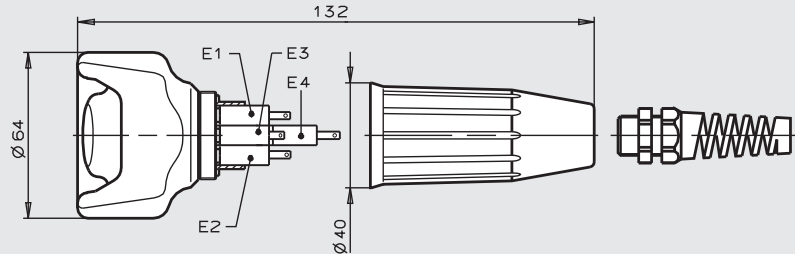
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Switching elements (see also page 8)

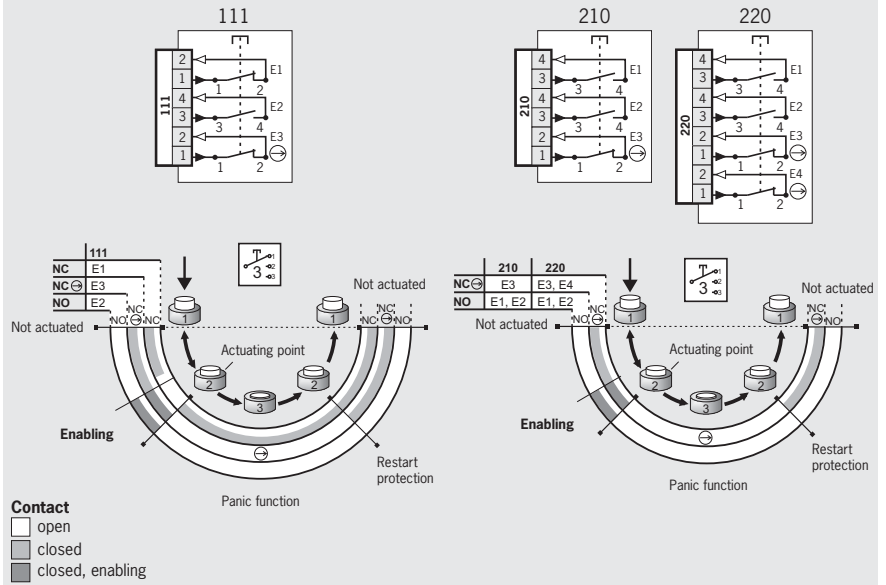
- ▶ **111** 1 NO + 1 NC ⊕ + 1 NC
- ▶ **121** 1 NO + 2 NC ⊕ + 1 NC
- ▶ **210** 2 NO + 1 NC ⊕
- ▶ **220** 2 NO + 2 NC ⊕
- ▶ **220** 2 NO/NC ⊕²⁾

ZSA, 3-stage function Tab connector

Dimension drawings



Wiring diagrams/function sequence



Ordering table

| Design | Connection | Version | Switching element | | |
|----------------------|---------------|---------------|-------------------------|-------------------------|-------------------------|
| | | | 111: 1 NO+1 NC ⊕ + 1 NC | 210: 2 NO+1 NC ⊕ | 220: 2 NO + 2 NC ⊕ |
| Kit 3-stage G1 | Tab connector | without cable | 070734 ZSA2-1 | 070735 ZSA2-2 | 070792 ZSA2-4 |

Enabling device kit ZSA

- ▶ Housing G1
- ▶ 2-stage function
- ▶ Single or dual-channel version
- ▶ Kit without connection cable



2-stage function ¹⁾

Enabling function is active in the second stage (pressed position). When the button is released, the enabling is removed (see function sequence).

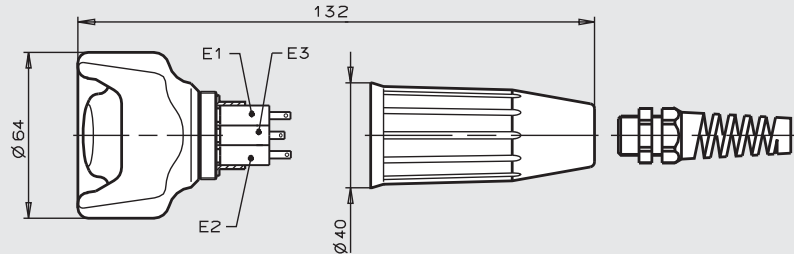
Switching elements (see also page 8)

- ▶ **10** 1 NO
- ▶ **20** 2 NO
- ▶ **21** 2 NO + 1 NC

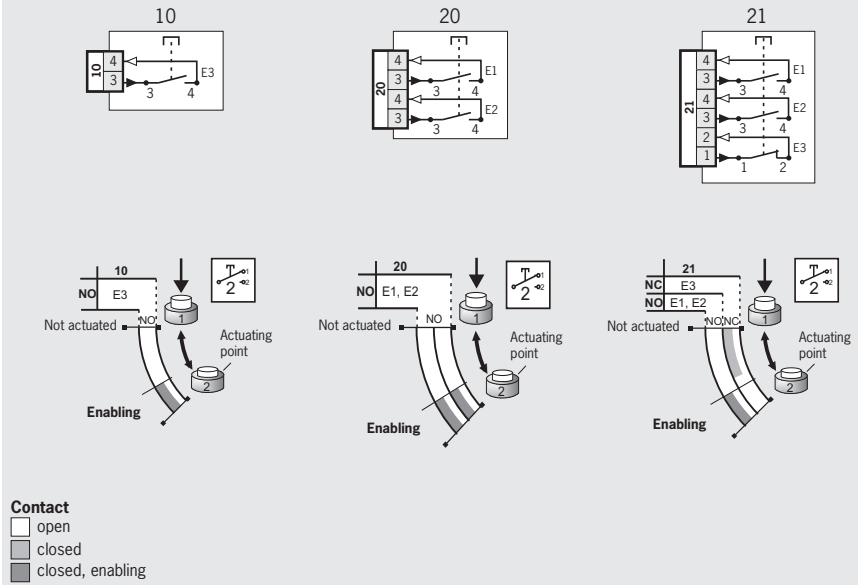
ZSA, 2-stage function ¹⁾

Tab connector

Dimension drawings



Wiring diagrams/function sequence



Ordering table

| Design | Connection | Version | Switching element | | |
|--|----------------------|---------------|-------------------------|-------------------------|-------------------------|
| | | | 10: 1NO | 20: 2NO | 21: 2NO+1NC |
| Kit 2-stage ¹⁾ G1 | Tab connector | without cable | 070750 ZSA1-1 | 070800 ZSA1-2 | 070736 ZSA1-3 |

1) As per VDI 2854, a device comparable to an emergency stop device must be fitted!

2) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

Selection table for accessories

Holders for hand-held enabling switches

Actuator for safety switches NZ.VZ and TZ with separate safety function

Plug connectors

| | |
|--------------|-------------|
| BD4 | 3-pin + PE |
| SS4 | 3-pin + PE |
| C16-1 | 6-pin + PE |
| SD12 | 11-pin + PE |
| BS12 | 11-pin + PE |
| RC12 | 12-pin |
| RC17 | 17-pin |
| UT23 | 23-pin |

Connection cables

| Holder | | Actuator | Plug connectors | | | | | | | | Connection cables | Page |
|--------|-----|----------|-----------------|-----|-------|------|------|------|------|------|-------------------|------|
| ZSM | ZSA | | BD4 | SS4 | C16-1 | SD12 | BS12 | RC12 | RC17 | UT23 | | |
| ● | | | | | | | | | | | | 62 |
| | ● | ● | | | | | | | | | | 63 |
| | | | ● | ● | ● | ● | ● | | | | | 64 |
| | | | | | | | | ● | ● | | | 65 |
| | | | | | | | | | | ● | | 66 |
| | | | | | | | | | | | ● | 68 |

Holder for hand-held enabling switch ZSM

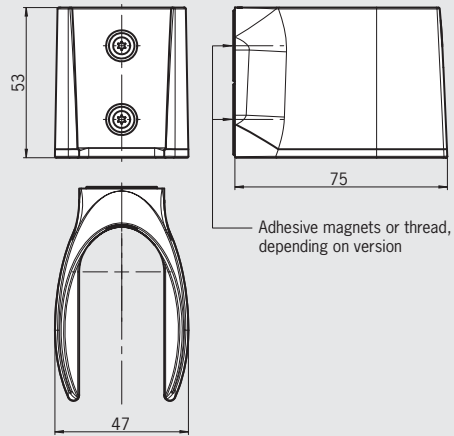
- ▶ Holder for hand-held enabling switch ZSM

Screw holder for enabling switch ZSM

Depending on the version, the holder can be fastened to machine parts either with a magnet or two screws.

Screw holder for enabling switch ZSM

Dimension drawing



Ordering table

| Designation | Version | Order No./item |
|--------------------------------|------------------|---|
| Holder for enabling switch ZSM | Screw mounting | 102969 Holder ZSM |
| | Magnet fastening | 102965 Holder ZSM with magnet |

Holder for hand-held enabling switches ZSA and ZSB/ Actuator for safety switches NZ.VZ and TZ with separate safety function

- ▶ Magnetic holder
- ▶ Screw holder
- ▶ Screw holder with cable hook
- ▶ Actuator for mounting on the hand-held enabling switch

Magnetic holder for housing G1

The enabling switches can be attached at any time to any part of the machine due to the magnets fastened to the holder. In this way the enabling switch can be positioned in the activity area as necessary.

Screw holder for housing G1

The holder can be securely fastened to parts of the machine with a wall thickness of max. 15 mm using two screws.

Screw holder for housing G1 with cable hook

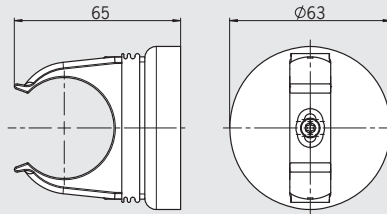
A holder with an additional cable hook for hanging a wound-up cable.

Actuator for safety switch

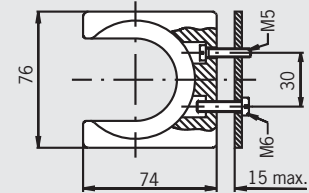
Suitable for fitting, e.g. to the hand-held enabling switch kit. Safe position sampling of the enabling switch can be achieved by fitting the actuator and the use of an appropriate safety switch (NZ.VZ or TZ). By suitable integration of this combination, the signal from the safety switch can be used, e.g., as an operating mode selector switch when the actuator is removed (removal of the enabling switch). Suitable for the kit ZSA.

Magnetic holder

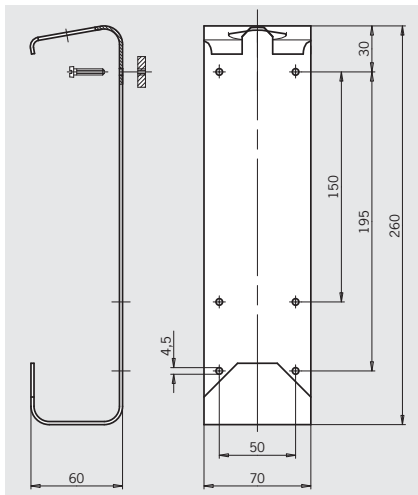
Dimension drawings



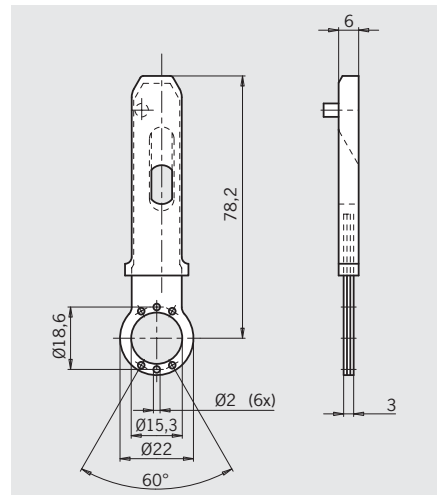
Screw holder



Screw holder with cable hook



Actuator for safety switches series NZ.VZ and TZ



Ordering table

| Designation | Version | Order No./item |
|-----------------|----------------------------|-------------------------------------|
| Magnetic holder | | 059340 Magnetic holder |
| Screw holder | M5 x 25 | 052406 Holder complete |
| | with cable hook M4 x 20 | 047820 Cable holder |
| Actuators NZ/TZ | | 084833 Actuator-Z-G-C1932 |

Plug connectors

- ▶ Female flange connector BD4
- ▶ Male plug SS4
- ▶ Female connector C16-1
- ▶ Male flange connector SD12
- ▶ Female connector BS12
- ▶ Extension cable

Female flange connector BD4

Female flange connector for male plug SS4 on the enabling switch.

Male plug SS4

Male plug for enabling switch for connection to safety switch TZ...C1662 (see catalog NZ/TZ).

