Enabling Switches

ZS

More than safety.

EUCHNER

More than safety.

Emil Euchner, the company's founder and inventor of the multiple limit switch, circa 1928.

Around the world – the Swabian specialists in motion sequence control for mechanical and systems engineering.

EUCHNER's history began in 1940 with the establishment of an engineering office by Emil Euchner. Since that time, EUCHNER has been involved in the design and development of switchgear for controlling a wide variety of motion sequences in mechanical and systems engineering. In 1953, Emil Euchner founded EUCHNER + Co., a milestone in the company's history. In 1952, he developed the first multiple limit switch – to this day a symbol of the enterprising spirit of this family-owned company.

Automation – Safety – ManMachine

Today, our products range from electromechanical and electronic components to complex system solutions. With this wide range of products we can provide the necessary technologies to offer the right solution for special requirements – regardless of whether these relate to reliable and precise positioning or to components and systems for safety engineering in the automation sector.
EUCHNER products are sold through a world-wide sales network of competent partners. With our closeness to the customer and the guarantee of reliable solutions throughout the globe, we enjoy the confidence of customers all over the world.

Quality, reliability, precision

Quality, reliability and precision are the hallmarks of our corporate philosophy. They represent concepts and values to which we feel totally committed.
At EUCHNER, quality means that all our employees take personal responsibility for the company as a whole and, in particular, for their own field of work. This individual commitment to perfection results in products which are ideally tailored to the customers' needs and the requirements of the market. After all: our customers and their needs are the focus of all our efforts. Through efficient and effective use of resources, the promotion of personal initiative and courage in finding unusual solutions to the benefit of our customers, we ensure a high level of customer satisfaction. We familiarize ourselves with their needs, requirements and products and we learn from the experiences of our customers' own customers.

EUCHNER – More than safety.

Quality – made by EUCHNER

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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					
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**
ZSG **ZSE** **ZXE**	**ZSM** 	**ZSA** **G1**	**ZSB** **G1** **G3**	**ZSR** **G2**	

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

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	Safety related requirements on design, configuration and operation of industrial robots (withdrawn)
VDI 2854	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	Machinery and Machine Guarding
Subpart P	Hand and Portable Power Tools and Other Hand-Held Equipment
Subpart S	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:

DGUV Test Sicherheit geprüft tested safety	Switches with this symbol have the approval of the German Social Accident Insurance association (DGUV) – formerly the employers' liability insurance association (BG)
c UL us LISTED	Switches with this symbol are approved by Underwriters Laboratories (UL, Canada and USA)

Function and technology used in enabling switches

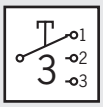
Task of enabling switches

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 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 switch 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:

Symbol for a 2-stage enabling device



Symbol for a 3-stage enabling switch

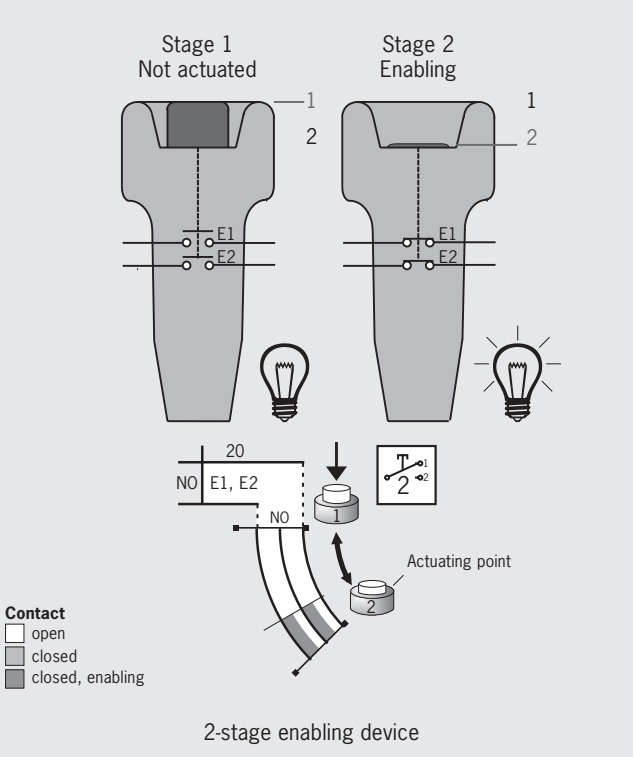
Large selection of switching elements

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

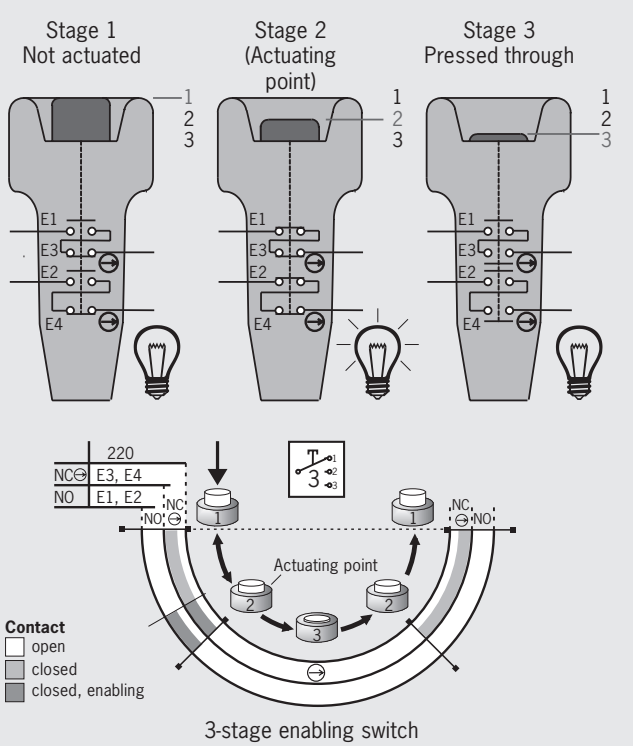
Positively driven contacts are used in many switching elements. These are special switching contacts that are designed to ensure the switching contacts are always reliably separated. Even if contacts are welded together, the connection is opened by the actuating force.

Function sequence of two-stage enabling device



2-stage enabling device

Function sequence of three-stage enabling switch



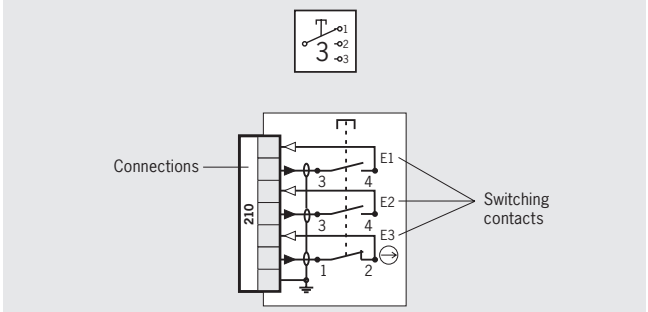
3-stage enabling switch

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 (NC ⊖).
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. Das ist nur bei der Betätigung von Stufe 1 nach Stufe 2 möglich. 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).

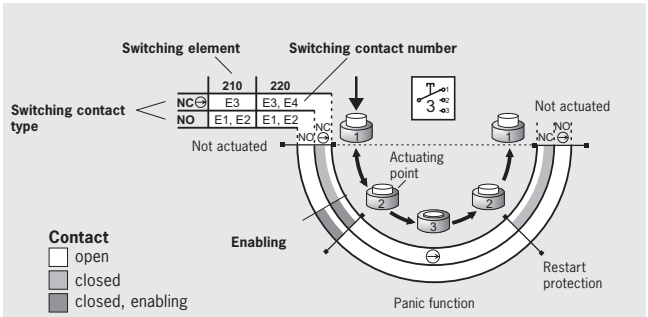
Reading travel diagrams and wiring diagrams

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:



Wiring diagram for switching element 210

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.



Travel diagram for switching element 210

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 ⊖).

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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
  (as 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“.

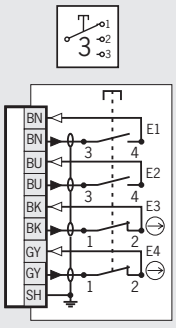
In the example for switching element 210 the sequence is as follows:

- 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. Dies ist der Zustimmbereich.
- 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:

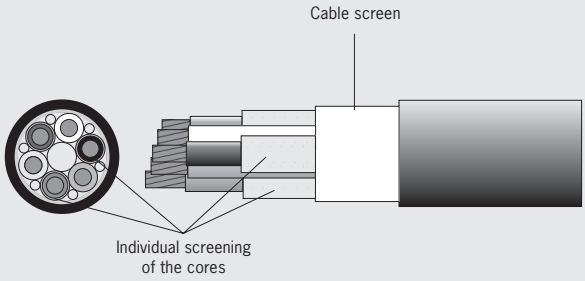


Wiring diagram for switching element 220

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.



Layout of connection cables

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 the model, the hand-held enabling switches have degree of protection IP 67 or IP 65. Along with the enabling function, EUCHNER enabling switches can be equipped with further controls (pushbuttons, selector switches, key-operated switches or emergency stop device) and LED indicators. 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 with 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.

Acknowledgement of enabling

Vibration signal
The ZSM enabling switch is optionally equipped with a vibration motor. This permits acknowledgement 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 acknowledgement. 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.

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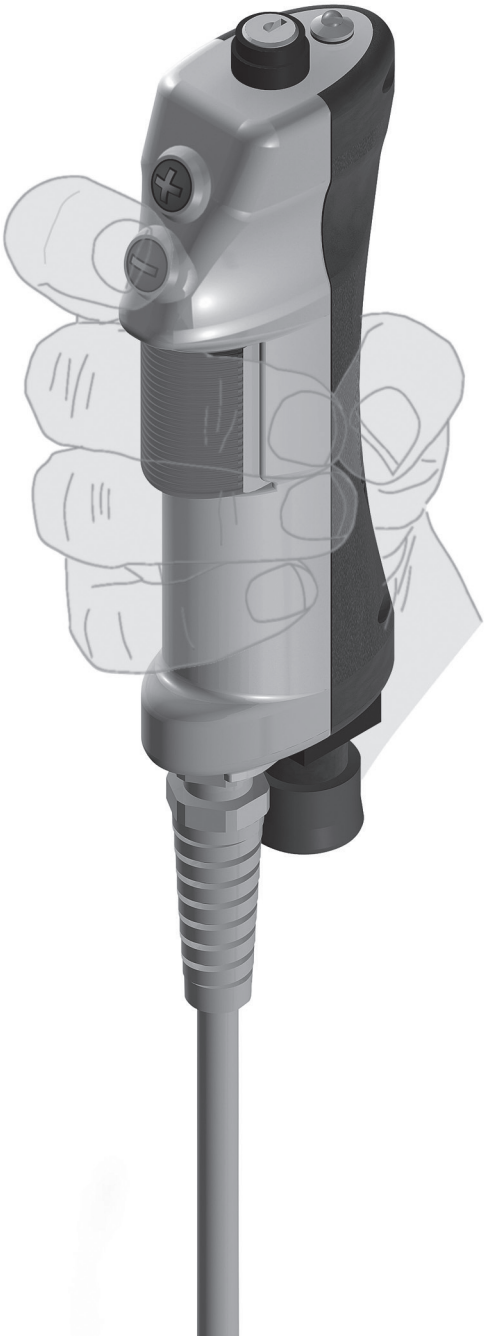
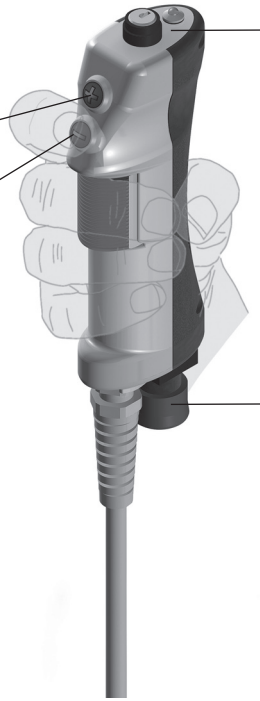


Article overview for enabling switch ZSM

Order no. / item	Top: Selector switch	Top: Key switch	Top: Push button	Top: LEDs	Top: Stop command device: Machine stop Black 2 NC	Top: Stop command device: Emergency stop red 2 NC	Front: Top push button	Front: Bottom push button	Front: One-touch function (joy-stick)	Bottom: Stop command device: Machine stop Black 2 NC	Bottom: Stop command device: Emergency stop red 2 NC	ZS	vibration signal	Cable length [m]: Connection cable Straight	Cable length [m]: Connection cable coiled	Plug connector	Page
102059 ZSM4201-102059	–	–	–	●	●	–	–	white	–	–	–	3 W	●	5		–	**12**
102966 ZSM4204-102966	–	–	–	●	–	●	–	white	–	–	–	3 W	●	5		–	**12**
105645 ZSM4204-105645	–	–	–	–	–	●	–	Black	–	–	–	3 W	–		1.88 - 5	–	**13**
099715 ZSM2101-099715	–	●	–	●	–	–	⊕	⊖	–	●	–	2 S	●	5		–	**14**
103126 ZSM2101-103126	–	●	–	●	–	–	⊕	⊖	–	–	●	2 S	●	5		–	**14**
110317 ZSM2301-110317	3-stage 1 of 3	–	–	●	–	–	⊕	⊖	–	●	–	2 S	–		1.88 - 5	RC17	**15**
105075 ZSM2301-105075	–	–	● Reset	●	–	–	⊖	⊕	–	●	–	2 S	●		1.4 - 3.8	HAN Q17	**15**
099713 ZSM4200-099713	–	–	–	–	–	–	–	–	–	–	–	3 W	–	5		–	**16**
111871 ZSM2300-111871	–	–	–	2 x ●	–	–	–	–	–	–	–	1 C + 1 NO	-	-	1.88 - 5	-	**17**
099714 ZSM2100-099714	–	–	–	●	–	–	⊕	⊖	–	–	–	2 S	●	5		–	**18**
109971 ZSM2300-109971	–	–	–	●	–	–	⊕	⊖	–	–	–	2 S	●	5		–	**18**
111462 ZSM2300-111462	–	–	–	●	–	–	⊕	⊖	–	–	–	2 S	●	–	1.88 - 5	RC12	**19**
111594 ZSM2100-111594	–	–	–	●	–	–	⊕	⊖	–	–	–	2 S	●	–	1.88 - 5	RC12	**19**
099716 ZSM2300-099716	–	–	–	–	–	–	⊕	⊖	–	–	–	2 S	–	5		RC12	**19**
100697 ZSM2200-100697	4-stage 1 of 4	–	–	–	–	–	⊕	⊖	–	–	–	2 S	●	10		–	**20**

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

106103 ZSM2100-106103	5-stage Gray code	–	–	●	–	–	⊕	⊖	–	–	–	2 S	–	3		–	**20**
105308 ZSM2200-105308	12-stage Gray code	–	–	●	–	–	⊕	⊖	–	–	–	3 S	–	5		–	**21**
103462 ZSM3100-103462	12-stage Gray code	–	–	–	–	–	⊕	⊖	–	–	–	2 NO + 1 C	–		1.88 - 5	–	**21**
105362 ZSM2200-105362	–	●	–	–	–	–	–	–	–	–	–	2 S	●	8		–	**22**
110338 ZSM2300-110338	–	●	–	●	–	–	⊕	⊖	–	–	–	2 S	–		1.55 - 3.5	RC12	**22**
106670 ZSM2300-106670	–	–	● Reset	●	–	–	⊖	⊕	–	–	–	2 S	●		1.25 - 3.1	HAN Q17	**23**
106374 ZSM2300-106374	–	–	Black	–	–	–	–		●	–	–	1 NO + 1 C	–	–		RC17	**23**



Top
An emergency stop or machine stop can be installed in the upper position for rapid access in an emergency. Alternatively, there is pace for various buttons, switches or an LED.

Upper front
There is space for two push buttons on the front. The one-touch function can also be installed.

Lower front

Bottom
An emergency stop or machine stop is built in here in some pre-assembled versions. The kit has a blank plug here for great flexibility. The cable gland protects the stop command device in the event of a fall.

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Enabling switch ZSM with upper stop command device

- **3-stage function**
- **Stop command device**
- **Vibration signal optional**
- **LED indicator optional**
- **Push button**
- **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

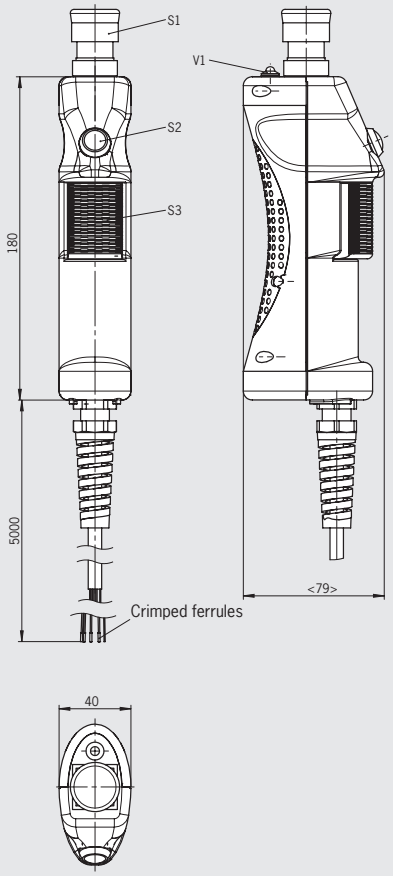
Vibration signal
The vibration signal is used for tactile feedback of the enabling position.

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

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

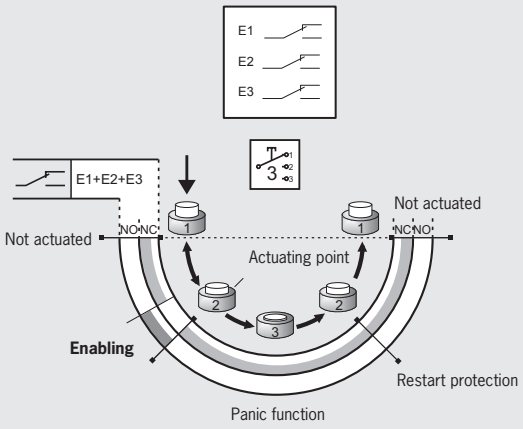
Cable
The high-quality connection cables are available in a straight or coiled version.

Dimension drawing



For wiring diagram see page 26

Switching element/function sequence



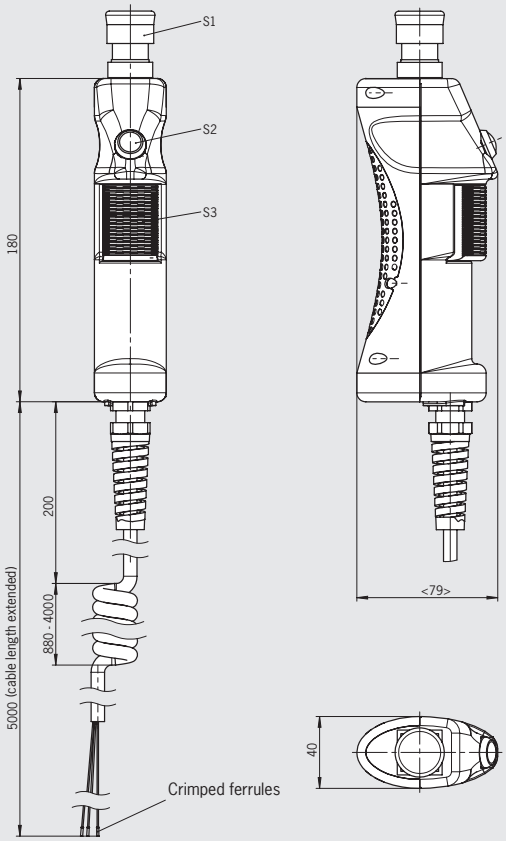
Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 23 x 0.14 mm²**	5 m Straight	Enabling switch with 3 changeover contacts (S3), black machine stop (S1), vibration signal, yellow LED indicator (V1), white push button (S2)	**102059** ZSM4201-102059
			Enabling switch with 3 changeover contacts (S3), red emergency stop device (S1), vibration signal, yellow LED indicator (V1), white push button (S2)	**102966** ZSM4204-102966

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

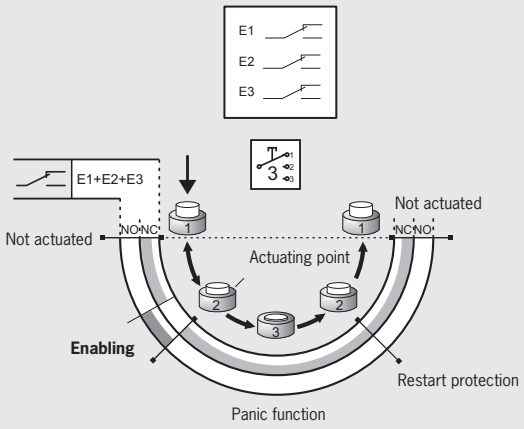
ZSM4204-105645, 3-stage function
Flying lead, emergency stop device

Dimension drawing



For wiring diagram see page 26

Switching element/function sequence



Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 23 x 0.14 mm²**	1.88 ... 5 m coiled	Enabling switch with 3 changeover contacts (S3), red emergency stop device (S1) white push button (S2)	**105645** ZSM4204-105645

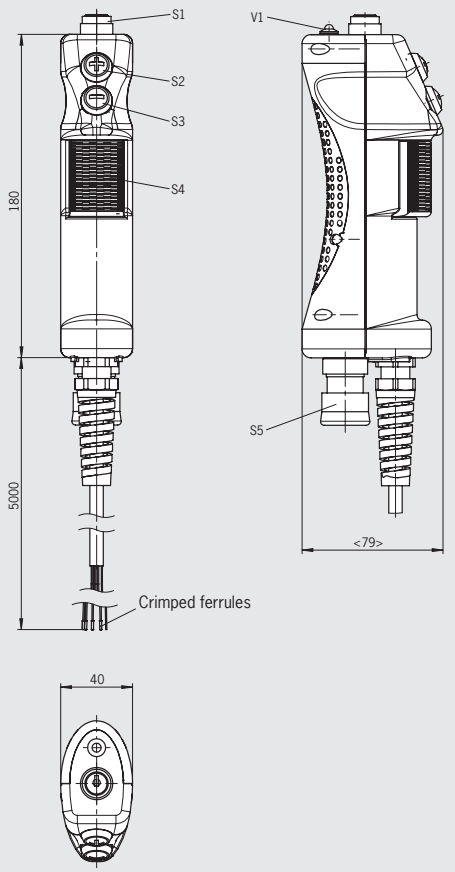
Enabling switch ZSM with lower stop command device

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

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

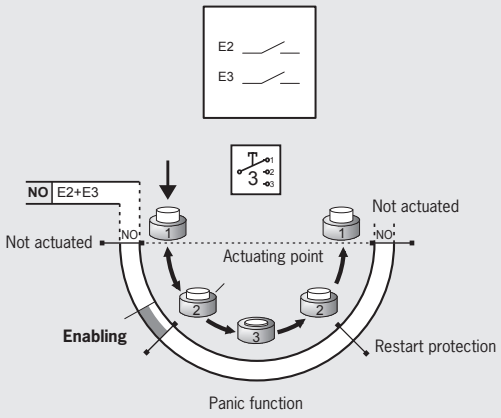
ZSM2101-103126, 3-stage function
Flying lead, emergency stop device

Dimension drawing



For wiring diagram see page 27

Switching element/function sequence



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.

LEDs
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 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.

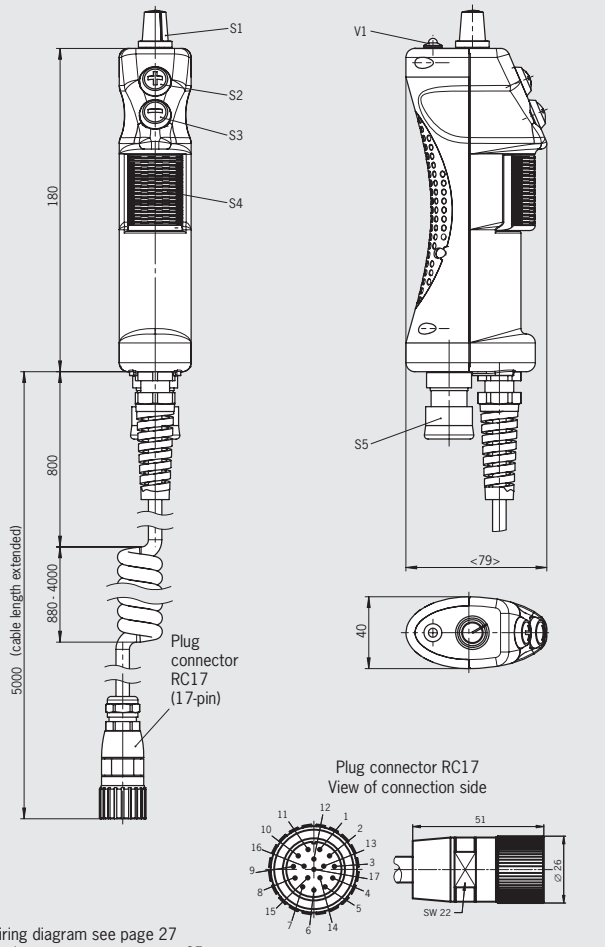
Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 23 x 0.14 mm²**	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 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 switch (S1)	**103126** ZSM2101-103126

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

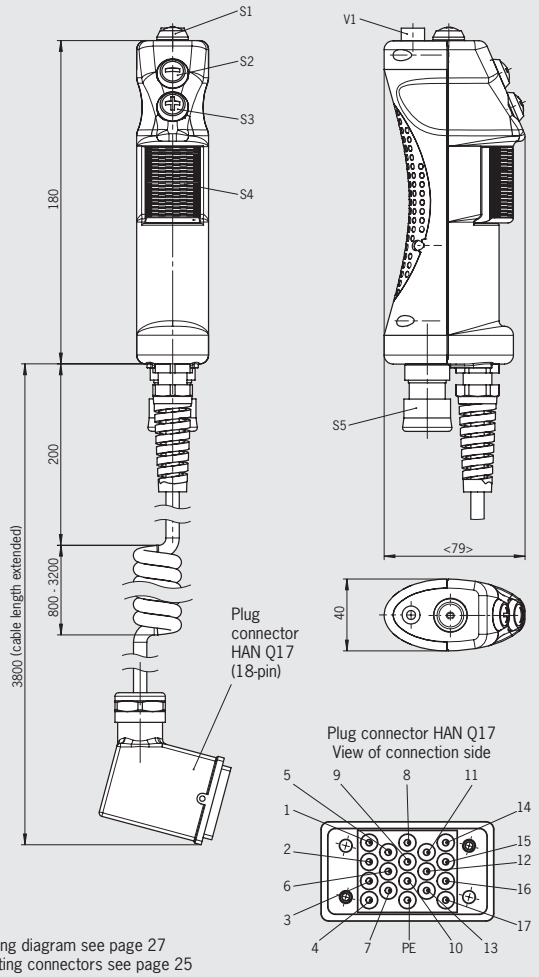
ZSM2301-110317, 3-stage function
Plug connector RC17, machine stop

Dimension drawing



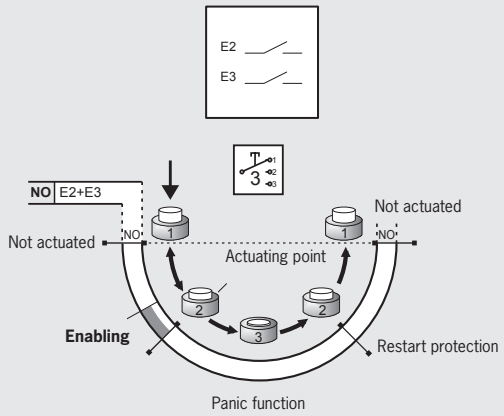
For wiring diagram see page 27
For mating connectors see page 25

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



For wiring diagram see page 27
For mating connectors see page 25

Switching element/function sequence



Ordering table

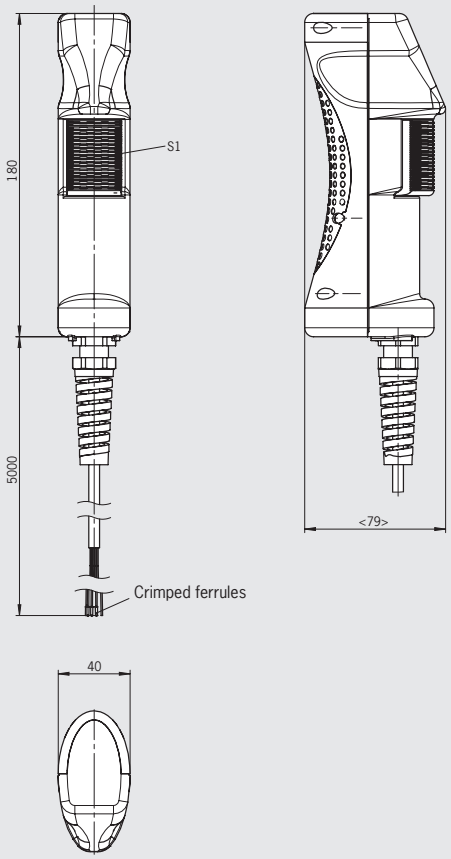
Design	Connection	Conductor length	Version	Order no. / item
ZSM	**RC17** Plug connector (17-pin)	1.88 ... 5 m coiled	Enabling switch with 2 NO contacts (S4), black machine stop (S5), yellow LED indicator (V1), +/- buttons (S2/S3), selector switch 3-stage 1 from 3 (S1)	**110317** ZSM2301-110317
	HAN Q17 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

Enabling switch ZSM without stop command device

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

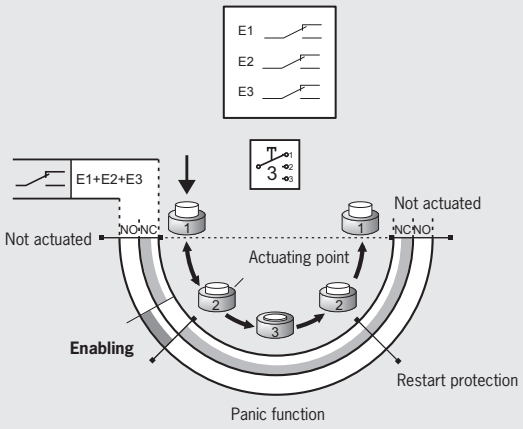
ZSM4200-099713, 3-stage function
flying lead

Dimension drawing



For wiring diagram see page 28

Switching element/function sequence



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.

