Enabling Switches

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

Contents

Enabling Switches

About this catalog

The *Enabling Switch ZS* catalog provides an overview of our two 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:

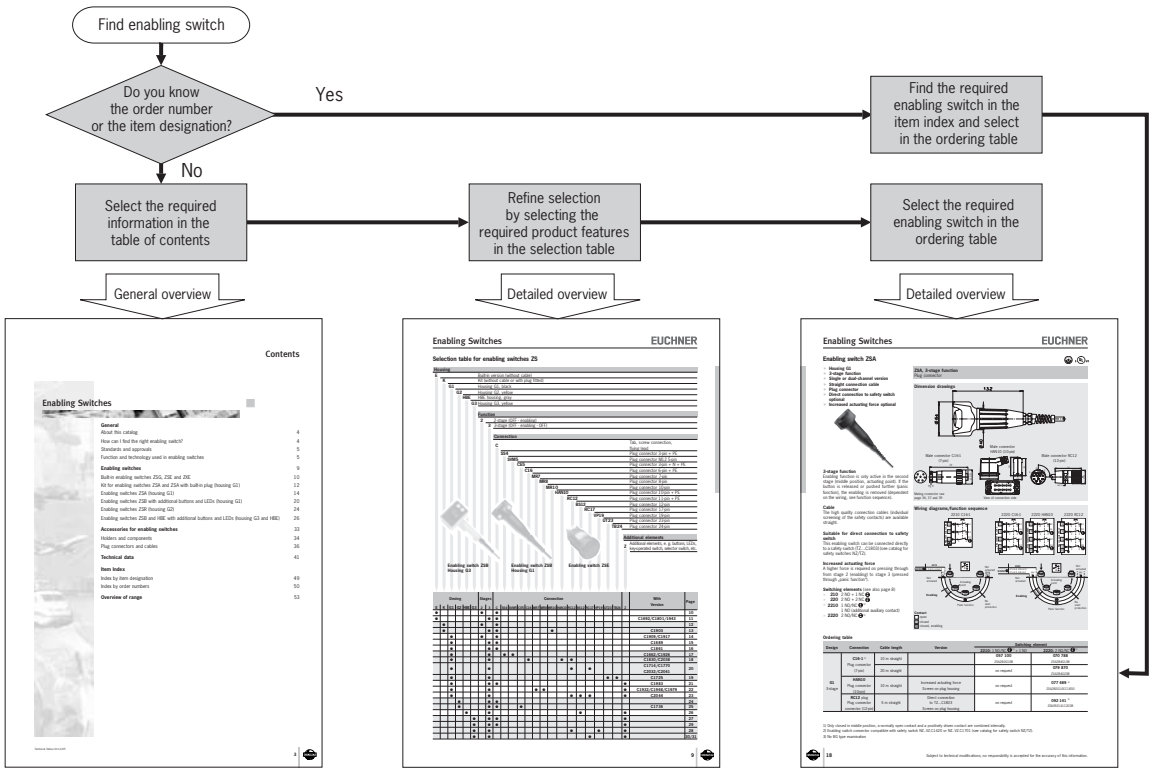
Enabling switches

Enabling switches for building in	Hand-held enabling switches			Accessories
ZSG, ZSE and ZXE	in housing G1 or as kit	in housing G1, G3 or HBE with additional function	in housing G2	
ZXE, ZSE	ZSA: G1	ZSB: G1, G3, HBE	ZSR: G2	Cables, plug connectors, holders, blanking covers

How can I find the right enabling switch?

There are two ways you can find the right enabling switch:

1. If you know the order number or the item designation, look for the enabling switch directly in the item index (see page 49 or page 50).
2. If you have specific requirements, refine the selection step-by-step with the aid of the table of contents and the selection table.



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:

BG-PRÜFZERT	Switches with this symbol are approved by an employers' liability insurance association (Berufsgenossenschaft, BG)
c UL us	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 operating 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 additionally 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 or three-stage enabling switch?

The operator can only start a machine movement if he/she actuates the enabling switch and keeps the switch 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 switch 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 operators 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 switch

Symbol for a 3-stage enabling switch

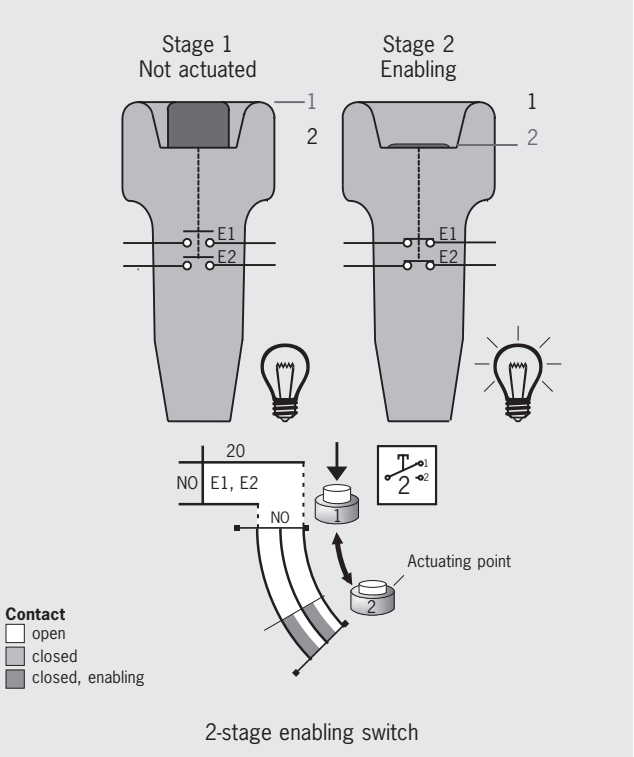
Large selection of switching elements

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 ⊝

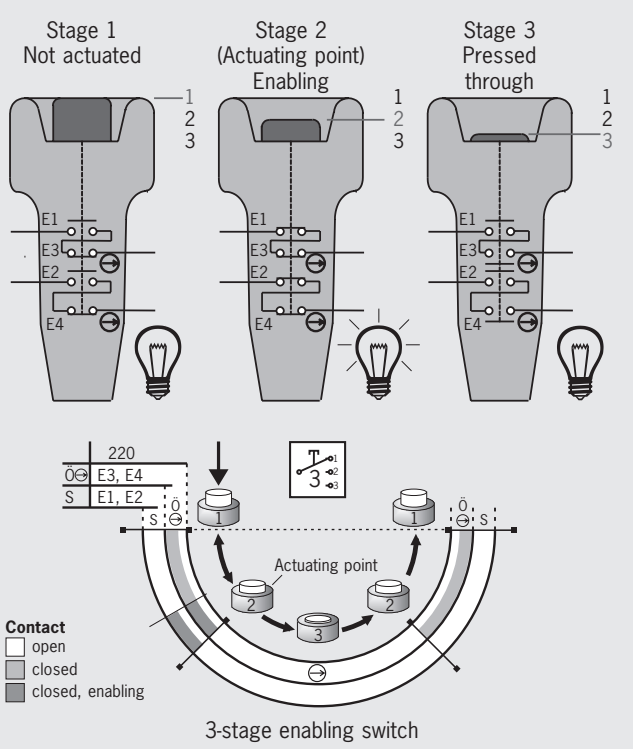
Positively driven contacts are used in many switching elements. These are special contact elements that are designed to ensure the switching contacts are always reliably separated. Even if contacts are welded together, the connection is opened by the actuating force.

Function sequence of two-stage enabling switch



2-stage enabling switch

Function sequence of three-stage enabling switch



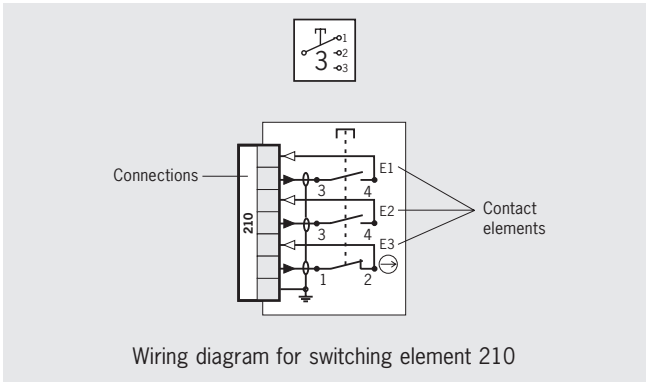
3-stage enabling switch

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 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. This situation is only possible on actuation from stage 1 to stage 2. In the other direction, from stage 3 to stage 1, stage 2 is skipped and unintentional re-starting prevented.
Once the pushbutton has reached stage 1, the function sequence can be started again.
Due to its design, the switch unit also provides a wear-free, constant actuating point (stage 2).

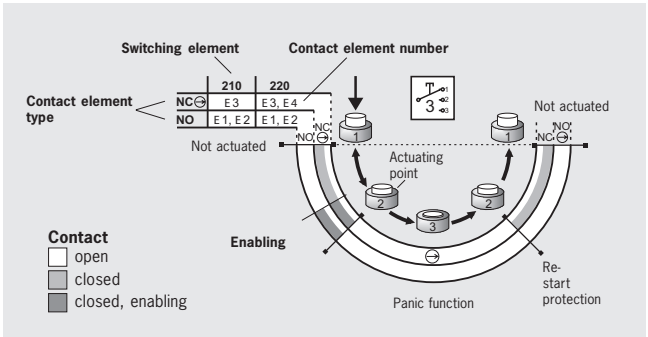
Reading travel diagrams and wiring diagrams

For each of the switching elements used, there is a travel diagram which, dependent of the enabling switch's switch stage, shows the switching states.
The following example is intended to explain these diagrams:



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 contact elements (E1, E2 and E3).
The contact element E3 is designed as a positively driven contact, the other contact elements 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 contact elements E1,E2 and E3, there is also the switching element 220 with the contact elements E1 to E4.
The letters on the left beside the contact element E3 define the contact element type, in this case a positively driven contact (NC ⊖).

The following contact element types are available:

- NO normally open contact
- NC normally closed contact
- NC ⊖ positively driven contact
- NO/NC three-point switch
  (3-stage contact element with normally open/normally closed function 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 contact element for the three switch stages "Not actuated", "Enabling" and "Panic function" (pressed past actuating point). Gray areas mean "switch closed", white areas mean "switch open".

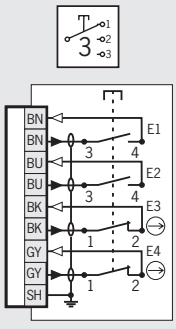
In the example for switching element 210 the sequence is as follows:

- In the not actuated state, the positively driven contact E3 is closed (gray area) and the two normally open contacts E1 and E2 are open.
- When the switch has reached stage 2, the normally open contacts E1 and E2 are closed, E3 remains closed. This is the enabling area.
- If the switch is released, the contact elements return to their initial state.
- If the switch is pressed beyond the enabling area, all contact elements 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:

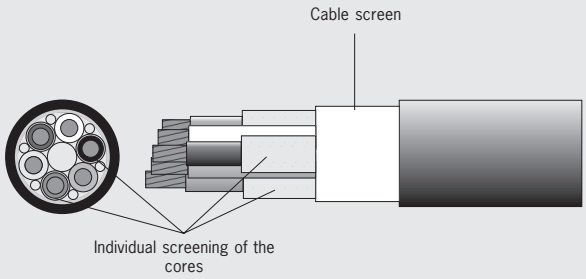


Wiring diagram for switching element 220

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, a high level of 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. As a matter of preference, switches with thumb actuation are used, as it is generally easier to maintain the actuating force with the thumb, and that over an extended period.
By selecting a spiral 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 switches in series ZSG, ZSE and ZXE can be integrated into any housing or control panel. 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 in a two or three-stage version with different switching elements.

Hand-held enabling switches

The enabling switches in the series 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 ZSA, ZSB and ZSR are available with various plug connectors. In addition to the related plug 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 switch type.

Explanation of symbols and notation

Symbols and specific notation related to the switches or the contact element 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 NC contact is a positively driven contact. This switch therefore has one NC contact and one NO contact; the NC contact is a positively driven contact.

Selection table for enabling switches ZS

Housing

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

Function

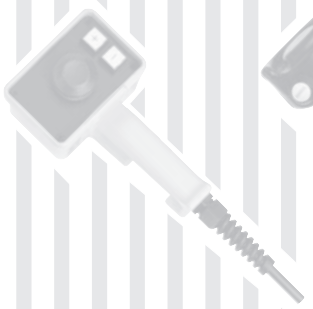
- **2** 2-stage (OFF - enabling)
- **3** 3-stage (OFF - enabling - OFF)

Connection

C	Tab, screw connection, flying lead
SS4	Plug connector 3-pin + PE
SVM5	Plug connector M12 5-pin
CE5	Plug connector 3-pin + N + PE
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
VP19	Plug connector 19-pin
UT23	Plug connector 23-pin
TB24	Plug connector 24-pin

Additional elements

- **Z** Additional elements, e. g. buttons, LEDs, key-operated switch, selector switch, etc.



Enabling switch ZSB Housing G3

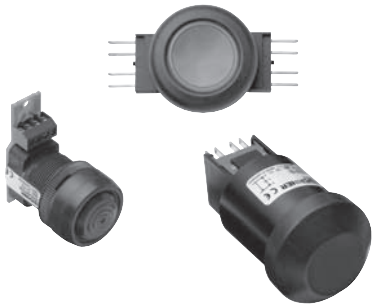
Enabling switch ZSB Housing G1

Enabling switch ZSE

Desing						Stages		Connection															With Version	Page
E	K	G1	G2	HBE	G3	2	3	C	SS4	SVM5	CE5	C16	MR7	MR8	MR10	HAN10	RC12	BS12	RC17	VP19	UT23	TB24	Z	
●						●		●																10
●							●	●																C1692/C1801/1943	11
	●					●		●																	12
	●						●	●							●									C1903	13
		●				●		●																C1909/C1917	14
		●					●	●																C1689	15
		●					●	●																C1861	16
		●					●		●	●														C1662/C1926	17
		●					●					●				●	●							C1830/C2038	18
		●					●										●		●					C1714/C1770 C2032/C2041	20
		●					●														●	●		C1725	19
		●					●	●															●	C1983	21
		●					●						●	●									●	C1932/C1968/C1979	22
		●					●										●	●	●				●	C2044	23
			●				●	●																	24
			●				●	●			●													C1736	25
				●			●											●					●		26
					●		●	●															●		27
					●		●	●															●		29
					●		●										●			●			●		28
					●		●												●				●		30/31

Built-in enabling switch 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 HBE/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).