Female connector C16-1¹⁾

Female connector for hand-held enabling switches.

Male flange connector SD12

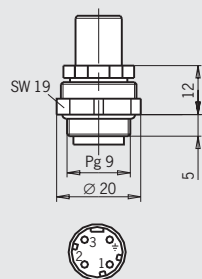
Male socket for female connector BS12. For the connection of hand-held and HBE enabling switches.

Female connector BS12

Female connector for male flange connector SD12. For connection, e.g. to enabling switch.

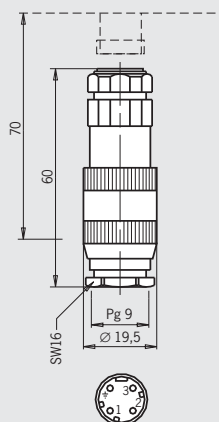
Female flange connector BD4 3-pin + PE

Dimension drawings



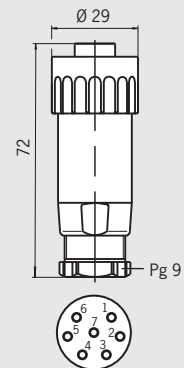
View of connection side, socket

Male plug SS4 3-pin + PE



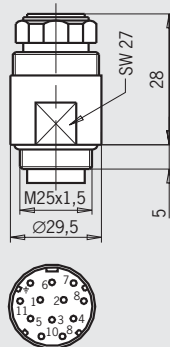
View of connection side, plug

Female connector C16-1 6-pin + PE



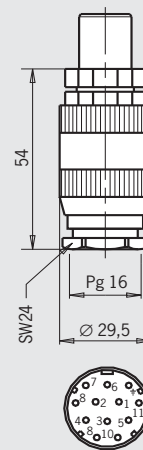
View of connection side, socket

Male flange connector SD12 11-pin + PE



View of connection side, socket

Female connector BS12 11-pin + PE



View of connection side, socket

Ordering table

| Designation | Connection | Version | Order No./item |
|----------------------------|-----------------------------|--|------------------------------------|
| BD4 3-pin + PE | Soldered contact | Female flange connector for male plug SS4 on the enabling switch | 002786 BD4 |
| SS4 3-pin + PE | Soldered contact | Male plug for flange connector BD4 (e.g. TZ...C1662) | 002787 SS4 |
| C16-1 6-pin + PE | Crimp contact ¹⁾ | Female connector | 043861 Cable socket 6+PE |
| SD12 11-pin + PE | Soldered contact | Male flange connector for female connector BS12 on the enabling switch | 085648 SD12-M |
| BS12 11-pin + PE | Soldered contact | Female connector, straight, for flange connector SD12 | 002763 BS12 |
| BS12 11-pin + PE | - | Extension cable 5 m | 071362 BS12 |

For information on crimp contacts see page 68.

1) Crimp contacts are included.

Plug connectors

- ▶ Female flange connector RC12
- ▶ Male plug RC12
- ▶ Blanking plug RC12
- ▶ Female flange connector RC17
- ▶ Male plug RC17
- ▶ Blanking plug RC17

Female flange connector RC12¹⁾
For front panel mounting for connection of hand-held enabling switches. Fitted with soldered contacts. Rubber seal included.

Male plug RC12¹⁾
For connection, e.g. to enabling switches.

Blanking plug RC12¹⁾
For covering the flange connector RC12. As an option, bridges can be fitted to the individual contacts at the customer, or a pre-wired version (coded) used.

Coding: bridge from pin 1 to pin 2 and from pin 9 to pin 10.

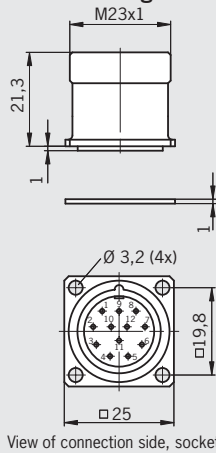
Flange connector RC17¹⁾
For front panel mounting for connection of enabling switches. Rubber seal included. Fitted with soldered contacts.

Male plug RC17¹⁾
For connection, e.g. to enabling switch.

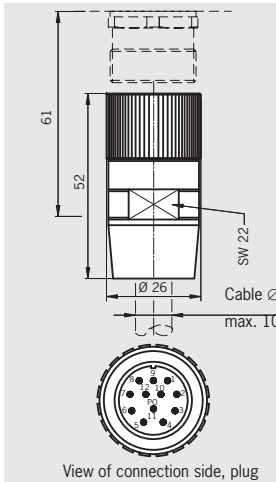
Blanking plug RC17¹⁾
For covering the flange connector RC17. Optionally, individual contacts can be bridged at the customer.

Female flange connector RC12
12-pin

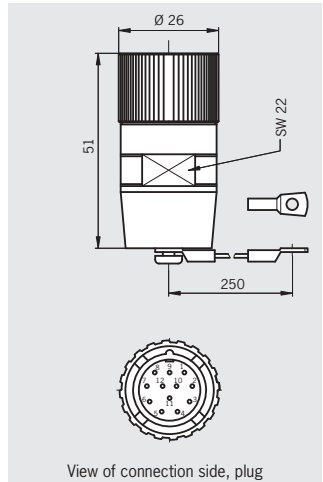
Dimension drawings



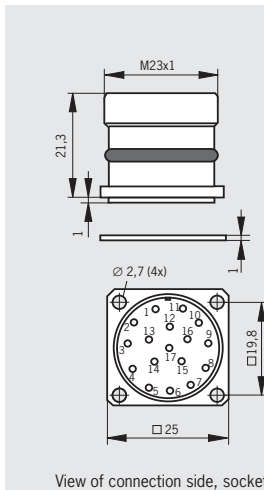
Male plug RC12
12-pin



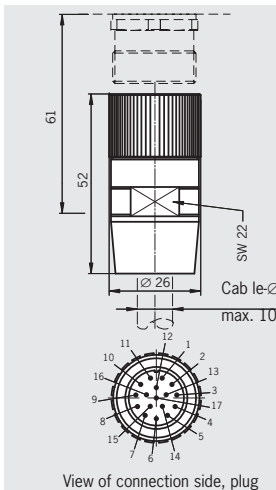
Blanking plug RC12
12-pin



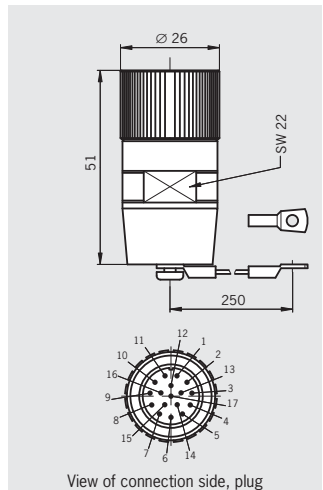
Female flange connector RC17
17-pin



Male plug RC17
17-pin



Blanking plug RC17
17-pin



Ordering table

| Designation | Connection | Version | Order No./item |
|-----------------------|-----------------------------|---|---|
| RC12 12-pin | Soldered connection | Female flange connector | 073290 Female flange connector 12-pin |
| | Crimp contact ¹⁾ | Male plug | 073294 Plug connector 12-pin |
| | Crimp contact ¹⁾ | Blanking plug (with bridges) e.g. in combination with ZS...C1770 | 073291 Blanking plug complete 12-pin |
| | Crimp contact ¹⁾ | Blanking plug (without bridges) | 073293 Blanking plug 12-pin |
| RC17 17-pin | Soldered connection | Female flange connector | 077502 Female flange connector 17-pin |
| | Crimp contact ¹⁾ | Male plug | 096481 Plug connector 17-pin |
| | Crimp contact ¹⁾ | Blanking plug (without bridges) | 096159 Blanking plug 17-pin |

For information on crimp contacts see page 68.

1) Crimp contacts are included.

Plug connectors

- ▶ Female flange connector UT23
- ▶ Blanking plug UT23 with chain

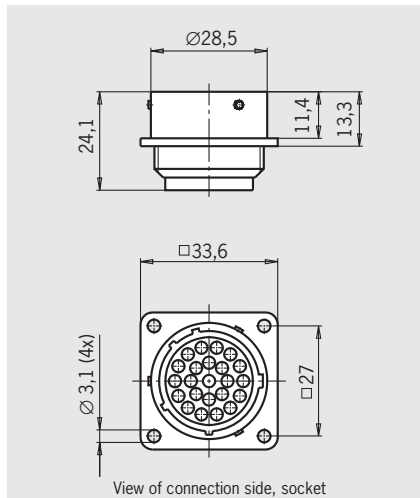
Female flange connector UT23 ¹⁾

Female flange connector for male plug UT23 on enabling switch ...C1715.

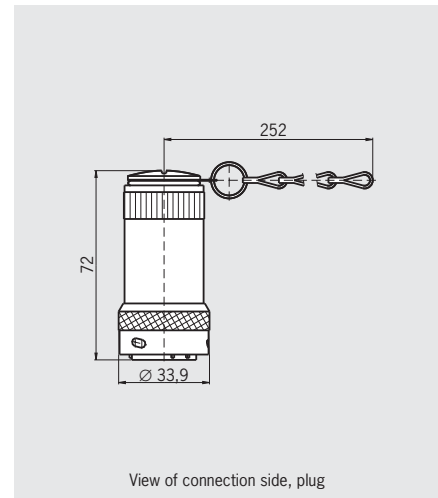
Blanking plug UT23 with chain ¹⁾

Blanking plug for female flange connector UT23.

Female flange connector UT23
23-pin



Blanking plug UT23
with chain



Ordering table

| Designation | Connection | Version | Order No./item |
|----------------|-----------------------------|---|--|
| UT23 23-pin | Crimp contact ¹⁾ | Female flange connector for enabling switch ..C1725 | 074384 Flange connector / 23-pin / metal version |
| | | Blanking plug with chain (3 bridges included) | 083457 Short-circuit plug with chain |

For information on crimp contacts see page 68.

1) Crimp contacts are included.

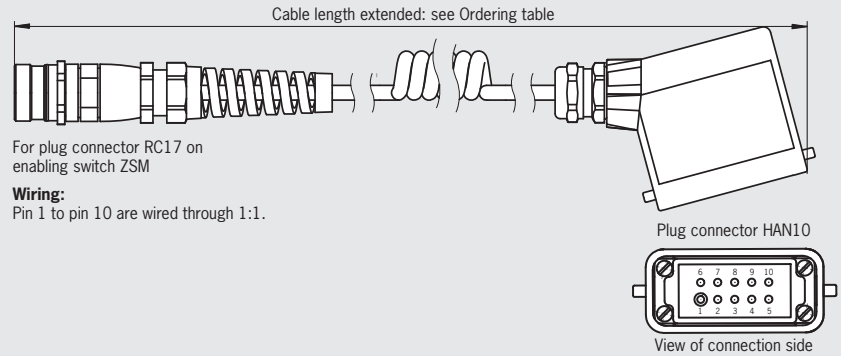
Connection cables

Connection cable for enabling switch ZSM with plug connector RC17

Connection cable for enabling switch ZSM with plug connector RC17

The high-quality connection cable for the ZSM2300-106374 is available in two lengths and can be plugged directly on the device.

The corresponding flange connector is available for connection to the ZSM kit (see page 65).

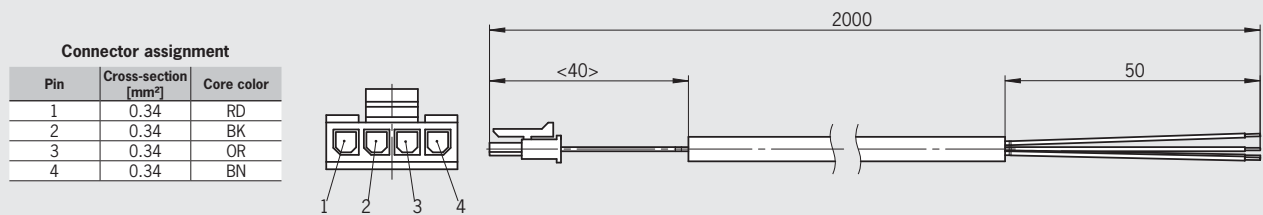


Ordering table

| Designation | Version | Order No./item |
|---|----------------------|---|
| Connection cable for enabling switch ZSM with plug connector RC17 | Coiled, length 3.9 m | 106391 Coiled cable with plug connector 3.9 m |
| | Coiled, length 9.0 m | 106392 Coiled cable with plug connector 9 m |

Connection cable for enabling switch ZXE-111276

4-pin, tab connector



| Pin | Cross-section [mm ²] | Core color |
|-----|----------------------------------|------------|
| 1 | 0.34 | RD |
| 2 | 0.34 | BK |
| 3 | 0.34 | OR |
| 4 | 0.34 | BN |

Ordering table

| Designation | Connection | Order No./item |
|---|---------------|--|
| Connection cable for enabling switch ZXE-111276 | Tab connector | 115123 Connection cable for enabling switch ZXE-111276 |

For technical data see page 69

List of plug connector suppliers

We provide no guarantee for the completeness and correctness of the ordering data given. The data was valid on October 2004. The related manufacturers reserve the right to make changes without notice. The plug connectors and accessories listed are also available from other manufacturers.