LEDs
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.

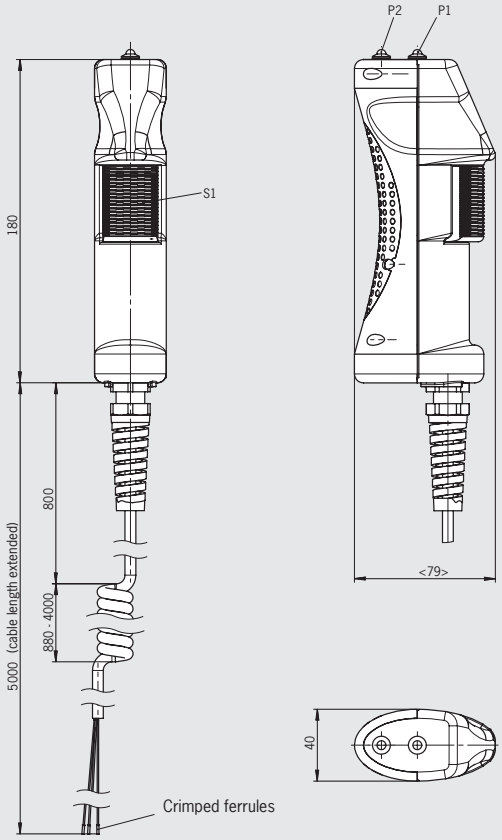
Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 12 x 0.14 mm²**	5 m Straight	Enabling switch with 3 changeover contacts (S1)	**099713** ZSM4200-099713

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

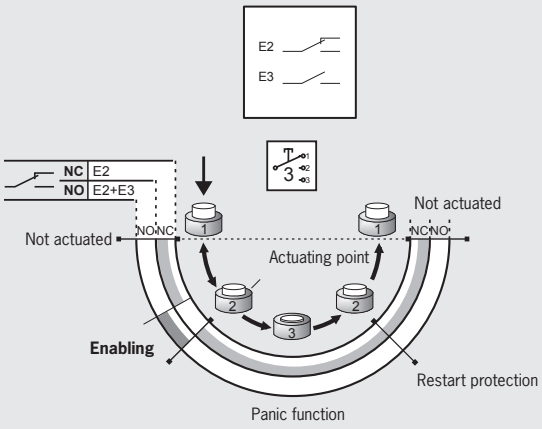
ZSM2300-111871, 3-stage function
flying lead

Dimension drawing



For wiring diagram see page 28

Switching element/function sequence



Ordering table

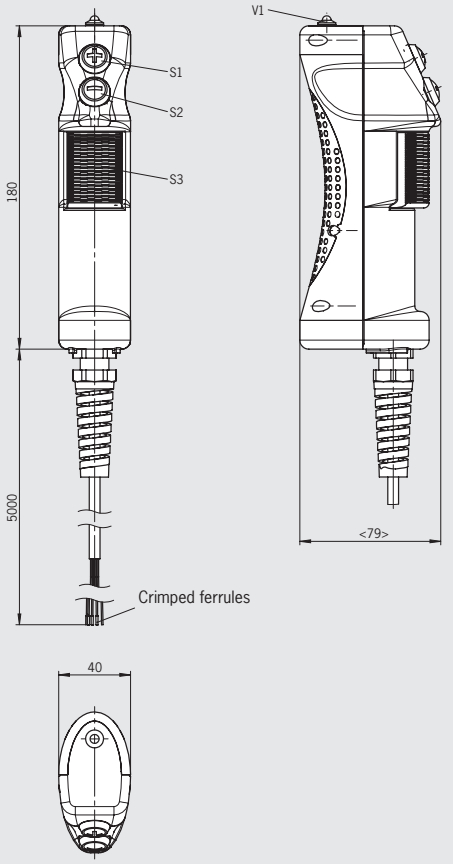
Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 12 x 0.14 mm²**	1.88 ... 5 m coiled	Enabling switch with 1 changeover contact and 1 normally open contact (S1), 2 green (P1) and yellow (P2) LED indicators	**111871** ZSM2300-111871

Please turn over

ZSM2100-099714, 3-stage function
flying lead

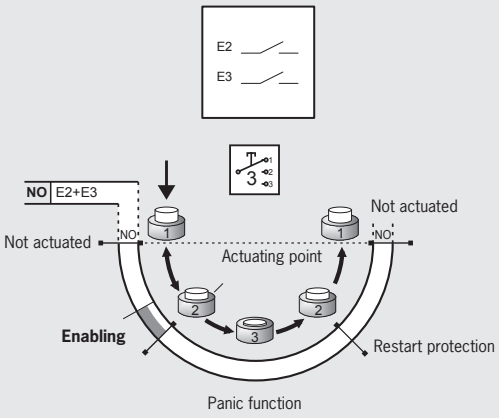
ZSM2300-109971, 3-stage function
flying lead

Dimension drawing



For wiring diagram see page 28

Switching element/function sequence



Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 12 x 0.14 mm²**	5 m Straight	Enabling switch with 2 NO contacts (S3), vibration signal, yellow LED indicator (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

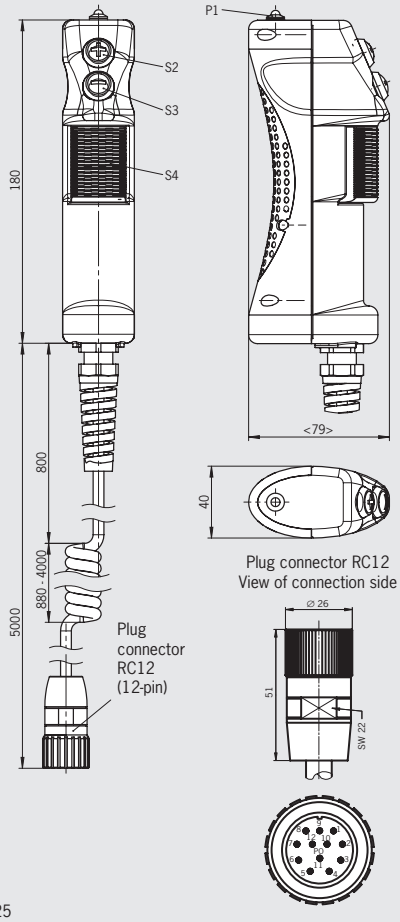
Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

ZSM2300-111462, 3-stage function
Plug connector RC12

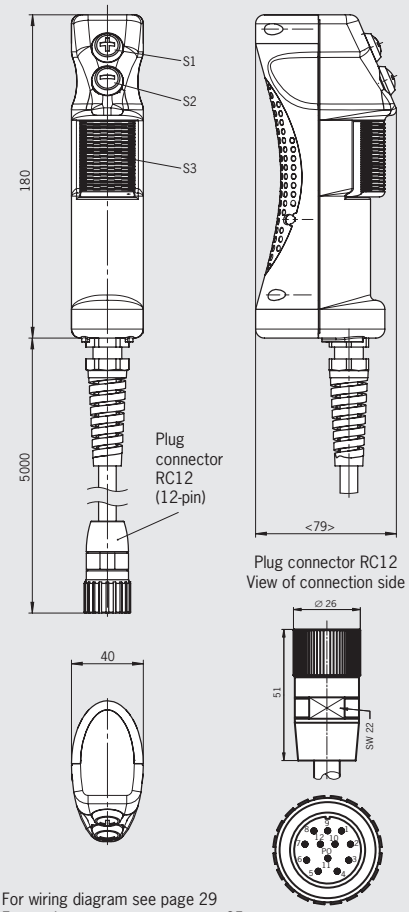
ZSM2100-111594, 3-stage function
Plug connector RC12

ZSM2300-099716, 3-stage function
Plug connector RC12

Dimension drawing

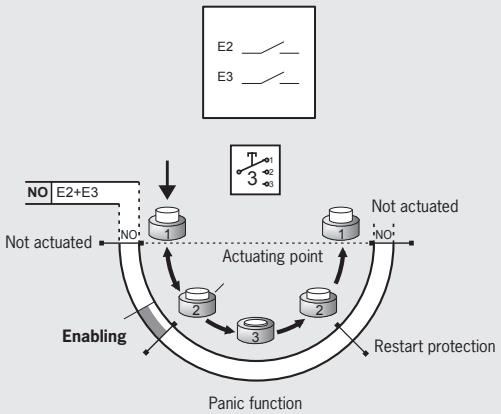


For wiring diagram see page 29
For mating connectors see page 25



For wiring diagram see page 29
For mating connectors see page 25

Switching element/function sequence



Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**RC12** Plug connector (12-pin)	1.88 ... 5 m coiled	Enabling switch with 2 NO contacts (S3), yellow LED indicator (P1), +/– buttons (S1/S2)	**111462** ZSM2300-111462
			Enabling switch with 2 NO contacts (S3), yellow LED indicator (P1), +/– buttons (S1/S2), alternative wiring	**111594** ZSM2100-111594
		5 m Straight	Enabling switch with 2 NO contacts (S3), +/– buttons (S1/S2)	**099716** ZSM2300-099716

Enabling switch ZSM without stop command device

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

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

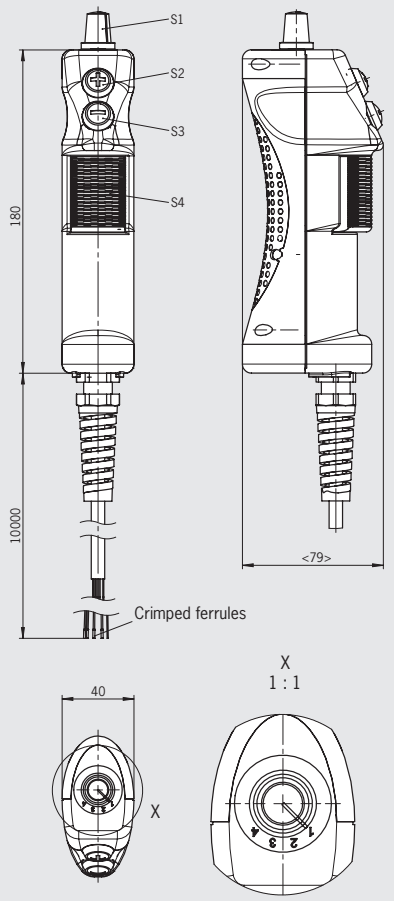
+ and – buttons
These buttons can be configured individually. For example for moving axes in the positive or negative direction.

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.

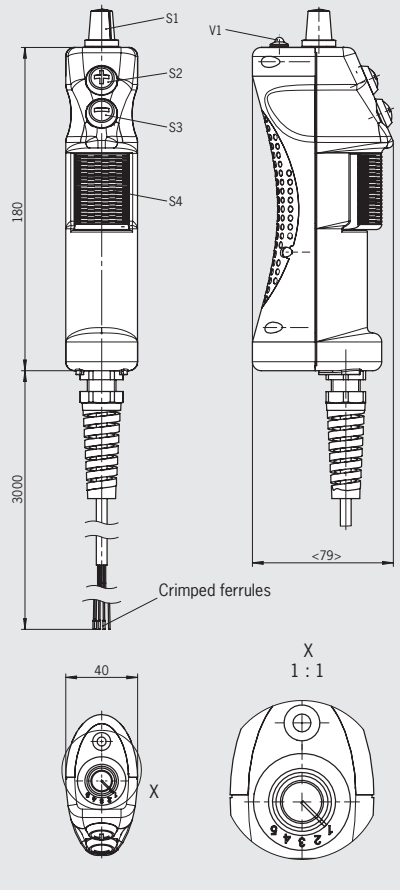
ZSM2200-100697, 3-stage function
Flying lead, selector switch

Dimension drawing



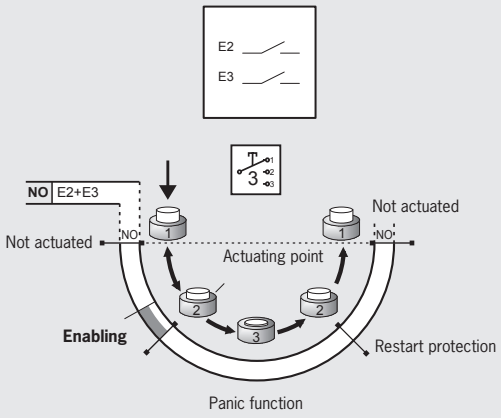
For wiring diagram see page 29

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



For wiring diagram see page 30

Switching element/function sequence



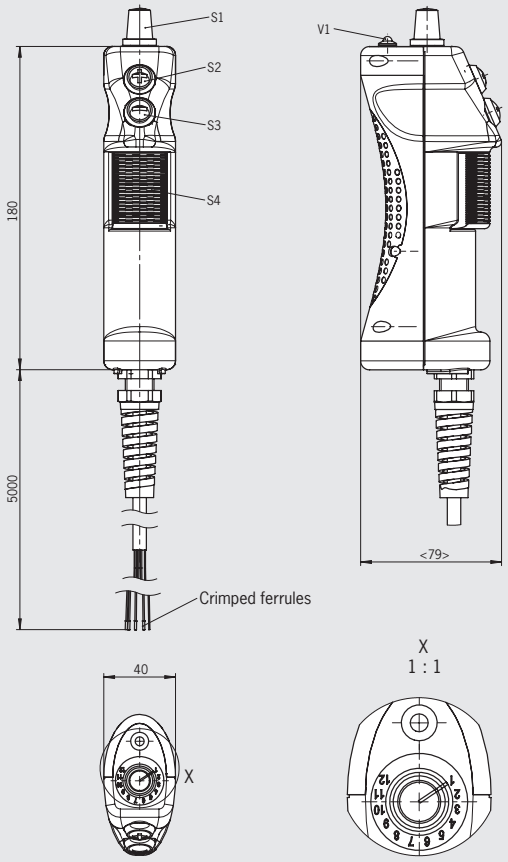
Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 23 x 0.14 mm²**	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 mm²	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

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

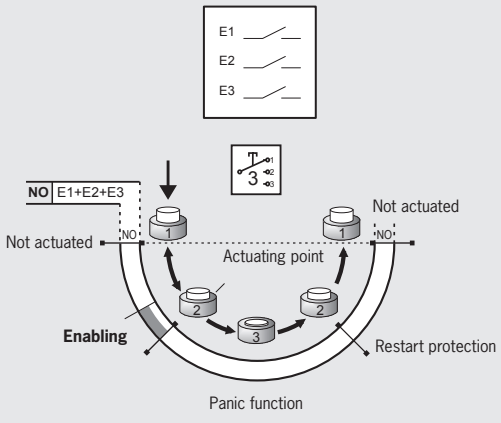
ZSM2200-105308, 3-stage function
Flying lead, selector switch

Dimension drawing

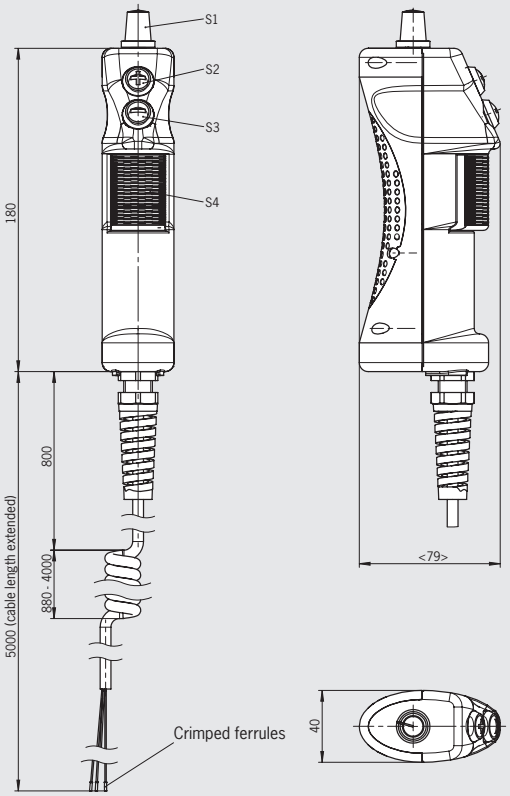


For wiring diagram see page 30

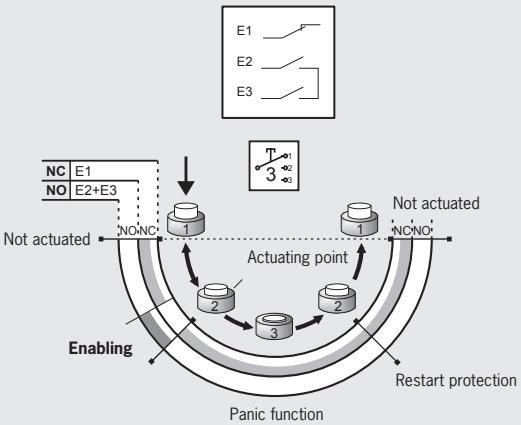
Switching element/function sequence



ZSM3100-103462, 3-stage function
Flying lead, selector switch



For wiring diagram see page 30



Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 23 x 0.14 mm²**	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 mm²	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

Enabling switch ZSM without stop command device

- **3-stage function**
- **Vibration signal optional**
- **LED indicator optional**
- **Reset button optional**
- **+ and – buttons optional**
- **Push button optional**
- **Key-operated 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.

LEDs
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.

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

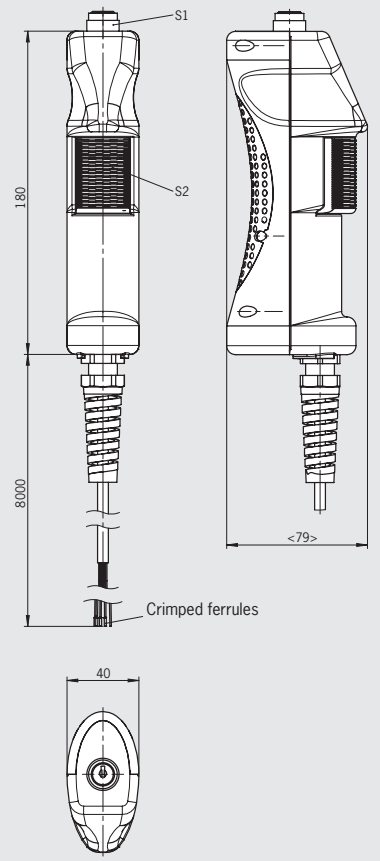
Key switch
For individual use, e.g. as operating mode selector switch.

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.

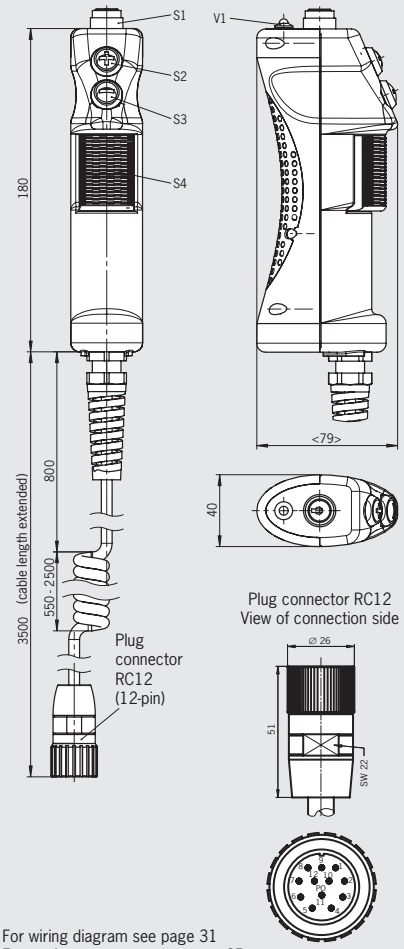
ZSM2200-105362, 3-stage function
Flying lead, key-operated switch

Dimension drawing



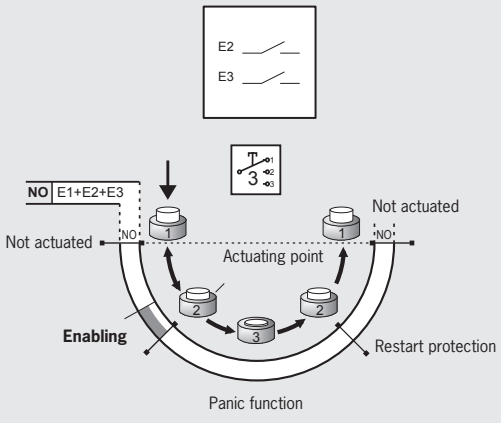
For wiring diagram see page 30

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



For wiring diagram see page 31
For mating connectors see page 25

Switching element/function sequence



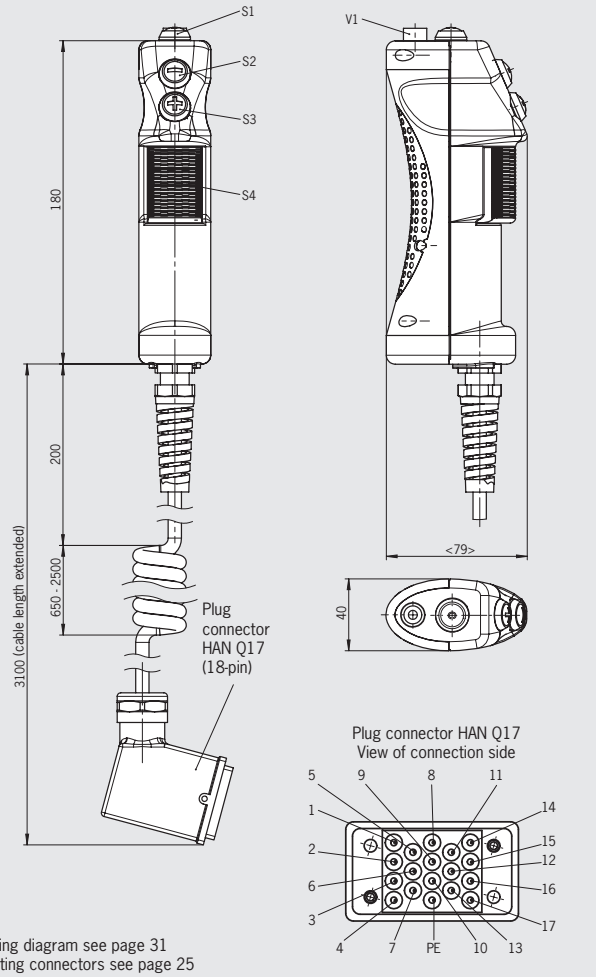
Ordering table

Design	Connection	Conductor length	Version	Order no. / item
ZSM	**flying lead 12 x 0.14 mm²**	8 m Straight	Enabling switch with 2 NO contacts (S2), vibration signal, key-operated switch (S1)	**105362** ZSM2200-105362
	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 switch (S1)	**110338** ZSM2300-110338

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

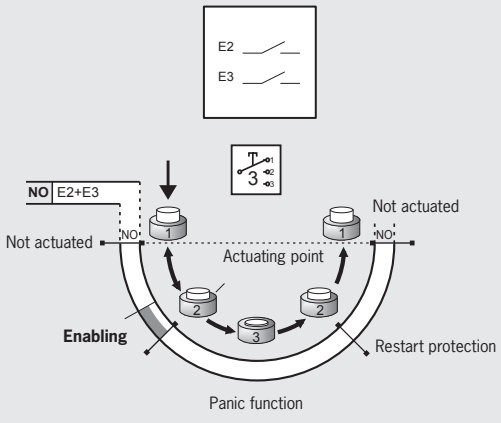
ZSM2300-106670, 3-stage function
Plug connector HAN Q17, reset button

Dimension drawing

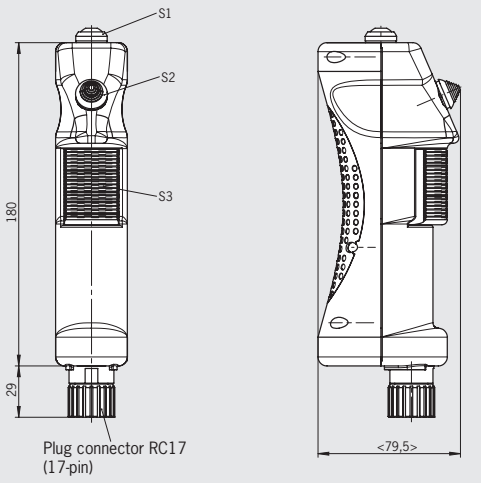


For wiring diagram see page 31
For mating connectors see page 25

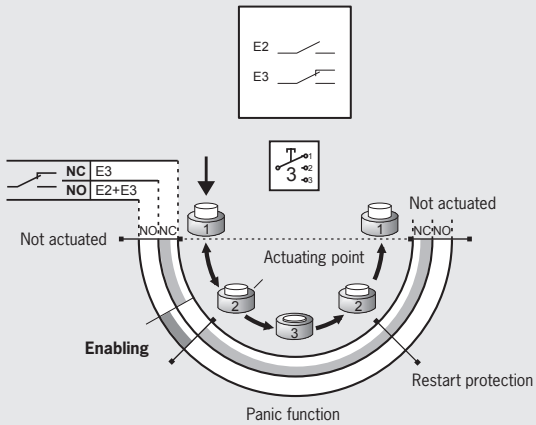
Switching element/function sequence



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



For wiring diagram see page 31
For mating connectors see page 25
For connection cable see page 24



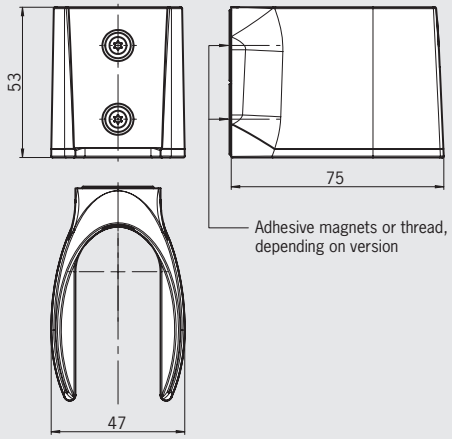
Ordering table

Design	Connection	Conductor length	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 push button (S1)	**106374** ZSM2300-106374

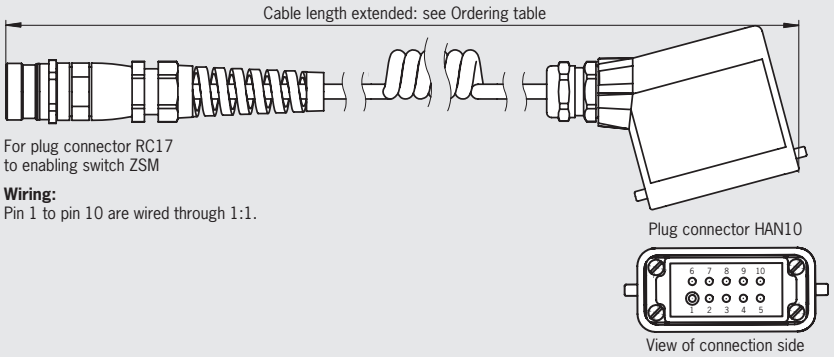
Accessories

- **Holder for enabling switch ZSM**
- **Connection cable for enabling switch ZSM with plug connector RC17**

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.