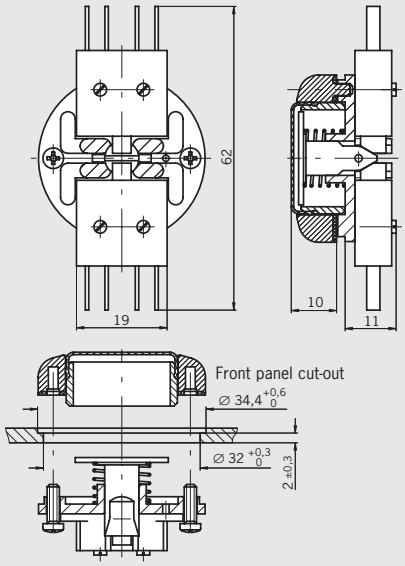
3-stage function
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

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

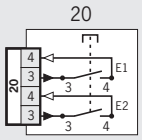
Switching elements (see also page 8)
- **20** 2 NO
- **111** 1 NO + 1 NC ⊖ + 1NC
- **121** 1 NO + 2 NC ⊖ + 1 NC
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **2202** 2 NO/NC [1]

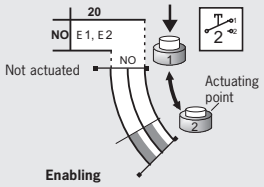
ZSG, 2-stage function [2]
Tab connection

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 HBE	**070 793** ZSG1-2

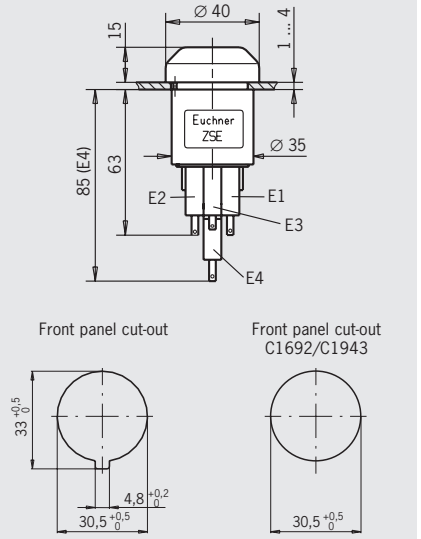
1) Only closed in middle position, a normally open contact and a normally closed contact are combined internally.
2) As per VDI 2854, a device comparable to an EMERGENCY STOP device must be fitted!

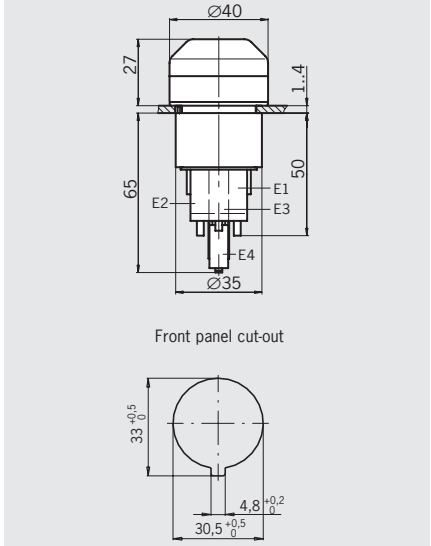
ZSE, 3-stage function
Tab connection

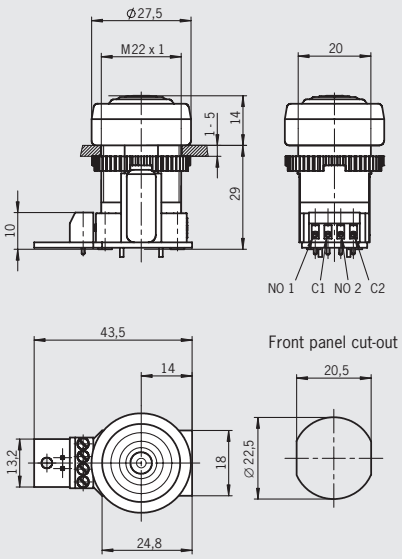
ZSE, 3-stage function
Tab connection, with spacer

ZXE, 3-stage function
Screw terminals

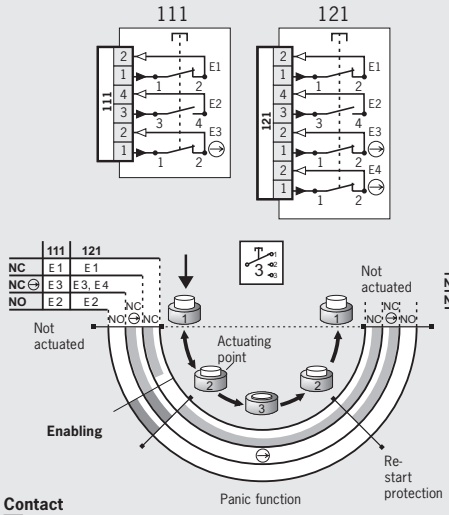
Dimension drawings

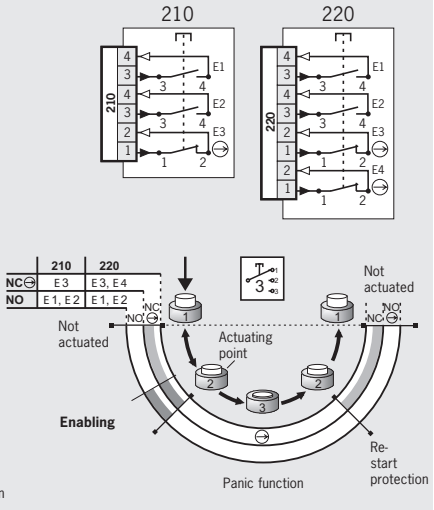


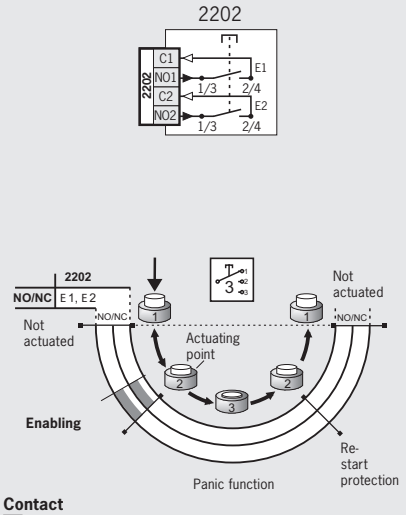




Wiring diagrams/function sequence







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:** 2NO/NC[1]				
Built-in 3-stage **ZSE**	**Tab connector**		**052 448** ZSE2-1	**070 782** ZSE2-3	**052 449** ZSE2-2	**070 762** ZSE2-4	on request
		Suitable, e. g. for hand-held pendant stations HBE/HBL	on request	on request	**070 752** [2] ZSE2-2C1692	**083 477** [2] ZSE2-4C1943	on request
	Tab connector	With spacer for installation in housing G2 or G3	on request	on request	on request	**091 098** ZSE2-4C1801	on request
Built-in 3-stage **ZXE**	**Screw terminals**		-	-	-	-	**091 336** ZXE-091336

For technical data see page 41

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

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**

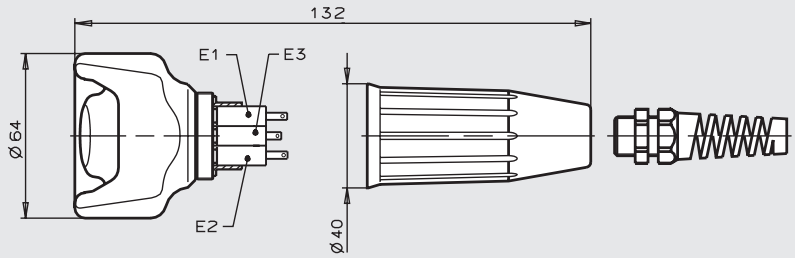
2-stage function [1]
Enabling function is active in the second stage (pressed position). When the button is released, the enabling is removed (see function sequence).

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).

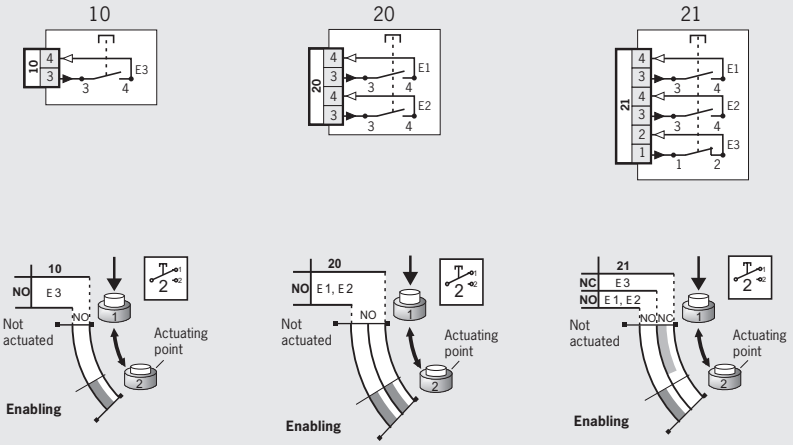
Switching elements (see also page 8)
- **10** 1 NO
- **20** 2 NO
- **21** 2 NO + 1 NC
- **111** 1 NO + 1 NC ⊖ + 1NC
- **121** 1 NO + 2 NC ⊖ + 1 NC
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **2220** 2 NO/NC ⊖ [2]

ZSA, 2-stage function [1]
Tab connection

Dimension drawings



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

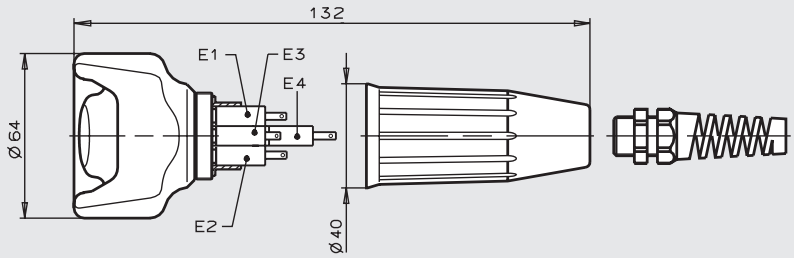
Ordering table

Design	Connection	Version	Switching element		
			10: 1 NO	**20:** 2 NO	**21:** 2 NO + 1 NC
Kit 2-stage [1] **G1**	**Tab connection**	Without cable	**070 750** ZSA1-1	**070 800** ZSA1-2	**070 736** ZSA1-3

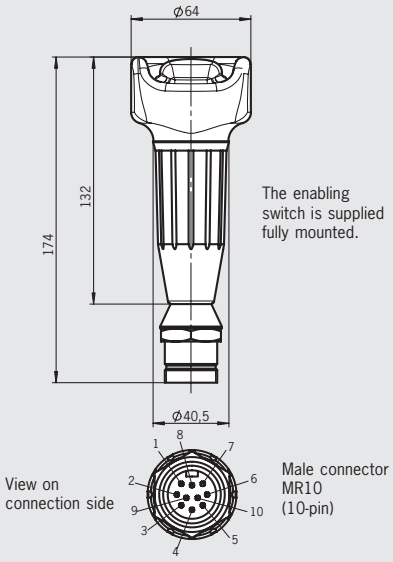
1) As per VDI 2854, a device comparable to an EMERGENCY STOP device must be fitted!
2) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

ZSA, 3-stage function
Tab connection

Dimension drawings

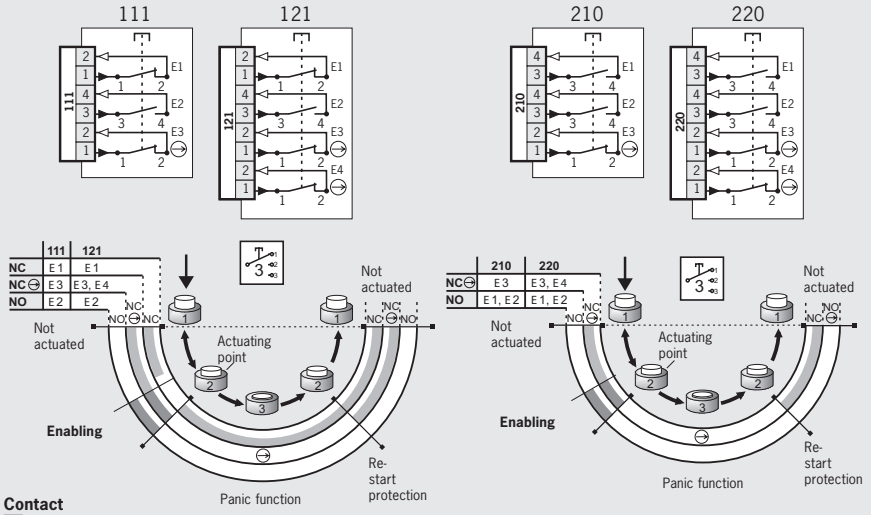


ZSA, 3-stage function
With built-in plug connector



For mating connectors see page 39

Wiring diagrams/function sequence



Ordering table

Design	Connection	Version	Switching element			
			111: 1NO+1NC ⊖ +1NC	**210:** 2NO+1NC ⊖	**220:** 2NO+2NC ⊖	**2220:** 2NO/NC ⊖ [1]
Kit 3-stage **G1**	**Tab connection**	Without cable	**070 734** ZSA2-1	**070 735** ZSA2-2	**070 792** ZSA2-4	-
3-stage **G1** with built-in plug	**MR10** Plug connector (10-pin)	Without cable	-	-	-	**095 497** ZSA2-4-10C1903

For technical data see page 41

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**

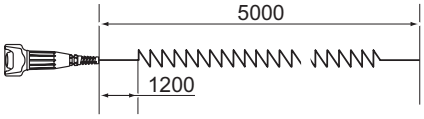
2-stage function [1)]
Enabling function is active in the second stage (pressed position). When the button is released, the enabling is removed (see function sequence).

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.