► Plug connectors and accessories

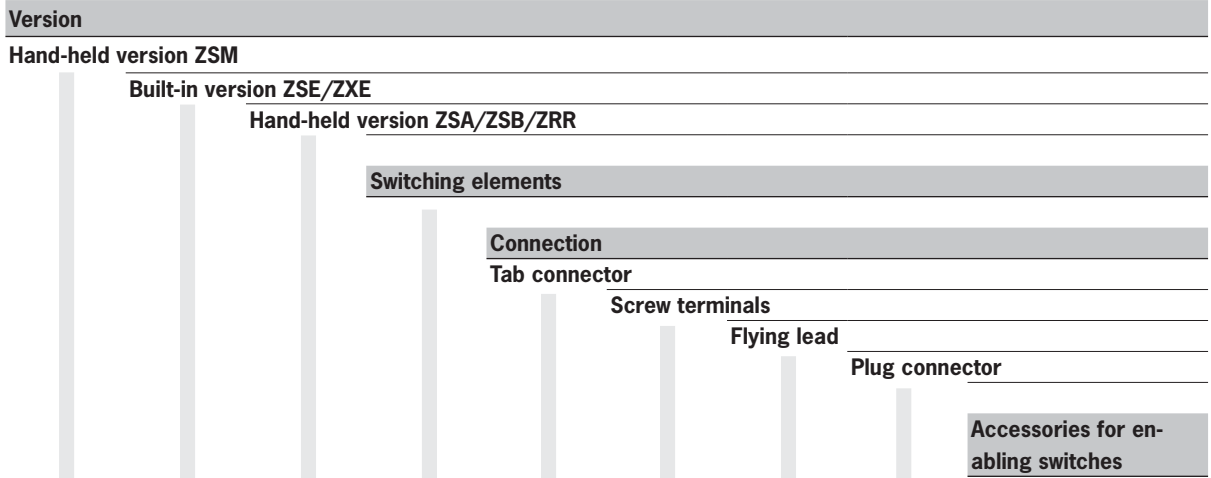
| For plug connector | Function | Manufacturer's designation | |
|--------------------------------------|---|--|---|
| SVM5 5 pins | Female connector M12 | 99-0436-57-05 Cable socket | Binder www.binderconnector.de |
| | Female flange connector M12 | 09-3442-700-05 Flange connector with flexible wires | |
| | Blanking plug M12 | 08-2425-000-000 Protective cap for socket with retaining strap | |
| C16-1 6 pins + PE | Female flange connector | T3107 500 Female receptacle | Amphenol-Tuchel www.amphenol-tuchel.com |
| | Socket crimp contacts for C16-1, packaging unit 100 pcs. | VN02 016 0002 (1) Single contact, silver, 0.5-1.5 mm2 | |
| | Blanking plug | T6483 000 Protective cap for female receptacle | |
| MR 7, 8, 9, 10 and 12 pins | Straight female connector (7-pin), pre-assembled for built-in connector MR7 | MIN-7FPX-.. Female plugs with cable | MENCOM www.mencomcorp.com |
| | Straight female connector (8-pin), pre-assembled for built-in connector MR8 | MIN-8FPX-.. Female plugs with cable | |
| | Straight female connector (9-pin), pre-assembled for built-in connector MR9 | MIN-9FP-.. Female plugs with cable | |
| | Straight female connector (10-pin), pre-assembled for built-in connector MR10 | MIN-10FP-.. Female plugs with cable | |
| | Straight female connector (12-pin), pre-assembled for built-in connector MR12 | MIN-12FP-.. Female plugs with cable | |
| HAN10 10 pins + PE | Flange connector 1 cable exit | 19 20 010 0251 Socket housing 1 cable exit | Harting www.harting.com |
| | Socket contacts (installation for flange connector) | 09 20 010 3101 Socket contact insert crimp connection | |
| | Socket contacts for crimping | 09 33 000 6220 Crimp contacts, socket, 0.5 mm2 | |
| | Blanking plug | 09 20 010 5425 Cover | |
| RC17-Y coded 17 pins | Female flange connector, solder For male connector RC17 | RC-17S1Y122000 Flange plug connector 17-pin | Coninvers www.coninvers.com |

► Crimp and extraction tools

| For plug connector | Function | Manufacturer's designation | |
|----------------------|-----------------|---|---|
| SR6 and SR11 | Crimp tool | 932 507-002 XZC 0701 | Hirschmann www.hirschmann.com |
| | Extraction tool | 931 812-001 XWA 164 | |
| C16-1 | Crimp tool | TA0500 + TA0000163 + TA0002016001 Crimp pliers, jaws and contact receptacle | Amphenol-Tuchel www.amphenol-tuchel.com |
| | Extraction tool | FG 0300 1461 Extraction tool | |
| RC12 and RC17 | Crimp tool | RC-Z2504 Crimp pliers for machined contacts | Coninvers www.coninvers.com |
| | Extraction tool | RC-Z2494 Extraction tool/insertion tool | |
| UT23 | Crimp tool | Y16RCM Crimping tool for machined contacts | Burndy www.burndy.com |
| | Extraction tool | RX2025GE1 Extraction tool | |

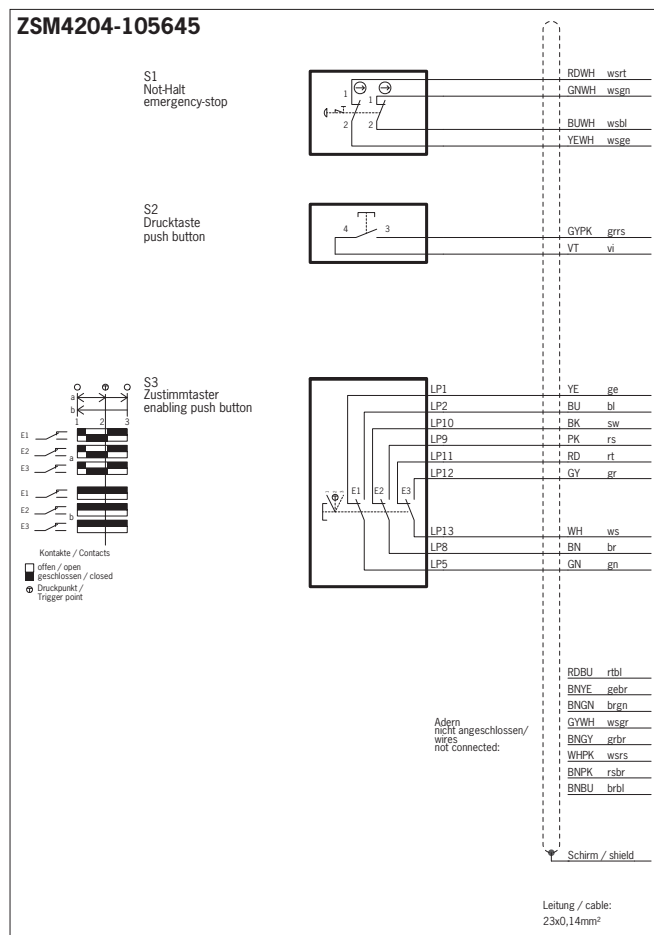
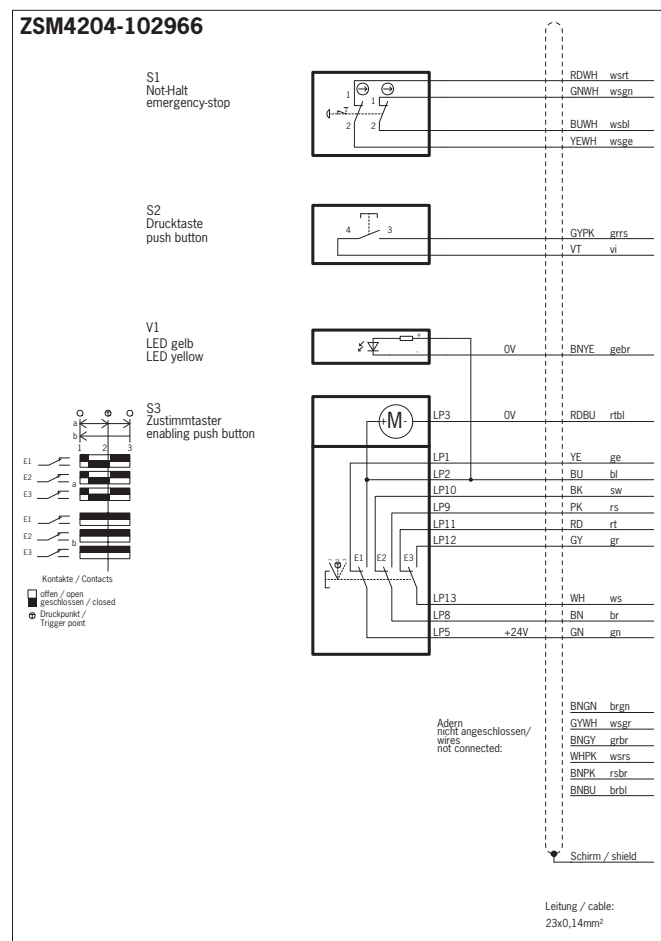
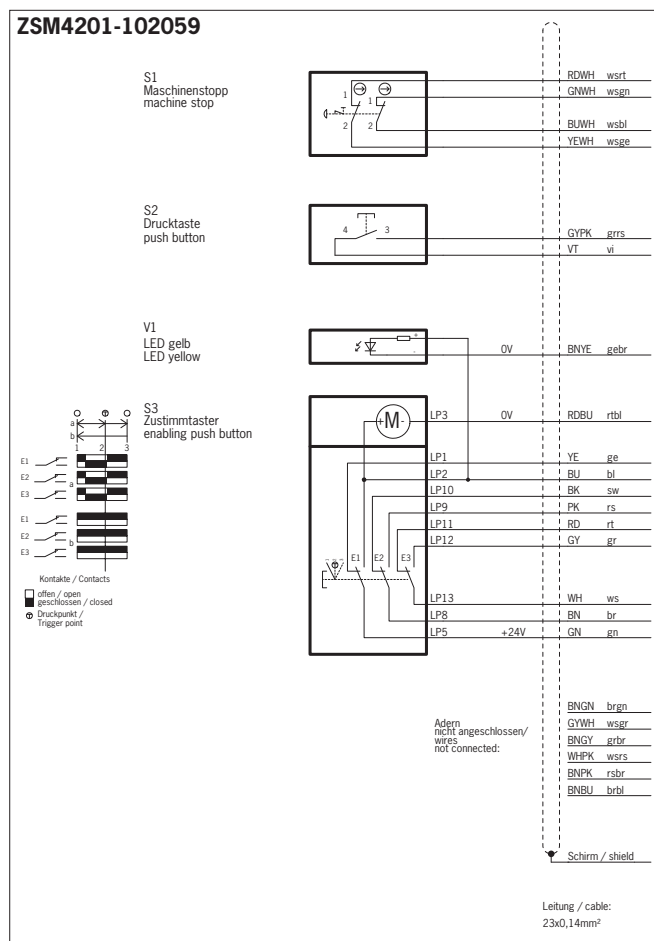
Overview