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 the ZSM kit (see page 36).



Ordering table

Designation	Version	Order no. / item
Holder for enabling switch ZSM	Screw mounting	**102969** Holder ZSM
	Magnet fastening	**102965** Holder ZSM with magnet
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

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Accessories

- **Female flange connector RC12**
- **Male plug RC12**
- **Dummy plug RC12**
- **Female flange connector RC17**
- **Male plug RC17**
- **Dummy plug RC17**

Female flange connector RC12 [1)]
For front panel mounting for connection of hand-held enabling switch. Fitted with soldered contacts. Rubber seal included.

Male plug RC12 [1)]
For connection, e.g. to enabling switches.

Dummy plug RC12 [1)]
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.

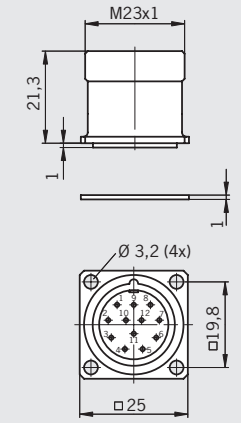
Flange connector RC17 [1)]
For front panel mounting for connection of enabling switches. Rubber seal included. Fitted with soldered contacts.

Male plug RC17 [1)]
For connection, e.g. to enabling switch.

Dummy plug RC17 [1)]
For covering the flange connector RC17. Optionally, individual contacts can be bridged at the customer.

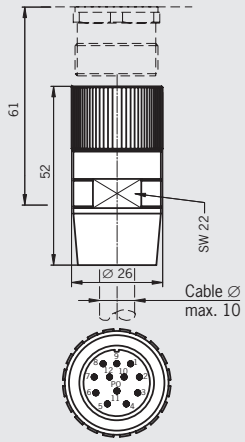
Female flange connector RC12
12-pin

Dimension drawings



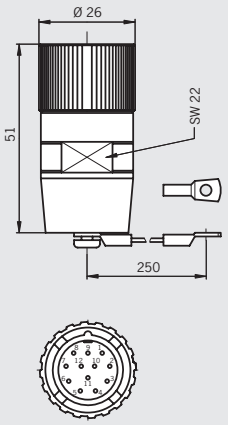
View of connection side, socket

Male plug RC12
12-pin



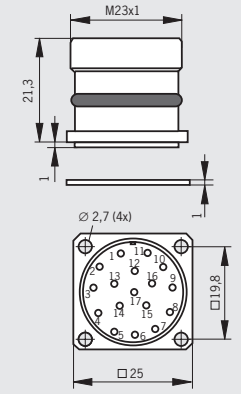
View of connection side, plug

Dummy plug RC12
12-pin



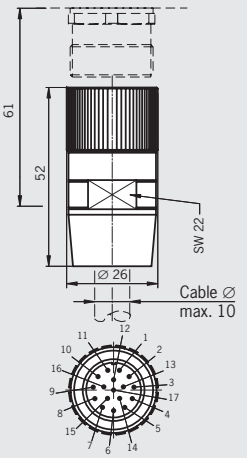
View of connection side, plug

Female flange connector RC17
17-pin



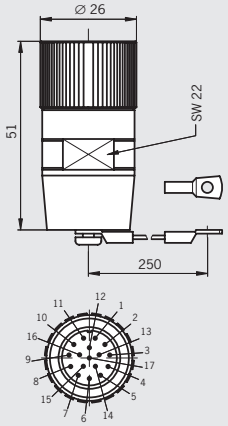
View of connection side, socket

Male plug RC17
17-pin



View of connection side, plug

Dummy plug RC17
17-pin



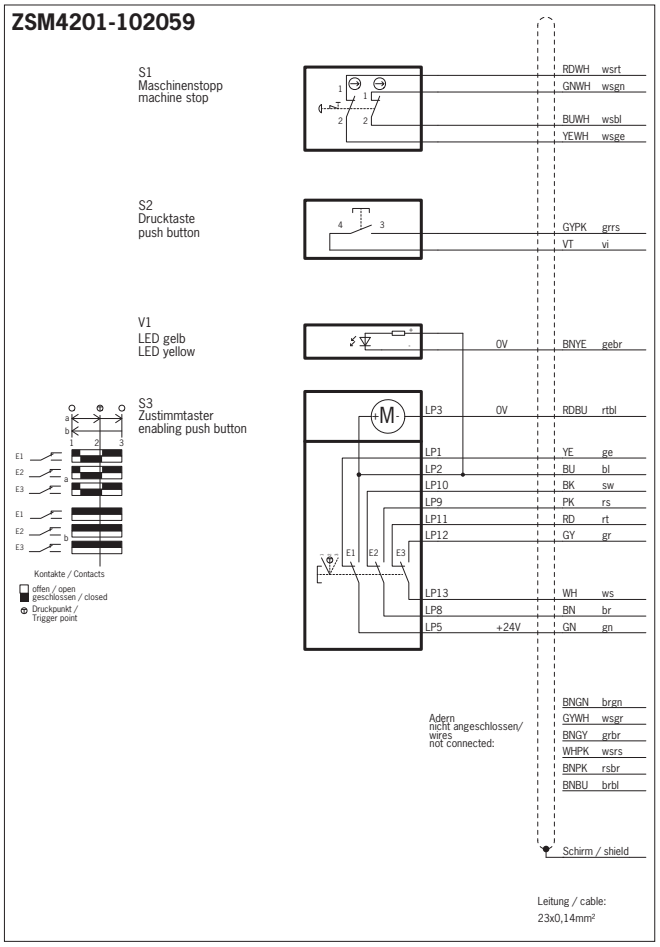
View of connection side, plug

Ordering table

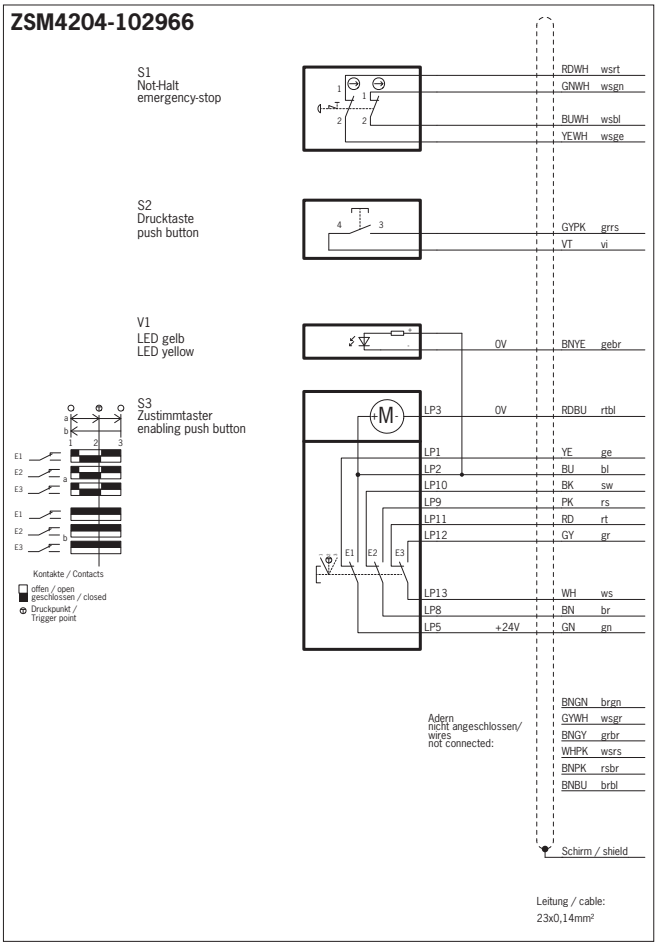
Item	Connection	Version	Order no. / item
RC12 12-pin	Soldered connection	Female flange connector	**073290** Female flange connector 12-pin
	Crimp contact [1)]	Male plug	**073294** Plug connector 12-pin
	Crimp contact [1)]	Dummy plug (with bridges) e.g. in combination with ZS...C1770	**073291** Dummy plug complete 12-pin
	Crimp contact [1)]	Dummy plug (without bridges)	**073293** Dummy 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)]	Dummy plug (without bridges)	**096159** Dummy plug 17-pin

Wiring diagrams

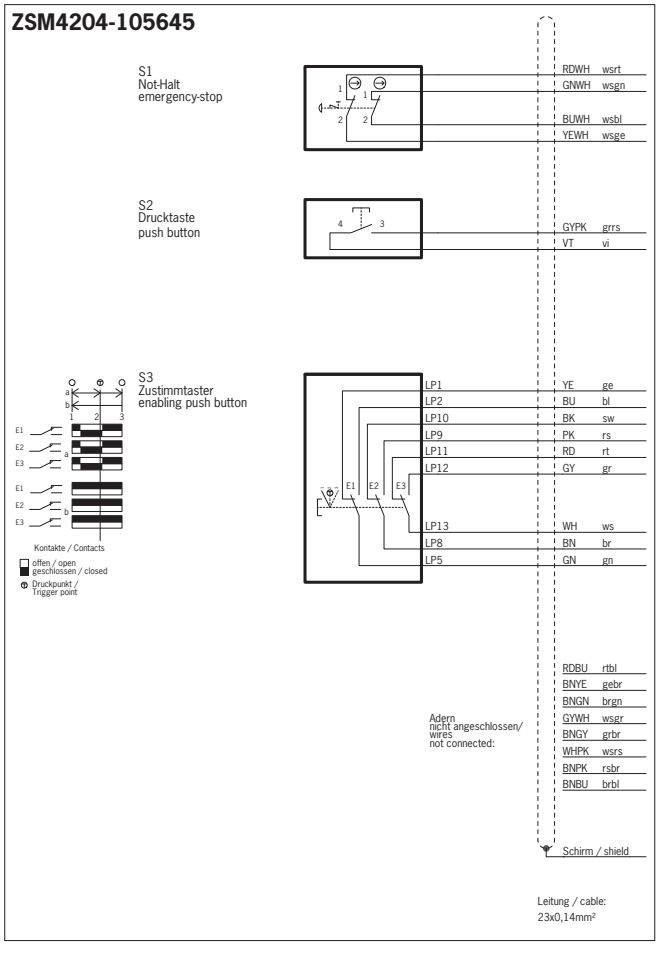
ZSM4201-102059



ZSM4204-102966

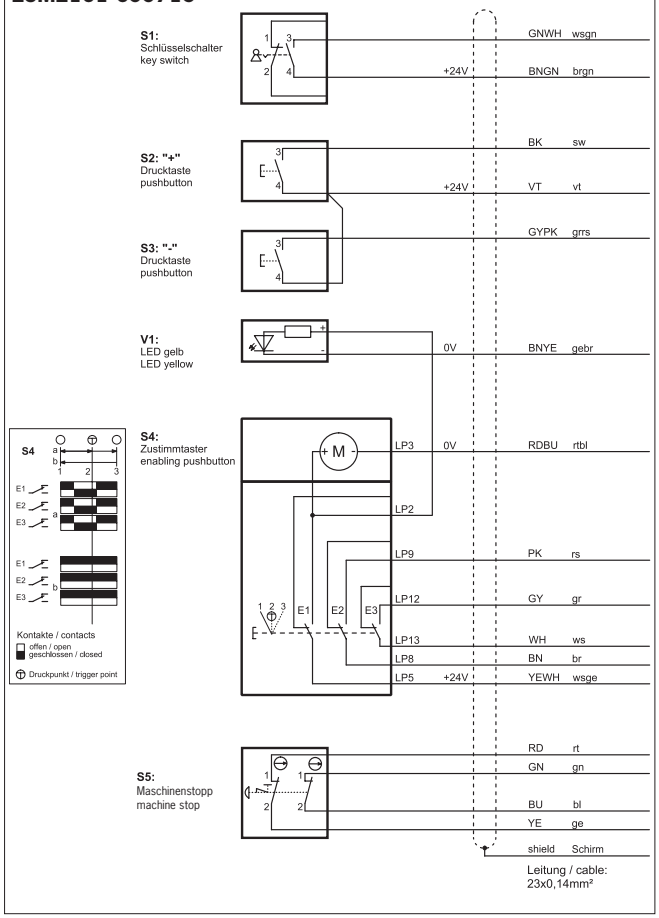


ZSM4204-105645



Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

ZSM2101-099715



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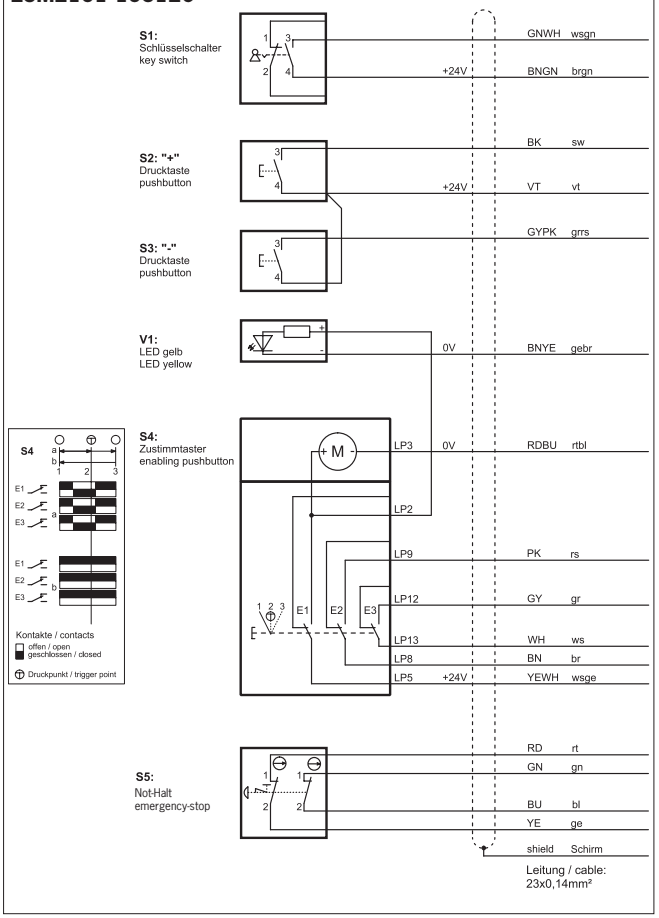

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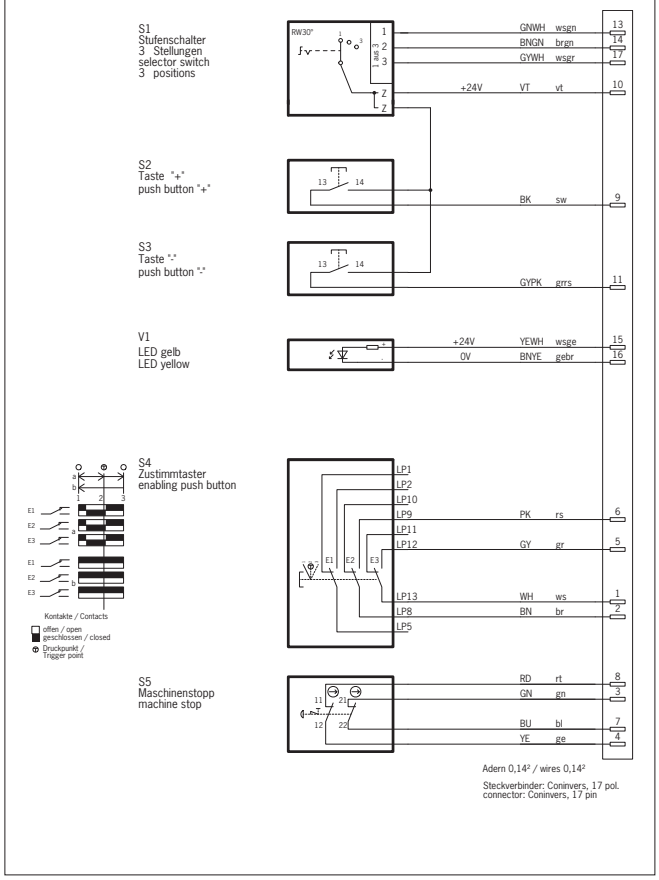

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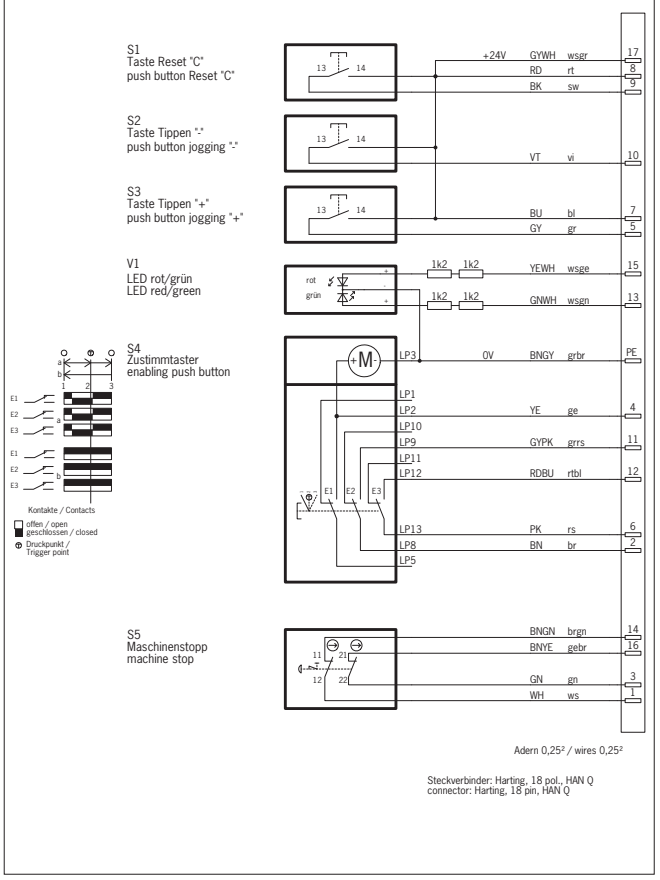
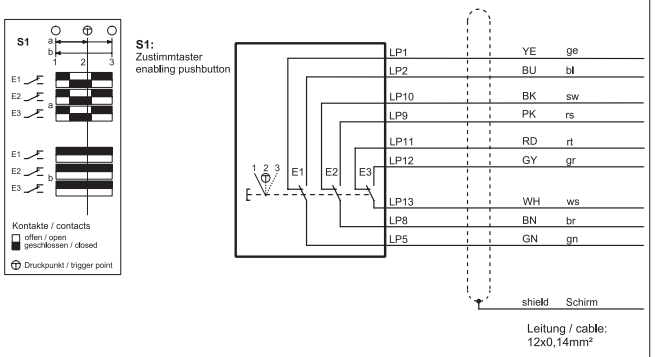
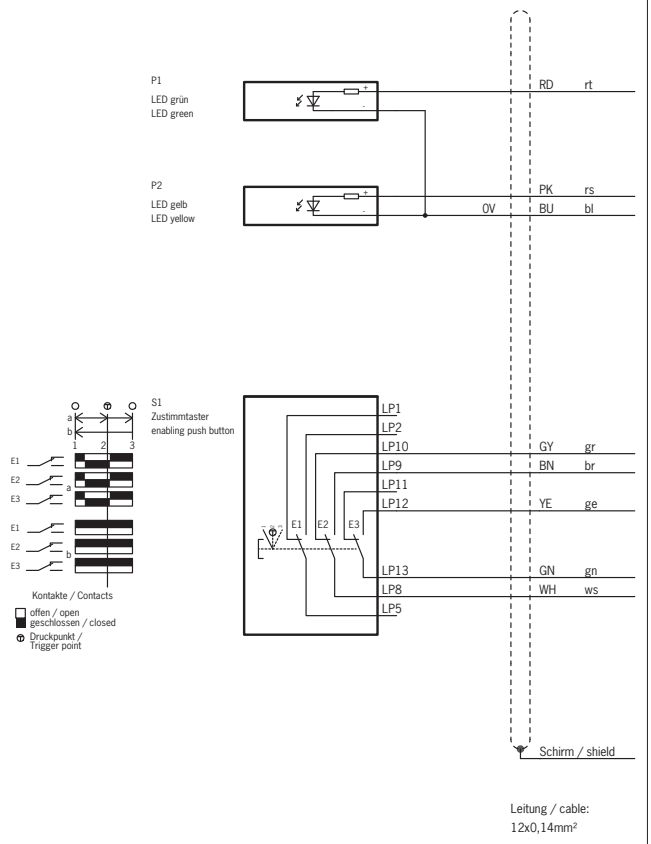


Wiring diagrams

ZSM4200-099713



ZSM2300-111871



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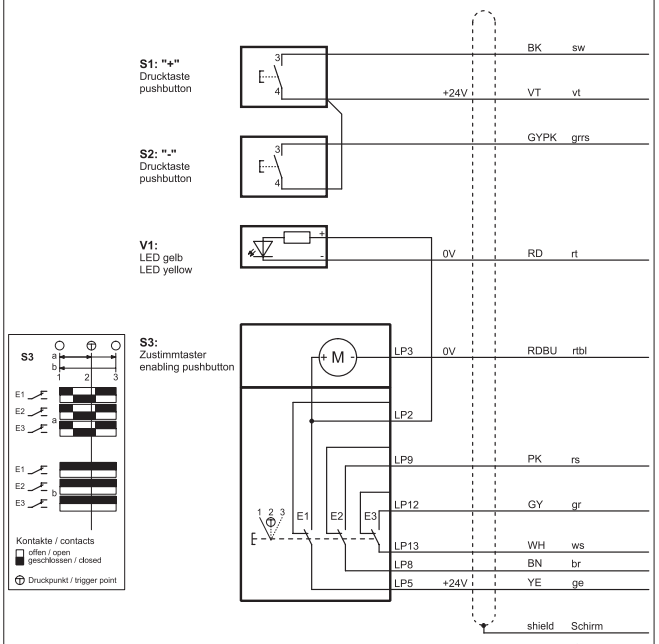
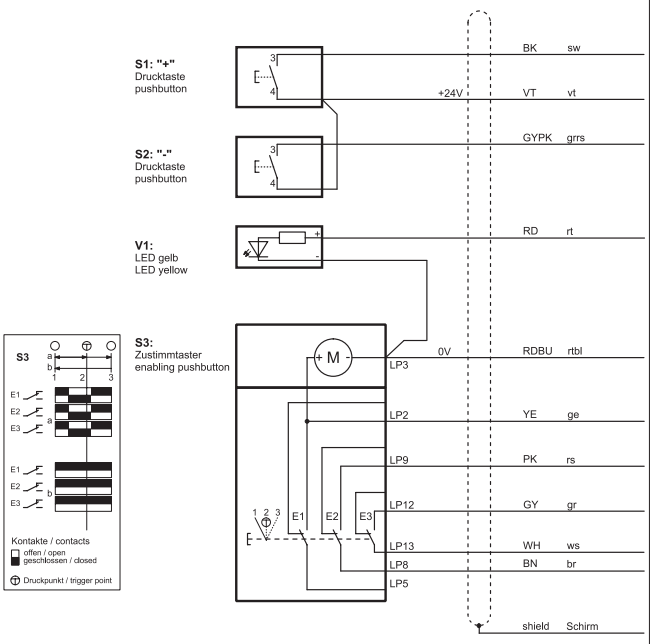
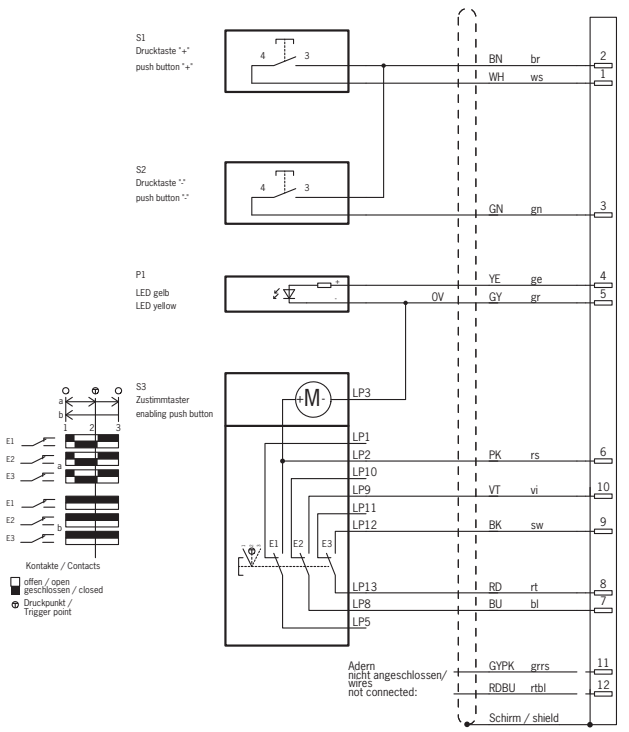