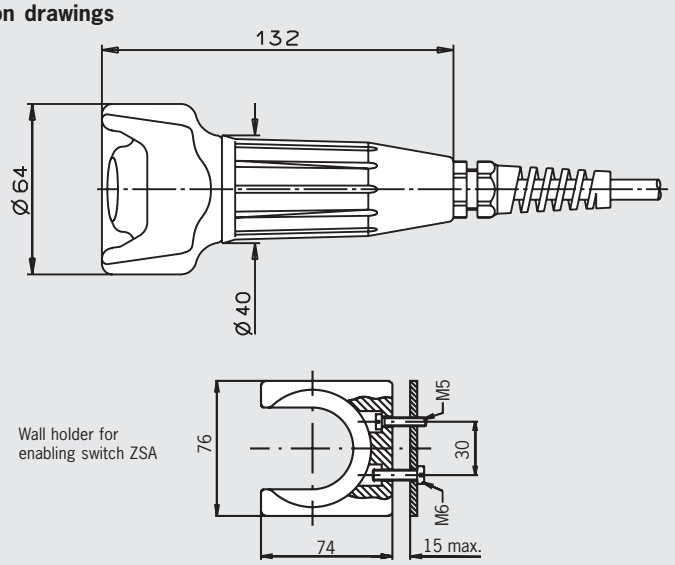
Switching elements (see also page 8)
- **10** 1 NO
- **20** 2 NO
- **21** 2 NO + 1 NC
- **111** 1 NO + 1 NC ⊖ + 1NC
- **121** 1 NO + 2 NC ⊖ + 1 NC
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖

Cable lengths (coiled cable pulled out straight)

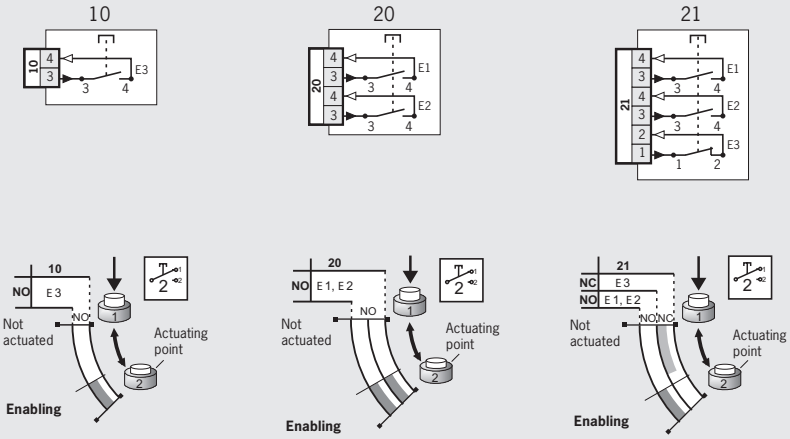


ZSA, 2-stage function [1)]
Flying lead

Dimension drawings



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

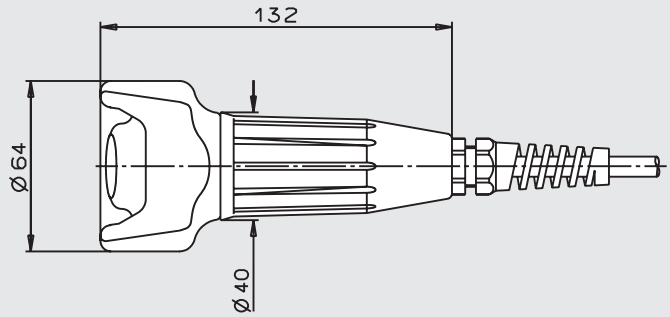
Ordering table

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	**082 557** ZSA1A2L25AC1909	on request
		5 m coiled		on request	on request	**094 321** ZSA1A2S05A
	Flying lead 3 x 0.75 mm²	5 m straight		**082 524** ZSA1A5G05AC1917	-	-
		10 m straight		**095 144** ZSA1A5G10AC1917	-	-

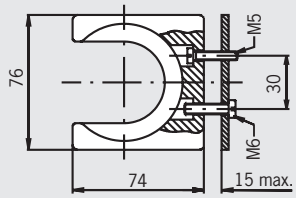
1) As per VDI 2854, a device comparable to an EMERGENCY STOP device must be fitted!

ZSA, 3-stage function
Flying lead

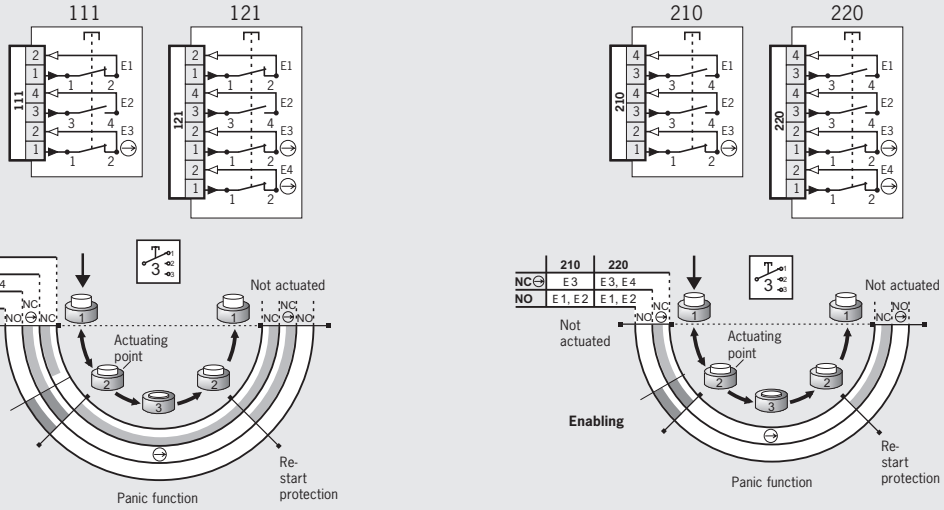
Dimension drawings



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 **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	**057 089** ZSA2A1L15AC1689	-	on request	-
		2.5 m straight	Incl. wall holder	**072 728** ZSA2A1L25AC1689	-	on request	-
		5 m straight		**055 402** ZSA2A1G05A	-	**055 406** ZSA2A2G05A	-
		5 m coiled		**055 404** ZSA2A1S05A	-	**055 408** ZSA2A2S05A	-
		10 m straight		**055 403** ZSA2A1G10A	-	**055 407** ZSA2A2G10A	-
		15 m straight		on request	-	**057 007** ZSA2A2G15A	-
		20 m straight		on request	-	**075 807** ZSA2A2G20A	-
		25 m straight		on request	-	**078 939** ZSA2A2G25A	-
	Flying lead 8 x 0.34 mm²	2.5 m straight	Incl. wall holder	-	on request	-	**086 788** ZSA2A4L25AC1689
		5 m straight		-	**070 784** ZSA2A3G05A	-	**070 764** ZSA2A4G05A
		5 m coiled		-	**070 786** ZSA2A3S05A	-	**070 766** ZSA2A4S05A
		10 m straight		-	**070 785** ZSA2A3G10A	-	**070 765** ZSA2A4G10A
		20 m straight		-	on request	-	**073 300** ZSA2A4G20A

For technical data see page 41

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**

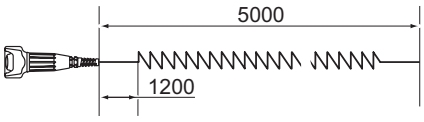
3-stage function
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

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 NZ/TZ).

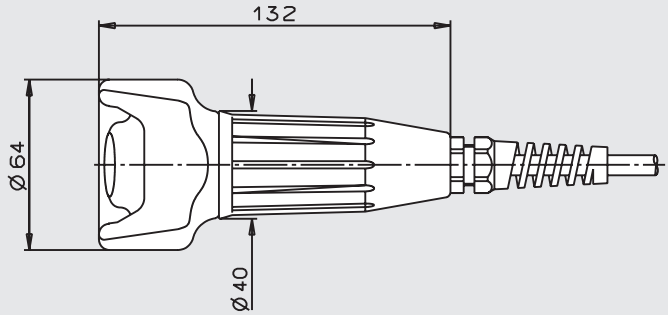
Switching elements (see also page 8)
- **1110** 1 NO/NC ⊖ 1)
- **1210** 1 NO/NC ⊖ 1) + 1 NO
- **2210** 1 NO/NC ⊖ 1)
  1 NO (additional auxiliary contact)
- **2220** 2 NO/NC ⊖ 1)

Cable lengths (coiled cable pulled out straight)

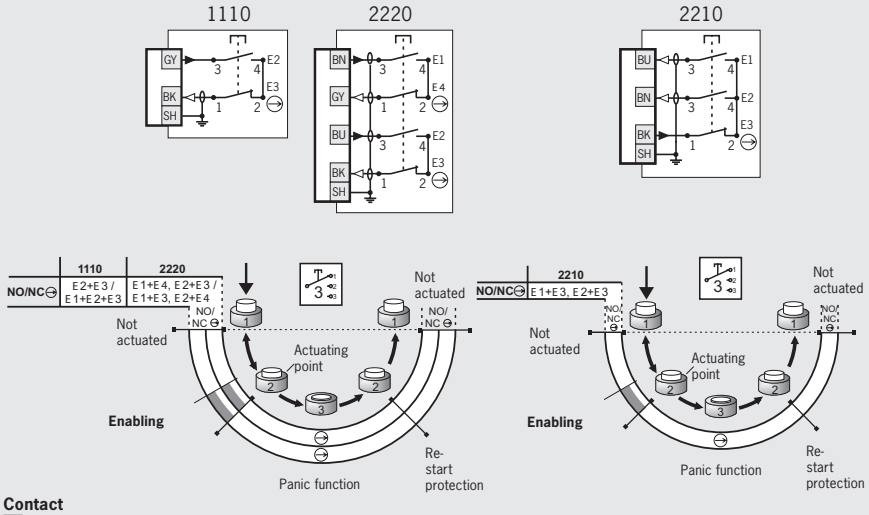


ZSA, 3-stage function
Flying lead

Dimension drawings



Wiring diagrams/function sequence



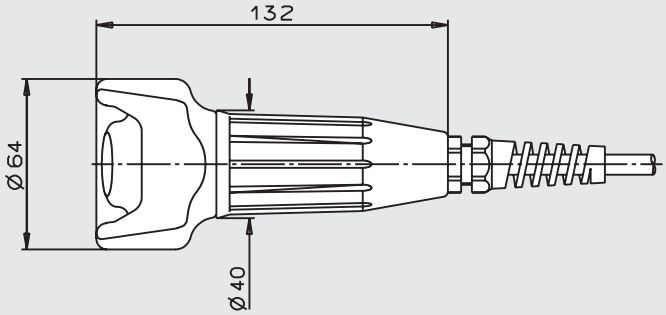
Ordering table

Design	Connection/ cross-section	Cable length	Version	Switching element		
				1110: 1 NO/NC ⊖ 1)	**2210:** 1 NO/NC ⊖ 1) + 1 NO	**2220:** 2 NO/NC ⊖ 1)
G1 3-stage	**Flying lead 8 x 0.34 mm²**	5 m straight		on request	on request	**072 961** ZSA2B4G05A
		5 m coiled		on request	on request	**085 118** ZSA2B4S05A
		10 m straight	Increased actuating force	**072 759** 2) ZSA2B5G10AC1861	on request	on request
	Flying lead 3 x 0.75 mm²	5 m straight		on request	**055 410** ZSA2B2G05A	-
		10 m straight		on request	**055 411** ZSA2B2G10A	-

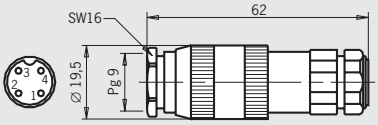
1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.
2) No BG type examination

ZSA, 3-stage function
Plug connector

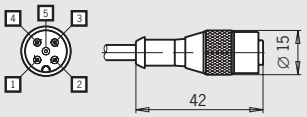
Dimension drawings



Male connector SS4 (4-pin)



Male connector SVM5 (5-pin)

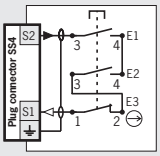


For mating connectors see page 36

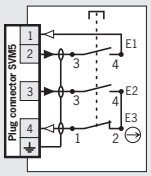
View of connection side

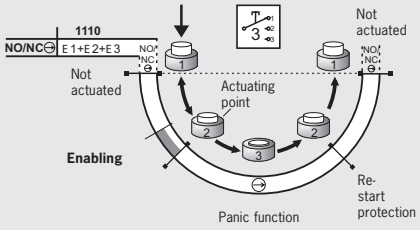
Wiring diagrams/function sequence

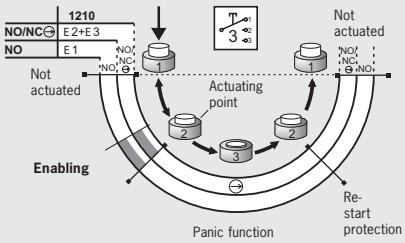
1110 SS4



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	**057 097** ZSA2B2G05B-C1662	-
		10 m straight	Direct connection to TZ...C1662 with plug BD4	**057 098** ZSA2B2G10B-C1662	-
	SVM5 Plug connector (5-pin)	15 m straight		on request	**072 870** ZSA2B2G15CC1926
		25 m straight		on request	**086 206** ZSA2B2G25CC1926

For technical data see page 41

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.

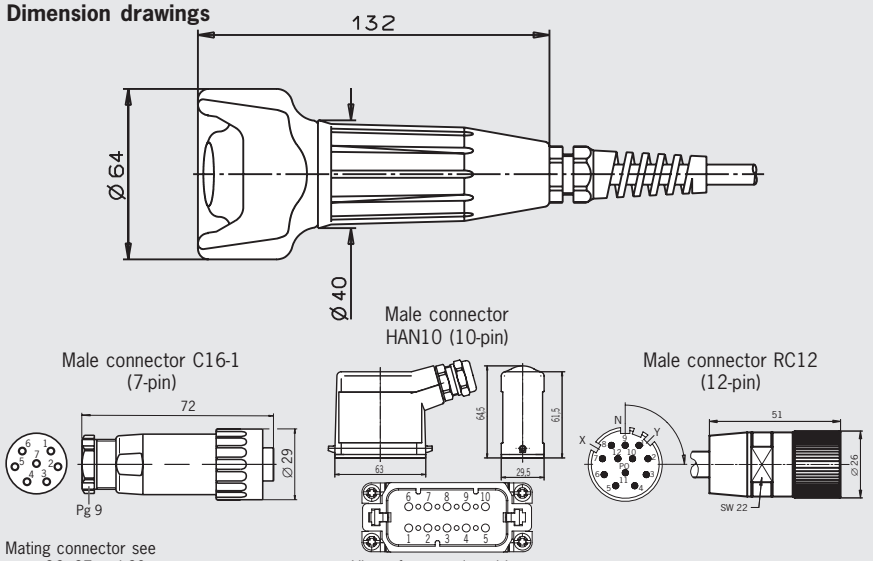
Suitable for direct connection to safety switch
This enabling switch can be connected directly to a safety switch (TZ…C1803) (see catalog for safety switches NZ/TZ).