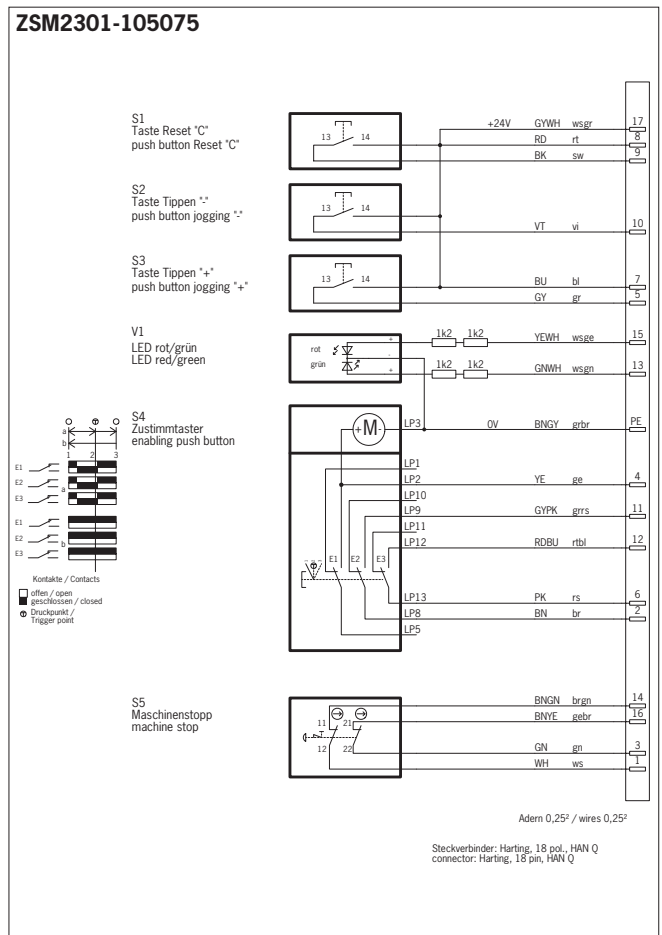
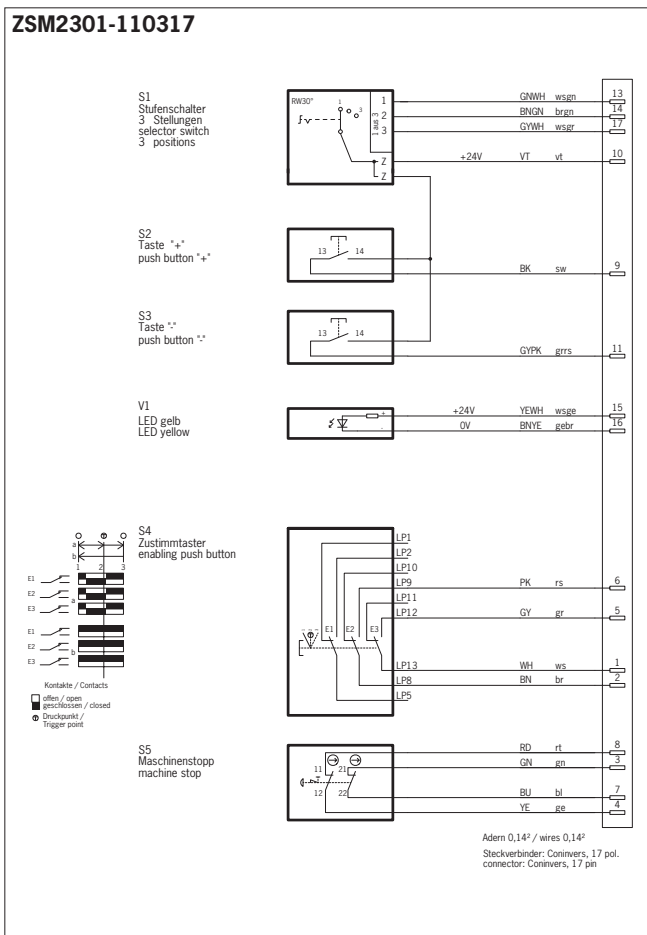
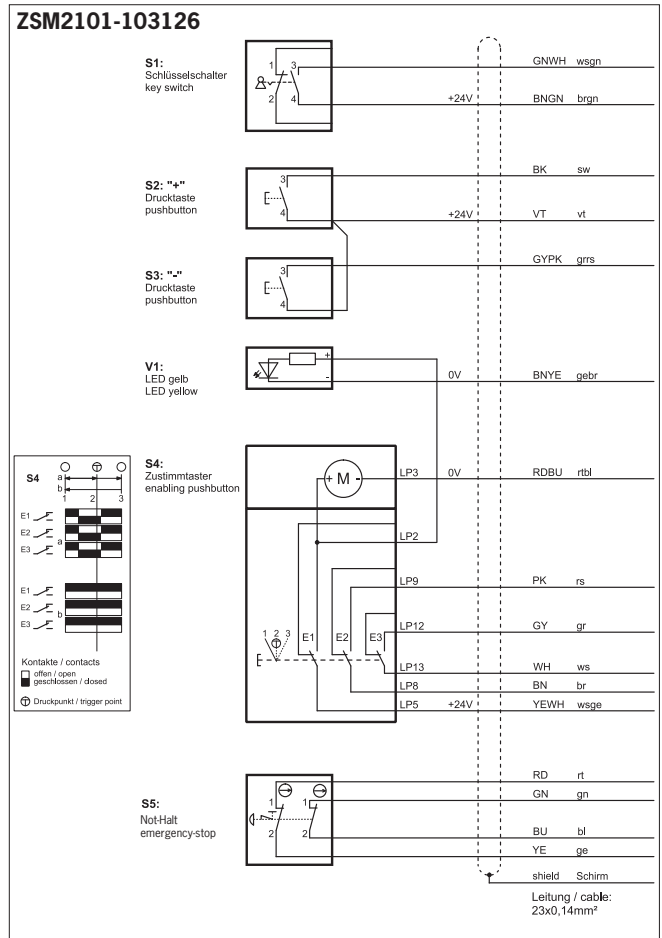
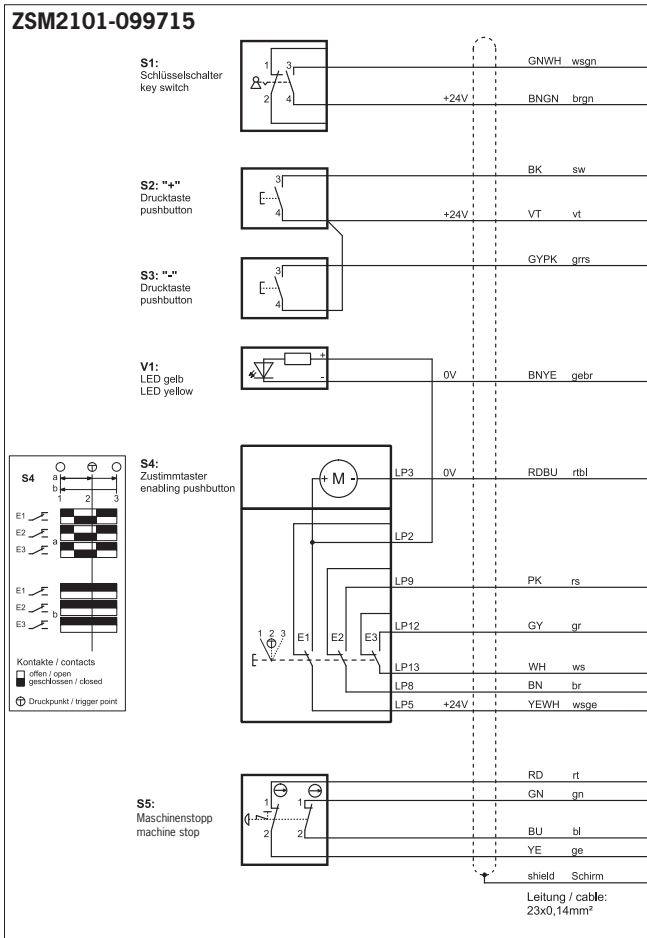
Wiring diagrams ZSM



| Wiring diagrams ZSM | Version | | | Switching elements | Connection | | | | Accessories | Page |
|------------------------|------------------|---------------------|--------------------------|-----------------------|--------------------|----------------------|-------------|---------------------|-------------|---------|
| | ZSM Hand-held | ZSE/ZXE Built-in | ZSA/ZSB/ZSR Hand-held | | Tab connec- tor | Screw termi- nals | Flying lead | Plug connec- tor | | |
| • | | | | | | | | | | 70 - 76 |
| | • | | | | | | | | | 77/78 |
| | | • | | | | | | | | 79 |
| | | | • | | | | | | | 79 |
| | | | | • | | | | | | 79 |
| | | | | | • | | | | | 80 |
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| | | | | | | | • | | | 80 |
| | | | | | | | | • | | 80/82 |
| | | | | | | | | | • | 83/84 |