ZSM2300-109971



Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

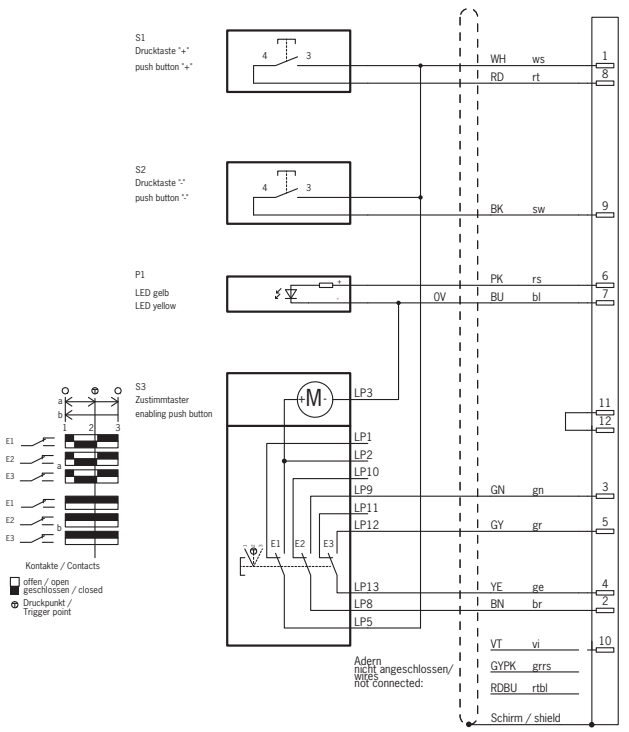
ZSM2300-111462



Adern 0,14² / wires 0,14²

Steckverbinder: Coninvers, 12 pol.
connector: Coninvers, 12 pin

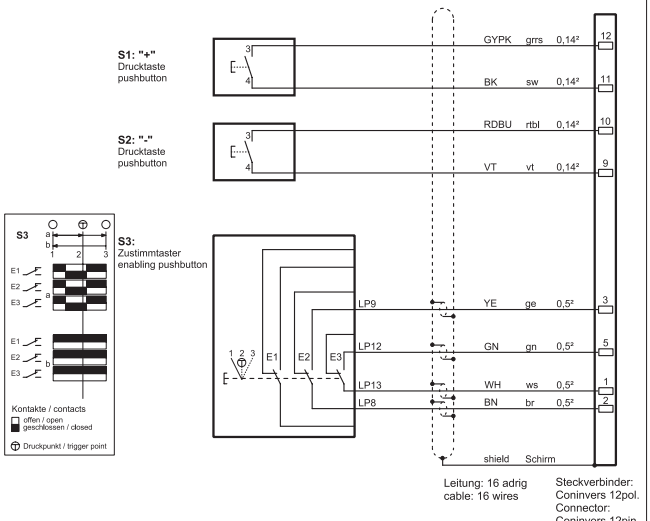
ZSM2100-111594



Adern 0,14² / wires 0,14²

Steckverbinder: Coninvers, 12 pol.
connector: Coninvers, 12 pin

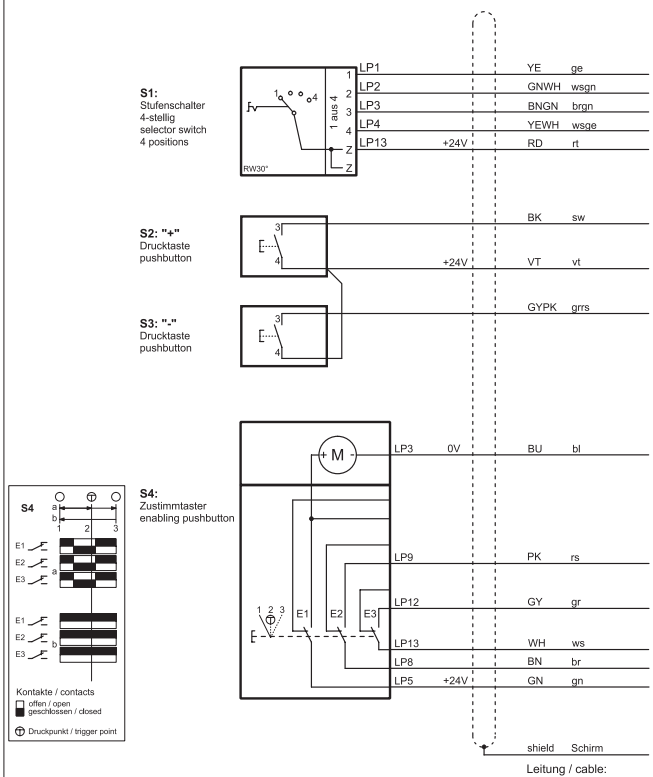
ZSM2300-099716



Leitung: 16 adrig
cable: 16 wires

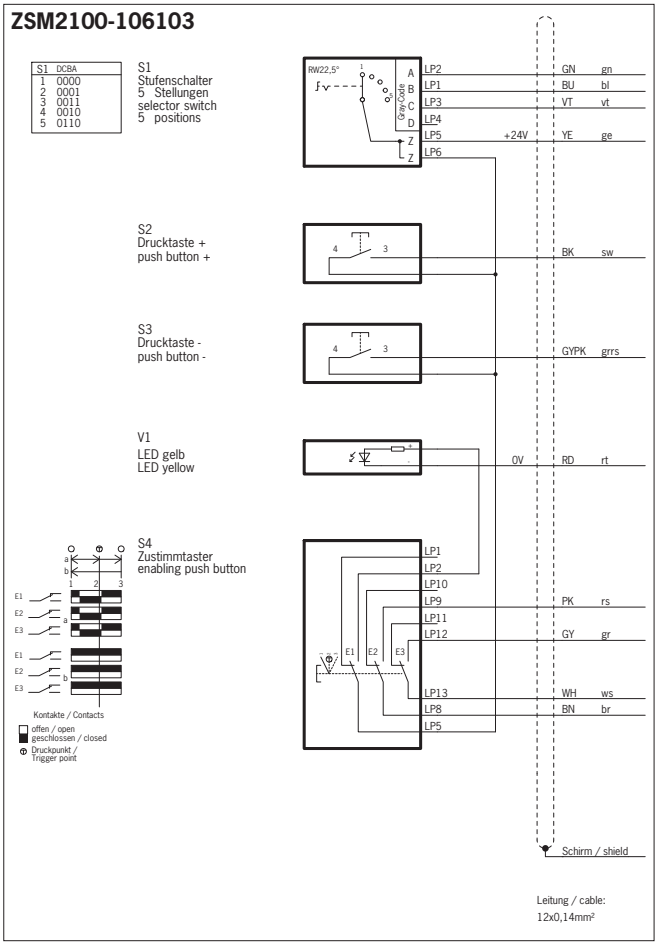
Steckverbinder:
Coninvers 12pol.
Connector:
Coninvers 12pin

ZSM2200-100697

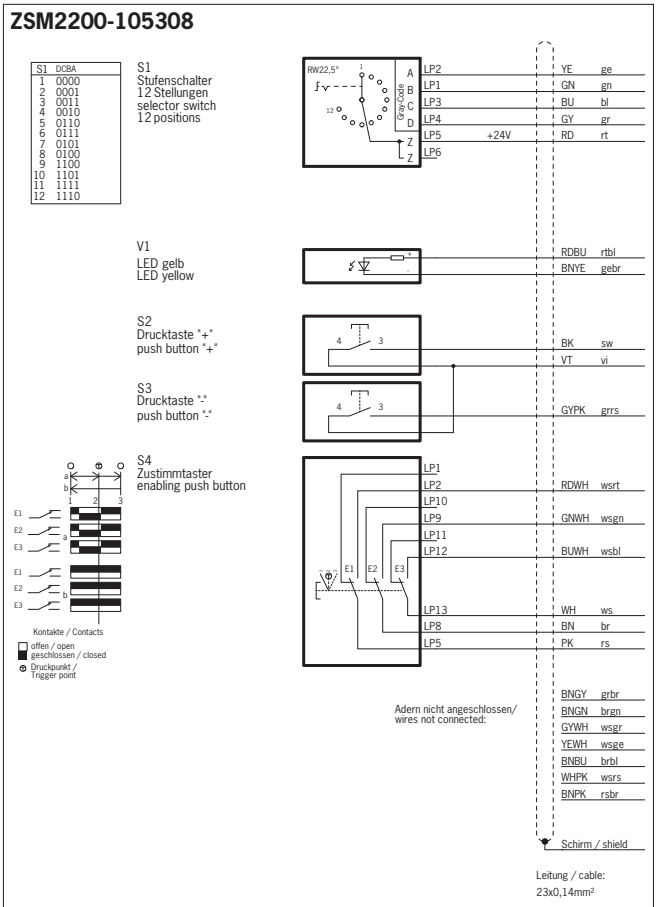


Leitung / cable:
23x0,14mm²

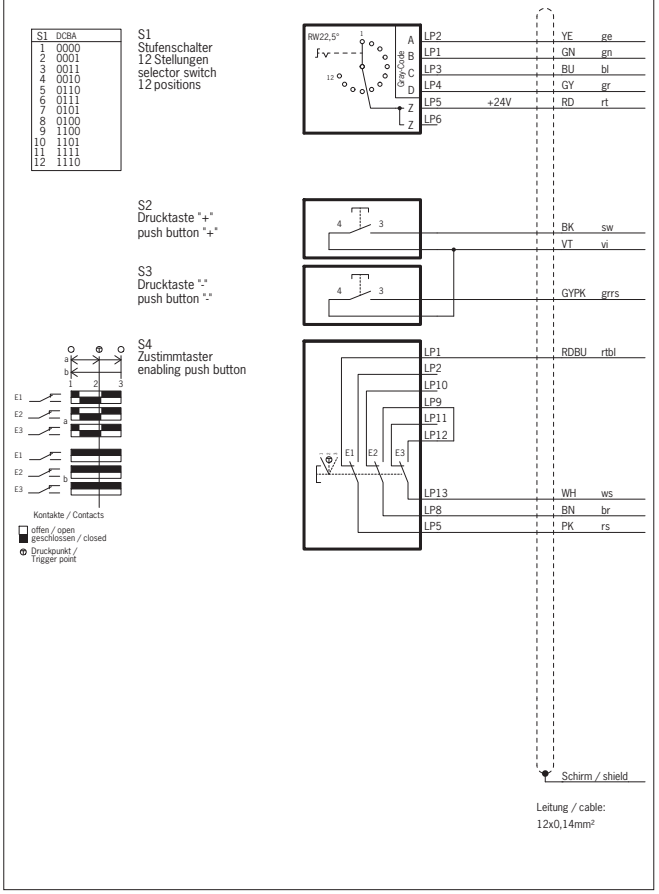
ZSM2100-106103



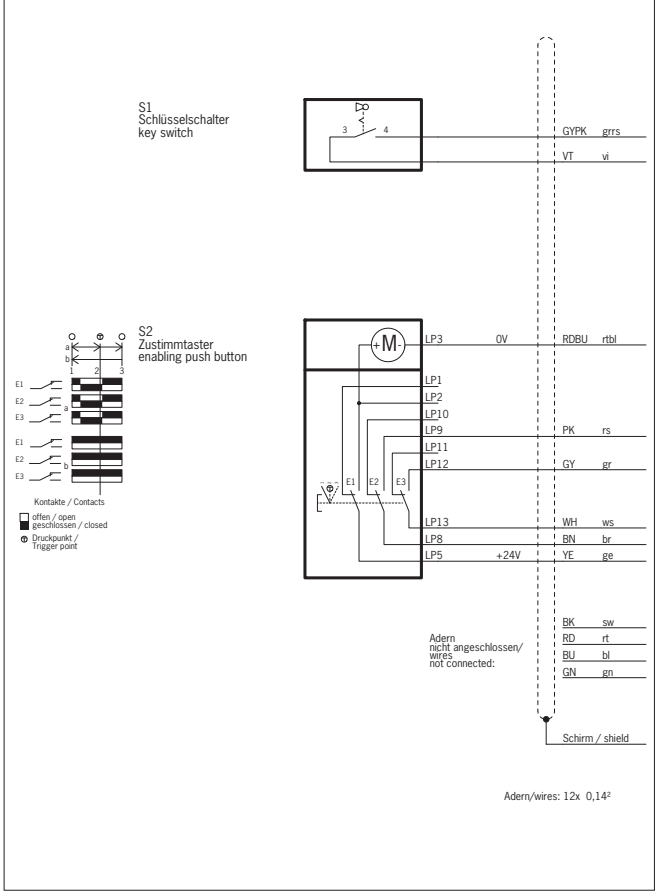
ZSM2200-105308



ZSM3100-103462



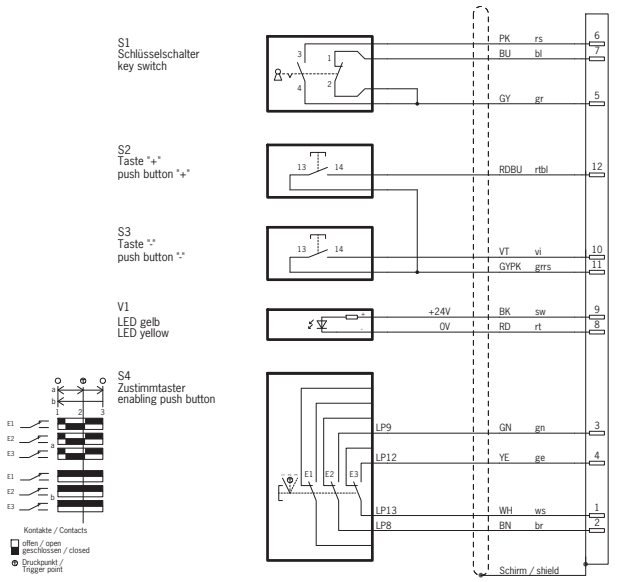
ZSM2200-105362



Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Wiring diagrams

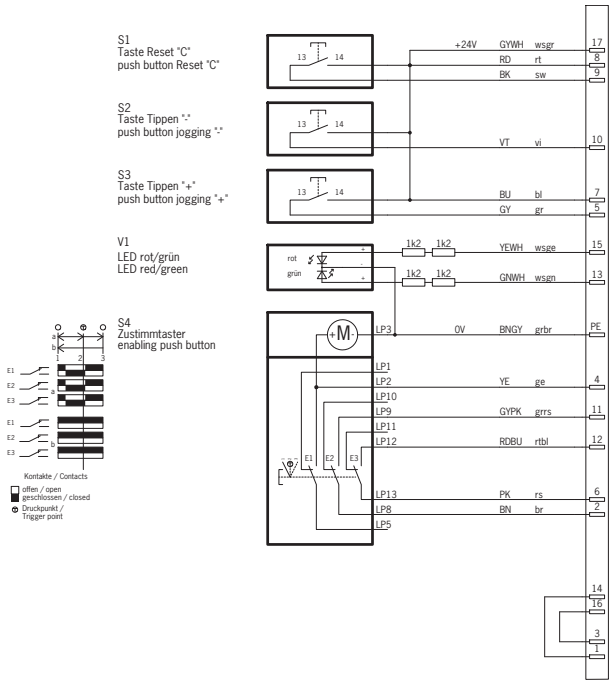
ZSM2300-110338



Adern 0,14² / wires 0,14²

Steckverbinder: Coninvers, 12 pol.
connector: Coninvers, 12 pin

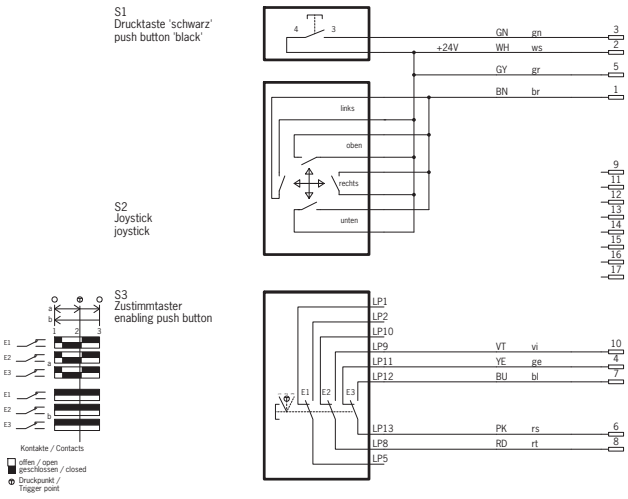
ZSM2300-106670



Adern 0,25² / wires 0,25²

Steckverbinder: Harting, 18 pol., HAN Q
connector: Harting, 18 pin, HAN Q

ZSM2300-106374



Steckverbinder Coninvers 17polig
Connector Coninvers 17pin
Adern 0,14² / wires 0,14²

Technical data

Basic enabling switch ZSM			
Parameter		**Value**	**Unit**
Material	Housing	PA	
	Enabling switch	CR	
	Grip/seal	TPE	
Degree of protection acc. 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_e 24V I_e 0.3 A U_e 24V I_e 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 to IEC 947-5-1	DC-13 I_e 3 A U_e 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 to IEC 947-5-1	DC-13 I_e 3 A U_e 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.	20	mA
Voltage red	1.85	V
Voltage green	2.2	V

Reset button/push button		
Parameter	**Value**	**Unit**
Switching voltage max.	30	V DC
Switching current max.	100	mA

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

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

One-touch function

Parameter	Value	Unit
Switching current max. at DC 28 V - with ohmic load - with inductive load	 2 1	A

Key switch

Parameter	Value	Unit
Switching voltage max.	30	V AC/DC
Switching current max.	250	mA

Connection using flying lead

Parameter		Value		Unit
Connection		Cable 12 x 0.14 mm"	Cable 23 x 0.14 mm"	
Degree of protection acc. to IEC 60529		IP 67		
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		2		A gG
Utilization category acc. to EN 60947-5-1				
Enabling switches	AC-15	I_e 2 A U_e 24 V		
	DC-13	I_e 2 A U_e 24 V		
Keys and LEDs	AC-15	24 V 400 mA		
	DC-13	24 V 400 mA		

Plug connector RC12 connection

Parameter		Value		Unit
Connection		Male connector		
Version		RC12 (11-pin + PE)		
Connection cable conductor cross-section		12 x 0.14	23 x 0.14	mm²
Degree of protection acc. to IEC 60529		IP 67 [1]		
Rated insulation voltage U_i		0.8		kV
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		2		A gG
Utilization category acc. to EN 60947-5-1				
Enabling switches	AC-15	I_e 2 A U_e 24 V		
	DC-13	I_e 2 A U_e 24 V		
Keys and LEDs	AC-15	24 V 400 mA		
	DC-13	24 V 400 mA		

Plug connector RC17 connection

Parameter		Value		Unit
Connection		Male connector		
Version		RC17 (17-pin)		
Connection cable conductor cross-section		12 x 0.14	23 x 0.14	mm²
Degree of protection acc. to IEC 60529		IP 67 [1]		
Rated insulation voltage U_i		0.8		kV
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		2		A gG
Utilization category acc. to EN 60947-5-1				
Enabling switches	AC-15	I_e 2 A U_e 24 V		
	DC-13	I_e 2 A U_e 24 V		
Keys and LEDs	AC-15	24 V 400 mA		
	DC-13	24 V 400 mA		

Plug connector connection HAN Q17

Parameter		Value		Unit
Connection		Male connector		
Version		HAN Q17 (17-pin)		
Connection cable conductor cross-section		12 x 0.14	23 x 0.14	mm²
Degree of protection acc. to IEC 60529		IP 65 [1]		
Rated insulation voltage U_i		0.8		kV
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		2		A gG
Utilization category acc. to EN 60947-5-1				
Enabling switches	AC-15	I_e 2 A U_e 24 V		
	DC-13	I_e 2 A U_e 24 V		
Keys and LEDs	AC-15	24 V 400 mA		
	DC-13	24 V 400 mA		

1) Only screwed tight with the related plug connector

ZSM housing

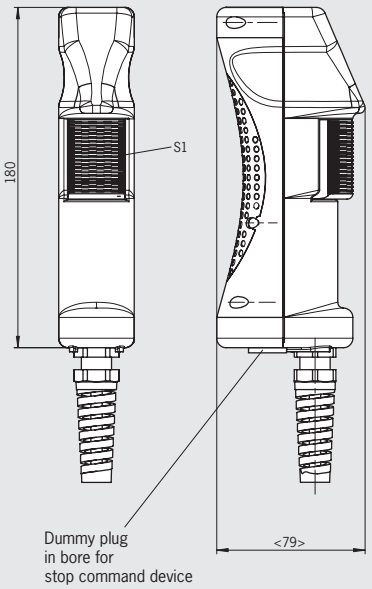
- **3-stage function**
- **+ and – buttons optional**
- **Hole for lower stop command device**
- **Cable gland included**

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).

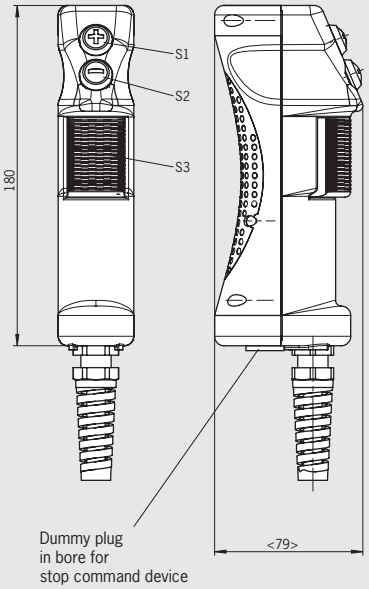
+ and – buttons
These buttons can be individually assigned, e.g. to move axes in positive or negative direction.

ZSM4200-106104, 3-stage function

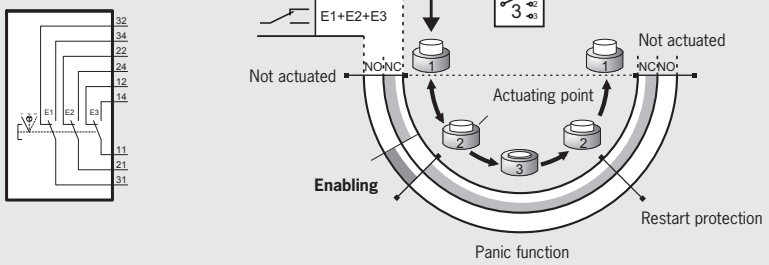
Dimension drawing



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

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Accessories for installation in ZSM housing

- **Machine stop**
- **Emergency stop device**

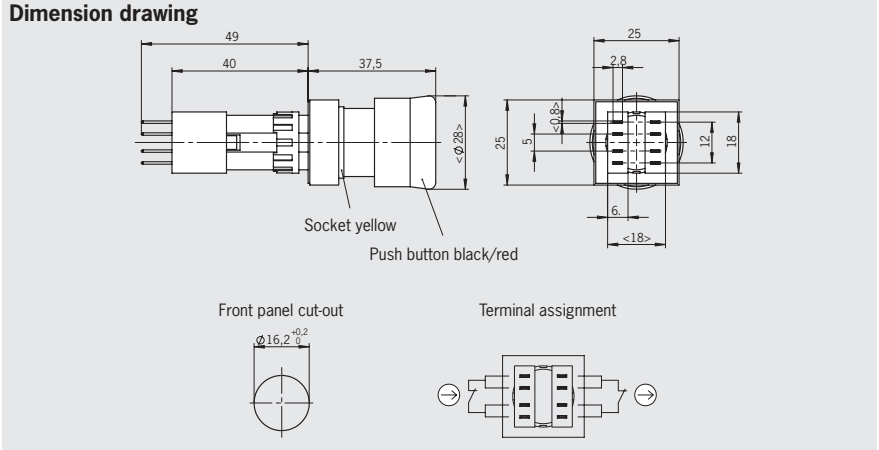
Machine stop

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

Dimension drawing



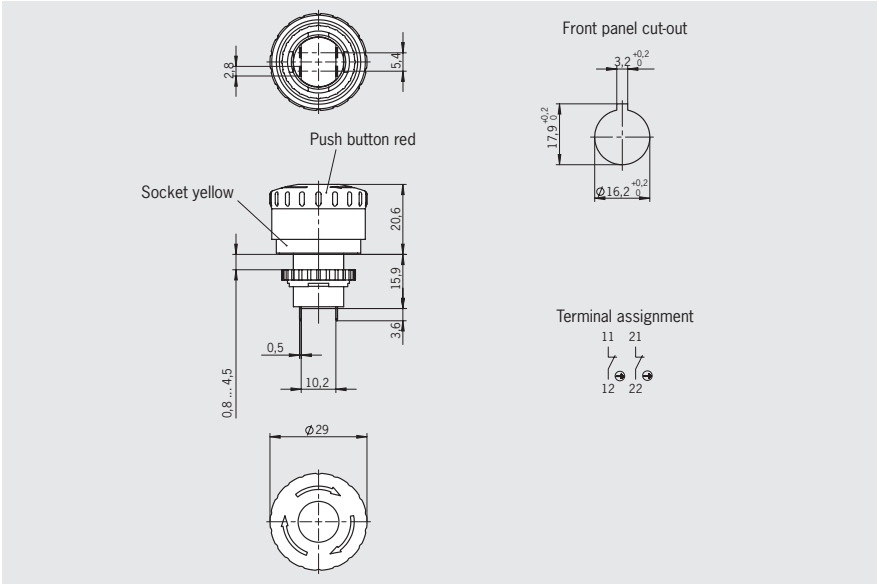
Parameter	Value
Color of actuating head	black/red
Color of bottom shell	yellow
Reset	Pull-to-reset button
Degree of protection	IP 65
Max. number of switching elements	2
Contact element	2 x positively driven contact
Utilization category to IEC 947-5-1	DC-13 I_e 3 A U_e 24 V

Ordering table

Designation	Version	Order no. / item
Machine stop	Installation ∅ 16 mm, palm button black ∅ 28 mm	**106434** Machine stop 16 mm
Emergency stop device	Installation ∅ 16 mm, palm button red ∅ 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 to IEC 947-5-1	DC-13 I_e 3 A U_e 24 V

Ordering table

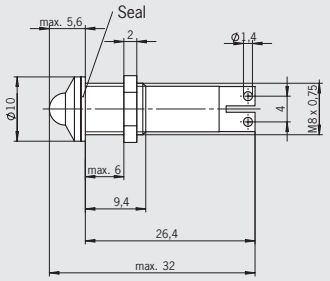
Designation	Version	Order no. / item
Emergency stop device with small installation depth	Installation ∅ 16 mm, palm button red ∅ 29 mm	**106435** Emergency stop 16 mm

- **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



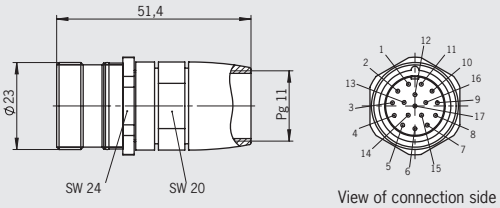
Parameter	Value
Housing	Chrome-plated
Operating voltage	24 V
Color	yellow

Ordering table

Designation	Version	Order no. / item
LED indicator	Color yellow	**106347** LED indicator GE 106347

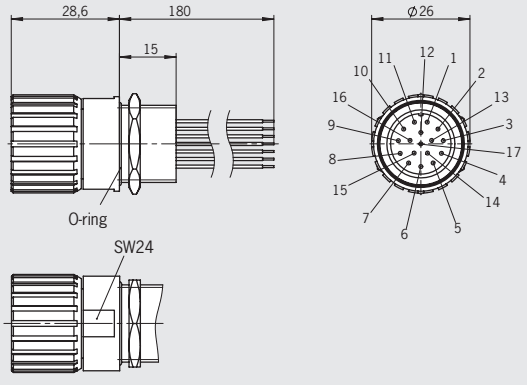
Female plug RC17

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 mm²	Soldered connections 1.0 mm²
Nominal voltage max.	230 V AC/DC	
Degree of protection according to IEC 60529 (inserted)	IP 67	

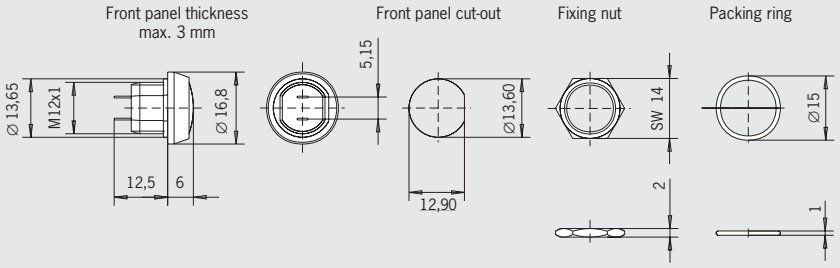
Ordering table

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

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

- **Push button**
- **Key switch**

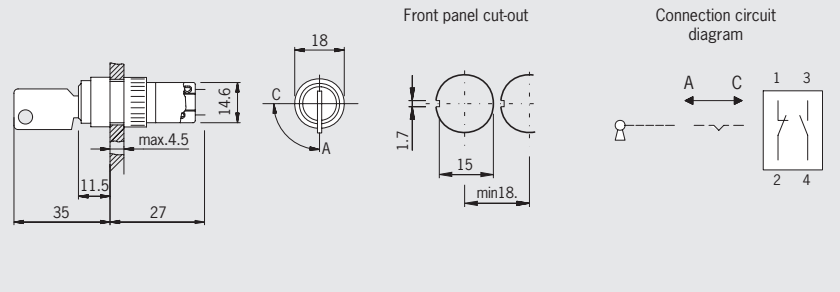
Dimension drawing



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 contact
Switching voltage	DC 30 V
Switching current max.	100 mA
Connection type	Soldered connection