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

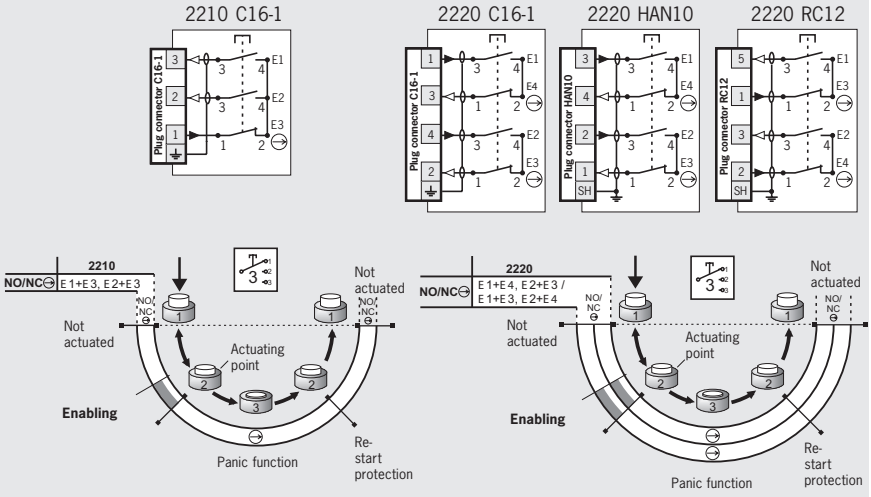
Switching elements (see also page 8)
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **2210** 1 NO/NC ⊖ 1)
  1 NO (additional auxiliary contact)
- **2220** 2 NO/NC ⊖ 1)

ZSA, 3-stage function
Plug connector

Dimension drawings



Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

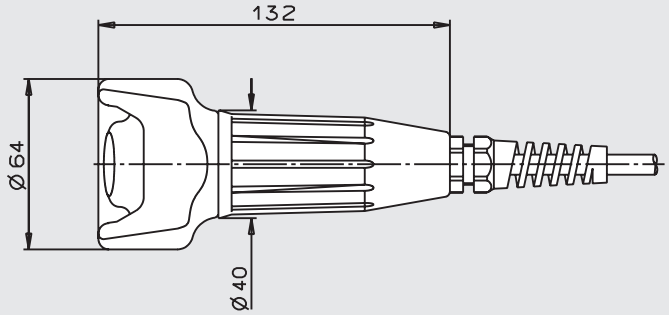
Ordering table

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		**057 100** ZSA2B2G10B	**070 788** ZSA2B4G10B
		20 m straight		on request	**079 870** ZSA2B4G20B
	HAN10 Plug connector (10-pin)	10 m straight	Increased actuating force Screen on plug housing	on request	**077 489** 3) ZSA2B2G10CC1830
	RC12 Plug connector (12-pin)	5 m straight	Direct connection to TZ...C1803 Screen on plug housing	on request	**092 141** 3) ZSA092141C2038

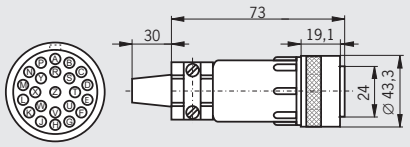
1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.
2) Enabling switch connector compatible with safety switch NZ..VZ.C1420 or NZ..VZ.C1701 (see catalog for safety switch NZ/TZ).
3) No BG type examination

ZSA, 3-stage function
Plug connector

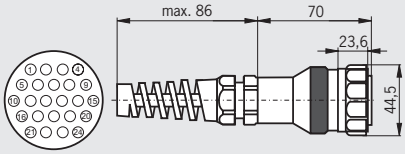
Dimension drawings



Male connector UT23
(23-pin)



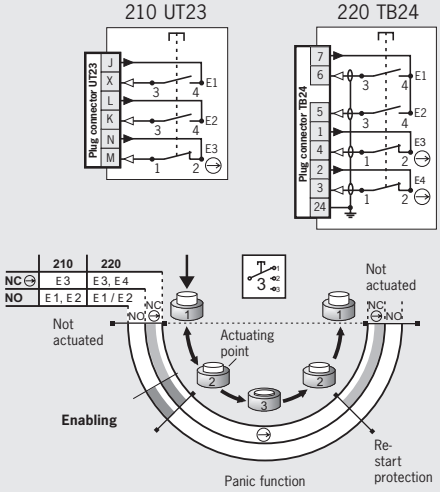
Male connector TB24
(24-pin)



For mating
connectors see page 38

View of connection side

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	**070 731** ZSA2A2L12CC1725	on request
	TB24 Plug connector (24-pin)	1.3 m straight	on request	**072 851** ZSA072851

For technical data see page 41

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.

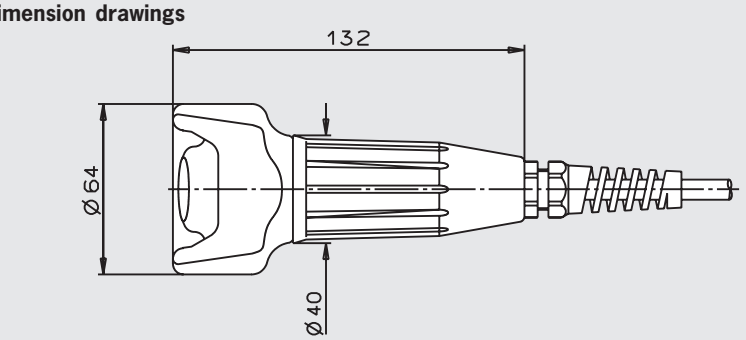
LEDs
The LEDs are used for visual feedback direct at the enabling switch.

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

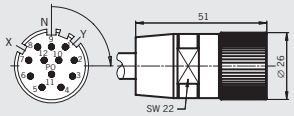
Switching elements (see also page 8)
- **210** 2 NO + 1 NC ⊖
- **220** 2 NO + 2 NC ⊖
- **2220** 2 NO/NC ⊖ 1)

ZSA, 3-stage function
Plug connector

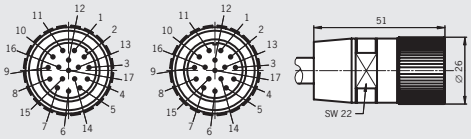
Dimension drawings



Male connector RC12 (12-pin)



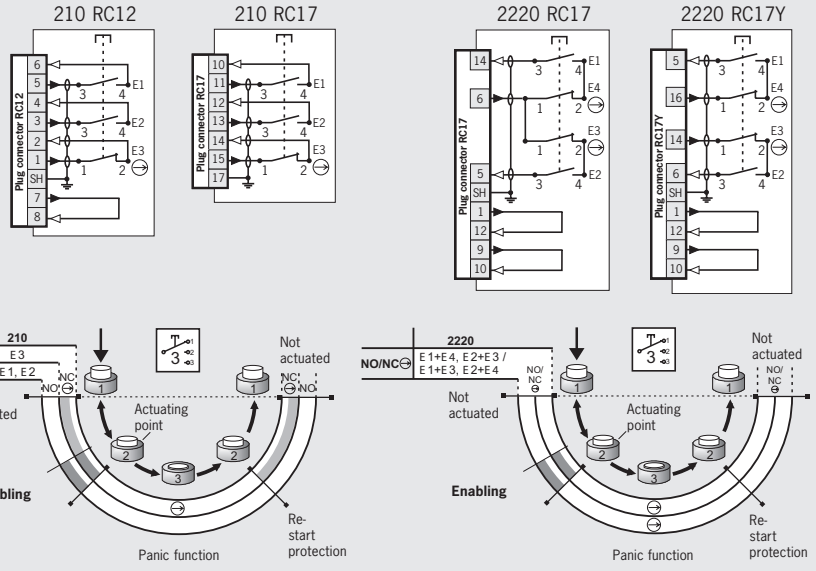
Male connector RC17 (17-pin)
Y-coded



For mating connectors see page 37

View of connection side

Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

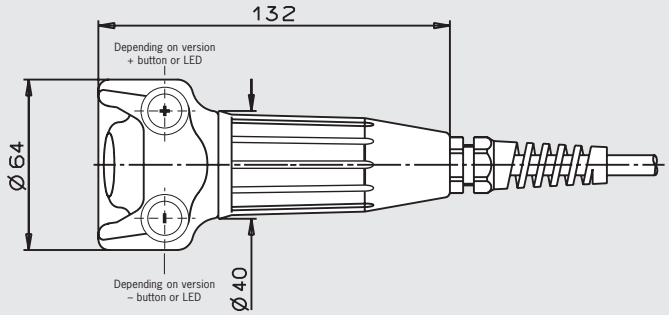
Ordering table

Design	Connection	Cable length	Version	Switching element	
				210: 2 NO + 1 NC ⊖	**2220:** 2 NO/NC ⊖ 1)
G1 3-stage	**RC12** Plug connector (12-pin)	5 m straight	Screen on plug housing	**073 289** ZSA2AG05CC1770	on request
	RC17 Plug connector (17-pin)	5 m straight		**070 741** ZSA2A2G05CC1714	on request
			Suitable for Siemens panel PP031 (1-channel) Screen on plug housing	on request	**092 738** 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	**091 547** ZSA2A4G05C-C2032

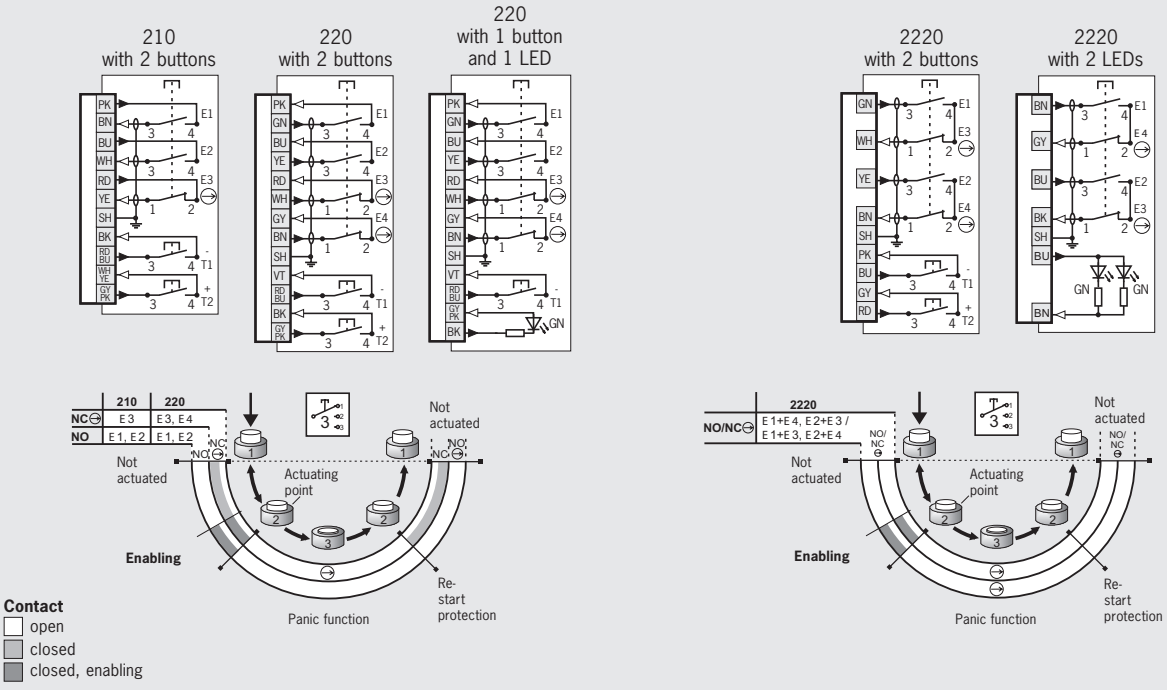
1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

ZSB, 3-stage function
Flying lead

Dimension drawings



Wiring diagrams/function sequence



Ordering table

Design	Connection/ cross-section	Cable length	Version	Switching element		
				210: 2 NO + 1 NC ⊖	**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	**086 707** 2) ZSA086707C1983
		15 m straight	2 LEDs (gn)	on request	on request	**072 969** 2) ZSA072969C1983
	Flying lead 8 x 0.5 mm² + 8 x 0.14 mm²	5 m straight	1 button 1 LED (gn)	on request	**085 126** 2) ZSB085126	on request
		5 m straight	2 buttons (+ and -)	**073 260** ZSB2A2G05A	**083 317** 2) ZSB083317	**092 378** 2) 3) ZSB092378
		10 m straight	2 buttons (+ and -)	**073 261** ZSB2A2G10A	on request	on request
		15 m straight	2 buttons (+ and -)	**095 612** ZSB2A2G15A	on request	on request
		20 m straight	2 buttons (+ and -)	on request	**096 900** ZSB096900	on request

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 41

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.

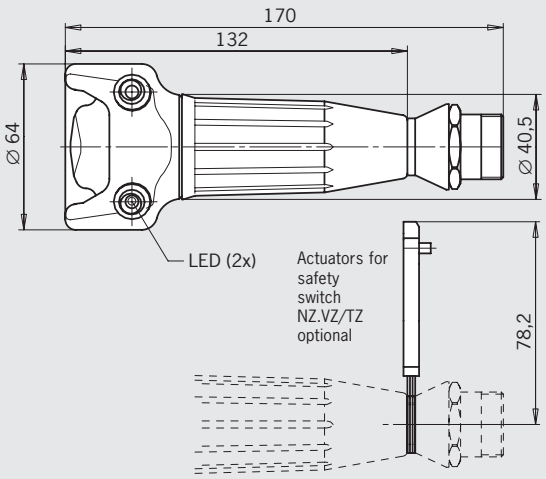
Suitable for direct connection to safety switch
This enabling switch can be connected directly to a safety switch (TZ...C1803) (see catalog for safety switches NZ/TZ).

Actuator
Suitable for safety switch NZ.VZ/TZ (see catalog for safety switches NZ/TZ). 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).