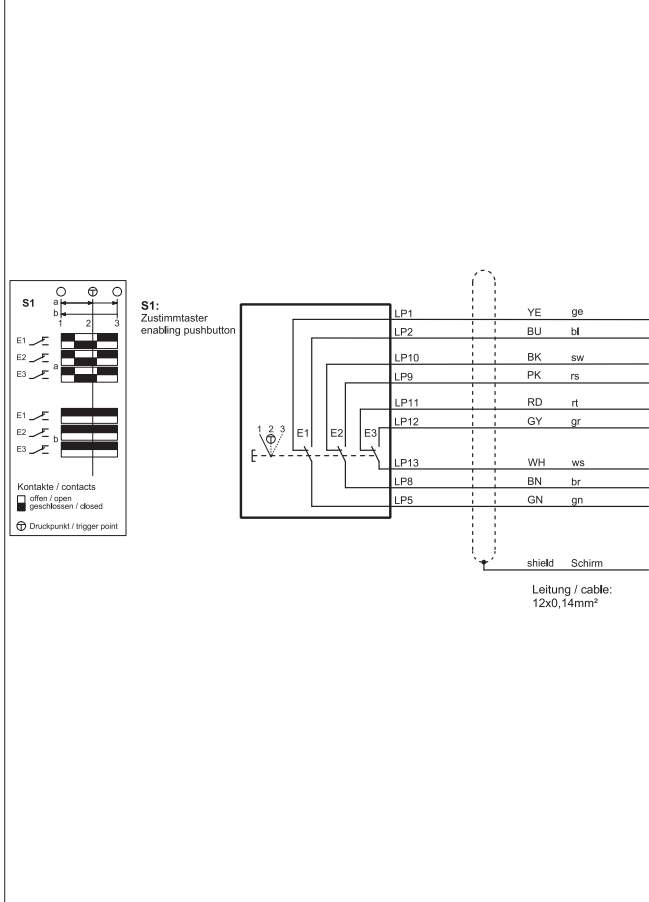
Wiring diagrams



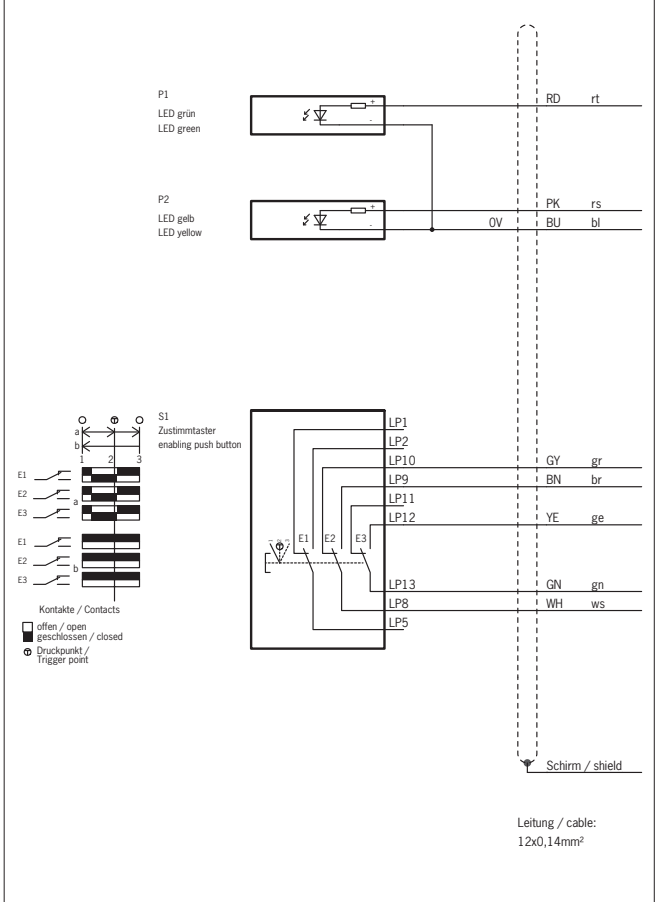


Wiring diagrams

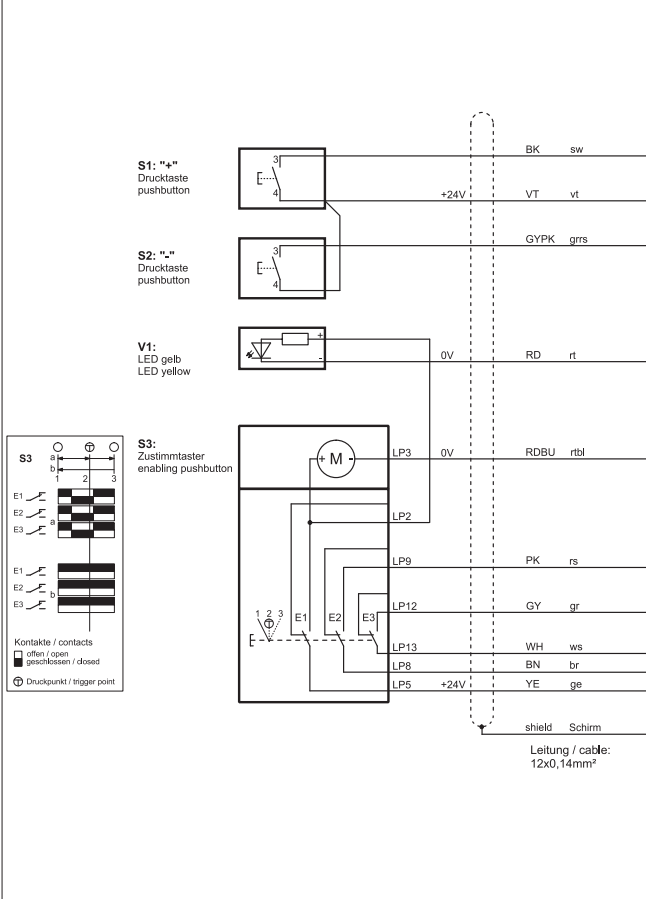
ZSM4200-099713



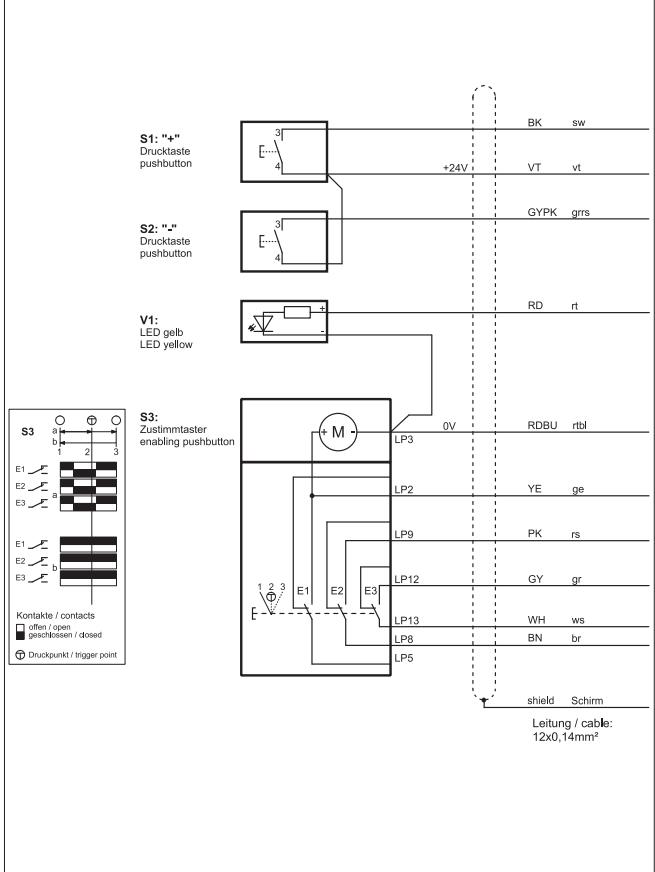
ZSM2300-111871



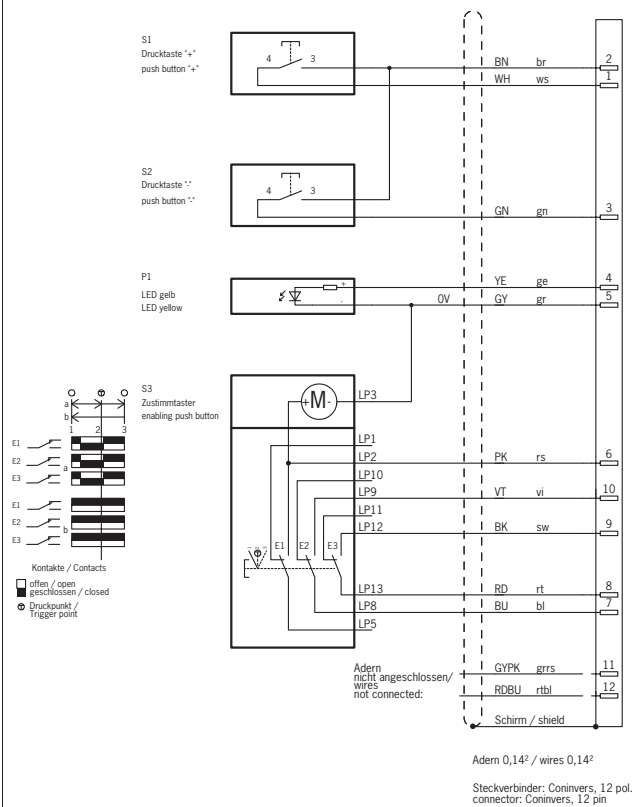
ZSM2100-099714



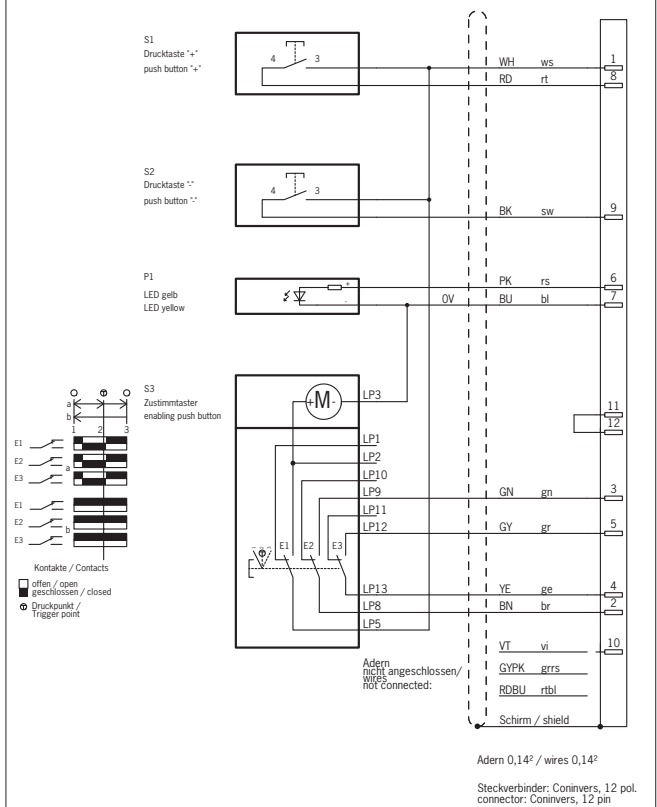
ZSM2300-109971
ZSM2300-112803



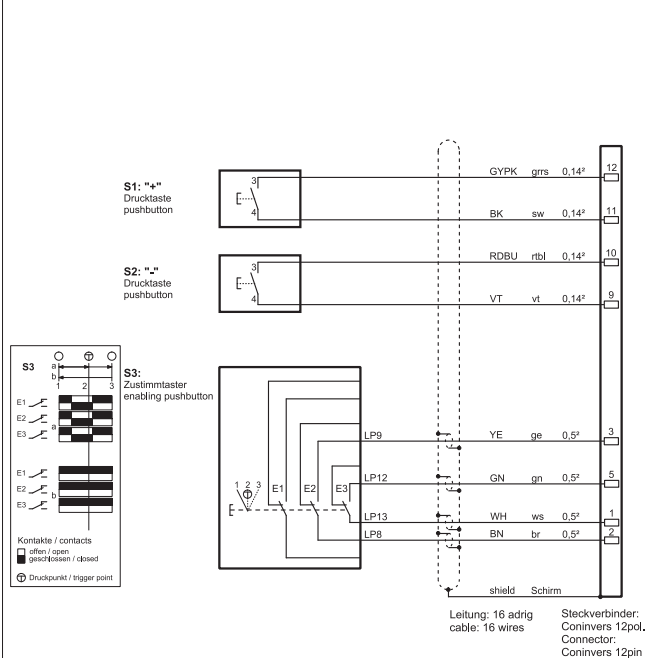
ZSM2300-111462



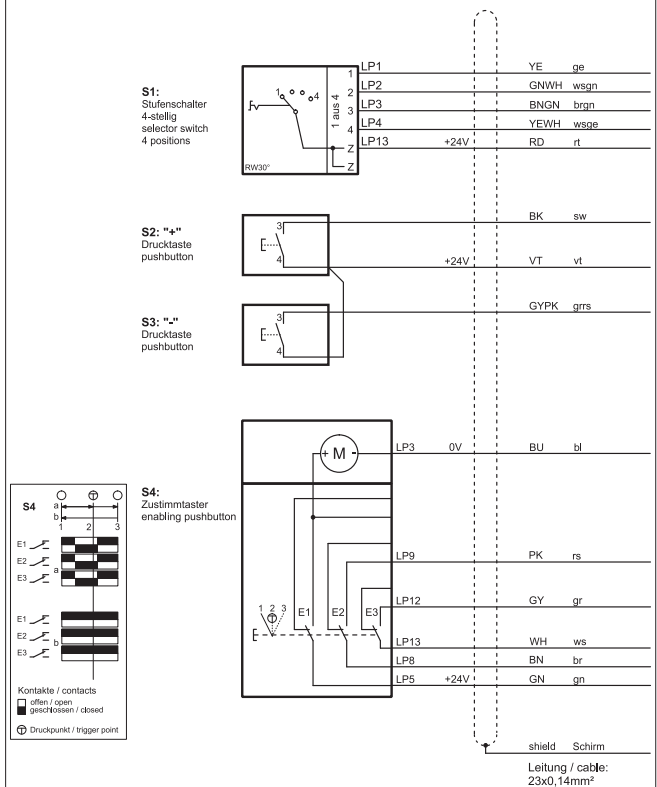