Ordering table

Designation	Button color	Order no.
Push button	Black	**083640**
	Red	**086753**
	Green	**086754**
	Blue	**086757**
	White	**086755**
	Yellow	**086756**



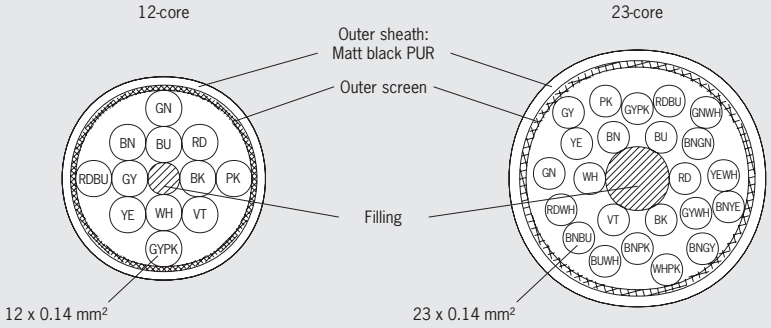
Parameter	Value
Ambient temperature	-25 ... +55 °C
Front degree of protection (integrated in front panel) / NEMA	IP 65 / 250-12
Switching principle	Snap-action switching element
Switching elements	1 NC contact, 1 NO contact
Switching voltage	AC/DC 30 V
Switching current max.	250 mA
Connection type	Soldered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

Ordering table

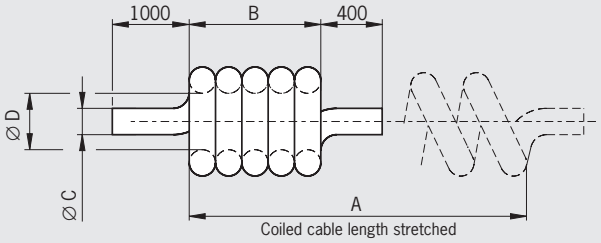
Designation	Version	Order no.
Key switch	Key removable in both positions	**083639**

Connection cable coiled and straight

View of cable cross-section



Dimensions of spiral-shaped 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

Article	Conductor length [mm]	A [mm]	B [mm]	∅ C [mm]	∅ D [mm]	Order no.
12-pole, spiral-shaped cable	3900	Approx. 2500	550 ± 20	6 ± 3	8 ± 2	**086721**
12-pole, spiral-shaped cable	5400	Approx. 4000	880 ± 20	6 ± 3	8 ± 2	**086722**
12-pole, straight cable	3500	–	–	–	–	**087379**
12-pole, straight cable	5000	–	–	–	–	**087380**
12-pole, straight cable	10000	–	–	–	–	**087381**
23-pole, spiral-shaped cable	3900	Approx. 2500	550 ± 20	7.5 ± 0.3	10 ± 2	**087408**
23-pole, spiral-shaped cable	5400	Approx. 4000	880 ± 20	7.5 ± 0.3	10 ± 2	**087409**
23-pole, straight cable	3500	–	–	–	–	**087382**
23-pole, straight cable	5000	–	–	–	–	**087383**
23-pole, straight cable	10000	–	–	–	–	**087384**

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Selection table for enabling switches ZSG, ZSE, ZXE, ZSA, ZSB and ZSR

Housing

- **E** Built-in version (without cable)
- **K** Kit (without cable or with plug fitted)
- **G1** Housing G1, black
- **G2** Housing G2, yellow
- **G3** Housing G3, yellow

Function

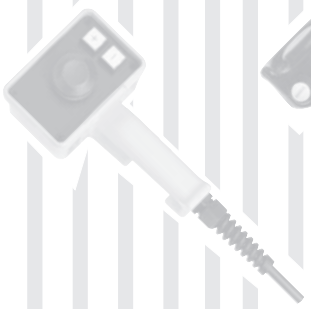
- **2** 2-stage (OFF - enabling)
- **3** 3-stage (OFF - enabling - OFF)

Connection

- **C** Tab, screw connection, flying lead
- **SS4** Plug connector 3-pin + PE
- **SVM5** Plug connector M12 5-pin
- **C16** Plug connector 6-pin + PE
- **MR7** Plug connector 7-pin
- **MR8** Plug connector 8-pin
- **MR10** Plug connector 10-pin
- **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 switch, selector switch, etc.



Enabling switch ZSB Housing G3

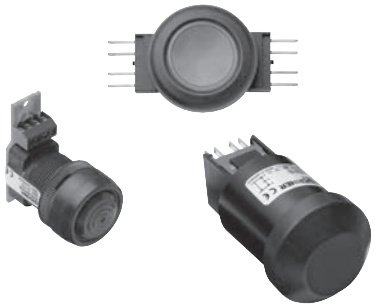
Enabling switch ZSB Housing G1

Enabling switch ZSE

Design					Stages		Connection												Page
E	K	G1	G2	G3	2	3	C	SS4	SVM5	C16	MR7	MR8	MR10	HAN10	RC12	BS12	RC17	UT23	Z	
●					●		●													40
●						●	●													41/42
	●				●		●													44
	●					●	●						●							45
		●			●		●													46
		●				●	●													47
		●				●	●													48
		●				●		●	●											49
		●				●				●				●	●					50
		●				●												●		51
		●				●									●		●			52
		●				●	●												●	53
		●				●					●	●							●	54
		●				●									●	●	●		●	55
			●			●	●													56
			●			●	●													57
				●		●	●												●	58
				●		●	●								●				●	59
				●		●	●												●	60
				●		●											●		●	61/62

Built-in enabling switches ZSG, ZSE and ZXE

- **2/3-stage function**
- **Dual-channel version**
- **Optionally with 22.5 mm, 30.5 mm or 34.4 mm installation dimension**
- **Suitable, e.g. for installation in the hand-held pendant stations HBL or housing G2 or G3**



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).

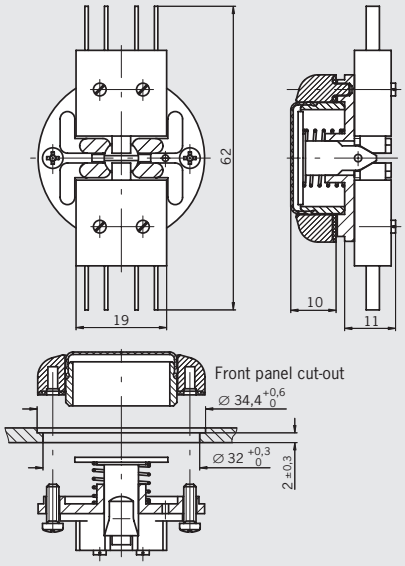
3-stage function
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

Hand-held pendant stations HBL
See catalog for hand-held pendant stations.

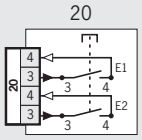
Switching elements (see also Page 8)
- **20** 2 NO
- **111** 1 NO + 1 NC ⊖ + 1 NC
- **121** 1 NO + 2 NC ⊖ + 1 NC
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **2202** 2 NO/NC [1]

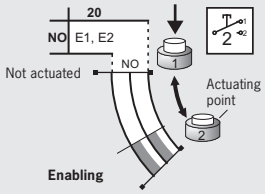
ZSG, 2-stage function [2]
Tab connection

Dimension drawings



Wiring diagrams/function sequence





Contact
- open
- closed
- closed, enabling

Ordering table

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

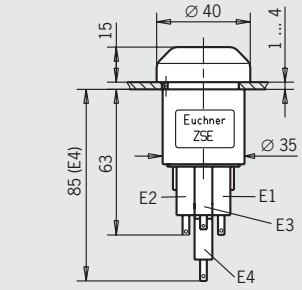
1) Only closed in middle position, a normally open contact and a normally closed contact are combined internally.
2) As per VDI 2854, a device comparable to an emergency stop device must be fitted!

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

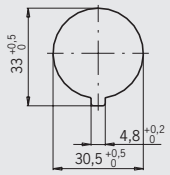
ZSE, 3-stage function
Tab connection

ZSE, 3-stage function
Tab connection, with spacer

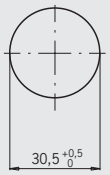
Dimension drawings

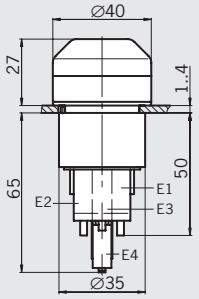


Front panel cut-out

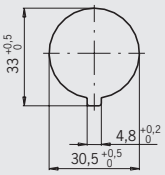


Front panel cut-out
C1692/C1943

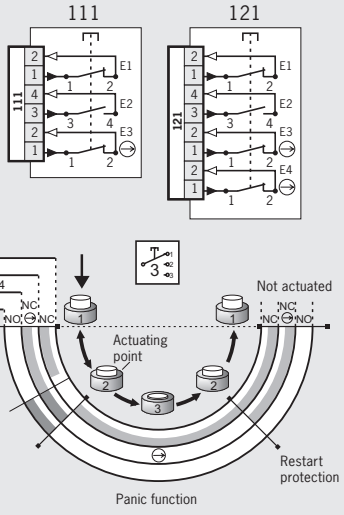


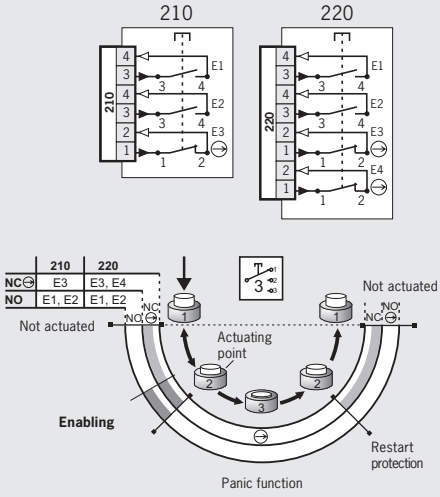


Front panel cut-out



Wiring diagrams/function sequence





Contact
- open
- closed
- closed, enabling

Ordering table

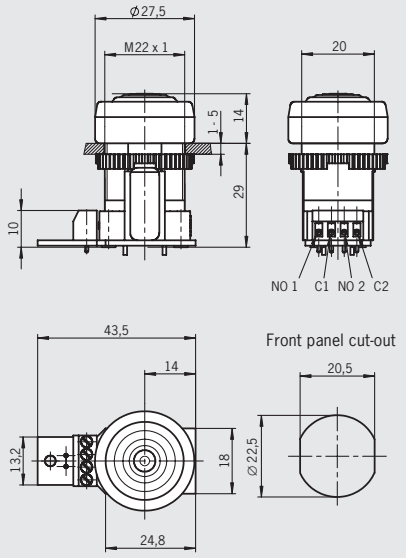
Design	Connection	Version	Switching element				
			111: 1NO+1NC ⊖ +1NC	**121:** 1NO+2NC ⊖ +1NC	**210:** 2NO+1NC ⊖	**220:** 2NO+2NC ⊖	**2202:** 2 NO/NC[1]
Built-in 3-stage **ZSE**	**Tab connection**		**052448** ZSE2-1	**070782** ZSE2-3	**052449** ZSE2-2	**070762** ZSE2-4	On request
		Suitable, e.g. for hand-pendant stations HBL	On request	On request	**070752** [2] ZSE2-2C1692	**083477** [2] ZSE2-4C1943	On request
	Tab connection	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 ➡ NO contact; from position 2 to position 3 ➡ NC contact.
2) No BG type examination

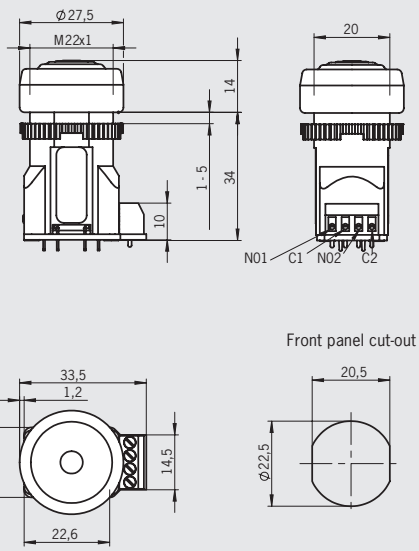
Please turn over

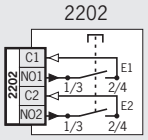
For technical data see page 71

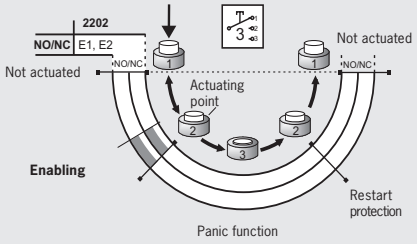
ZXE, 3-stage function
Screw terminals



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







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

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.

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

For technical data see page 71

Enabling switch ZSA

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

- **Housing G1**
- **2-/3-stage function**
- **Single or dual-channel version**
- **Kit without connection cable**

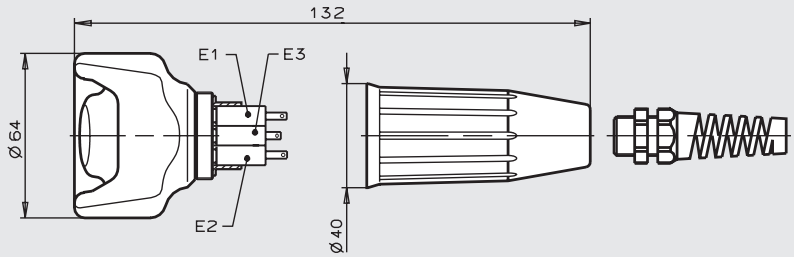
2-stage function [1]
Enabling function is active in the second stage (pressed position). When the button is released, the enabling is removed (see function sequence).

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).

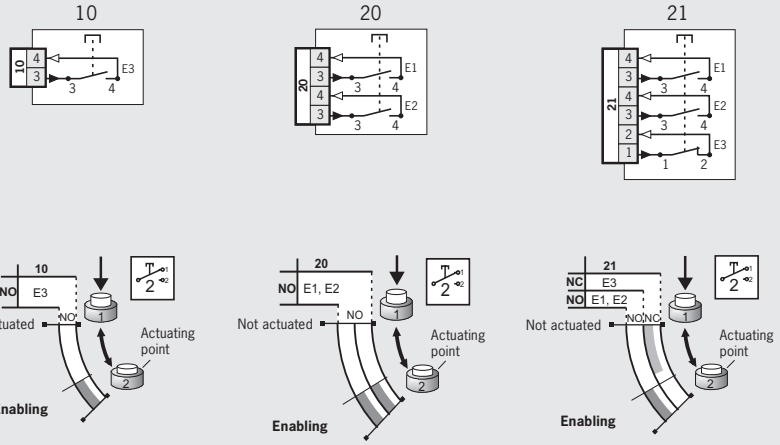
Switching elements (see also Page 8)
- **10** 1 NO
- **20** 2 NO
- **21** 2 NO + 1 NC
- **111** 1 NO + 1 NC ⊖ + 1 NC
- **121** 1 NO + 2 NC ⊖ + 1 NC
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **2220** 2 NO/NC ⊖ [2]

ZSA, 2-stage function [1]
Tab connection

Dimension drawings



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

Design	Connection	Version	Switching element		
			10: 1 NO	**20:** 2 NO	**21:** 2NO + 1 NC
Kit 2-stage [1] **G1**	**Tab connection**	without cable	**070750** ZSA1-1	**070800** ZSA1-2	**070736** ZSA1-3

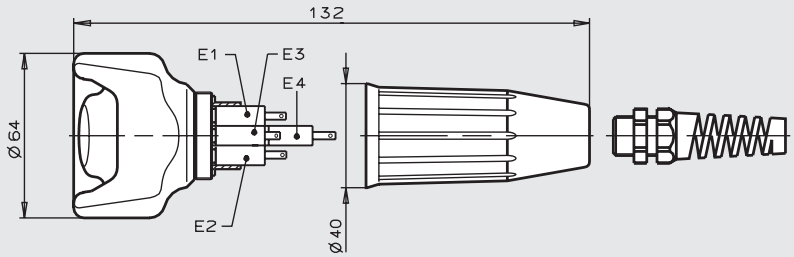
1) As per VDI 2854, a device comparable to an emergency stop device must be fitted!
2) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

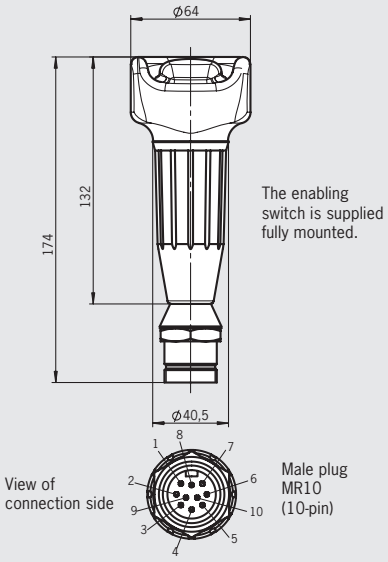
Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

ZSA, 3-stage function
Tab connection

ZSA, 3-stage function
With built-in plug connector

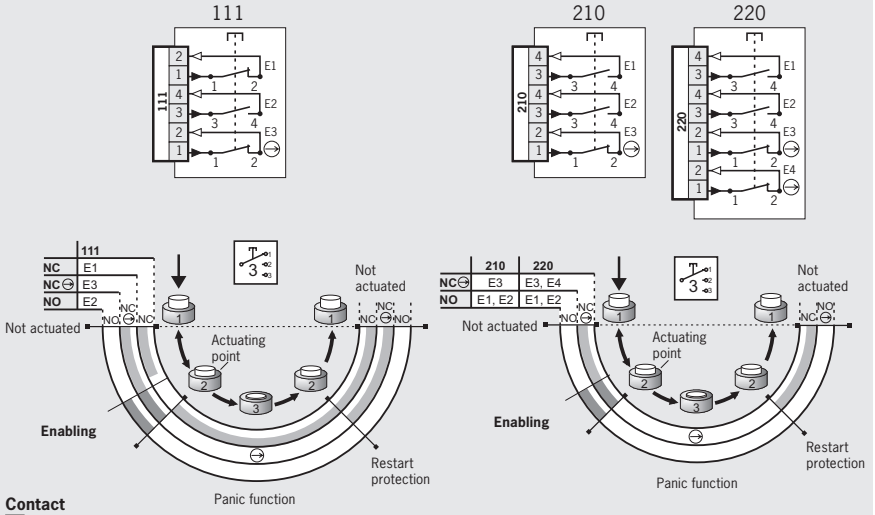
Dimension drawings

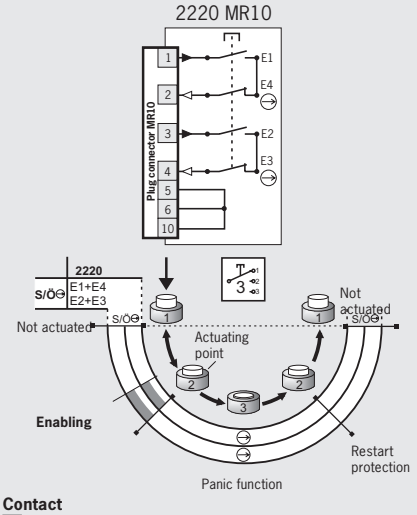




For mating connectors see page 69

Wiring diagrams/function sequence





Ordering table

Design	Connection	Version	Switching element			
			111: 1NO+1NC ⊖ +1NC	**210:** 2NO+1NC ⊖	**220:** 2NO+2NC ⊖	**2220:** 2 NO/NC ⊖ [1]
Kit 3-stage **G1**	**Tab connection**	without cable	**070734** ZSA2-1	**070735** ZSA2-2	**070792** ZSA2-4	-
3-stage **G1** with built-in plug	**MR10** Plug connector (10-pin)	without cable	-	-	-	**095497** ZSA2-4-10C1903

For technical data see page 71

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

Enabling switch ZSA

- **Housing G1**
- **2-/3-stage function**
- **Single or dual-channel version**
- **Connection cable straight or coiled**
- **Wall holder optional**

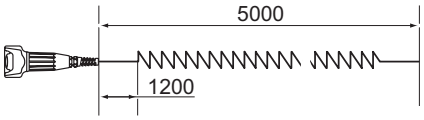
2-stage function [1)]
Enabling function is active in the second stage (pressed position). When the button is released, the enabling is removed (see function sequence).

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.

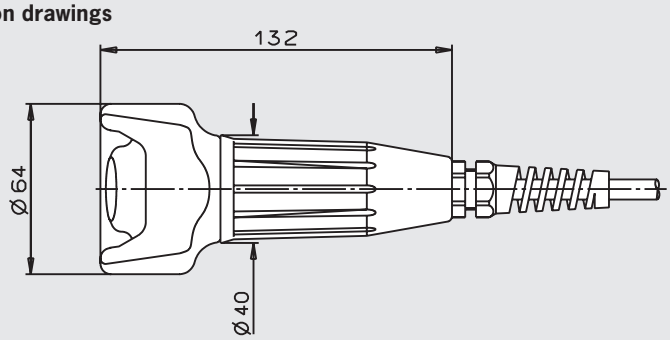
Switching elements (see also page 8)
- **10** 1 NO
- **20** 2 NO
- **21** 2 NO + 1 NC
- **111** 1 NO + 1 NC ⊖ + 1 NC
- **121** 1 NO + 2 NC ⊖ + 1 NC
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖

Cable lengths (coiled cable pulled out straight)

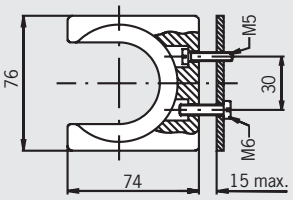


ZSA, 2-stage function [1)]
Flying lead

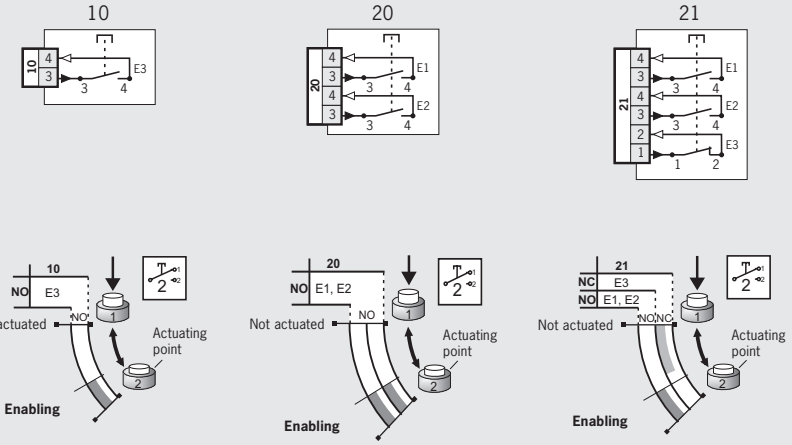
Dimension drawings



Wall holder for Enabling switch ZSA



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

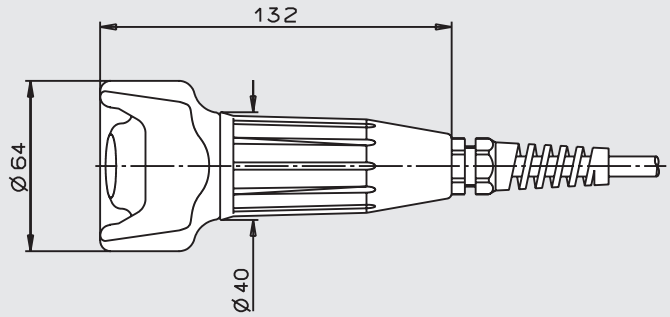
Design	Connection/ Cross section	Cable length	Version	Switching element		
				10: 1 NO	**20:** 2 NO	**21:** 2 NO + 1 NC
G1 2-stage [1)]	**Flying lead 6 x 0.34 mm²**	2.5 m straight	incl. wall holder	On request	**082557** ZSA1A2L25AC1909	On request
		5 m coiled		On request	On request	**094321** ZSA1A2S05A
	Flying lead 3 x 0.75 mm²	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!

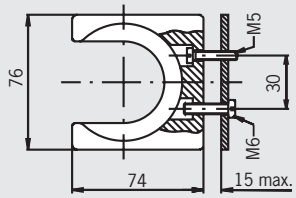
Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

ZSA, 3-stage function
Flying lead

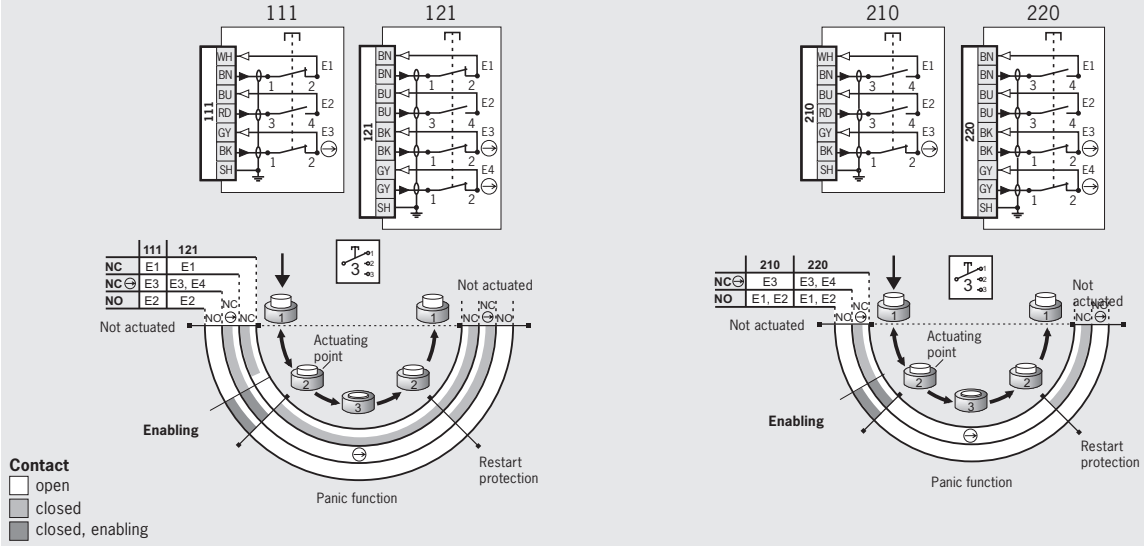
Dimension drawings



Wall holder for enabling switch ZSA



Wiring diagrams/function sequence



Ordering table

Design	Connection/ Cross section	Conductor length	Version	Switching element **111:** 1NO+1NC ⊖ +1NC	**121:** 1NO+2NC ⊖ +1NC	**210:** 2NO+1NC ⊖	**220:** 2NO+2NC ⊖
G1 3-stage	**Flying lead 6 x 0.34 mm²**	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	-
	Flying lead 8 x 0.34 mm²	2.5 m straight	incl. wall holder	-	On request	-	**086788** ZSA2A4L25AC1689
		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

For technical data see page 71

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**

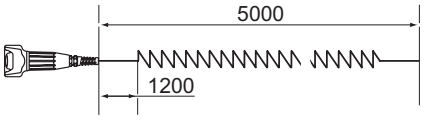
3-stage function
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence)

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).