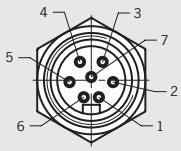
Switching elements (see also page 8)
- **210** 2 NO + 1 NC ⊖
- **2220** 2 NO/NC ⊖ 1)

ZSA, 3-stage function
Plug connector

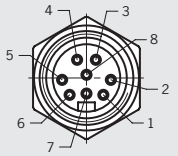
Dimension drawings



Male connector MR7 (7-pin)



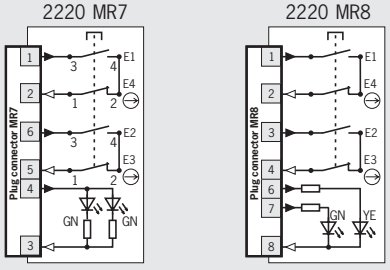
Male connector MR8 (8-pin)

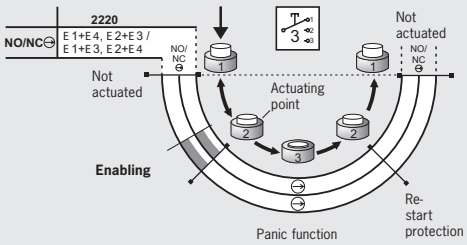


View of connection side

For mating connectors see page 39

Wiring diagrams/function sequence





Contact
- open
- closed
- closed, enabling

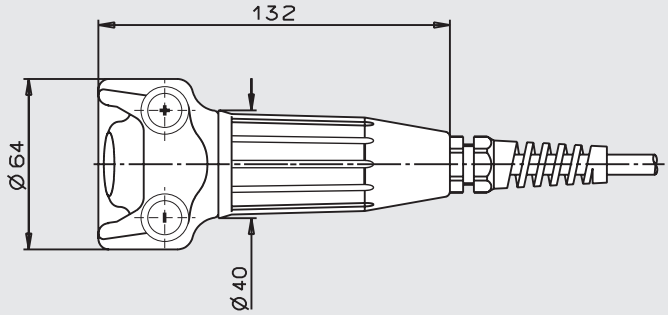
Ordering table

Design	Connection	Cable length	Version	Switching element **2220:** 2 NO/NC ⊖ 1)
G1 3-stage	**MR7** Plug connector (7-pin)	-	2 LEDs (gn)	**085 114** ZSA085114C1968
		-	2 LEDs (gn) With actuator for safety switch NZ.VZ/TZ	**072 887** ZSA072887-C1932
	MR8 Plug connector (8-pin)	-	2 LEDs (gn + ye) With actuator for safety switch NZ.VZ/TZ	**086 681** ZSA086681C1979

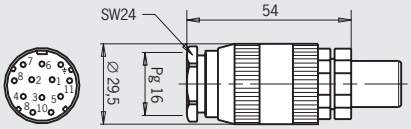
1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

ZSB, 3-stage function
Plug connector

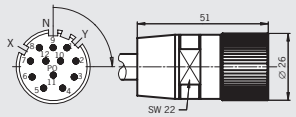
Dimension drawings



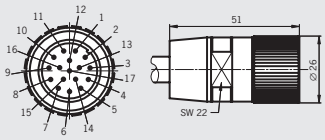
Female connector BS12 (12-pin)



Male connector PC12 (12-pin)



Male connector RC17 Y-coded (17-pin)

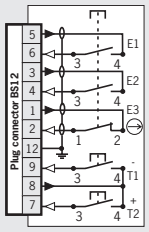


For mating connectors
see page 36 and 37

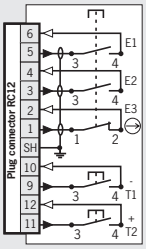
View of connection side

Wiring diagrams/function sequence

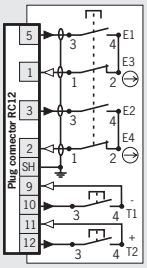
210 BS12



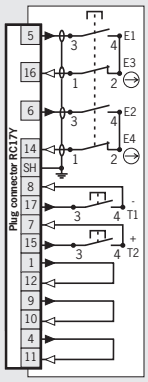
210 RC12

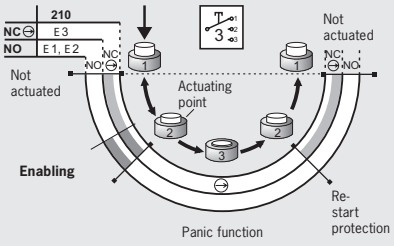


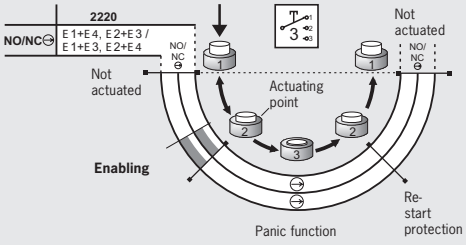
2220 RC12



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 connector (12-pin)	5 m straight	2 buttons (+ and -)	**079 832** [2] ZSB079832	on request
	RC12 Plug connector (12-pin)	5 m straight	2 buttons (+ and -), Screen on plug housing	**073 264** ZSB2A2G05C	on request
		5 m straight	2 buttons (+ and -), Direct connection TZ...C1803 Screen on plug housing	on request	**077 040** [2] ZSB077040
		10 m straight	2 buttons (+ and -) Screen on plug housing	**073 265** ZSB2A2G10C	on request
	RC17 Plug connector Y-coded (17-pin)	5 m straight	2 buttons (+ and -) Screen on plug housing	on request	**092 996** [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 41

Enabling switch ZSR

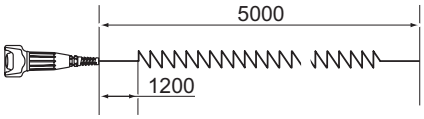
- **3-stage function**
- **Single or dual-channel version**
- **Housing G2**
- **Straight connection cable**
- **Plug connector optional**
- **Including holder**

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.

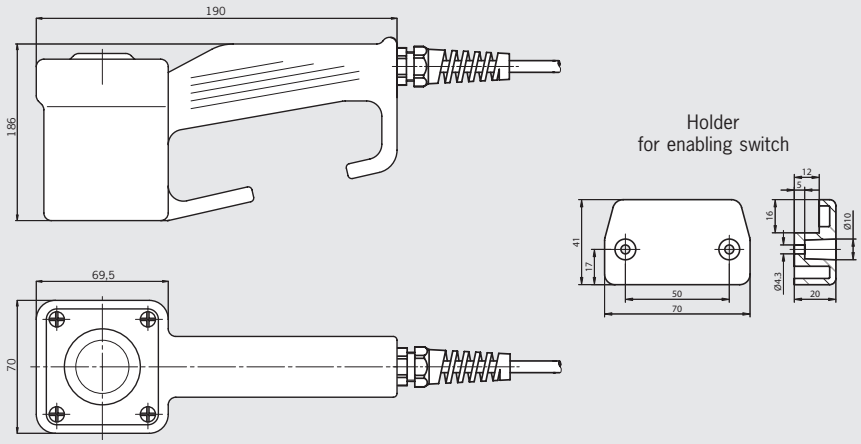
Switching elements (see also page 8)
- **111** 1 NO + 1 NC ⊖ + 1NC
- **210** 2 NO + 1 NC ⊖
- **1110** 1 NO/NC ⊖ 1)
- **2210** 1 NO/NC ⊖ 1)
  1 NO (additional auxiliary contact)

Cable lengths (coiled cable pulled out straight)

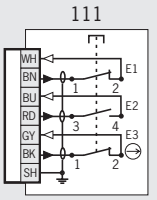


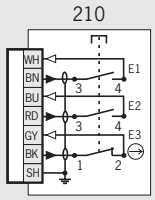
ZSR, 3-stage function
Flying lead / plug connector

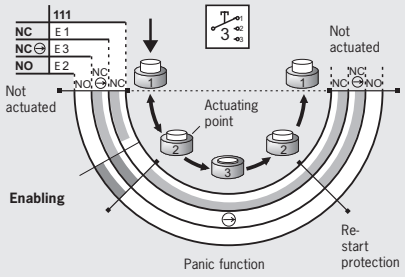
Dimension drawings

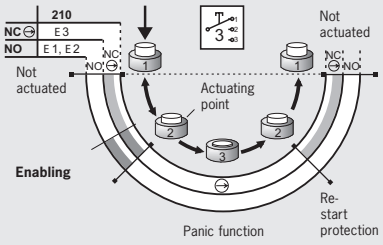


Wiring diagrams/function sequence









Contact
- open
- closed
- closed, enabling

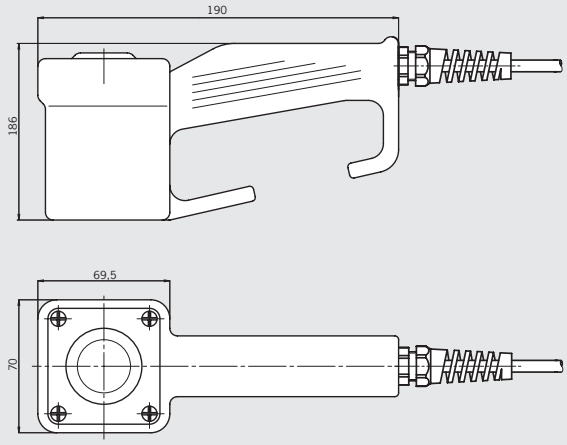
Ordering table

Design	Connection/ cross-section	Cable length	Switching element	
			111: 1 NO + 1 NC ⊖ + 1 NC	**210:** 2 NO + 1 NC ⊖
G2 3-stage	**Flying lead 6 x 0.34 mm²**	5 m straight	**055 423** ZSR2A1G05A	**055 427** ZSR2A2G05A
		10 m straight	**055 424** ZSR2A1G10A	**055 428** ZSR2A2G10A
		5 m coiled	**055 425** ZSR2A1S05A	**055 429** ZSR2A2S05A

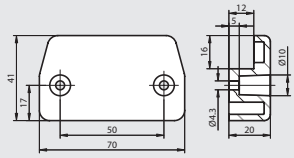
1) Only closed in middle position, a normally open contact and a positively driven contact are combined internally.

ZSR, 3-stage function
Flying lead / plug connector

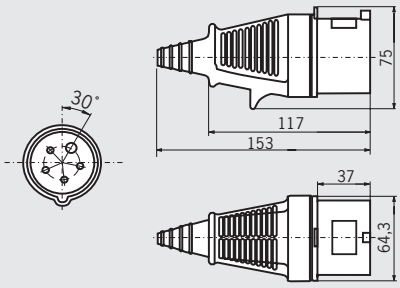
Dimension drawings



Holder
for enabling switch



Female connector CE5 (5-pin)

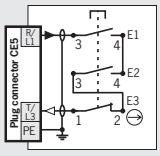


View of connection side

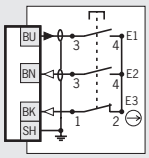
For mating connectors
see page 39

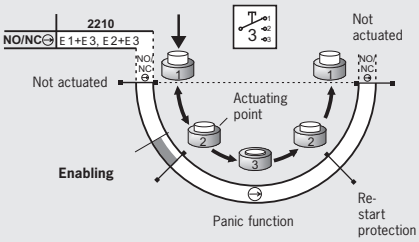
Wiring diagrams/function sequence

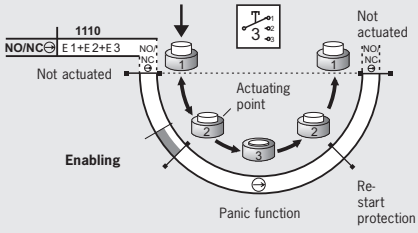
1110 CE5



2210







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	**055 431** ZSR2B2G05A
		10 m straight	on request	**055 432** ZSR2B2G10A
	CE5 plug (5-pin)	10 m straight	**073 268** [2] ZSR2C2G10CC1736	on request

For technical data see page 41

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

Enabling switch ZSB

- **3-stage function**
- **Dual-channel version**
- **Housing HBE**
- **Straight connection cable**
- **Plug connector**
- **Two 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).

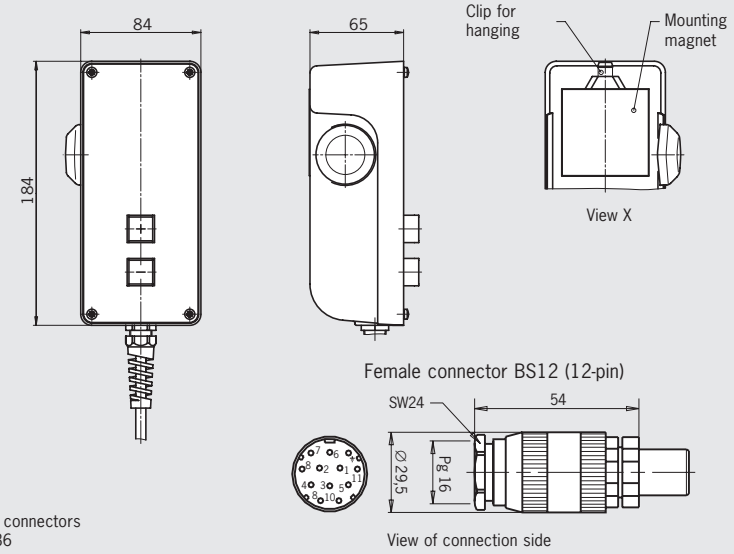
Cable
The high quality connection cables (individual screening of the safety contacts) are available straight.

+ 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 ⊖

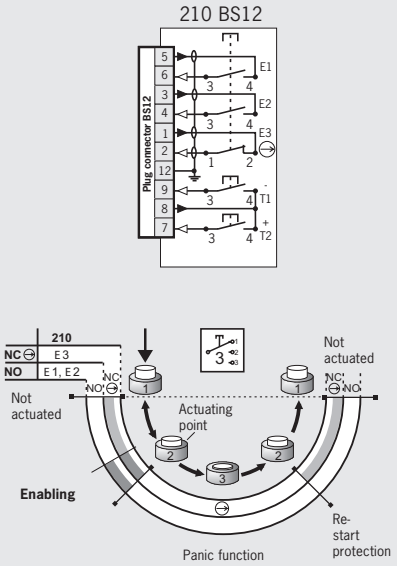
ZSB, 3-stage function
Plug connector

Dimension drawings



For mating connectors see page 36

Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

Design	Connection	Cable length	Version	Switching element
				210: 2 NO + 1 NC ⊖
HBE 3-stage	**BS12** Plug connector (12-pin)	5 m straight	2 buttons (+ and -)	**070 895** ZSB070895

Enabling switch ZSB

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

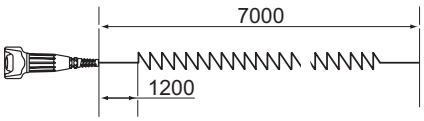
3-stage function
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

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.

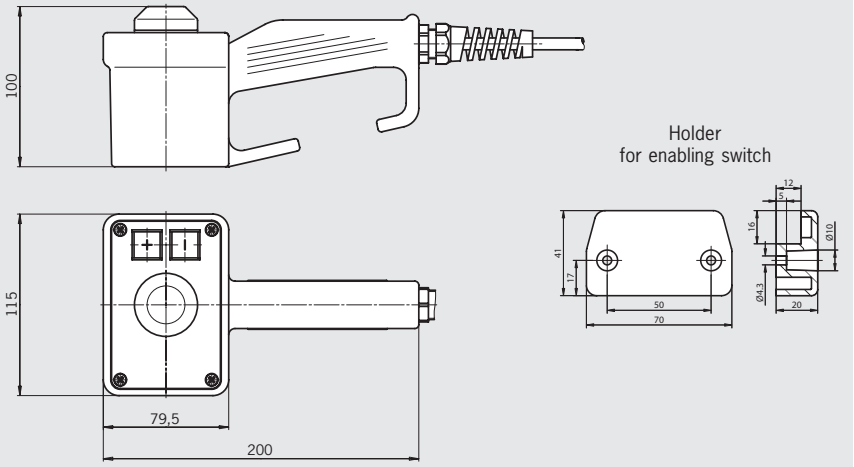
Switching elements (see also page 8)
- **210** 2 NO + 1 NC ⊖

Cable lengths (coiled cable pulled out straight)

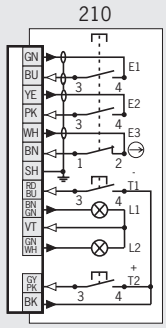


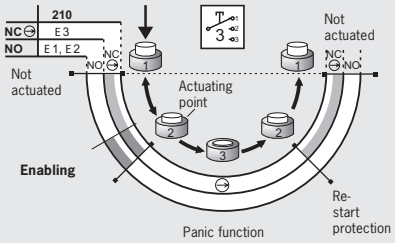
ZSB, 3-stage function
Flying lead

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 -)	**054 784** ZSB054784

For technical data see page 41

Enabling switch ZSB

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

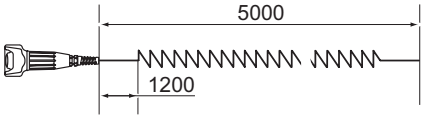
3-stage function
Enabling function is only active in the second stage (middle position, actuating point). If the button is released or pushed further (panic function), the enabling is removed (dependent on the wiring, see function sequence).