ZSM2100-111594



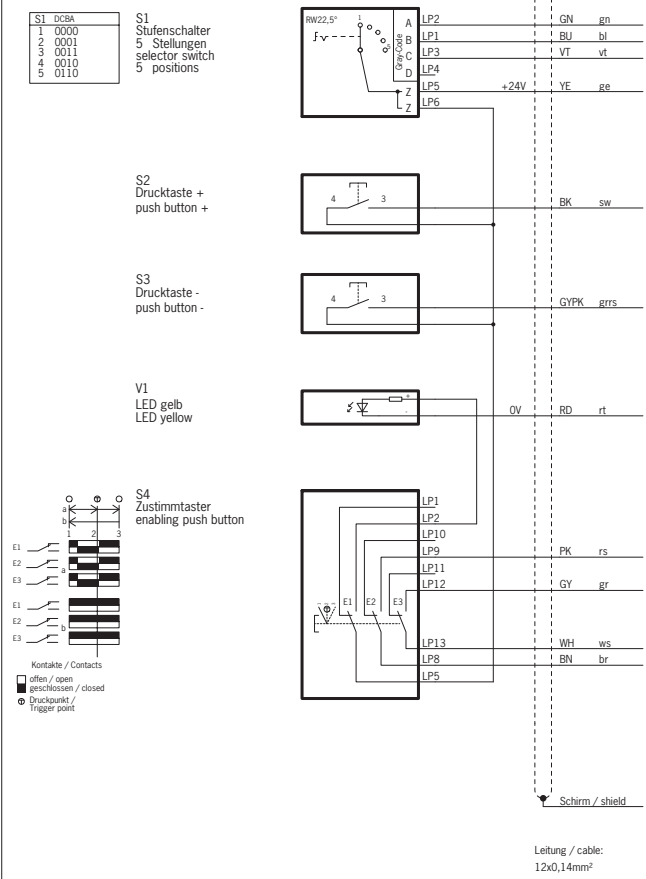
ZSM2300-099716 ZSM2300-113290



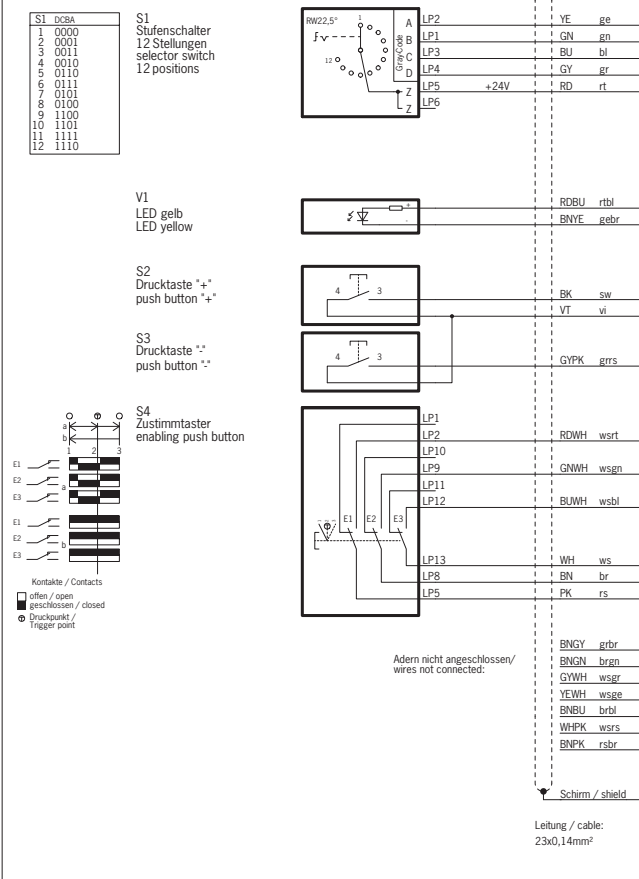
ZSM2200-100697



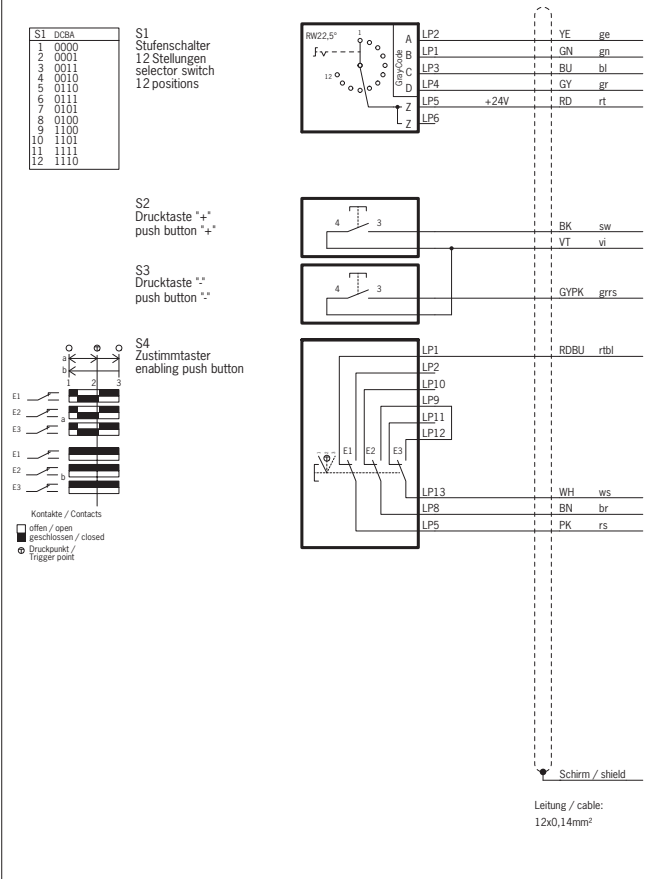
ZSM2100-106103



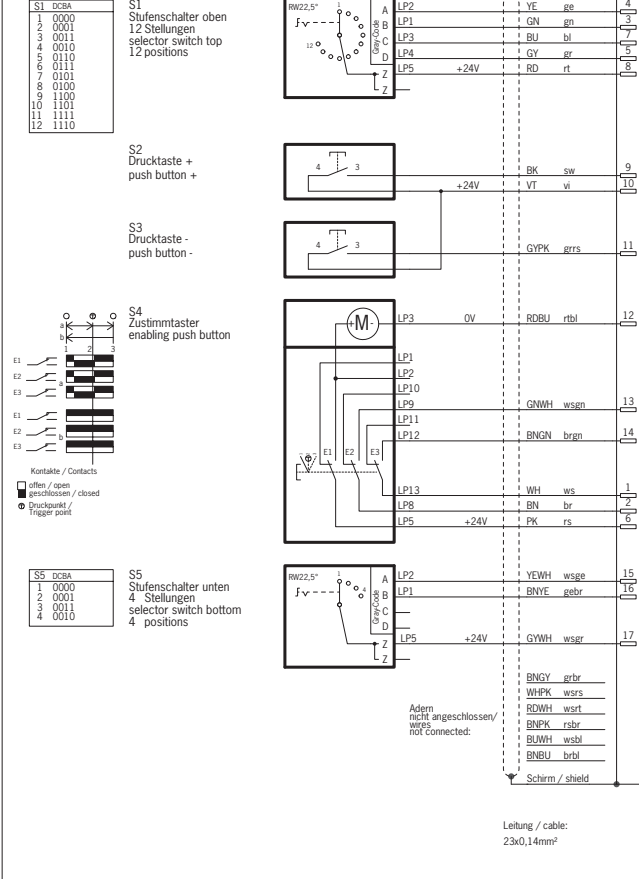
ZSM2200-105308



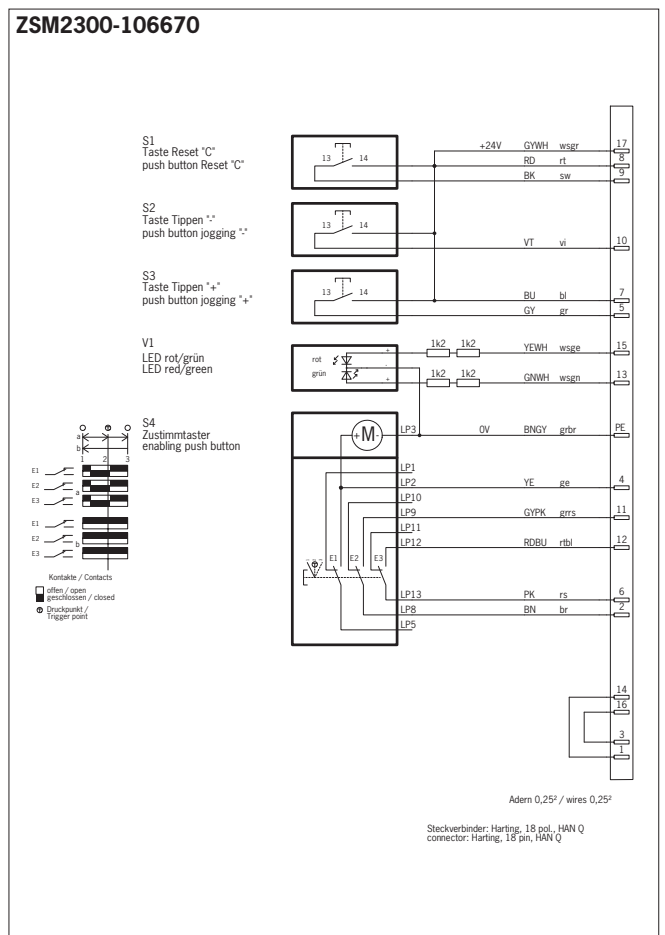
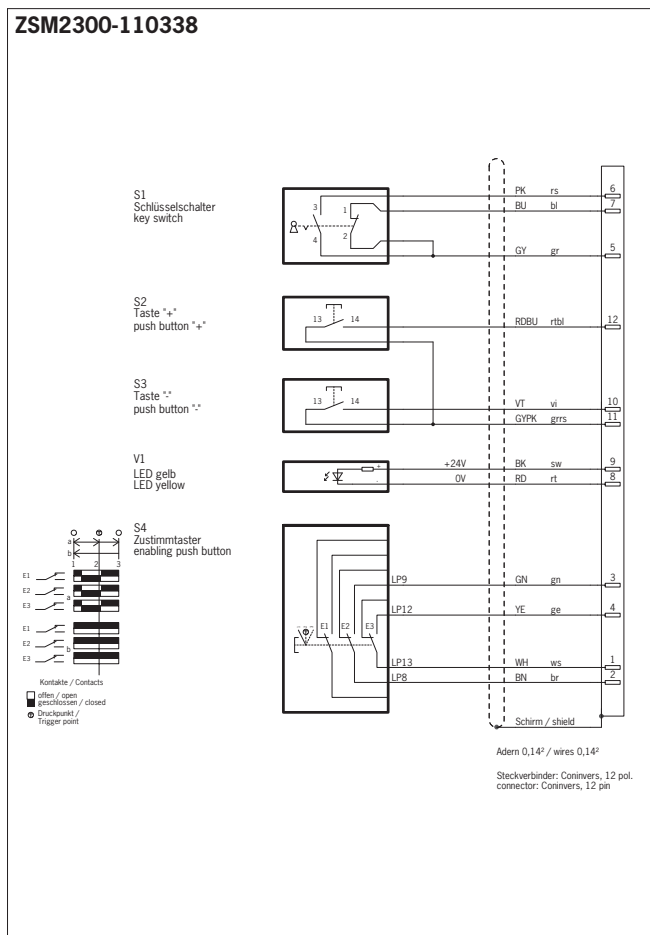
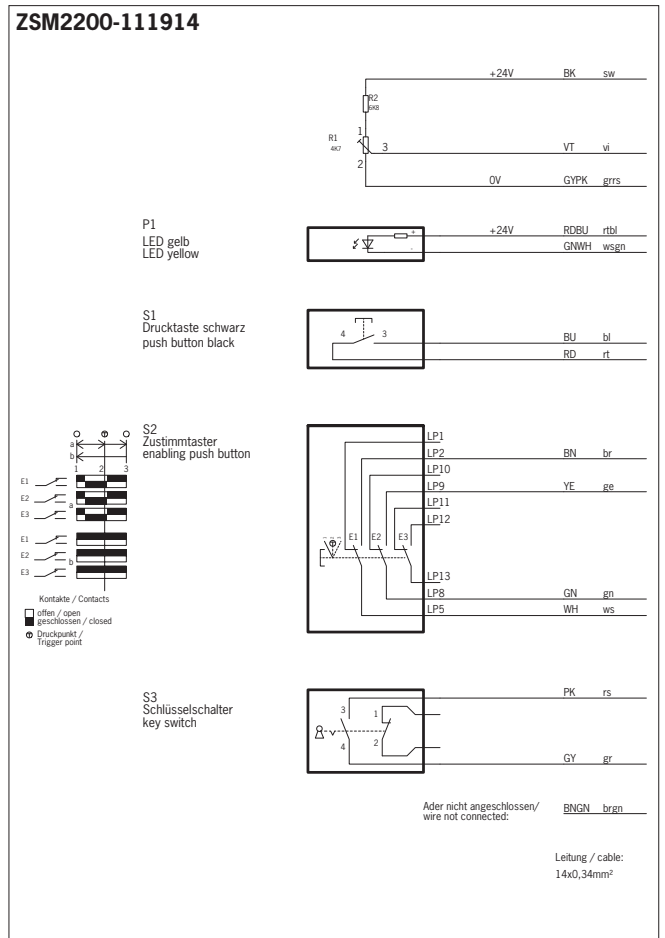
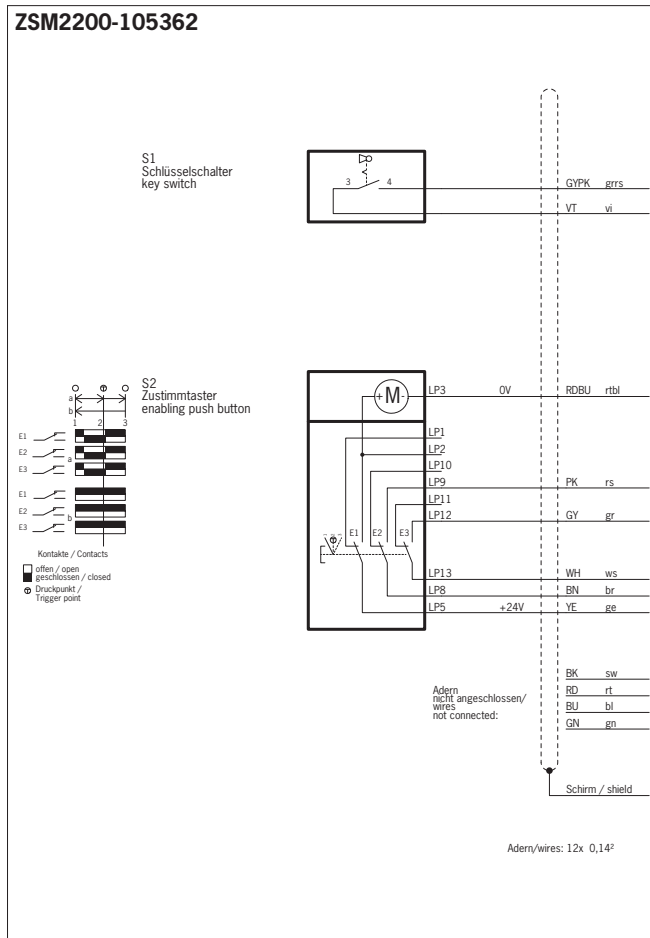
ZSM3100-103462