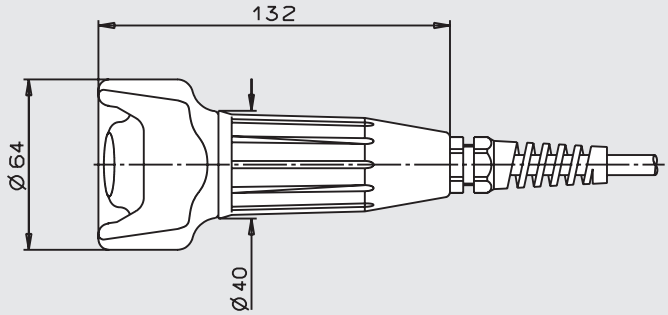
Switching elements (see also Page 8)
- **1110** 1 NO/NC ⊖ 1)
- **1210** 1 NO/NC ⊖ 1) + 1 NO
- **2210** 1 NO/NC ⊖ 1)
  1 NO (additional auxiliary contact)
- **2220** 2 NO/NC ⊖ 1)

Cable lengths (coiled cable pulled out straight)

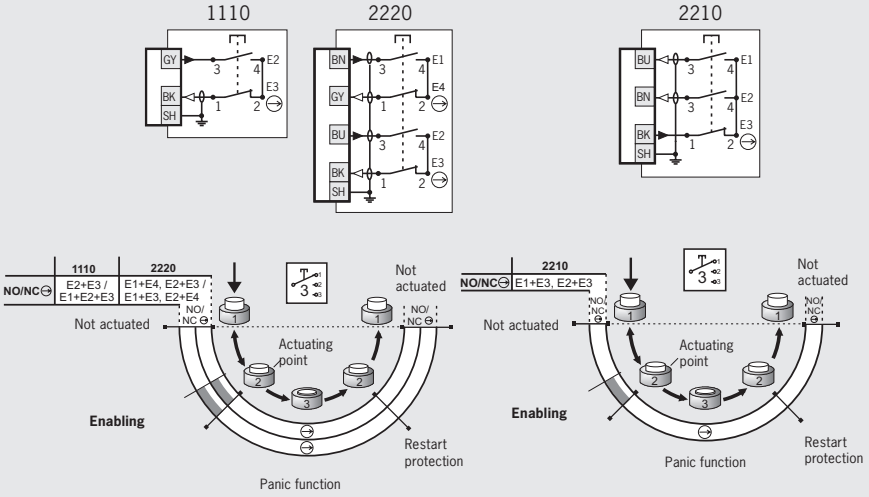


ZSA, 3-stage function
Flying lead

Dimension drawings



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

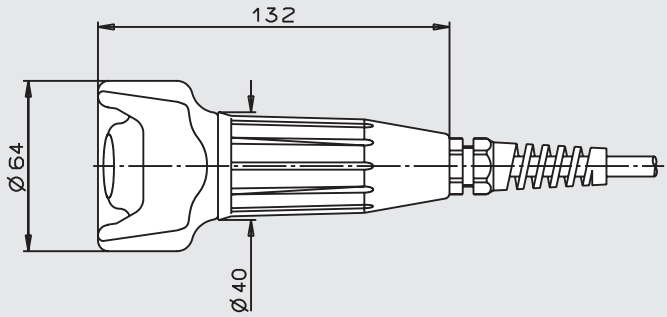
Design	Connection/ Cross section	Cablelength	Version	Switching element		
				1110: 1 NO/NC ⊖ 1)	**2210:** 1 NO/NC ⊖ 1) + 1 NO	**2220:** 2 NO/NC ⊖ 1)
G1 3-stage	**Flying lead 8 x 0.34 mm²**	5 m straight		On request	On request	**072961** ZSA2B4G05A
		5 m coiled		On request	On request	**085118** ZSA2B4S05A
		10 m straight	Increased actuating force	**072759** 2) ZSA2B5G10AC1861	on request	On request
	Flying lead 3 x 0.75 mm²	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.
2) No BG type examination

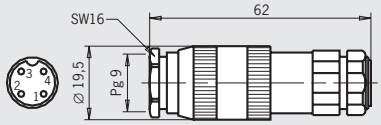
Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

ZSA, 3-stage function
Plug connectors

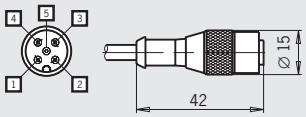
Dimension drawings



Male plug SS4 (4-pin)



Male plug SVM5 (5-pin)

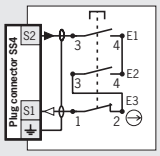


For mating connectors see page 36

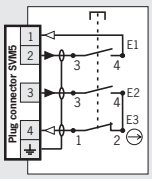
View of connection side

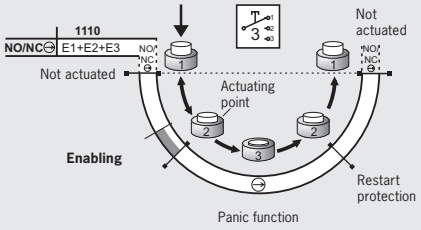
Wiring diagrams/function sequence

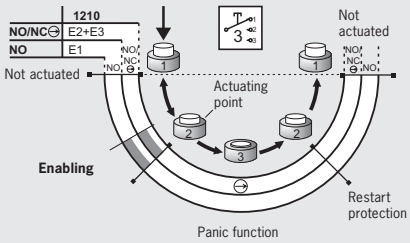
1110 SS4



1210 SVM5







Contact
- open
- closed
- closed, enabling

Ordering table

Design	Connection	Cable length	Version	Switching element	
				1110: 1 NO/NC ⊖ [1]	**1210:** 1 NO/NC ⊖ [1] + 1 NO
G1 3-stage	**SS4** Plug connector (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	**057098** ZSA2B2G10B-C1662	-
	SVM5 Plug connector (5-pin)	15 m straight		On request	**072870** ZSA2B2G15CC1926
		25 m straight		On request	**086206** ZSA2B2G25CC1926

For technical data see page 71

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

Enabling switch ZSA

- **Housing G1**
- **3-stage function**
- **Single or dual-channel version**
- **Straight connection cable**
- **Plug connector**
- **Direct connection to safety switch 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.

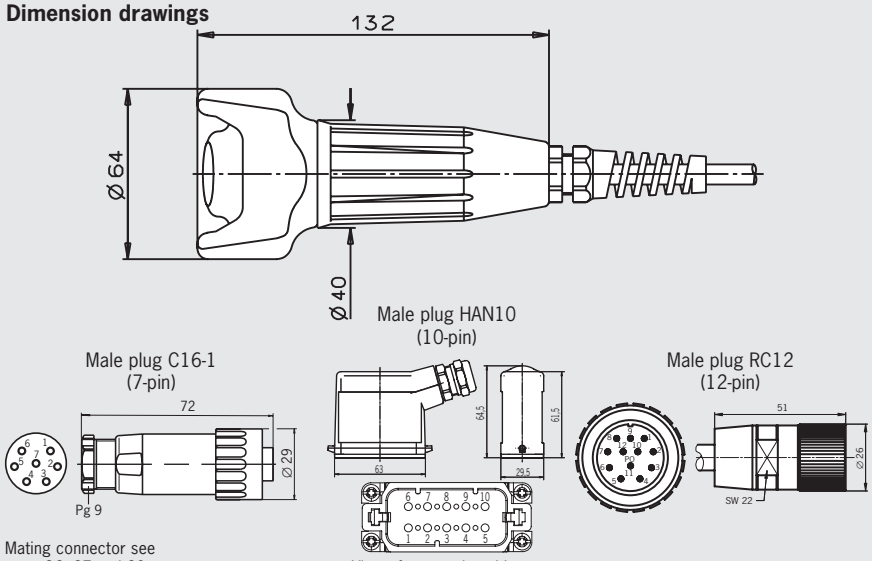
Suitable for direct connection to safety switch
This enabling switch can be connected directly to a safety switch (TZ…C1803) (see catalog for safety switches with metal housing).

Increased actuating force
A higher force is required on pressing through from stage 2 (enabling) to stage 3 (pressed through „panic function“).

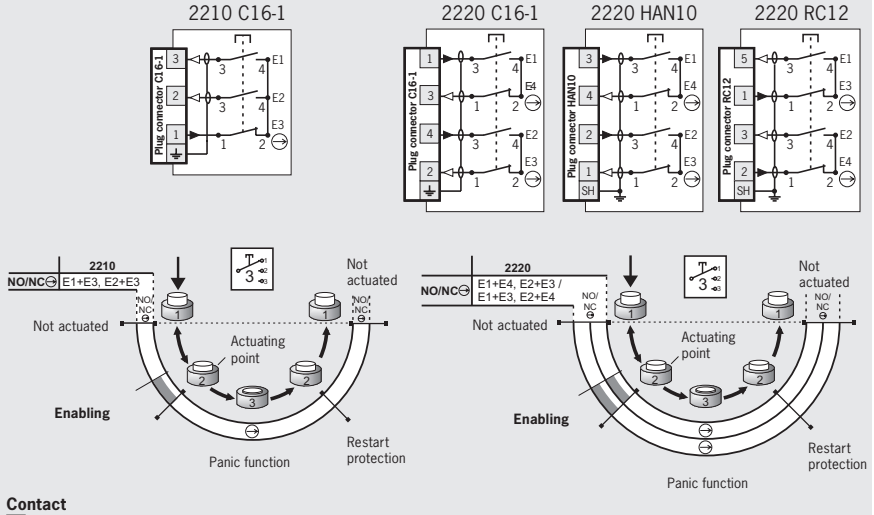
Switching elements (see also Page 8)
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **2210** 1 NO/NC ⊖ [1]
  1 NO (additional auxiliary contact)
- **2220** 2 NO/NC ⊖ [1]

ZSA, 3-stage function
Plug connector

Dimension drawings



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

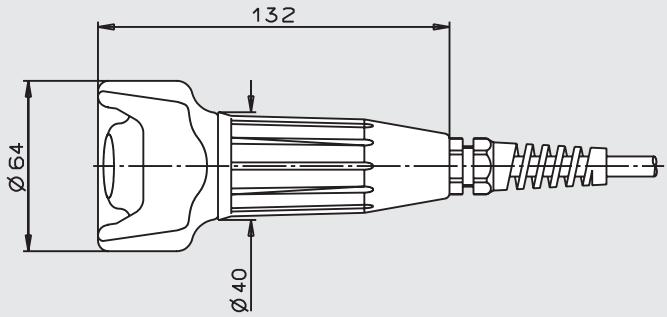
Design	Connection	Cable length	Version	Switching element	
				2210: 1 NO/NC ⊖ [1] + 1 NO	**2220:** 2 NO/NC ⊖ [1]
G1 3-stage	**C16-1** [2] Plug connector (7-pin)	10 m straight		**057100** ZSA2B2G10B	**070788** ZSA2B4G10B
		20 m straight		On request	**079870** ZSA2B4G20B
	HAN10 Plug connectors (10-pin)	10 m straight	Increased actuating force Screen on plug housing	On request	**077489** [3] ZSA2B4G10CC1830
	RC12 Plug connector (12-pin)	5 m straight	Direct connection to TZ...C1803 Screen on plug housing	On request	**092141** [3] ZSA092141C2038
		10 m straight		On request	**097567** [3] ZSA097567C2038
		15 m straight		On request	**099495** [3] ZSA099459C2038
		25 m straight		On request	**100873** [3] ZSA0100873C2038

1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.
2) Enabling switch connector compatible with safety switch NZ..VZ.C1420 or NZ..VZ.C1701 (see catalog for safety switches with metal housing).
3) No BG type examination

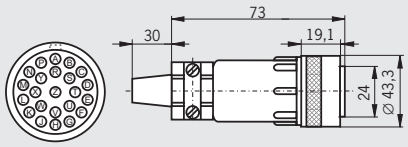
Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

ZSA, 3-stage function
Plug connector

Dimension drawings



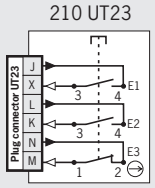
Male plug UT23
(23-pin)

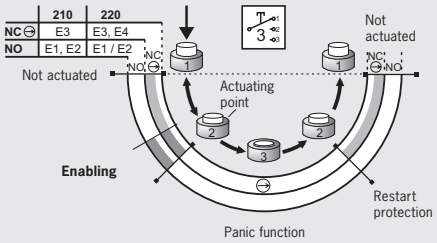


View of connection side

For mating connectors
see page 38

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 connector (23-pin)	12 m straight	**070731** ZSA2A2L12CC1725	on request

For technical data see page 71

Enabling switch 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.

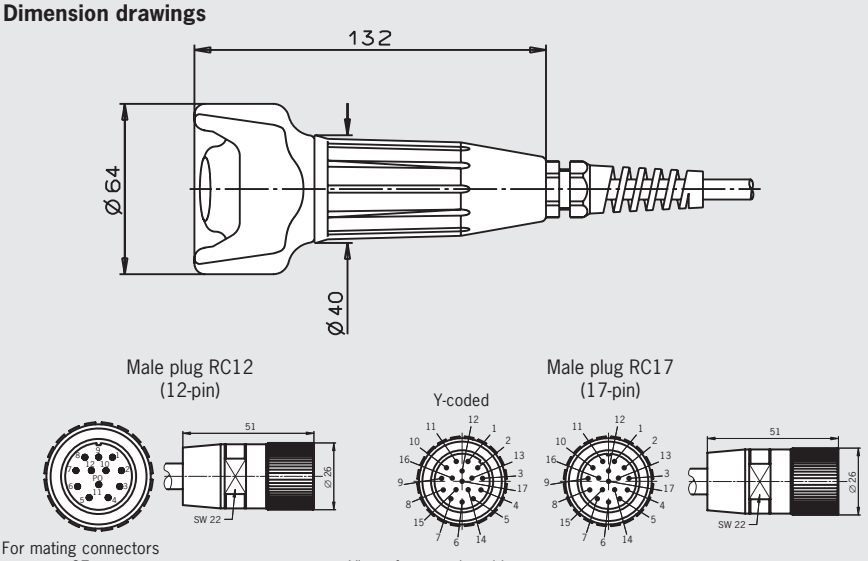
LEDs
The LEDs are used for visual feedback direct at the enabling switch.

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

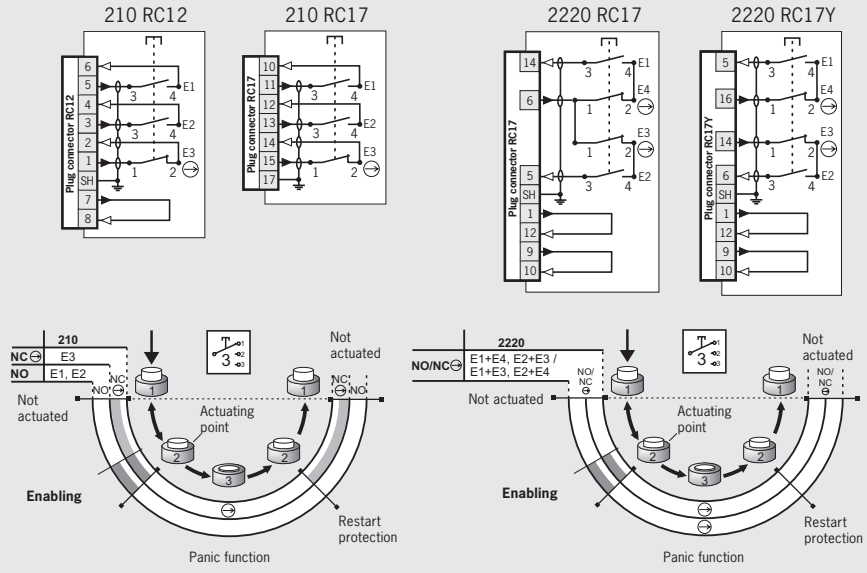
Switching elements (see also Page 8)
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **2220** 2 NO/NC ⊖ 1)

ZSA, 3-stage function
Plug connector

Dimension drawings



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

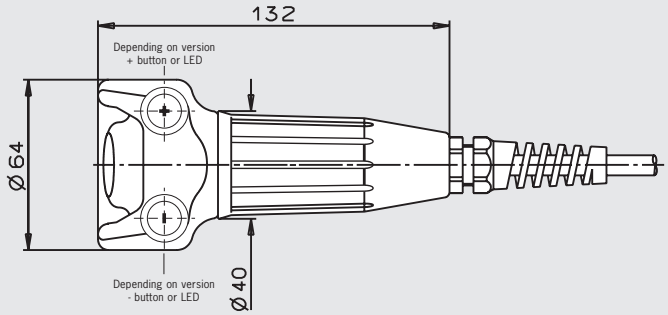
Design	Connection	Cable length	Version	Switching element	
				210: 2 NO + 1 NC ⊖	2220: 2 NO/NC ⊖ 1)
G1 3-stage	**RC12** Plug connectors (12-pin)	5 m straight	Screen on plug housing	**073289** ZSA2AG05CC1770	On request
	RC17 Plug connector (17-pin)	5 m straight		**070741** ZSA2A2G05CC1714	On request
			Suitable for Siemens panel PP031 (1-channel) Screen on plug housing	On request	**092738** ZSA2A4G05C-C2041
	RC17 Plug connector Y-coded (17-pin)	5 m straight	Suitable for Siemens panel PP012 and PP031 (2-channel) Screen on plug housing	On request	**091547** ZSA2A4G05C-C2032

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

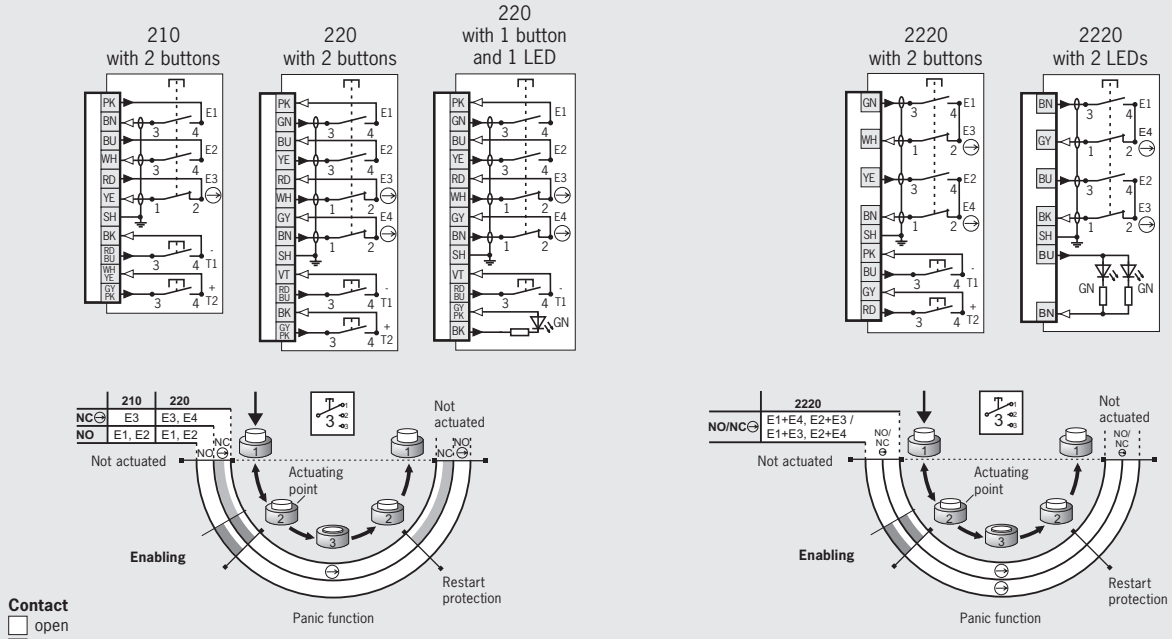
Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

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 ⊖	**220:** 2 NO + 2 NC ⊖	2220: 2 NO/NC ⊖ 1)
G1 3-stage	**Flying lead 8 x 0.34 mm²**	10 m straight	2 LEDs (gn)	On request	On request	**086707** 2) ZSA086707C1983
		15 m straight	2 LEDs (gn)	On request	On request	**072969** 2) ZSA072969C1983
	Flying lead 8 x 0.5 mm² + 8 x 0.14 mm²	5 m straight	1 button 1 LED (gn)	On request	**085126** 2) ZSB085126	**106112** ZSB2B4G05A-C2277
		5 m straight	2 buttons (+ and -)	**073260** ZSB2A2G05A	**083317** 2) 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** ZSB096900	On request
		7 m coiled	1 button 1 LED (gn)	On request	**109470** 2) ZSB2A4S06A-C2302	On request
		8 m coiled	2 buttons (+ and -)	On request	**103161** 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

For technical data see page 71

Enabling switch ZSA and ZSB

- **Housing G1**
- **3-stage function**
- **Dual-channel version**
- **Straight connection cable optional**
- **Plug connector**
- **LED and/or buttons optional**
- **Actuator for safety switch NZ.VZ or TZ 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.

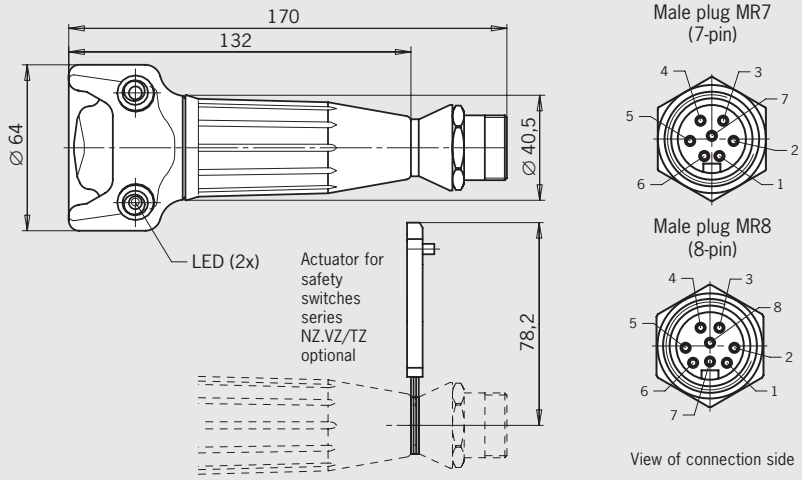
Suitable for direct connection to safety switch
This enabling switch can be connected directly to a safety switch (TZ...C1803) (see catalog for safety switches with metal housing).

Actuator
Suitable for safety switch NZ.VZ/TZ (see catalog for safety switches with metal housing). By using an appropriate safety switch as the holder for the enabling switch, the position of the enabling switch can be safely sampled. 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).

Switching elements (see also page 8)
- **210** 2 NO + 1 NC ⊖
- **2220** 2 NO/NC ⊖ 1)

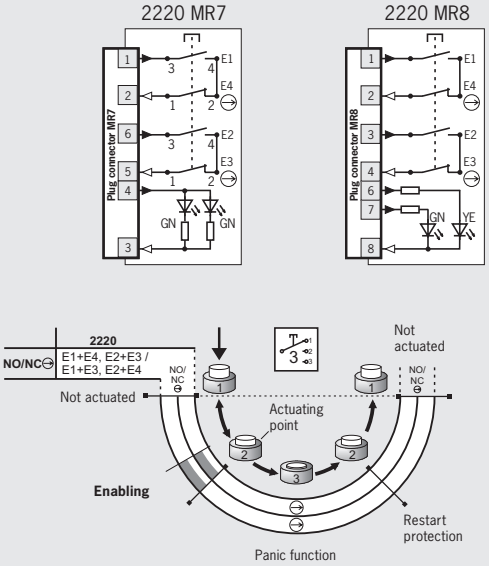
ZSA, 3-stage function
Plug connectors

Dimension drawings



For mating connectors see page 39

Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

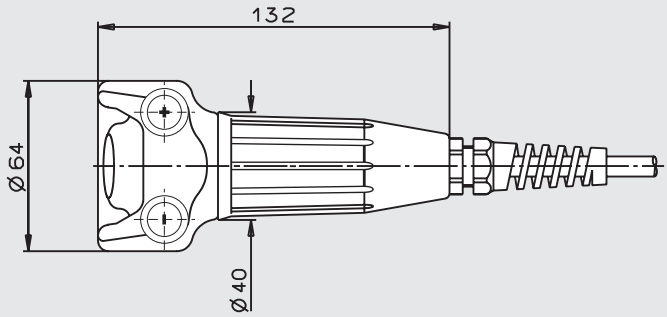
Design	Connection	Cable length	Version	Switching element **2220:** 2 NO/NC ⊖ 1)
G1 3-stage	**MR7** Plug connectors (7-pin)	-	2 LEDs (gn)	**085114** ZSA085114C1968
		-	2 LEDs (gn) With actuator for safety switch NZ.VZ/TZ	**072887** ZSA072887-C1932
	MR8 plug connector (8-pin)	-	2 LEDs (gn + ye) With actuator for safety switch NZ.VZ/TZ	**086681** ZSA086681C1979

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

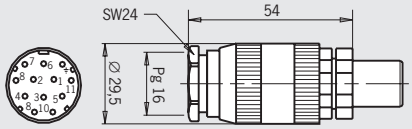
Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

ZSB, 3-stage function
Plug connectors

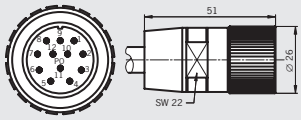
Dimension drawings



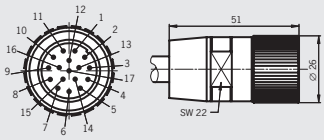
Female connector BS12 (12-pin)



Male plug PC12 (12-pin)



Male plug RC17 Y-coded (17-pin)

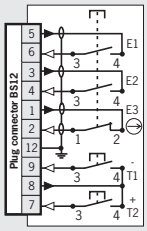


For mating connectors
see page 36 and 37

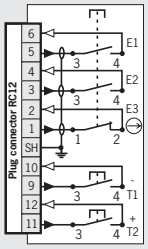
View of connection side

Wiring diagrams/function sequence

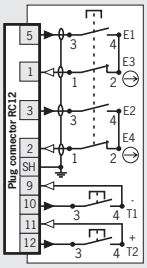
210 BS12



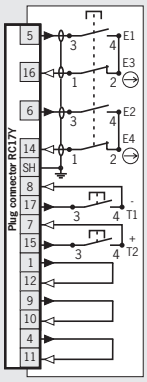
210 RC12

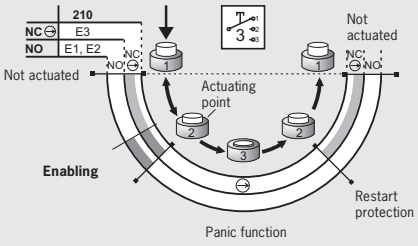


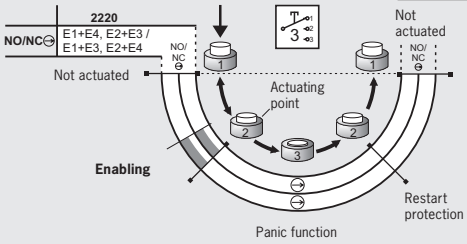
2220 RC12



2220 RC17Y







Contact
- open
- closed
- closed, enabling

Ordering table

Design	Connection	Cable length	Version	Switching element	
				210: 2 NO + 1 NC ⊖	2220: 2 NO/NC ⊖ 1)
G1 3-stage	**BS12** Plug connectors (12-pin)	5 m straight	2 buttons (+ and -)	**079832** 2) ZSB079832	On request
	RC12 Plug connectors (12-pin)	5 m straight	2 buttons (+ and -), Screen on plug housing	**073264** ZSB2A2G05C	On request
		5 m straight	2 buttons (+ and -), Direct connection TZ...C1803 Screen on plug housing	On request	**077040** 2) ZSB077040
		10 m straight	2 buttons (+ and -) Screen on plug housing	**073265** ZSB2A2G10C	On request
	RC17 plug connector Y-coded (17-pin)	5 m straight	2 buttons (+ and -) Screen on plug housing	On request	**092996** 2) 3) ZSB2B4G05C-C2044

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

For technical data see page 71

Enabling switch ZSR

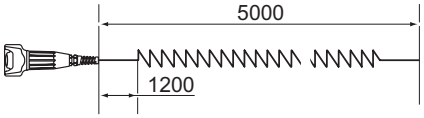
- **3-stage function**
- **Single or dual-channel version**
- **Housing G2**
- **Straight connection cable**
- **Plug connector optional**
- **Including holder**

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.