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.

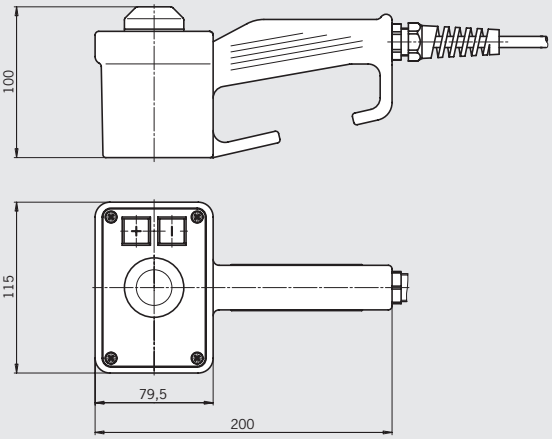
Switching elements (see also page 8)
- **220** 2 NO + 2 NC ⊖
- **2220** 2 NO/NC ⊖ 1)

Cable lengths (coiled cable pulled out straight)



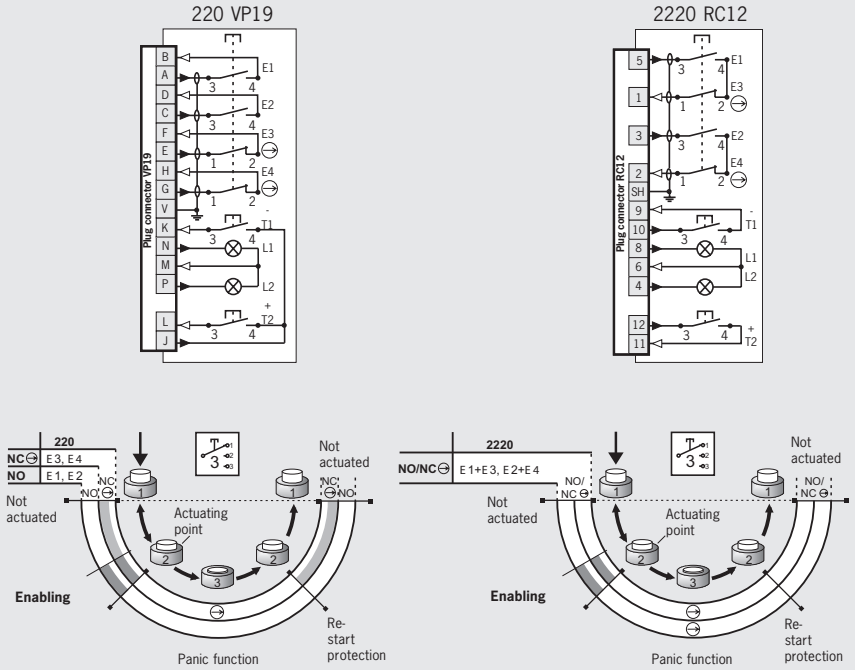
ZSB, 3-stage function
Plug connector

Dimension drawings



For mating connectors
see page 37 and 38

Wiring diagrams/function sequence



Contact
- open
- closed
- closed, enabling

Ordering table

Design	Connection	Cable length	Version	Switching element	
				220: 2 NO + 2 NC ⊖	2220: 2 NO/NC ⊖ 1)
G3 3-stage	**RC12** Plug connector (12-pin)	5 m straight	2 illuminated buttons (+ and -)	-	**077 029** ZSB077029
		12 m straight	2 illuminated buttons (+ and -)	-	**085 058** ZSB085058
	VP19 Plug connector (19-pin)	5 m coiled	2 illuminated buttons (+ and -)	**072 639** ZSB072639	on request

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

Enabling switch ZSB

- **3-stage function**
- **Dual-channel version**
- **Housing G3**
- **Connection cable straight or coiled**
- **Plug 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.

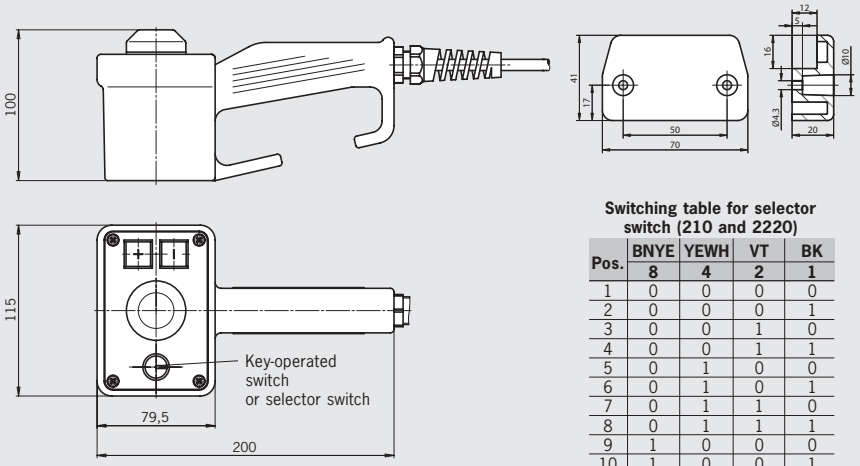
Key-operated switch
For individual use, e. g. as operating mode selector switch.

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

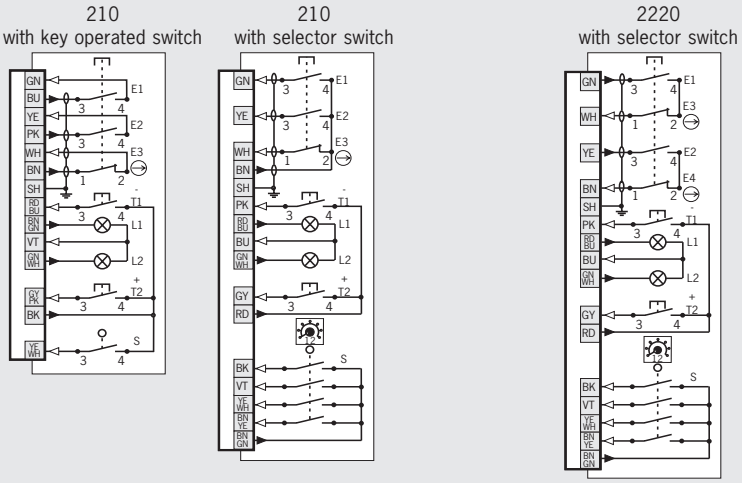
Dimension drawings

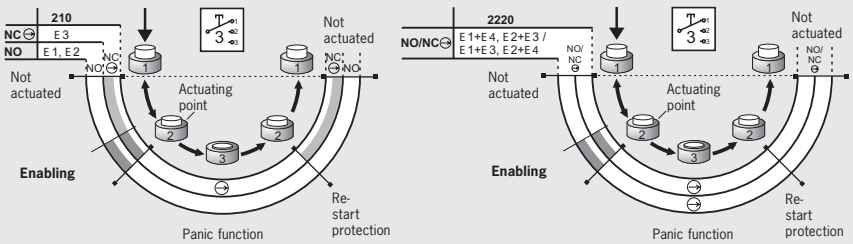


Switching table for selector switch (210 and 2220)

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





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	**077 027** ZSB077027	on request
		10 m straight	2 illuminated buttons (+ and -) 1 selector switch	**070 894** ZSB070894	**087 821** ZSB087821

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

For technical data see page 41

Enabling switch ZSB

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

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

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

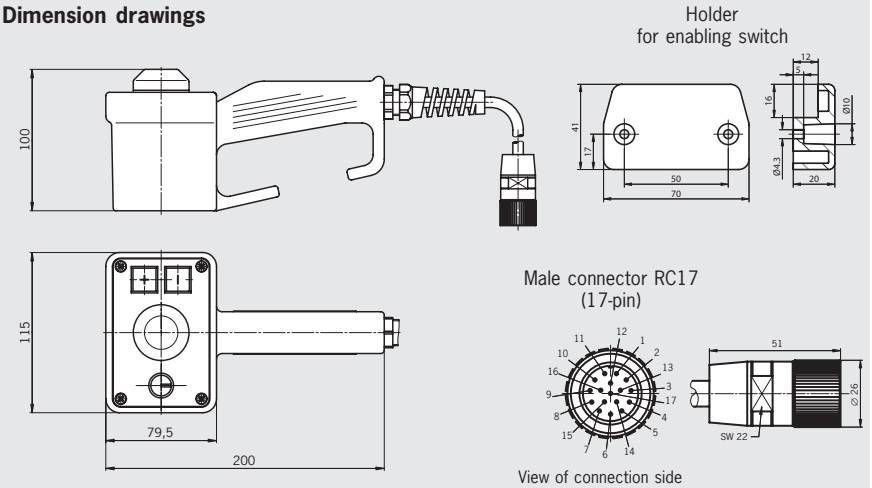
Illuminated + and – buttons
These buttons can be configured individually. For example for moving axes in positive or negative direction.

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

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

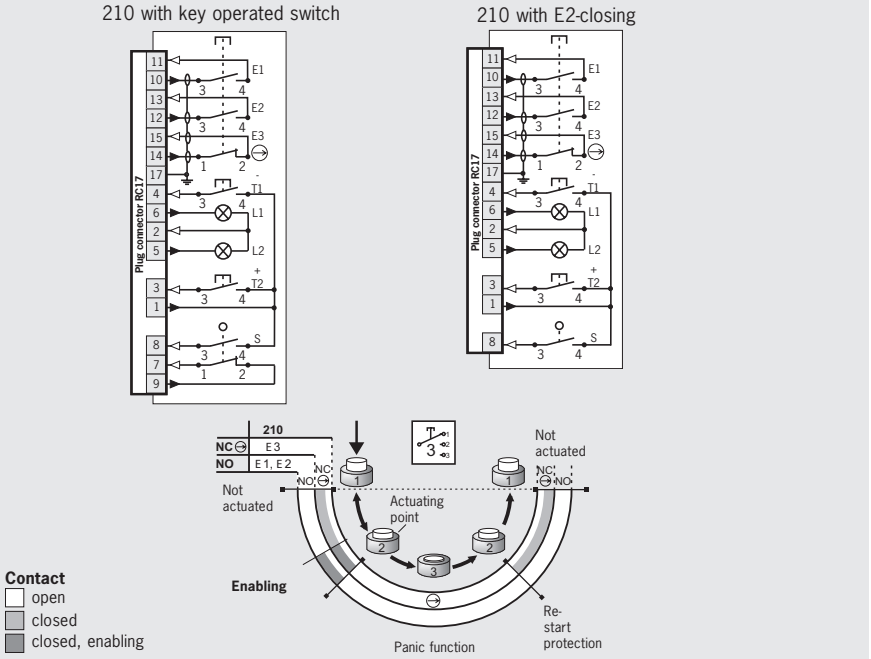
ZSB, 3-stage function
Plug connector, key operated switch

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 (1 NO)	**070 904** ZSB070904
		5 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1 NO)	**072 645** ZSB072645
		12 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1 NO)	**072 403** ZSB072403
		12 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1 NO, 1 NC)	**090 262** ZSB090262
		3 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1 NO) E2-closing [1]	**077 059** ZSB077059
		5 m straight	2 illuminated buttons (+ and -) 1 key-operated rotary switch (1 NO) E2-closing [1]	**072 711** ZSB072711

1) No key available

Enabling switch ZSB

- **3-stage function**
- **Dual-channel version**
- **Housing G3**
- **Straight connection cable**
- **Plug connector**
- **Two illuminated buttons**
- **Key-operated switch**
- **EMERGENCY STOP device**
- **Including holder**

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

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

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

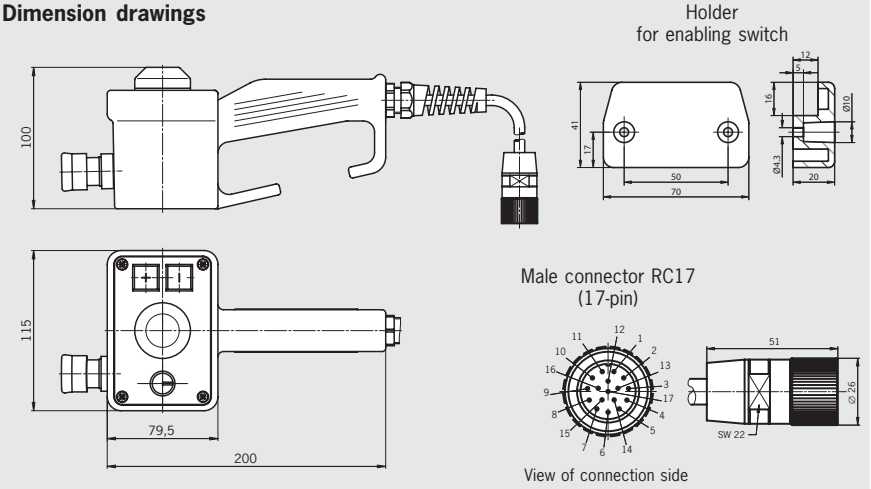
Key-operated switch
For individual use, e. g. as operating mode selector switch.