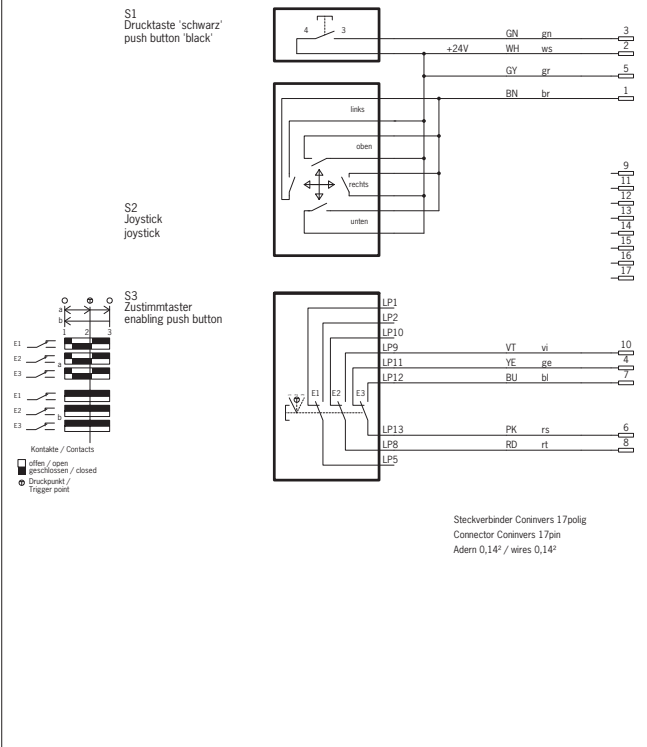
ZSM2200-112033



Wiring diagrams



ZSM2300-106374



Technical data

| Basic enabling switch ZSM | | | |
|---|-----------------|-------------|------|
| Parameter | | Value | Unit |
| Material | Housing | PA | |
| | Enabling switch | CR | |
| | Grip/seal | TPE | |
| Degree of protection according to IEC 529 | | IP 54 | |
| Ambient temperature | | -5 ... +60 | °C |
| Weight (incl. connection cable) | | approx. 1.1 | kg |

| Switching element, enabling switch | | | |
|---|--|---|------|
| Parameter | | Value | Unit |
| Switching contacts | | 3 changeover contacts | |
| Life | | 1 x 10 ⁶ operating cycles | |
| Utilization category to IEC 947-5-1 (for enabling switch) | | DC13 U _p 24 V I _p 0.3 A U _p 24 V I _p 1 A | |

| Machine stop | | | |
|---|--|--|------|
| Parameter | | Value | Unit |
| Color of actuating head | | Black | |
| Color of bottom shell | | yellow | |
| Reset | | Pull-to-reset button | |
| Degree of protection | | IP 65 | |
| Max. number of switching elements | | 2 | |
| Contact element | | 2 x positively driven contact | |
| Utilization category according to IEC 947-5-1 | | DC-13 I _p 1 A U _p 24 V | |

| Emergency stop device | | | |
|---|--|---|------|
| Parameter | | Value | Unit |
| Color of actuating head | | red | |
| Color of bottom shell | | yellow | |
| Reset | | Pull-to-reset button and turn-to-reset button | |
| Degree of protection | | IP 65 | |
| Number of switching elements | | 2 | |
| Contact element | | 1 x positively driven contact | |
| Utilization category according to IEC 947-5-1 | | DC-13 I _p 1 A U _p 24 V | |

| Single-color LED indicator | | | |
|----------------------------|--|---------------|------|
| Parameter | | Value | Unit |
| Housing | | Chrome-plated | |
| Operating voltage | | 24 | V |
| Color | | yellow or red | |

| Two-color LED indicator | | | |
|-------------------------|--|-------|------|
| Parameter | | Value | Unit |
| Forward current typ. | | 0.02 | A |
| Voltage red | | 1.85 | V |
| Voltage green | | 2.2 | V |

| Reset button/pushbutton | | | |
|-------------------------|--|-------|------|
| Parameter | | Value | Unit |
| Switching voltage max. | | 30 | V DC |
| Switching current max. | | 0.1 | A |

| Selector switch | | | |
|------------------------|--|---------------------|---------|
| Parameter | | Value | Unit |
| Output code | | see wiring diagrams | |
| Switching voltage max. | | 25 | V AC/DC |
| Breaking capacity max. | | 0.2 | VA |

Key-operated rotary switch

| Parameter | Value | Unit |
|------------------------|-------|---------|
| Switching voltage max. | 30 | V AC/DC |
| Switching current max. | 0.25 | A |

Rotary potentiometer

| Parameter | Value | Unit |
|---------------------|----------------|------|
| Resistance value | 4.7 | kΩ |
| Ambient temperature | - 55 to + +125 | °C |
| Actuating torque | 0.5 to 3.5 | Ncm |

One-touch function

| Parameter | Value | Unit |
|-----------------------------------|-------|------|
| Max. switching current at 28 V DC | 2 | A |
| - with resistive load | 1 | |
| - with inductive load | | |

Connection using flying lead

| Parameter | Value | Unit |
|---|---|------|
| Connection | Cable 12 x 0.14 mm ² Cable 23 x 0.14 mm ² | |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 2 | A gG |
| Utilization category according to EN 60947-5-1 | | |
| Enabling switches DC-13 | I _e 1 A U _e 24 V | |
| Keys and LEDs DC-13 | I _e 0.3 A U _e 24 V | |

Plug connector RC12 connection

| Parameter | Value | Unit |
|--|---|-----------------|
| Connection | Male connector | |
| Version | RC12 (11-pin + PE) | |
| Conductor cross-section | 0.14 | mm ² |
| Rated insulation voltage U _i | 0.8 | kV |
| Utilization category according to EN 60947-5-1 | | |
| Enabling switches DC-13 | I _e 1 A U _e 24 V | |
| Keys and LEDs DC-13 | I _e 0.3 A U _e 24 V | |

Plug connector RC17 connection

| Parameter | Value | Unit |
|--|---|-----------------|
| Connection | Male connector | |
| Version | RC17 (17-pin) | |
| Conductor cross-section | 0.14 | mm ² |
| Rated insulation voltage U _i | 0.8 | kV |
| Utilization category according to EN 60947-5-1 | | |
| Enabling switches DC-13 | I _e 1 A U _e 24 V | |
| Keys and LEDs DC-13 | I _e 0.3 A U _e 24 V | |

Plug connector HAN Q17 connection

| Parameter | Value | Unit |
|--|---|-----------------|
| Connection | Male connector | |
| Version | HAN Q17 (17-pin) | |
| Conductor cross-section | 0.14 | mm ² |
| Rated insulation voltage U _i | 0.8 | kV |
| Utilization category according to EN 60947-5-1 | | |
| Enabling switches DC-13 | I _e 1 A U _e 24 V | |
| Keys and LEDs DC-13 | I _e 0.3 A U _e 24 V | |

| Built-in version | | | |
|--|----------------------|--------------------------------------|------|
| Parameter | Value | | Unit |
| Housing material | Polyamide, black | | |
| Protective cap material | CR (neoprene), black | | |
| Degree of protection according to IEC 60529 | On the front panel | IP 65 | |
| Ambient temperature | - 5 to + +60 | | °C |
| Installation position | Any | | |
| Weight | ZSE/ZSG: approx. 0.1 | ZXE: approx. 0.03 | kg |
| Reliability values according to EN ISO 13849-1 | | | |
| B _{10d} | ZSE | 5 x 10 ⁵ operating cycles | |
| | ZXE | 1 x 10 ⁶ operating cycles | |

| Hand-held version G1 | | | |
|--|--|--------------------------------------|------|
| Parameter | Value | | Unit |
| Housing material | Polyamide, black | | |
| Protective cap material | CR (neoprene), black | | |
| Degree of protection according to IEC 60529 | IP 67 / IP 65 with additional function (button, LED) | | |
| Ambient temperature | - 5 to + 50 | | °C |
| Weight | Approx. 0.4 (no cable) | | kg |
| Reliability values according to EN ISO 13849-1 | | | |
| B _{10d} | ZSA | 5 x 10 ⁵ operating cycles | |
| | ZSB | 5 x 10 ⁵ operating cycles | |

| Hand-held version G2 | | | |
|--|---------------------------------------|--------------------------------------|------|
| Parameter | Value | | Unit |
| Housing material | Polyamide, yellow | | |
| Protective cap material | CR (neoprene), black | | |
| Degree of protection according to IEC 60529 | IP 65 | | |
| Ambient temperature | - 5 to + 50 | | °C |
| Weight | Approx. 1.1 (with 5 m straight cable) | | kg |
| Reliability values according to EN ISO 13849-1 | | | |
| B _{10d} | ZSR | 5 x 10 ⁵ operating cycles | |

| Hand-held version G3 | | | |
|--|---------------------------------------|--------------------------------------|------|
| Parameter | Value | | Unit |
| Housing material | Polyamide, yellow | | |
| Protective cap material | CR (neoprene), black | | |
| Degree of protection according to IEC 60529 | IP 65 | | |
| Ambient temperature | - 5 to + 50 | | °C |
| Weight | Approx. 1.5 (with 5 m straight cable) | | kg |
| Reliability values according to EN ISO 13849-1 | | | |
| B _{10d} | ZSB | 5 x 10 ⁵ operating cycles | |

| Switching elements | | | |
|---|---|------------------------------------|-----------------------------|
| Parameter | Value | | Unit |
| Switching principle | Slow-action switching contact | | |
| Life | 1 x 10 ⁵ cycles | | |
| Function sequence | 2-stage | 3-stage | |
| Switching element with 1 switching contact | 10 1 NO | 110 1 NO/NC ⊖ | |
| Switching element with 2 switching elements | 20 2 NO | 1210 1 NO/NC ⊖ + 1 NO | 2202 2 NO/NC |
| Switching element with 3 switching elements | 21 2 NO + 1 NC | 111 1 NO + 1 NC ⊖ + 1 NC | 210 2 NO + 1 NC ⊖ |
| Switching element with 4 switching elements | - | 121 1 NO + 2 NC ⊖ + 1 NC | 220 2 NO + 2 NC ⊖ |
| Min. switching current at 24 V | 1 mA (ZXE switching element 2202: 5 mA) | | |

Tab connector connection, hand-held kit ZSA

| Parameter | Value | Unit |
|---|---------------|-----------------------|
| Connection | Tab connector | |
| Version according to IEC 60760 | 2.8 x 0.8 mm | |
| Degree of protection according to IEC 60529 | IP 00 | |
| Rated impulse withstand voltage U_{mp} | 2.5 | kV |
| Rated insulation voltage U_i | 250 | V AC/DC |
| Conventional thermal current I_{th} | 3 | A |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 4 | A gG |
| Utilization category according to EN 60947-5-1 | AC-15 | I_e 4 A U_e 230 V |
| | DC-13 | I_e 3 A U_e 24 V |

Screw terminal connection, ZXE

| Parameter | Value | Unit |
|--|---|------------------------|
| Connection | Screw terminals | |
| Version | 4-pin | |
| Tightening torque, max., | 0.15 | Nm |
| Conductor diameter | single cond. 0.3 - 1.4 mm, AWG 22 - 16 | |
| Conductor nominal diameter | single cond. 1.5 | mm ² |
| | flexible cond. 1 mm ² , AWG 16 | |
| Conductor insulation stripping | 5 | mm |
| Degree of protection according to IEC 60529 | IP 00 | |
| Rated impulse withstand voltage U_{mp} | 1.5 | kV |
| Rated insulation voltage U_i | 30 | V AC/DC |
| Conventional thermal current I_{th} | 0.1 | A |
| External fuse U (+LA) / U (+LB) | 0.1 | A gG |
| Utilization category according to EN 60947-5-1 | DC-13 | I_e 0.1 A U_e 24 V |

Connection using flying lead

| Parameter | | Value | | | | Unit |
|---|----------------------|-----------------------------------|-----------------------------------|-----------------------------------|--|-----------------|
| | | Cable 3 x 0.75 mm ² | Cable 6 x 0.34 mm ² | Cable 8 x 0.34 mm ² | Cable 8 x 0.5 mm ² + 8 x 0.14 mm ² | |
| Version | Individual screening | 2 x 0.75 | 3 x 0.34 | 4 x 0.34 | 4 x 0.5 | mm ² |
| | Without screen | 1 x 0.75 | 3 x 0.34 | 4 x 0.34 | 4 x 0.5 | mm ² |
| | Additional elements | - | - | - | 8 x 0.14 | mm ² |
| Rated impulse withstand voltage U_{mp} | | 2.5 | 2.5 | 2.5 | 2.5 | kV |
| Rated insulation voltage U_i | | 250 | 250 | 250 | 250 | V AC/DC |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | | 4 | 2 | 2 | 2 | A gG |
| Utilization category of enabling switch according to EN 60947-5-1 | AC-15 | I_e 4 A U_e 230 V | I_e 2 A U_e 230 V | I_e 2 A U_e 230 V | I_e 2 A U_e 230 V | |
| | DC-13 | I_e 3 A U_e 24 V | I_e 2 A U_e 24 V | I_e 2 A U_e 24 V | I_e 2 A U_e 24 V | |
| Utilization category of buttons and LEDs according to EN 60947-5-1 | AC-15 | - | - | I_e 400 mA U_e 32 V | I_e 400 mA U_e 32 V | |
| | DC-13 | - | - | I_e 100 mA U_e 50 V | I_e 100 mA U_e 50 V | |

Plug connector SS4 connection

| Parameter | Value | Unit |
|---|---------------------|-----------------------|
| Connection | Male connector | |
| Version | SS4 (3-pin + PE) | |
| Connection cable conductor cross-section | 6 x 0.34 | mm ² |
| Degree of protection according to IEC 60529 | IP 67 ¹⁾ | |
| Rated impulse withstand voltage U_{mp} | 0.8 | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 2 | A gG |
| Utilization category according to EN 60947-5-1 | AC-15 | I_e 2 A U_e 230 V |
| | DC-13 | I_e 2 A U_e 24 V |