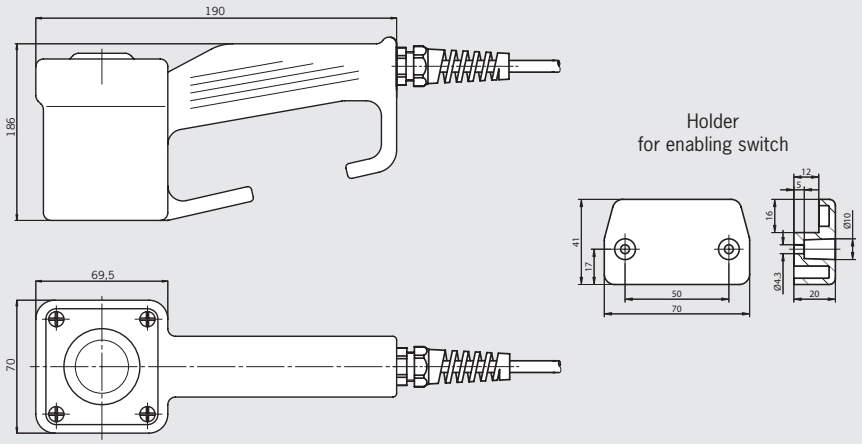
Switching elements (see also page 8)
- **111** 1 NO + 1 NC ⊖ + 1 NC
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **1110** 1 NO/NC ⊖ 1)
- **2210** 1 NO/NC ⊖ 1)
  1 NO (additional auxiliary contact)

Cable lengths (coiled cable pulled out straight)

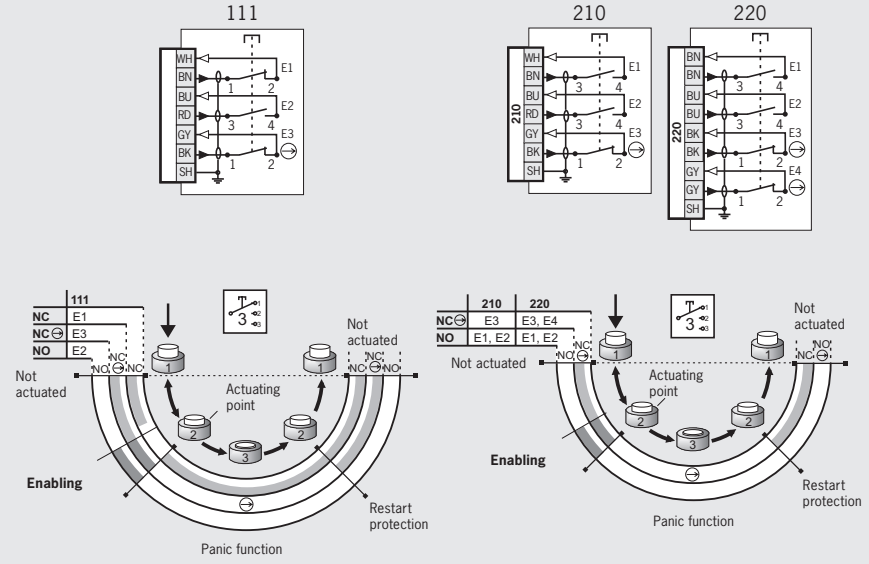


ZSR, 3-stage function
Flying lead

Dimension drawings



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

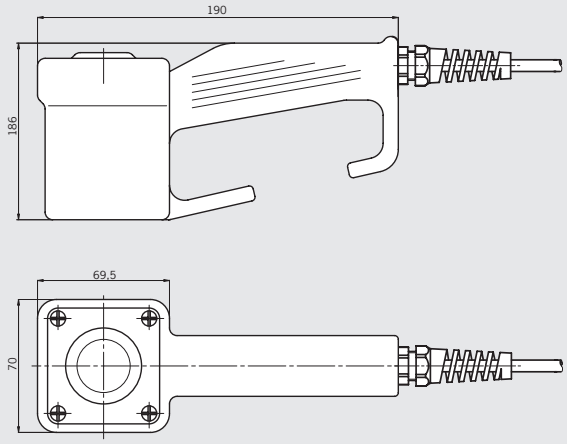
Design	Connection/ Cross section	Cable length	Switching element		
			111: 1 NO + 1 NC ⊖ +1 NC	**210:** 2 NO + 1 NC ⊖	**220:** 2 NO + 2 NC ⊖
G2 3-stage	**Flying lead 6 x 0.34 mm²**	5 m straight	**055423** ZSR2A1G05A	**055427** ZSR2A2G05A	-
		10 m straight	**055424** ZSR2A1G10A	**055428** ZSR2A2G10A	-
		5 m coiled	**055425** ZSR2A1S05A	**055429** ZSR2A2S05A	-
	Flying lead 8 x 0.34 mm²	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.

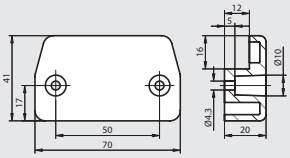
Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

ZSR, 3-stage function
Flying lead

Dimension drawings

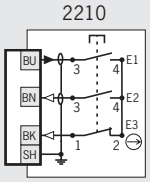


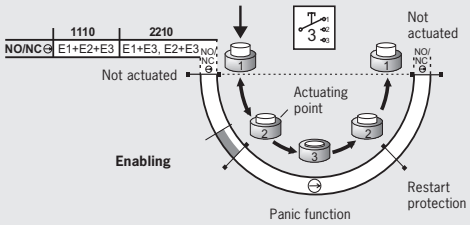
Holder
for enabling switch



For mating connectors
see page 39

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 mm²**	5 m straight	On request	**055431** ZSR2B2G05A
		10 m straight	On request	**055432** ZSR2B2G10A

For technical data see page 71

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**

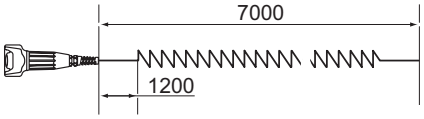
3-stage function
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

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.

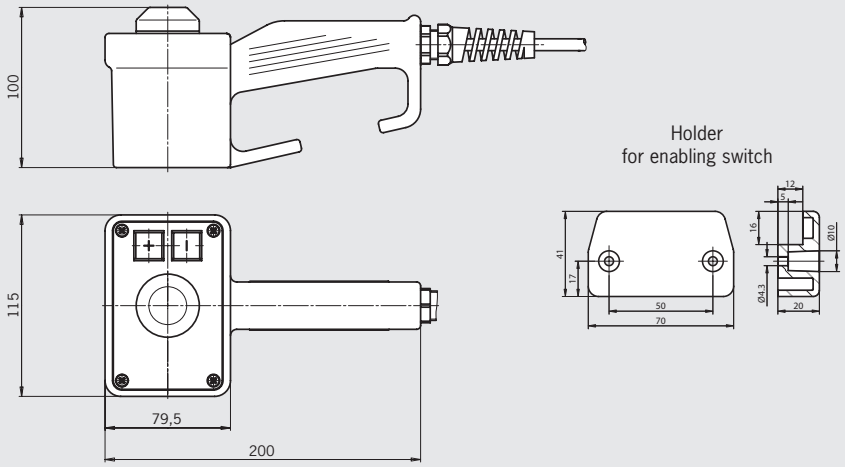
Switching elements (see also page 8)
- **210** 2 NO + 1 NC ⊖

Cable lengths (coiled cable pulled out straight)

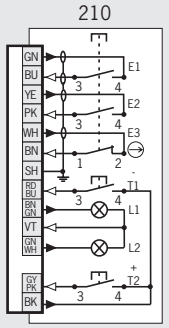


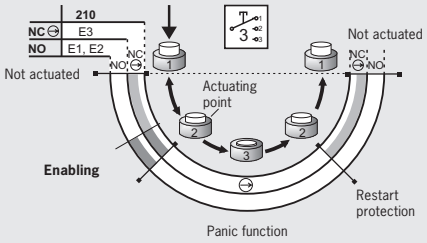
ZSB, 3-stage function
Flying lead

Dimension drawings



Wiring diagrams/function sequence





Contact
- open
- closed
- closed, enabling

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 mm² + 8 x 0.14 mm²**	7 m coiled	2 illuminated buttons (+ and -)	**054784** ZSB054784

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Enabling switch ZSB

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

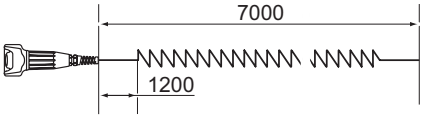
3-stage function
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

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.

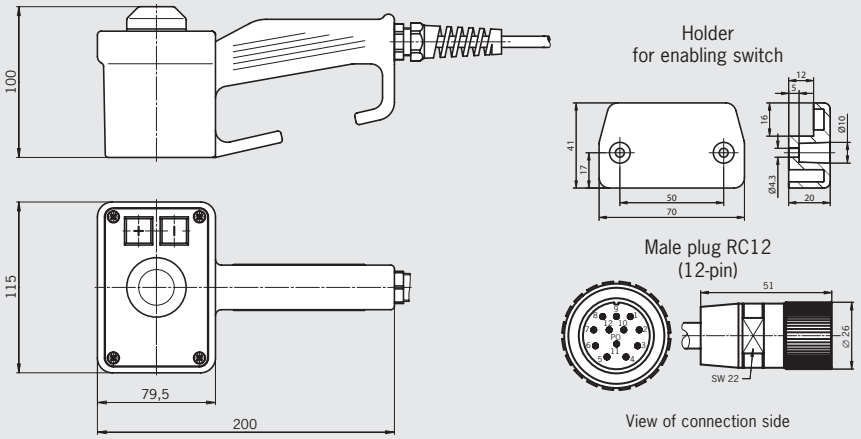
Switching elements (see also Page 8)
- **220** 2 NO + 2 NC ⊖
- **2220** 2 NO/NC ⊖ 1)

Cable lengths (coiled cable pulled out straight)



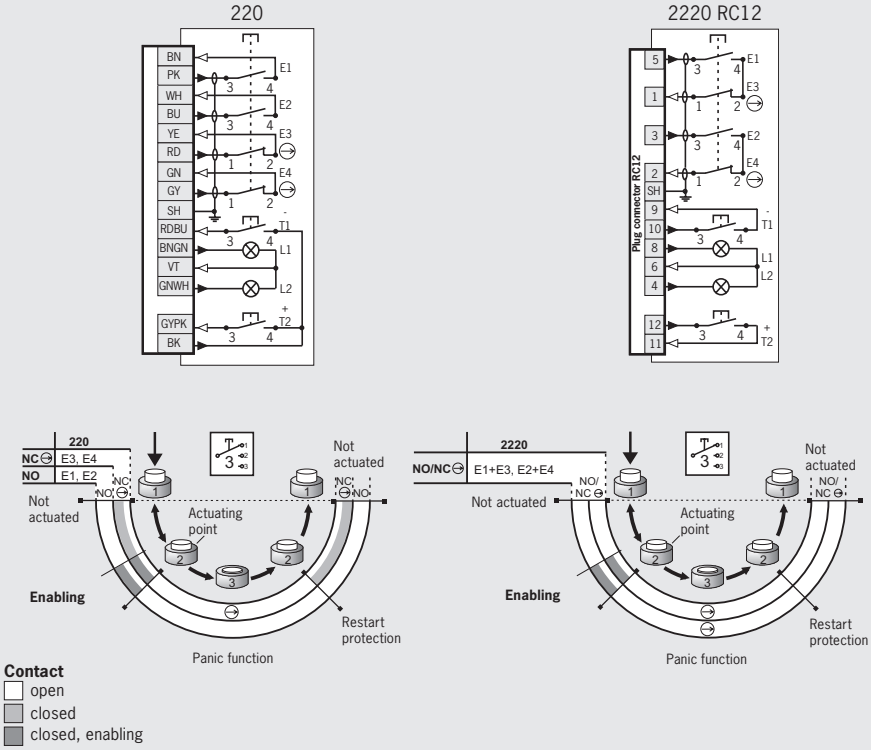
ZSB, 3-stage function
Plug connector

Dimension drawings



For mating connectors
see page 37 and 38

Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

Design	Connection	Conductor length	Version	Switching element	
				220: 2 NO + 2 NC ⊖	2220: 2 NO/NC ⊖ 1)
G3 3-stage	**Flying lead 4 x 0.5 mm² + 4 x 0.5 mm² + 8 x 0.14 mm²**	7 m coiled	2 illuminated buttons (+ and -)	**100570** ZSB100570	On request
	RC12 Plug connector (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.

For technical data see page 71

Enabling switch ZSB

- **3-stage function**
- **Dual-channel version**
- **Housing G3**
- **Connection cable straight or coiled**
- **Plug connector**
- **Two illuminated buttons**
- **Key-operated 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.

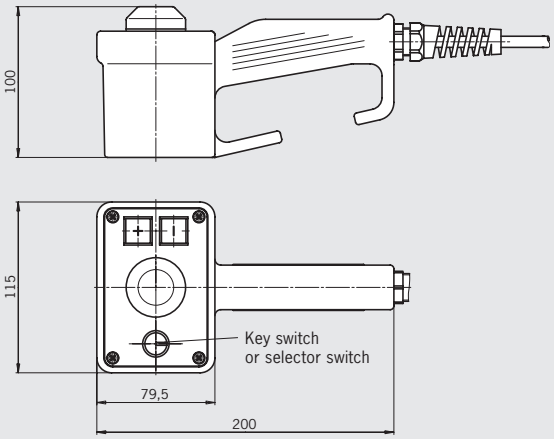
Key switch
For individual use, e.g. as operating mode selector switch.

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)!

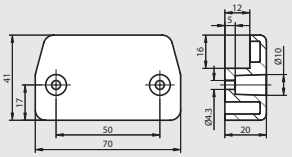
Switching elements (see also Page 8)
- **210** 2 NO + 1 NC ⊖
- **2220** 2 NO/NC ⊖ 1)

ZSB, 3-stage function
Flying lead, key operated switch or selector switch

Dimension drawings



Holder for enabling switch

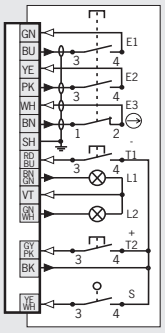


Switching table for selector switch (210 and 2220)

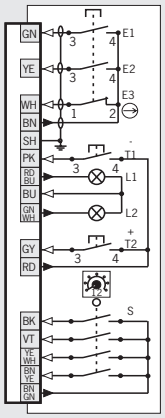
Pos.	BNYE	YEWH	VT	BK
	8	4	2	1
1	0	0	0	0
2	0	0	0	1
3	0	0	1	0
4	0	0	1	1
5	0	1	0	0
6	0	1	0	1
7	0	1	1	0
8	0	1	1	1
9	1	0	0	0
10	1	0	0	1
11	1	0	1	0
12	1	0	1	1

Wiring diagrams/function sequence

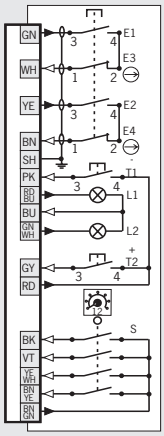
210
with key operated switch

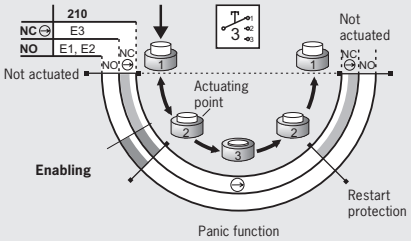


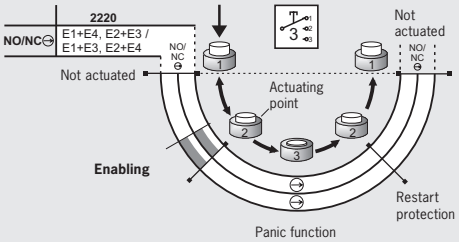
210
with selector switch



2220
with selector switch







Contact
- open
- closed
- closed, enabling

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 mm² + 8 x 0.14 mm²**	3 m straight	2 illuminated buttons (+ and -) 1 key operated 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.

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Enabling switch ZSB

- **3-stage function**
- **Dual-channel version**
- **Housing G3**
- **Straight connection cable**
- **Plug connector**
- **Two illuminated buttons**
- **Key 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.

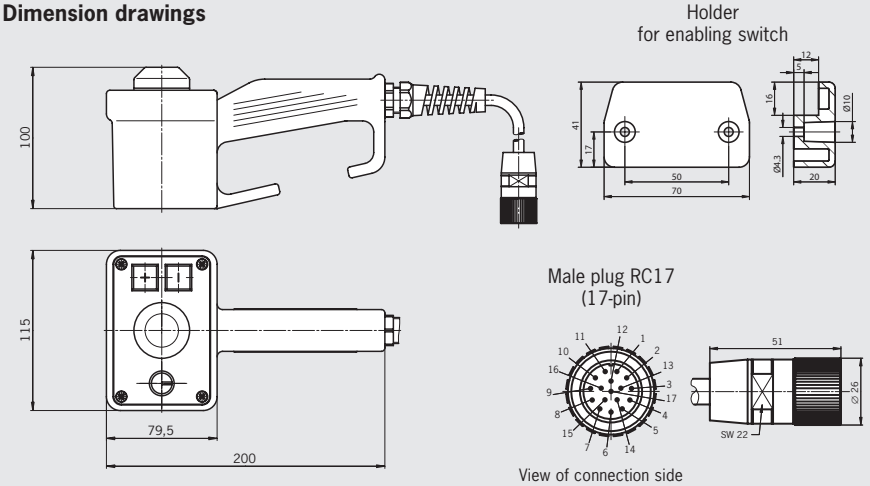
Illuminated + and – buttons
These buttons can be configured individually. For example for moving axes in positive or negative direction.

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

Switching elements (see also Page 8)
- **210** 2 NO + 1 NC ⊖

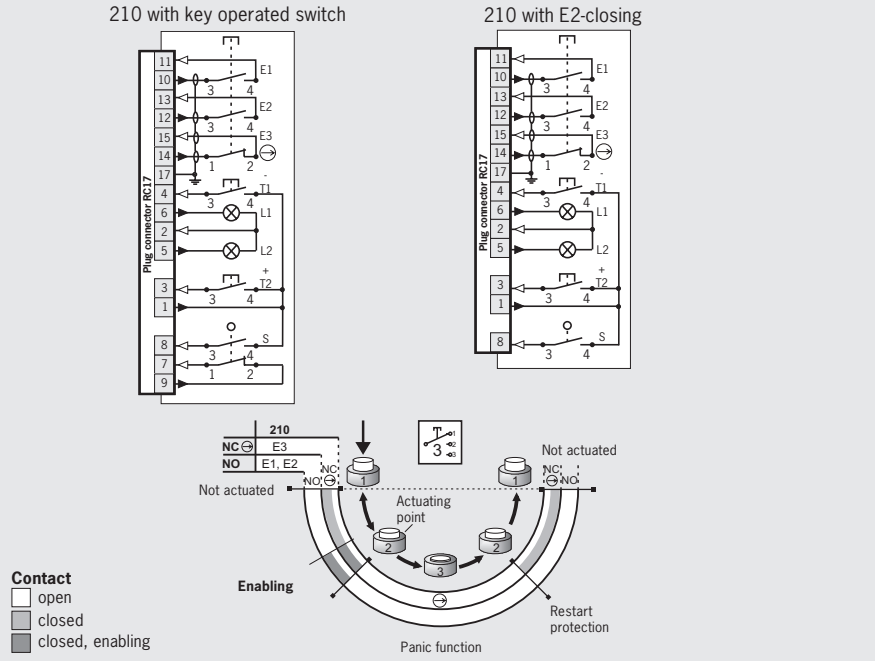
ZSB, 3-stage function
Plug connector, key-operated switch

Dimension drawings



For mating connectors
see page 37

Wiring diagrams/function sequence



Ordering table

Design	Connection	Cable length	Version	Switching element
				210: 2 NO + 1 NC ⊖
G3 3-stage	**RC17** Plug connector (17-pin)	3 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1NO)	**070904** ZSB070904
		5 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1NO)	**072645** ZSB072645
		12 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1NO)	**072403** ZSB072403
		12 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1NO, 1NC)	**090262** ZSB090262
		3 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1 NO) E2-closing [1]	**077059** ZSB077059
		5 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1 NO) E2-closing [1]	**072711** ZSB072711

1) No key available

For technical data see page 71

Enabling switch ZSB

- **3-stage function**
- **Dual-channel version**
- **Housing G3**
- **Straight connection cable**
- **Plug connector**
- **Two illuminated buttons**
- **Key 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.

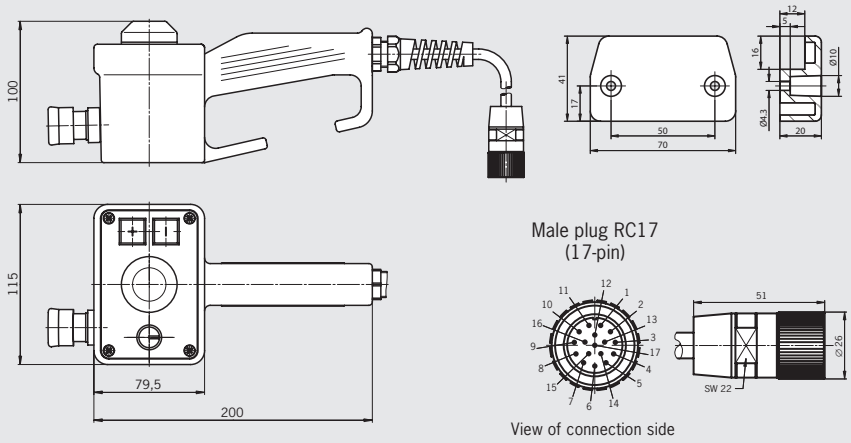
Key switch
For individual use, e.g. as operating mode selector switch.

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)]

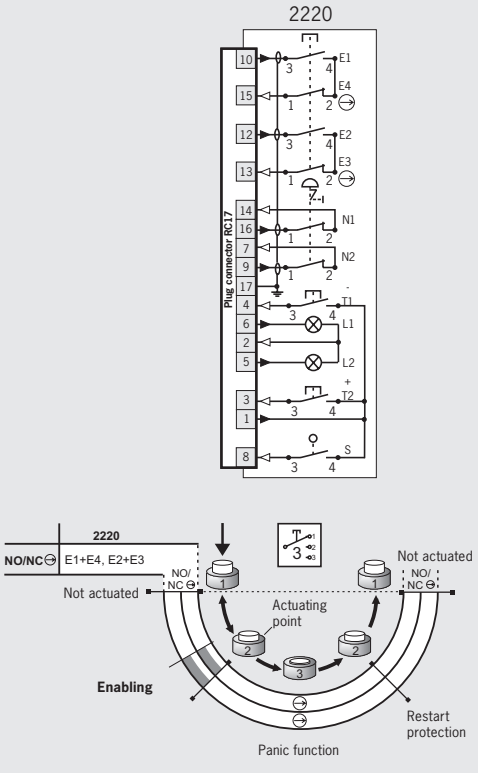
ZSB, 3-stage function
Plug connector, key operated switch, emergency stop device

Dimension drawings



For mating connectors
see page 37

Wiring diagrams/function sequence



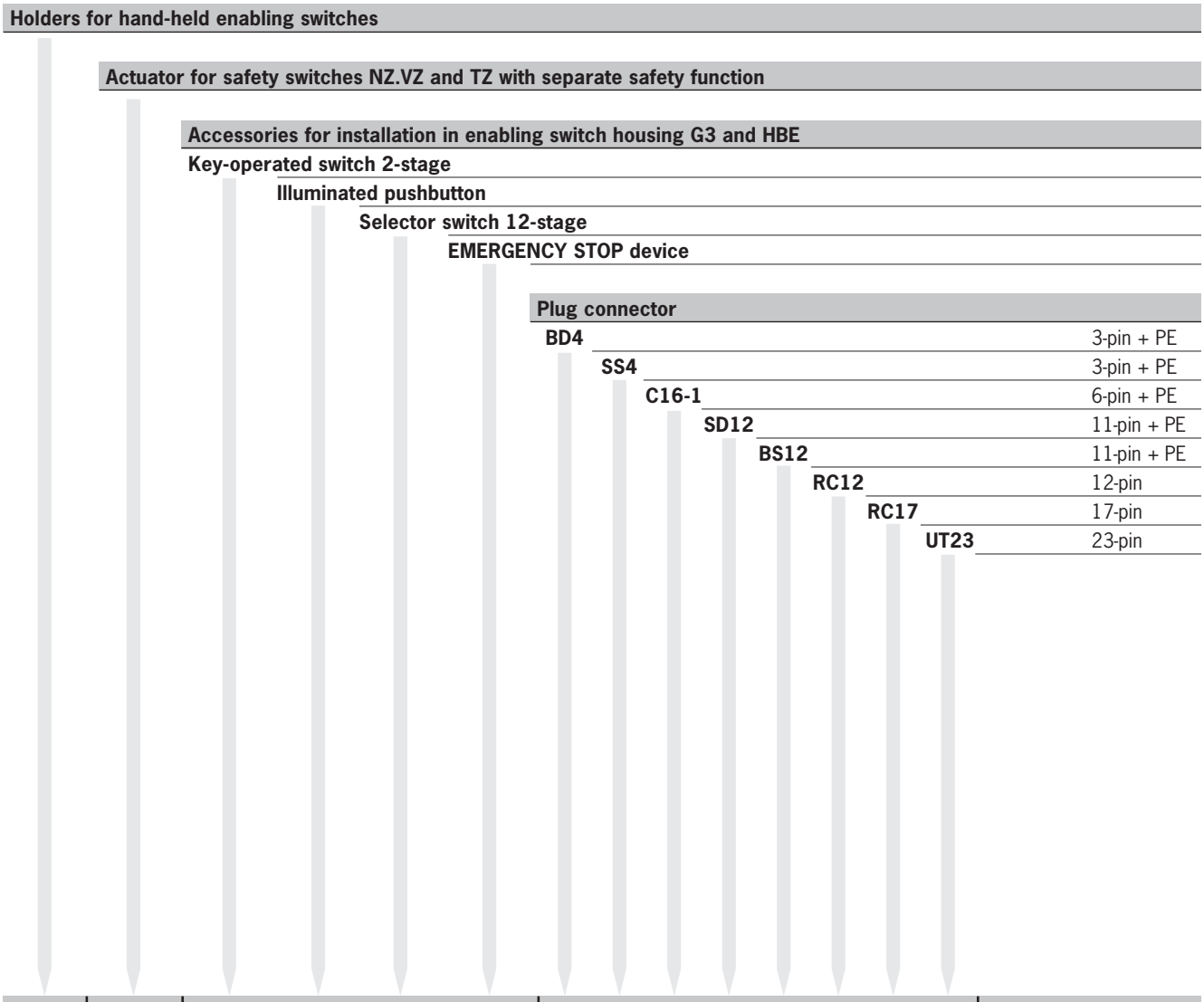
Contact
- open
- closed
- closed, enabling

Ordering table

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

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Selection table for accessories



Holder	Actuator	Accessories				Plug connector								Page
		Key-operated switch	Illumin. push button	Selector switch switch	EMERGENCY STOP	BD4	SS4	C16-1	SD12	BS12	RC12	RC17	UT23	
●	●													64
		●	●	●	●									65
						●	●	●	●	●				66
											●	●		67
													●	68

Holders for hand-held enabling switches/actuator for safety switches NZ.VZ/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.