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

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

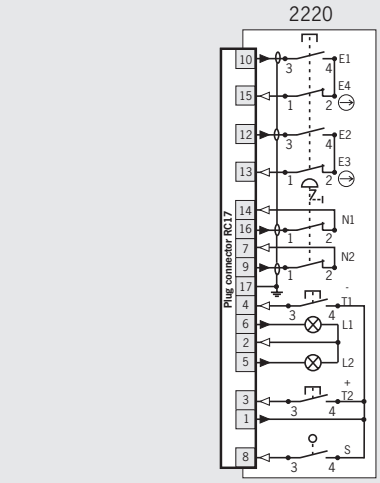
ZSB, 3-stage function
Plug connector, key operated switch, EMERGENCY STOP device

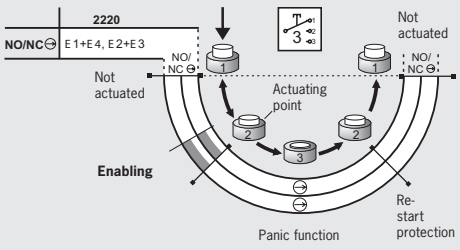
Dimension drawings



For mating connectors
see page 37

Wiring diagrams/function sequence





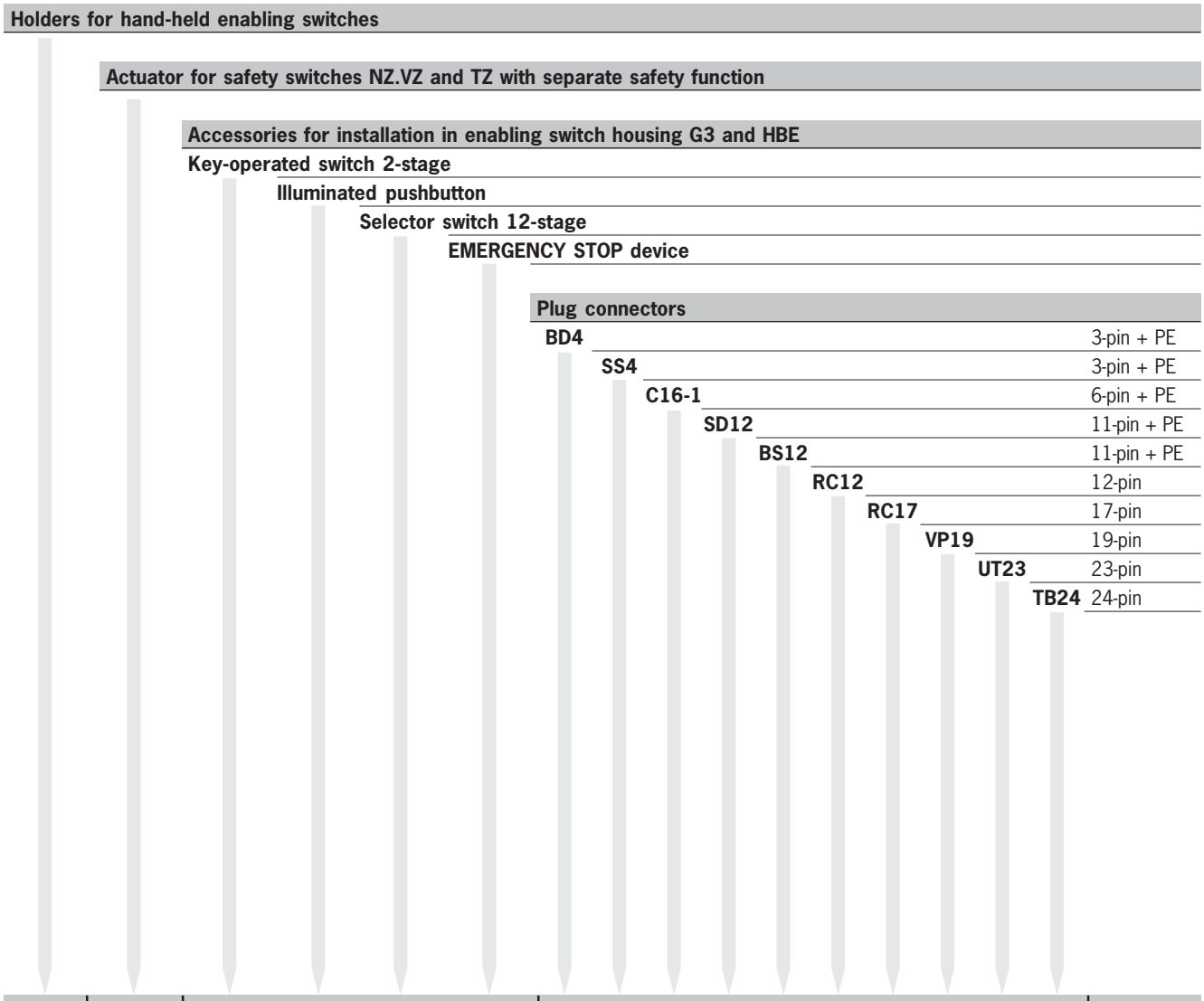
Contact
- open
- closed
- closed, enabling

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	**090 489** ZSB090489

For technical data see page 41

Selection table for accessories



Holders	Actuator	Accessories				Plug connectors										Page
		Key-operated switch	Illuminated push-button	Selector switch	EMERGENCY STOP	BD4	SS4	C16-1	SD12	BS12	RC12	RC17	VP19	UT23	TB24	
●	●															34
		●	●	●	●											35
						●	●	●	●	●						36
											●	●				37
													●	●	●	38

Holders for hand-held enabling switches/actuator for safety switches NZ.VZ and TZ with separate safety function

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

Magnetic holder for housing G1
The enabling switches can be attached at any time to any part of the machine due to the magnets fastened to the holder. In this way the enabling switch can be positioned in the activity area as necessary.

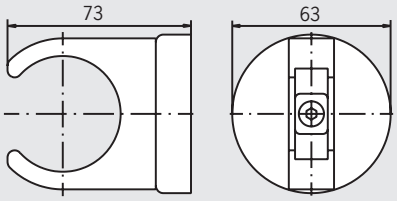
Screw holder for housing G1
The holder can be securely fastened to parts of the machine with a wall thickness of max. 15 mm using two screws.

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

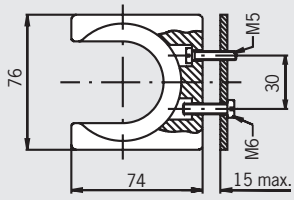
Actuator for safety switch
Suitable for fitting, e.g. to the hand-held enabling switch kit. Safe position sampling of the enabling switch can be achieved by fitting the actuator and the use of an appropriate safety switch (NZ.VZ or TZ). By suitable integration of this combination, the signal from the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

Magnetic holder

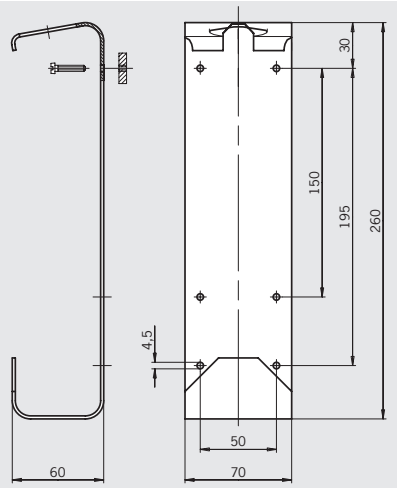
Dimension drawings



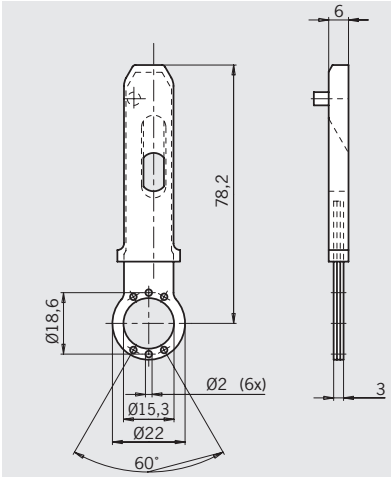
Screw holder



Screw holder with cable hook



Actuator for safety switches series NZ.VZ and TZ



Ordering table

Item	Version	
Magnetic holder		**059 340** Magnetic holder
Screw holder	M5 x 25	**052 406** Holder complete
	With cable hook M4 x 20	**047 820** Cable holder
Actuator TZ/NZ		**084 833** Actuator-Z-G-C1932

Accessories for installation in enabling switch housing G3 and HBE

- **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 button.

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.

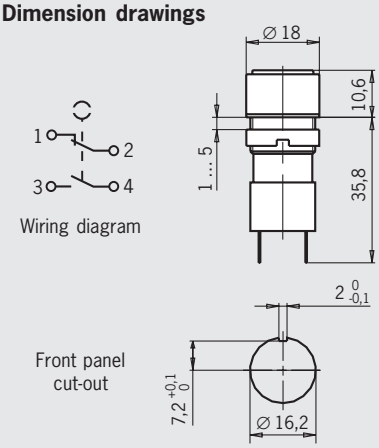
Selector switch 12-stage
The 12-stage, binary coded selector switch is supplied complete with rotary knob with position indicator. As required the 2 - 12 adjustable detent positions can, e.g. be used for axis, speed or range selection.

Detent position	Output 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

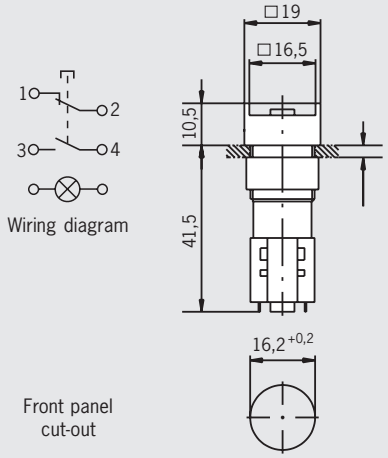
All outputs are open between the detent positions

Key-operated switch 2-stage

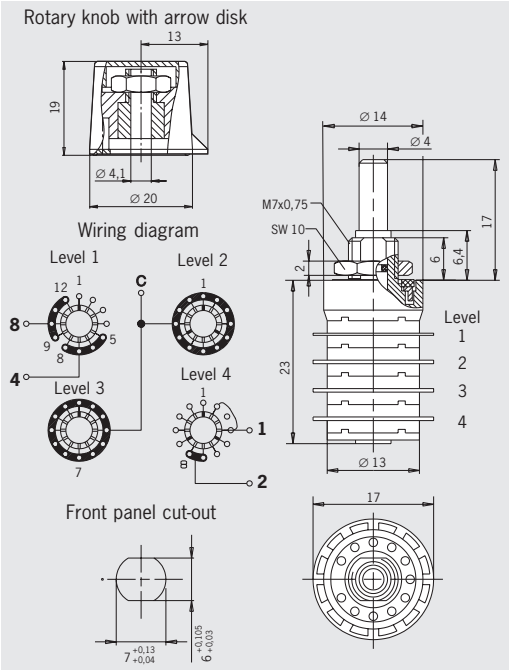
Dimension drawings



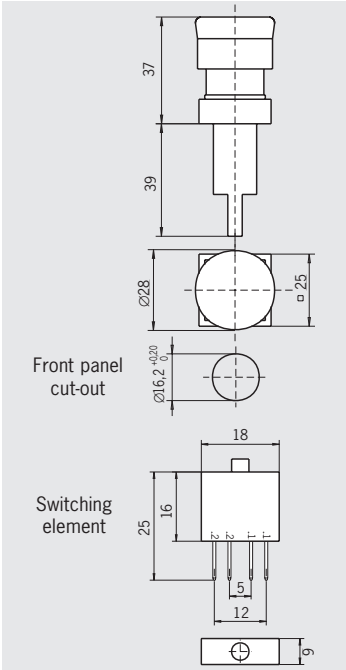
Illuminated pushbutton



Selector switch 12-stage



EMERGENCY STOP device



Ordering table

Item	Version	
Key-operated switch	Removal position: 0 1 NC + 1 NO	**072 604** Key-operated switch
	Removal position: 0 + 1 1 NC + 1 NO	**076 930** Key-operated switch removal position 0/1
Replacement key for key-operated switches	–	**075 387** Key for key-operated switch
Illuminated pushbutton	Installation ∅ 16.2 mm	**070 520** Illuminated pushbutton complete
Selector switch	12-stage	**052 874** Selector switch with rotary knob
EMERGENCY STOP device	Installation ∅ 28 mm for max. 2 switching elements	**083 637** Emergency stop actuating element
Switching element for EMERGENCY STOP device	1 NC ⊖	**083 638** Emergency stop switching element 1 NC ⊖

For technical data see page 47

Plug connectors

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

Female flange connector BD4
Female flange connector for male connector SS4 on the enabling switch.

Male connector SS4
Male connector for enabling switch for connection to safety switch TZ...C1662 (see catalog NZ/TZ).

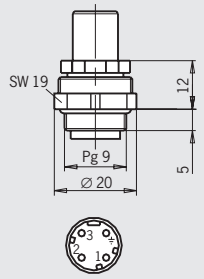
Female connector C16-1 [1)]
Female connector for hand-held enabling switches.

Male flange connector SD12
Male connector 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.

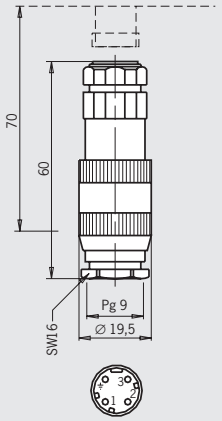
Female flange connector BD4
3-pin + PE

Dimension drawings



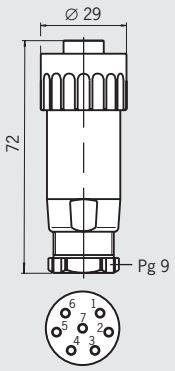
View of connection side, socket

Male connector SS4
3-pin + PE



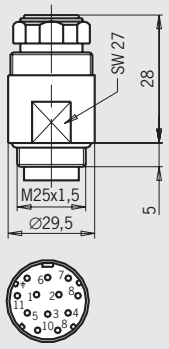
View of connection side, plug

Female connector C16-1
6-pin + PE



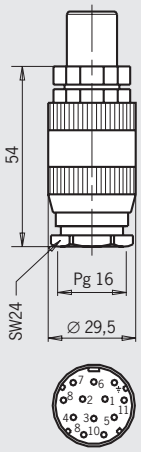
View of connection side, socket

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 for male connector SS4 on the enabling switch	**002 786** BD4
SS4 3-pin + PE	Soldered contact	Male connector for flange connector BD4 (e.g. TZ...C1662)	**002 787** SS4
C16-1 6-pin + PE	Crimp contact [1)]	Female connector	**043 861** Cable socket 6+PE
SD12 11-pin + PE	Soldered contact	Male flange connector for female connector BS12 on the enabling switch	**085 648** SD12-M
BS12 11-pin + PE	Soldered contact	Female connector, straight, for flange connector SD12	**002 763** BS12
BS12 11-pin + PE	-	Extension cable 5 m	**071 362** BS12
	-	Extension cable 10 m	**079 835** BS12

For information on crimp contacts see page 39.
1) Crimp contacts are included.

Plug connectors

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

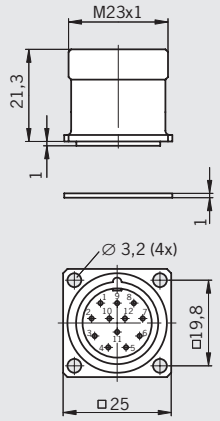
Flange connector RC17 [1)]
For front panel mounting for connection of enabling switches. Rubber seal included. Fitted with soldered contacts.

Male connector RC17 [1)]
For connection, e.g. to enabling switches.

Dummy plug RC17 [1)]
For covering the flange connector RC17. As an option, bridges can be fitted to the individual contacts at the customer, or a pre-wired version (coded) used.