Plug connector SVM5 connection

| Parameter | Value | Unit |
|---|---------------------|----------------------|
| Connection | Male connector | |
| Version | SVM5 (5-pin) | |
| Connection cable conductor cross-section | 6 x 0.34 | mm ² |
| Degree of protection according to IEC 60529 | IP 67 ¹⁾ | |
| Rated impulse withstand voltage U_{mp} | 0.8 | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 2 | A gG |
| Utilization category according to EN 60947-5-1 | AC-15 | I_e 2 A U_e 24 V |
| | DC-13 | I_e 2 A U_e 24 V |

¹⁾ Only screwed tight with the related plug connector from page 64ff

Plug connector C16 connection

| Parameter | | Value | Unit |
|---|-------|--|-----------------|
| Connection | | Male connector | |
| Version | | C16 (6-pin + PE) | |
| Connection cable conductor cross-section | | 3 x 0.75 | 8 x 0.34 |
| Degree of protection according to IEC 60529 | | IP 67 ¹⁾ | mm ² |
| Rated impulse withstand voltage U _{imp} | | 0.8 | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | | 2 | A gG |
| Utilization category according to EN 60947-5-1 | AC-15 | I _e 2 A U _e 24 V | |
| | DC-13 | I _e 2 A U _e 24 V | |

Plug connector MR7 connection

| Parameter | | Value | Unit |
|---|-------|--|-----------------|
| Connection | | Male connector | |
| Version | | MR7 (7-pin) | |
| Connection cable conductor cross-section | | without cable | mm ² |
| Degree of protection according to IEC 60529 | | IP 65 ¹⁾ | |
| Rated impulse withstand voltage U _{imp} | | 0.8 | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | | 2 | A gG |
| Utilization category of enabling switch according to EN 60947-5-1 | AC-15 | I _e 2 A U _e 24 V | |
| | DC-13 | I _e 2 A U _e 24 V | |
| Utilization category of buttons and LEDs according to EN 60947-5-1 | AC-15 | 24 V 400 mA | |
| | DC-13 | 24 V 100 mA | |

Plug connector MR8 connection

| Parameter | | Value | Unit |
|---|-------|--|-----------------|
| Connection | | Male connector | |
| Version | | MR8 (8-pin) | |
| Connection cable conductor cross-section | | without cable | mm ² |
| Degree of protection according to IEC 60529 | | IP 65 ¹⁾ | |
| Rated impulse withstand voltage U _{imp} | | 0.8 | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | | 2 | A gG |
| Utilization category of enabling switch according to EN 60947-5-1 | AC-15 | I _e 2 A U _e 24 V | |
| | DC-13 | I _e 2 A U _e 24 V | |
| Utilization category of buttons and LEDs according to EN 60947-5-1 | AC-15 | 24 V 400 mA | |
| | DC-13 | 24 V 100 mA | |

Plug connector MR10 connection

| Parameter | | Value | Unit |
|---|-------|--|-----------------|
| Connection | | Male connector | |
| Version | | MR10 (10-pin) | |
| Connection cable conductor cross-section | | without cable | mm ² |
| Degree of protection according to IEC 60529 | | IP 65 ¹⁾ | |
| Rated impulse withstand voltage U _{imp} | | 0.8 | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | | 2 | A gG |
| Utilization category of enabling switch according to EN 60947-5-1 | AC-15 | I _e 2 A U _e 24 V | |
| | DC-13 | I _e 2 A U _e 24 V | |

Plug connector HAN10 connection

| Parameter | | Value | Unit |
|---|-------|---|-----------------|
| Connection | | Male connector | |
| Version | | HAN10 (10-pin + PE) | |
| Connection cable conductor cross-section | | 8 x 0.34 | mm ² |
| Degree of protection according to IEC 60529 | | IP 65 ¹⁾ | |
| Rated impulse withstand voltage U _{imp} | | 0.8 | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | | 2 | A gG |
| Utilization category according to EN 60947-5-1 | AC-15 | I _e 2 A U _e 230 V | |
| | DC-13 | I _e 2 A U _e 24 V | |

¹⁾ Only screwed tight with the related plug connector from page 64ff

Plug connector RC12 connection

| Parameter | Value | | Unit |
|---|--|--|-----------------|
| Connection | Male connector | | |
| Version | RC12 (11-pin + PE) | | |
| Connection cable conductor cross-section | 8 x 0.5 + 8 x 0.14 | 6 x 0.34 | mm ² |
| Degree of protection according to IEC 60529 | IP 67/IP 65 with additional elements ¹⁾ | | |
| Rated impulse withstand voltage U _{imp} | 0.8 | | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 2 | | A gG |
| Utilization category of enabling switch according to EN 60947-5-1 | AC-15 DC-13 | I _e 2 A U _e 24 V I _e 2 A U _e 24 V | |
| Utilization category of buttons and LEDs according to EN 60947-5-1 | AC-15 DC-13 | 24 V 400 mA 24 V 100 mA | - - |

Plug connector BS12 connection

| Parameter | Value | | Unit |
|---|---------------------|--|-----------------|
| Connection | Female connector | | |
| Version | BS12 (12-pin) | | |
| Connection cable conductor cross-section | 8 x 0.5 + 8 x 0.14 | | mm ² |
| Degree of protection according to IEC 60529 | IP 65 ¹⁾ | | |
| Rated impulse withstand voltage U _{imp} | 0.8 | | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 2 | | A gG |
| Utilization category of enabling switch according to EN 60947-5-1 | AC-15 DC-13 | I _e 2 A U _e 24 V I _e 2 A U _e 24 V | |
| Utilization category of buttons and LEDs according to EN 60947-5-1 | AC-15 DC-13 | 24 V 400 mA 24 V 100 mA | |

Plug connector RC17 connection

| Parameter | Value | | Unit |
|---|---|--|-----------------|
| Connection | Male connector | | |
| Version | RC17 (17-pin) | | |
| Connection cable conductor cross-section | 8 x 0.34 | 8 x 0.5 + 8 x 0.14 | mm ² |
| Degree of protection according to IEC 60529 | IP 67 or IP 65 with additional elements ¹⁾ | | |
| Rated impulse withstand voltage U _{imp} | 0.8 | | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 2 | | A gG |
| Utilization category of enabling switch according to EN 60947-5-1 | AC-15 DC-13 | I _e 2 A U _e 24 V I _e 2 A U _e 24 V | |
| Utilization category of buttons and LEDs according to EN 60947-5-1 | AC-15 DC-13 | 24 V 400 mA 24 V 100 mA | |

Plug connector RC17 Y-coded connection

| Parameter | Value | | Unit |
|---|---|--|-----------------|
| Connection | Male connector | | |
| Version | RC17 Y-coded (17-pin) | | |
| Connection cable conductor cross-section | 8 x 0.5 + 8 x 0.14 | | mm ² |
| Degree of protection according to IEC 60529 | IP 67 or IP 65 with additional elements ¹⁾ | | |
| Rated impulse withstand voltage U _{imp} | 0.8 | | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 2 | | A gG |
| Utilization category of enabling switch according to EN 60947-5-1 | AC-15 DC-13 | I _e 2 A U _e 24 V I _e 2 A U _e 24 V | |
| Utilization category of buttons and LEDs according to EN 60947-5-1 | AC-15 DC-13 | 24 V 400 mA 24 V 100 mA | |

Plug connector UT23 connection

| Parameter | Value | | Unit |
|---|---------------------|--|-----------------|
| Connection | Male connector | | |
| Version | UT23 (23-pin) | | |
| Connection cable conductor cross-section | 6 x 0.34 | | mm ² |
| Degree of protection according to IEC 60529 | IP 67 ¹⁾ | | |
| Rated impulse withstand voltage U _{imp} | 0.8 | | kV |
| Short circuit protection acc. to IEC 60269-1 (control circuit fuse) | 2 | | A gG |
| Utilization category according to EN 60947-5-1 | AC-15 DC-13 | I _e 2 A U _e 24 V I _e 2 A U _e 24 V | |

¹⁾ Only screwed tight with the related plug connector from page 64ff

Key-operated rotary switch

| Parameter | Value | Unit |
|--|---------------------------------|------|
| Housing material | PA black | |
| Ambient temperature | -25 to + 70 | °C |
| Front degree of protection (installed) | IP 65 | °C |
| Switching principle | Slow-action contact element | |
| Switching element | 1 x NC + 1 x NO | A |
| Max. switching current | 250 | mA |
| Switching voltage | 30 | V |
| Contact resistance | ≤ 200 | mΩ |
| Connection | Tinned circuit board connection | mΩ |

Selector switch

| Parameter | Value | Unit |
|--|---|------|
| Front degree of protection (installed) | IP 65 | |
| Single-hole bushing mounting | M7 x 0.75 | |
| Detent | Max. 12, stop can be adjusted as required from 2 to 12 detent positions | °C |
| Output code | Binary-coded | |
| Max. switching current | 0.5 | A |
| Max. switching voltage | AC 115 V, DC 24 V on installation in P2 or HB.. housing | |
| Max. breaking capacity | 10 | VA |
| Contact resistance | ≤ 6 | mΩ |
| Connection | Soldered connection | mΩ |

Illuminated pushbutton

| Parameter | Value | Unit |
|--|--|------|
| Housing material | PA6 black | |
| Cover material | PC, transparent | |
| Ambient temperature | -25 to +70 | °C |
| Front degree of protection (installed) | IP 65 | |
| Switching principle | Snap-action contact element | |
| Switching element | NC + NO | |
| Max. switching current | 4 | A |
| Switching voltage | 250 V, 12 ... 24 V on installation in P2 or HB.. housing | V |
| Contact resistance | ≤ 200 | mΩ |
| Connection | Soldered connection | |
| Built-in LED | Incandescent lamp, white, 21 mA 24 V | |

Emergency stop button

| Parameter | Value | Unit |
|-----------------------------------|------------|------|
| Color of actuating head | red | |
| Color of bottom shell | yellow | |
| Ambient temperature | -25 to +60 | °C |
| Max. number of switching elements | 2 | |
| Degree of protection | IP 65 | |

Emergency stop switching element

| Parameter | Value | Unit |
|---|--|------|
| Contact element | 1 x positively driven contact | |
| Utilization category according to IEC 947-5-1 | DC-13 U _e 24 V I _e 3 A | |
| Connection | Soldered connection | |

Plug connector series SS4 and BD4

| Parameter | Value | Unit |
|--|--|---------|
| Housing material | Brass matt chromium plated | |
| Number of pins | 4 (3 + PE) | |
| Cable diameter | 6 - 8 | mm |
| Nominal voltage max. | 250 | V AC/DC |
| Degree of protection according to IEC 60529 (inserted) | IP 67 | |
| Connection | Soldered connections 1.0 mm ² | |

Plug connector C16-1

| Parameter | Value | Unit |
|--|--|------|
| Housing material | Polyamide 6.6 | |
| Number of pins | 7 (6 + PE) | |
| Cable diameter max. | 9.5 | mm |
| Nominal voltage max. | 230 | V |
| Degree of protection according to IEC 60529 (inserted) | IP 67 | |
| Connection | Crimp contacts 0.5 - 1.5 mm ² | |

Plug connector series BS12

| Parameter | Value | Unit |
|--|--|---------|
| Housing material | Brass matt chromium plated | |
| Number of pins | 12 (11 + PE) | |
| Cable diameter max. | 12 - 14 | mm |
| Nominal voltage max. | 250 | V AC/DC |
| Degree of protection according to IEC 60529 (inserted) | IP 67 | |
| Connection | Soldered connections 1.0 mm ² | |

Plug connector series RC12

| Parameter | Value | Unit |
|--|--|--|
| Housing material | Metal | |
| Number of pins | 12 (screen on the housing) | |
| | Male plug | Flange connector |
| Cable diameter max. | 10 | - |
| Connection | Crimp contacts 0.14 - 0.56 mm ² | Soldered connections 1.0 mm ² |
| Nominal voltage max. | 230 | V AC/DC |
| Degree of protection according to IEC 60529 (inserted) | IP 67 | |

Plug connector series RC17

| Parameter | Value | Unit |
|--|--|--|
| Housing material | Metal | |
| Number of pins | 17 (screen on the housing) | |
| | Male plug | Flange connector |
| Cable diameter max. | 10 | - |
| Connection | Crimp contacts 0.14 - 0.56 mm ² | Soldered connections 1.0 mm ² |
| Nominal voltage max. | 230 | V AC/DC |
| Degree of protection according to IEC 60529 (inserted) | IP 67 | |

Plug connector series UT23

| Parameter | Value | Unit |
|--|--|---------|
| Housing material | Metal | |
| Number of pins | 23 | |
| Nominal voltage max. | 230 | V AC/DC |
| Degree of protection according to IEC 60529 (inserted) | IP 67 | |
| Connection | Crimp contacts 0.3 - 0.5 mm ² | |

Index by item designation

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