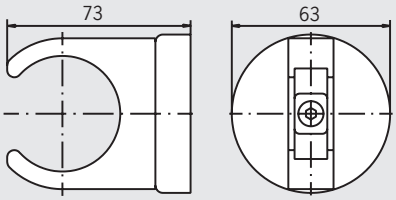
Screw holder for housing G1
The holder can be securely fastened to parts of the machine with a wall thickness of max. 15 mm using two screws.

Screw holder for housing G1 with cable hook
A holder with an additional cable hook for hanging a wound-up cable.

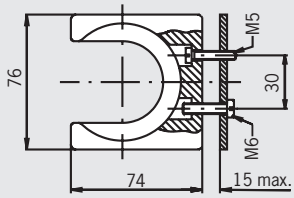
Actuator for safety switch
Suitable for fitting, e.g. to the hand-held enabling switch kit. Safe position sampling of the enabling switch can be achieved by fitting the actuator and the use of an appropriate safety switch (NZ.VZ or TZ). By suitable integration of this combination, the signal from the 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

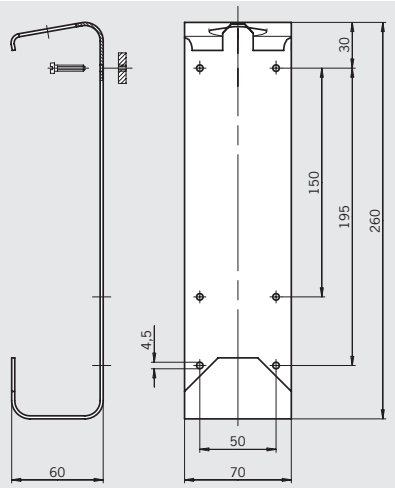
Dimension drawings



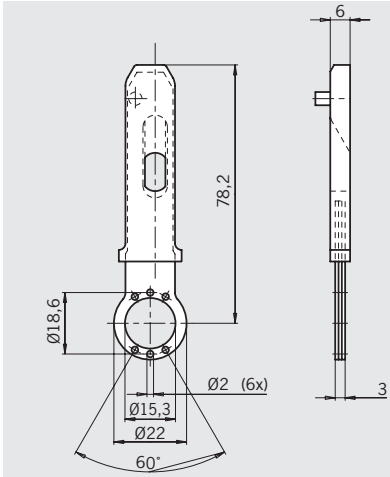
Screw holder



Screw holder with cable hook



Actuator for safety switches series NZ.VZ and TZ



Ordering table

Item	Version	
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

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Accessories for installation in enabling switch housing G3

- **Key-operated switch 2-stage**
- **Illuminated pushbutton**
- **Selector switch 12-stage**
- **EMERGENCY STOP device**

Key-operated switch 2-stage
As an option the key can be removed in both positions or in only one position. Replacement keys for the key-operated switch are available if required. Depending on the application, the key-operated switch can be used to activate the enabling switch or as an operating mode selector switch.

Illuminated pushbutton
The illuminated pushbutton is equipped with a white lamp and a transparent cover. Additional functions can be run directly at the enabling switch using the buttons.

EMERGENCY STOP device
The emergency stop switch can be fitted with two switching elements (available separately), for redundant evaluation. With the additional EMERGENCY STOP device, an EMERGENCY STOP function can be initiated directly at the enabling switch. At least one switching element must be ordered at the same time. Red emergency stop button.

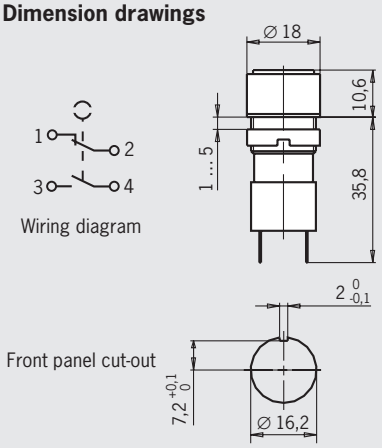
Selector switch 12-stage
The 12-stage, binary coded selector switch is supplied complete with rotary knob with position indicator. As required the 2 - 12 adjustable detent positions can, e.g. be used for axis, speed or range selection.

Detent	output			
position	8	4	2	1
1	0	0	0	0
2	0	0	0	1
3	0	0	1	0
4	0	0	1	1
5	0	1	0	0
6	0	1	0	1
7	0	1	1	0
8	0	1	1	1
9	1	0	0	0
10	1	0	0	1
11	1	0	1	0
12	1	0	1	1

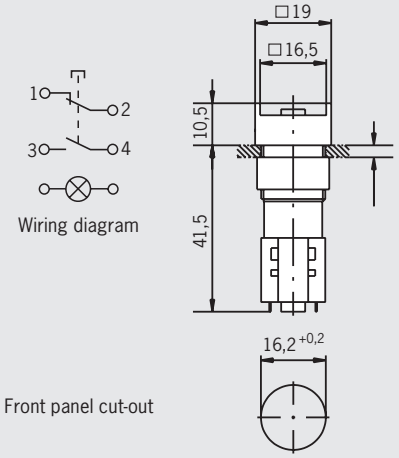
All outputs are open between the detent positions

Key-operated switch 2-stage

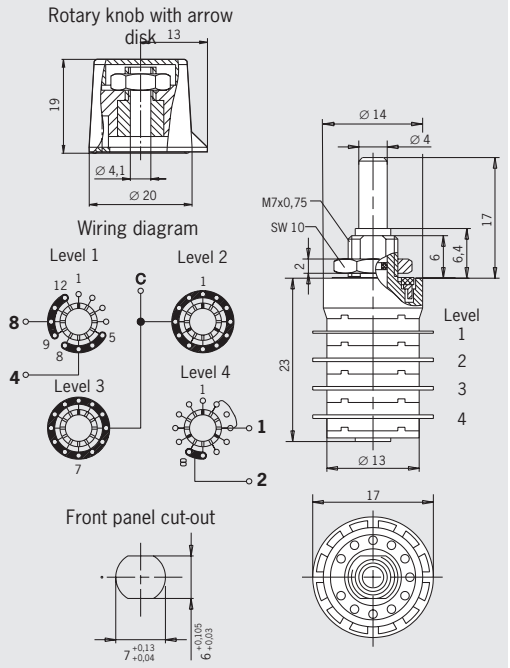
Dimension drawings



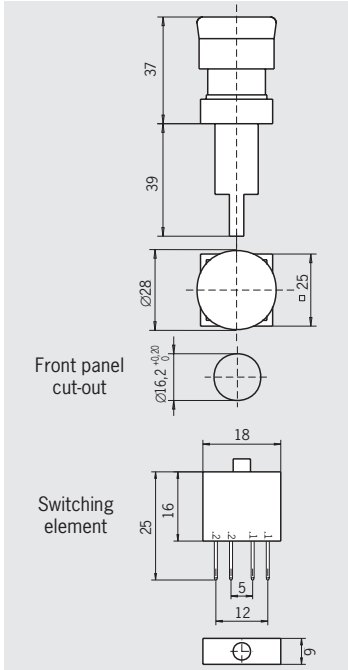
Illuminated pushbutton



Selector switch 12-stage



EMERGENCY STOP device



Ordering table

Item	Version	
Key-operated switch	Removal position: 0 1 NC +1 NO	**072604** Key-operated switch
	Removal position: 0 + 1 1 NC + 1 NO	**076930** Key-operated switch removal position 0/1
Replacement key for key-operated switch	–	**075387** Key for key-operated switch
Illuminated pushbutton	Installation Ø 16.2 mm	**070520** Illuminated pushbutton complete
Selector switch	12-stage	**052874** Selector switch with rotary knob
EMERGENCY STOP device	Installation Ø 16.2 mm for max. 2 switching elements	**083637** Emergency stop actuating element
Switching element for EMERGENCY STOP device	1 NC ⊖	**083638** Emergency stop switching element 1 NC ⊖

For technical data see page 71

Plug connector

- **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).

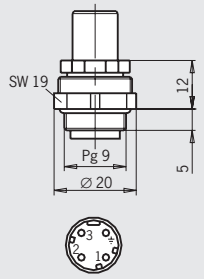
Female connector C16-1 [1)]
Female connector for hand-held enabling switches.

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.

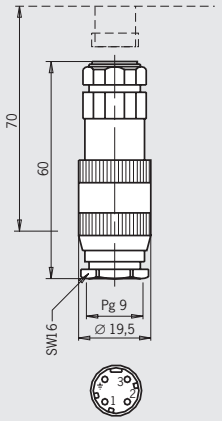
Female flange connector BD4
3-pin + PE

Dimension drawings



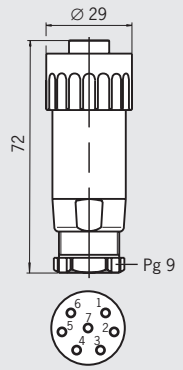
View of connection side, socket

Male plug SS4
3-pin + PE



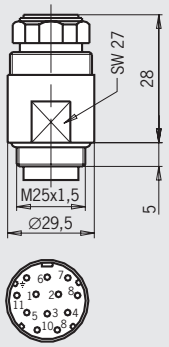
View of connection side, plug

Female connector C16-1
6-pin + PE



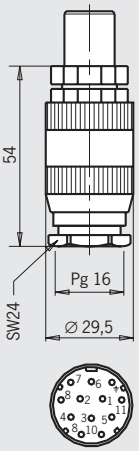
View of connection side, socket

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

Item	Connection	Version	
BD4 3-pin + PE	Soldered contact	Female flange connector to male plug SS4 on enabling switch	**002786** BD4
SS4 3-pin + PE	Soldered contact	Male plug to flange connector BD4 (e.g. TZ...C1662)	**002787** SS4
C16-1 6-pin + PE	Crimp contact [1)]	Female plug	**043861** Cable socket 6+PE
SD12 11-pin + PE	Soldered contact	Male flange connector to female connector BS12 on enabling switch	**085648** SD12-M
BS12 11-pin + PE	Soldered contact	Straight female connector to male flange connector SD12	**002763** BS12
BS12 11-pin + PE	-	Extension cable 5 m	**071362** BS12
		Extension cable 10 m	**079835** BS12

For information on crimp contacts see page 69.
1) Crimp contacts are included.

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Plug connector

- **Female flange connector RC12**
- **Male plug RC12**
- **Dummy plug RC12**
- **Female flange connector RC17**
- **Male plug RC17**
- **Dummy plug RC17**

Female flange connector RC12 [1)]
For front panel mounting for connection of hand-held and P20 enabling switch. Fitted with soldered contacts. Rubber seal included.

Male plug RC12 [1)]
For connection, e.g. to enabling switches.

Dummy plug RC12 [1)]
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.

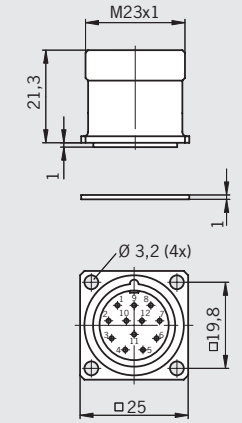
Flange connector RC17 [1)]
For front panel mounting for connection of enabling switches. Rubber seal included. Fitted with soldered contacts.

Male plug RC17 [1)]
For connection, e.g. to enabling switch.

Dummy plug RC17 [1)]
For covering the flange connector RC17. Optionally, individual contacts can be bridged at the customer.

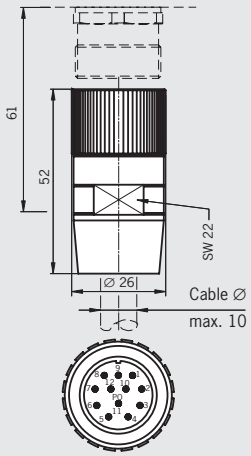
Female flange connector RC12
12-pin

Dimension drawings



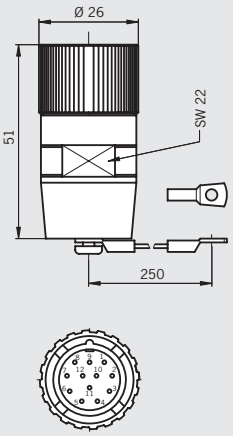
View of connection side, socket

Male plug RC12
12-pin



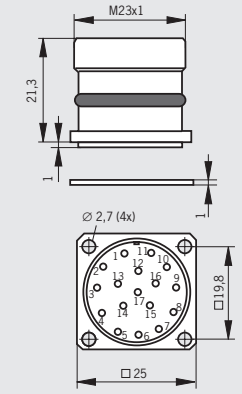
View of connection side, plug

Dummy plug RC12
12-pin



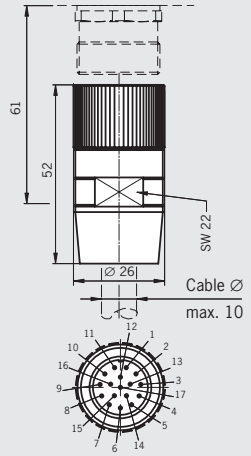
View of connection side, plug

Female flange connector RC17
17-pin



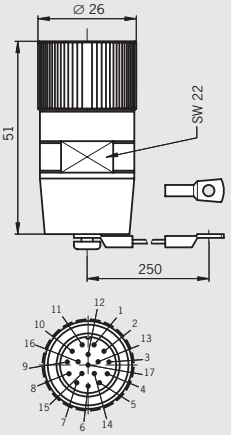
View of connection side, socket

Male plug RC17
17-pin



View of connection side, plug

Dummy plug RC17
17-pin



View of connection side, plug

Ordering table

Item	Connection	Version	
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)]	Dummy plug (with bridges) e.g. in combination with ZS...C1770	**073291** Dummy plug complete 12-pin
	Crimp contact [1)]	Dummy plug (without bridges)	**073293** Dummy 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** Dummy plug 17-pin

For technical data see page 71

For information on crimp contacts see page 69.
1) Crimp contacts are included.

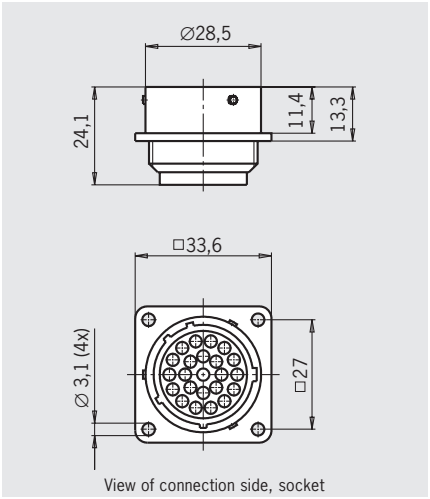
Plug connector

- **Female flange connector UT23**
- **Dummy plug UT23 with chain**

Female flange connector UT23 [1)]
Female flange connector for plug UT23 on enabling switch ...C1715.

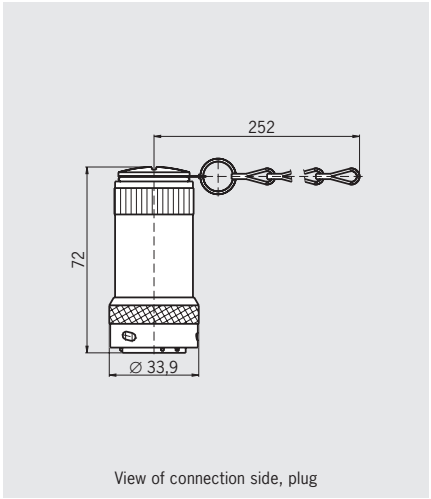
Dummy plug UT23 with chain [1)]
Dummy plug for female flange connector UT23.

Female flange connector UT23
23-pin



View of connection side, socket

Dummy plug UT23
with chain



View of connection side, plug

Ordering table

Item	Connection	Version	
UT23 23-pin	Crimp contacts [1)]	Female flange connector for enabling switch ..C1725	**074384** Flange connector / 23-pin / metal version
		Dummy plug with chain (3 bridges included)	**083457** Short-circuit plug with chain

For information on crimp contacts see page 69.
1) Crimp contacts are included.

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

List of plug connector suppliers

We provide no guarantee for the completeness and correctness of the ordering data given. The data was valid in 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

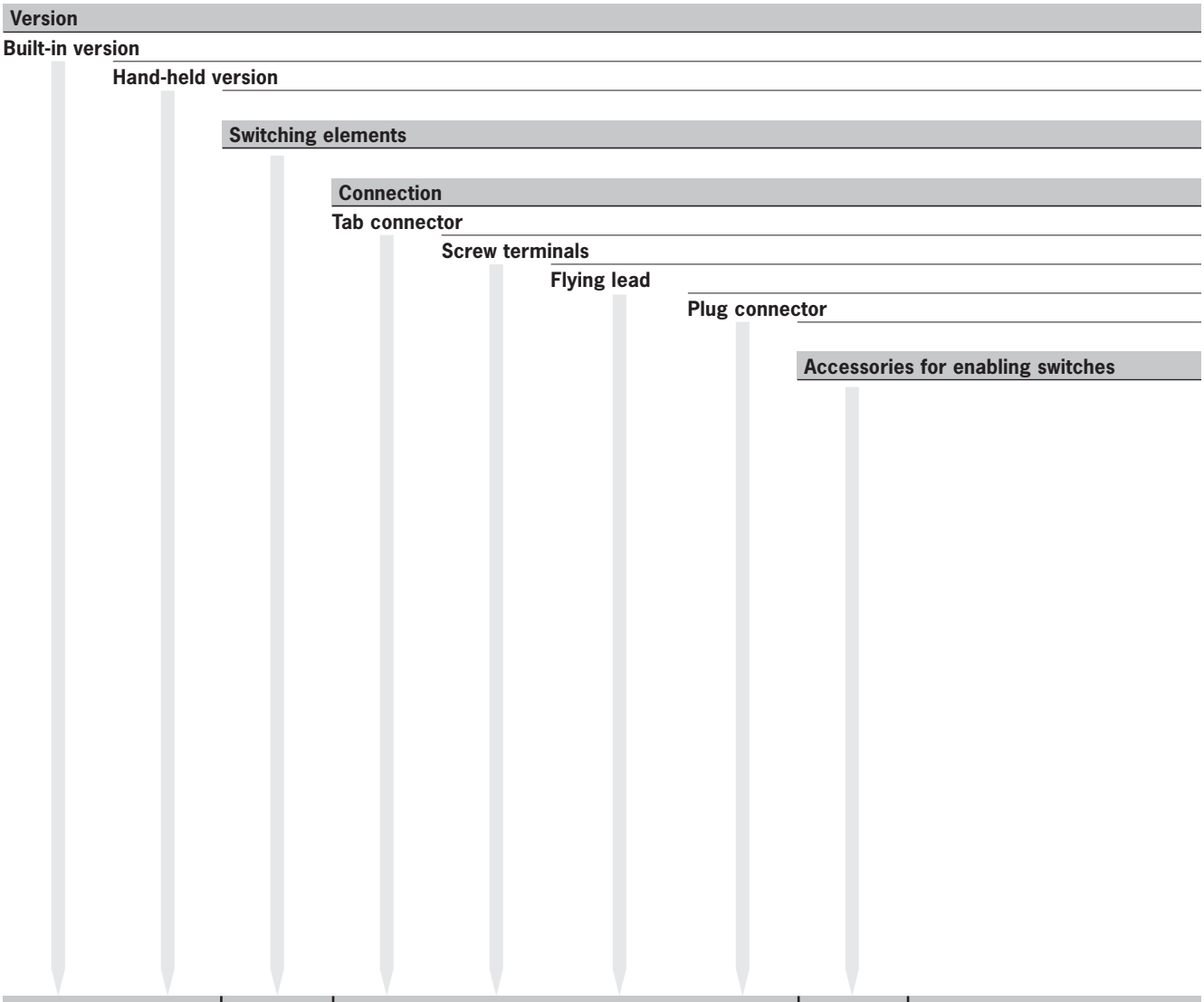
Item	Version	Manufacturer's designation	
SVM5 5-pin	Female plug M12	**99-0436-57-05** Cable socket	**Binder** www.binder-connector.de
	Female flange connector M12	**09-3442-700-05** Flange connector with litz wires	
	Dummy plug M12	**08-2425-000-000** Protective cap for socket with retaining strap	
C16-1 6-pin + PE	Female flange connector	**T3107 500** Female receptacle	**Amphenol-Tuchel** www.amphenol-tuchel.com
	Female crimp contacts for C16-1, pack 100 ea.	**VN02 016 0002 (1)** Single contact, silver, 0.5-1.5 mm²	
	Dummy plug	**T6483 000** Protective cap for female receptacle	
MR 7, 8, 9, 10 and 12-pin	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-pin + PE	Flange connector 1 cable exit	**19 20 010 0251** Socket housing 1 cable exit	**Harting** www.harting.com
	Socket contacts (built-in for flange connector)	**09 20 010 3101** Contact insert, socket, crimp connection	
	Contact tubes for crimping	**09 33 000 6220** Crimp contacts, socket, 0.5 mm²	
	Dummy plug	**09 20 010 5425** Cover	
RC17-Y coded 17-pin	Female flange connector, solder for male plug RC17Y)	**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	**932 507-001** XCZ 0700	**Hirschmann** www.hirschmann.com
	Extraction tool	**931 812-001** XWA 164	
C16-1	Crimp tool	**TA0500 + TA0000163 + TA0002016001** Crimp pliers, crimp jaws and contact receptacle	**Amphenol-Tuchel** www.amphenol-tuchel.com
	Extraction tool	**FG 0300 1461** Extraction tool	
RC12	Crimp tool	**RC-Z 2378** Crimp pliers for machined contacts	**Coninvers** www.coninvers.com
	Extraction tool	**RC-Z 2097** Extraction tool/insertion tool	
RC17	Crimp tool	**RC-Z 2378** Crimp pliers for machined contacts	
	Extraction tool	**RC-Z 2274** Extraction tool	
UT23	Crimp tool	**Y16RCM** Crimp tool for machined contacts	**Burndy** www.burndy.com
	Extraction tool	**RX2025GE1** Extraction tool	

For technical data see page 71

Overview



Version		Switching elements	Connection				Accessories	Page
Built-in	Hand held		Tab connector	Screw terminals	Flying lead	Plug connector		
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Built-in version

Parameter	Value		Unit
Housing material	Polyamide, black		
Protective cap material	CR (neoprene), black		
Degree of protection acc. 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

Hand-held type G1

Parameter	Value	Unit
Housing material	Polyamide, black	
Protective cap material	CR (neoprene), black	
Degree of protection acc. 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

Hand-held type G2

Parameter	Value	Unit
Housing material	Polyamide, yellow	
Protective cap material	CR (neoprene), black	
Degree of protection acc. to IEC 60529	IP 65	
Ambient temperature	- 5 to + 50	°C
Weight	Approx. 1.1 (with 5 m straight cable)	kg

Hand-held type G3

Parameter	Value	Unit
Housing material	Polyamide, yellow	
Protective cap material	CR (neoprene), black	
Degree of protection acc. to IEC 60529	IP 65	
Ambient temperature	- 5 to + 50	°C
Weight	Approx. 1.5 (with 5 m straight cable)	kg

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 S	**1110** 1 NO/NC ⊖			
Switching elements with 2 switching contacts	**20** 2 S	**1210** 1 NO/NC ⊖ + 1 NO	**2202** 2 NO/NC	**2220** 2 NO/NC ⊖	
Switching elements with 3 switching contacts	**21** 2 NO + 1 NC	**111** 1 NO + 1 NC ⊖ +1 NC	**210** 2 NO + 1 NC ⊖	**300** 3 S	
Switching elements with 4 switching contacts	-	**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)				

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Tab connector connection, hand-held kit ZSA

Parameter		Value	Unit
Connection		Tab connection	
Version according to IEC 60760		2.8 x 0.8 mm	
Degree of protection acc. to IEC 60529	Connections	IP 00	
Rated impulse withstand voltage U_{imp}		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 acc. 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 conductor	0.3 - 1.4 mm, AWG 22 - 16	
Conductor nominal diameter	single conductor	1.5	mm^2
	flexible conductor	1 mm^2, AWG 16	
Conductor insulation stripping		5	mm^2
Degree of protection acc. to IEC 60529	Connections	IP 00	
Rated impulse withstand voltage U_{imp}		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 acc. to EN 60947-5-1	DC-13	I_e 0.1 A U_e 24 V	

Connection using flying lead

Parameter		Value				Unit
Connection		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_{imp}		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 enabling switches	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	
according to EN 60947-5-1	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 buttons and LEDs	AC-15	-	-	I_e 400 mA U_e 32 V	I_e 400 mA U_e 32 V	
according to EN 60947-1-5	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 acc. 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 acc. 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 acc. 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	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 66ff

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	mm²
Degree of protection acc. 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 acc. 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		No cable	
Degree of protection acc. 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 enabling switch	AC-15	I_e 2 A U_e 24 V	
according to EN 60947-1-5	DC-13	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs	AC-15	24 V 400 mA	
according to EN 60947-1-5	DC-13	24 V 100 mA	

Connection, plug connector MR8

Parameter		Value	Unit
Connection		Male connector	
Version		MR8 (8-pin)	
Connection cable conductor cross-section		No cable	
Degree of protection acc. 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 enabling switch	AC-15	I_e 2 A U_e 24 V	
according to EN 60947-1-5	DC-13	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs	AC-15	24 V 400 mA	
according to EN 60947-1-5	DC-13	24 V 100 mA	

Connection, plug connector MR10

Parameter		Value	Unit
Connection		Male connector	
Version		MR10 (10-pin)	
Connection cable conductor cross-section		No cable	
Degree of protection acc. 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 enabling switch	AC-15	I_e 2 A U_e 24 V	
according to EN 60947-1-5	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	mm²
Degree of protection acc. 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	AC-15	I_e 2 A U_e 230 V	
according to EN 60947-1-5	DC-13	I_e 2 A U_e 24 V	

[1] Only screwed tight with the related plug connector from page 66ff

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

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 acc. 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 enabling switch	AC-15	I_e 2 A U_e 24 V		
according to EN 60947-1-5	DC-13	I_e 2 A U_e 24 V		
Utilization category buttons and LEDs	AC-15	24 V 400 mA	-	
according to EN 60947-1-5	DC-13	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 acc. 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 enabling switch	AC-15	I_e 2 A U_e 24 V	
according to EN 60947-1-5	DC-13	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs	AC-15	24 V 400 mA	
according to EN 60947-1-5	DC-13	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 acc. 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 enabling switch	AC-15	I_e 2 A U_e 24 V		
according to EN 60947-1-5	DC-13	I_e 2 A U_e 24 V		
Utilization category buttons and LEDs	AC-15	24 V 400 mA		
according to EN 60947-1-5	DC-13	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	xmm^2
Degree of protection acc. 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 enabling switch	AC-15	I_e 2 A U_e 24 V	
according to EN 60947-1-5	DC-13	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs	AC-15	24 V 400 mA	
according to EN 60947-1-5	DC-13	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 acc. 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	AC-15	I_e 2 A U_e 24 V	
according to EN 60947-1-5	DC-13	I_e 2 A U_e 24 V	

[1] Only screwed tight with the related plug connector from page 66ff

Key switch

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

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	
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	

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	
Lighting	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 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 mm²	

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

Plug connector series 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	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	-	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 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	-	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 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
Degree of protection according to IEC 60529 (inserted)	IP 67	
Connection	Crimp contacts 0.3 - 0.5 mm^2	

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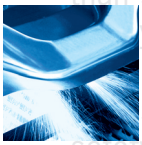

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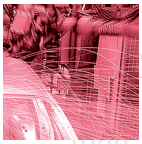

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