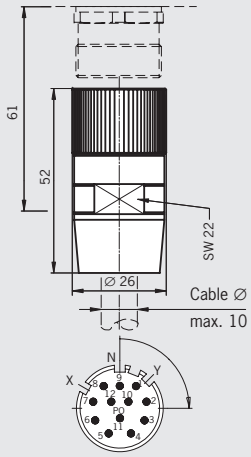
Female flange connector RC12
12-pin

Dimension drawings



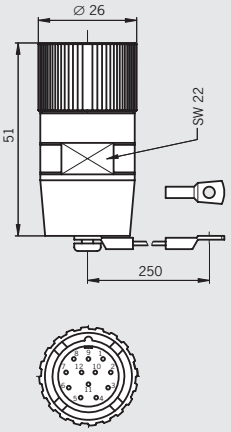
View of connection side, socket

Male connector RC12
12-pin



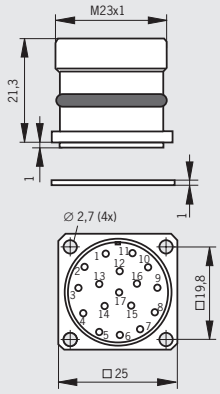
View of connection side, plug

Dummy plug RC12
12-pin



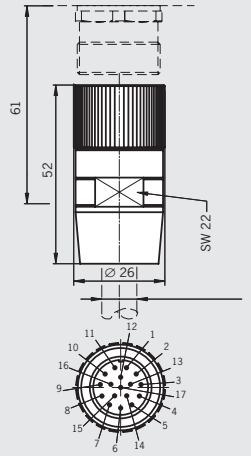
View of connection side, plug

Female flange connector RC17
17-pin



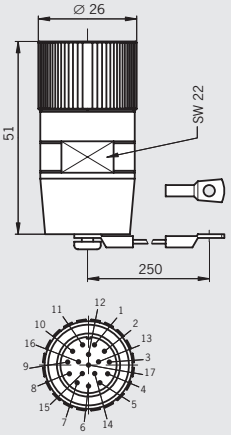
View of connection side, socket

Male connector 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	**073 290** Flange connector 12-pin
	Crimp contact [1)]	Male connector	**073 294** Plug connector 12-pin
	Crimp contact [1)]	Dummy plug (with bridges) e.g. in combination with ZS...C1770	**073 291** Dummy plug complete 12-pin
	Crimp contact [1)]	Dummy plug (without bridges)	**073 293** Dummy plug 12-pin
RC17 17-pin	Soldered connection	Female flange connector	**077 502** Flange connector 17-pin17
	Crimp contact[1)]	Male connector	**096 481** Plug connector 17-pin
	Crimp contact[1)]	Dummy plug (without bridges)	**096 159** Dummy plug 17-pin

For technical data see page 47

For information on crimp contacts see page 39.
1) Crimp contacts are included.

Plug connectors

- **Female flange connector VP19**
- **Female flange connector UT23**
- **Dummy plug UT23 with chain**
- **Female flange connector TB24**
- **Dummy plug TB24 with chain**

Female flange connector VP19
Female flange connector for male connector VP19 on the enabling switch.

Dummy plug VP19 with chain
Dummy plug for female flange connector VP19.

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 TB24 [1)]
Female flange connector for plug TB24 on enabling switch 072851.

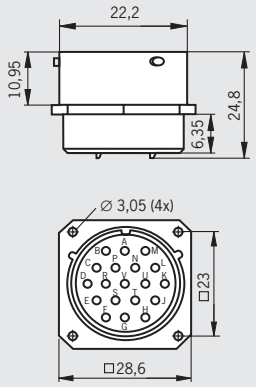
Dummy plug TB24 with chain [1)]
Dummy plug for female flange connector TB24.

Female flange connector VP19
19-pin

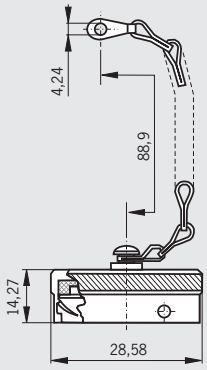
Dummy plug VP19
with chain

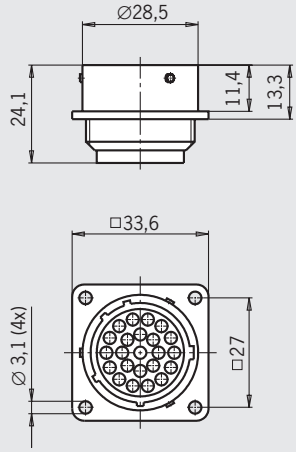
Female flange connector UT23
23-pin

Dimension drawings



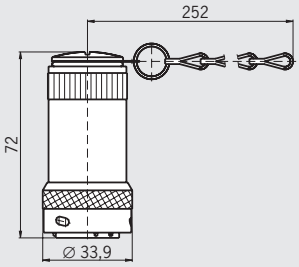
View of connection side, socket





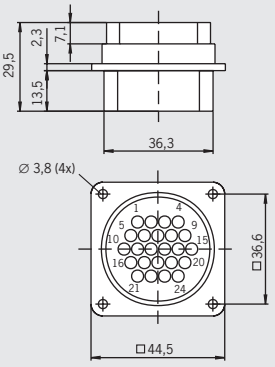
View of connection side, socket

Dummy plug UT23
with chain



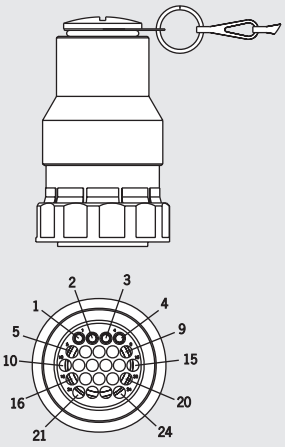
View of connection side, plug

Female flange connector TB24
24-pin



View of connection side, socket

Dummy plug TB24
with chain



View of connection side, plug

Ordering table

Item	Connection	Version	
VP19 19-pin		Female flange connector	**073 296** Female flange connector 19-pin
		Dummy plug with chain	**073 297** Dummy plug with chain
UT23 23-pin	Crimp contacts [1)]	Female flange connector for enabling switch ..C1715	**074 384** Flange connector / 23-pin / metal version
		Dummy plug with chain (3 bridges included)	**083 457** Short-circuit plug with chain
TB24 24-pin	Crimp contacts [1)]	Female flange connector for enabling switch 072 851 incl. dummy plug with chain (with bridges)	**072 937** Connection box and short-circuit plug

For information on crimp contacts see page 39.
1) Crimp contacts are included.

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

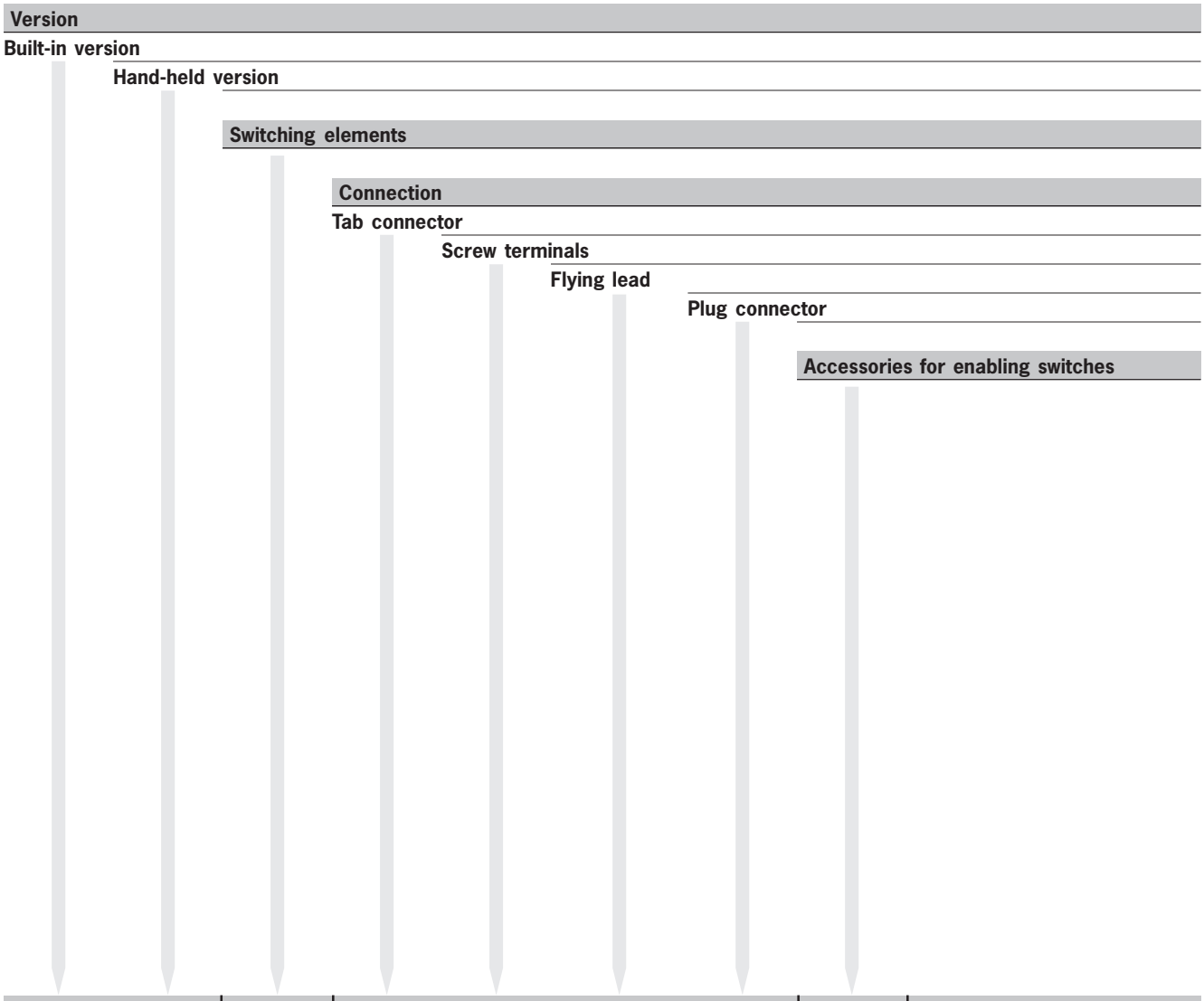
Item	Version	Manufacturer's designation	
SVM5 5-pin	Female connector M12	**99-0436-57-05** Cable socket	**Binder** www.binder-connector.de
	Female flange connector M12	**09-3442-700-05** Flange connector with wires	
	Dummy plug M12	**08-2425-000-000** Protective cap for socket with retaining strap	
CE5 3-pin + N + PE	Mating connector (socket)	**CEE plug as per CEE standard**	
C16-1 6-pin + PE	Female flange connector	**T3107 500** Female receptacle	**Amphenol-Tuchel** www.amphenol-tuchel.com
	Socket crimp contacts for C16-1, VPE 100 pcs.	**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 plug (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 (installation for flange connector)	**09 20 010 3101** Socket contact insert crimp connection	
	Socket contacts for crimping	**09 33 000 6220** Socket crimp contacts 0.5 mm²	
	Dummy plug	**09 20 010 5425** Cover	
RC17-Y coded 17-pin	Female flange connector, can be soldered to male connector 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, 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
	Removal tool	**RC-Z 2097** Extraction tool/insertion tool	
RC18	Crimp tool	**RC-Z 2378** Crimp pliers for machined contacts	
	Extraction tool	**RC-Z 2274** Extraction tool	
VP19	Crimp tool	**T98143 DAK 83S-30 / 11-7576T3** Insertion tool	**Litton/ Veam** www.littonveam.com
	Extraction tool	**46592-MT50 / 11-7576T3** Removal tool	
UT23	Crimp tool	**Y16RCM** Crimping tool for machined contacts	**Burndy** www.burndy.com
	Extraction tool	**RX2025GE1** Extraction tool	
TB24	Crimp tool	**WT10-04** Crimp tool	**Thomas & Betts** www.tnb.com
	Extraction tool	**TRT16** Contact removal tool	

For technical data see page 47

Overview



Version		Switching elements	Connection				Accessories	Page
Built-in	Hand-held		Tab connector	Screw terminals	Flying lead	Plug connector		
●								42
	●							42
		●						42
			●					43
				●				43
					●			43
						●		43 - 46
							●	47 - 48

Built-in version

Parameter		Value		Unit
Housing material		Polyamide, black		
Protective cap material		CR (neoprene), black		
Degree of protection 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 version G1

Parameter	Value	Unit
Housing material	Polyamide, black	
Protective cap material	CR (neoprene), black	
Degree of protection 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 version G2

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

Hand-held version HBE

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

Hand-held version G3

Parameter	Value	Unit
Housing material	Polyamide, yellow	
Protective cap material	CR (neoprene), black	
Degree of protection 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 contact element				
Life	1 x 10^5 cycles				
Function sequence	2-stage	3-stage			
Switching element With 1 contact element	**10** 1 NO	**1110** 1 NO/1 NC ⊖			
Switching elements With 2 contact elements	**20** 2 NO	**1210** 1 NO/NC ⊖ + 1 NO	**2202** 2 NO/NC	**2220** 2 NO/NC ⊖	
Switching elements With 3 contact elements	**21** 2 NO + 1 NC	**111** 1 NO + 1 NC ⊖ +1 NC	**210** 2 NO + 1 NC ⊖	**300** 3 NO	
Switching elements With 4 contact elements	-	**121** 1 NO + 2 NC ⊖ + 1 NC	**220** 2 NO + 2 NC ⊖		
Min. switching current at 24 V	1 mA (ZXE switching element 2202: 5 mA)				

Tab connector connection, hand-held kit ZSA

Parameter		Value	Unit
Connection		Tab connector	
Version according to IEC 60760		2.8 x 0.8 mm	
Degree of protection 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 according to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to EN 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 3 A U_e 24 V	

Screw terminal connection, ZXE

Parameter		Value	Unit
Connection		Screw terminals	
Version		4-pin	
Tightening torque, max.		0.15	Nm
Conductor diameter	single 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 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 according 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 according to IEC 60269-1 (control circuit fuse)		4	2	2	2	A gG
Utilization category enabling switches according to EN 60947-5-1	AC-15	I_e 4 A U_e 230 V	I_e 2 A U_e 230 V	I_e 2 A U_e 230 V	I_e 2 A U_e 230 V	
	DC-13	I_e 3 A U_e 24 V	I_e 2 A U_e 24 V	I_e 2 A U_e 24 V	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs according to EN 60947-1-5	AC-15	-	-	I_e 400 mA U_e 32 V	I_e 400 mA U_e 32 V	
	DC-13	-	-	I_e 100 mA U_e 50 V	I_e 100 mA U_e 50 V	

Plug connector SS4 connection

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

Plug connector SVM5 connection

Parameter		Value	Unit
Connection		Male connector	
Version		SVM5 (5-pin)	
Connection cable conductor cross-section		6 x 0.34	mm^2
Degree of protection to IEC 60529		IP 67 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according 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 36ff

Plug connector CE5 connection

Parameter		Value	Unit
Connection		Male connector	
Version		CE5 (3-pin + N + PE)	
Connection cable conductor cross-section		3 x 0.75	mm²
Degree of protection to IEC 60529		IP 65 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according to IEC 60269-1 (control circuit fuse)		2	A gG
Utilization category according to EN 60947-5-1	AC-15	I_e 2 A U_e 230 V	
	DC-13	I_e 2 A U_e 24 V	

Plug connector 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 to IEC 60529		IP 67 [1]		
Rated impulse withstand voltage U_{imp}		0.8		kV
Short circuit protection according to IEC 60269-1 (control circuit fuse)		2		A gG
Utilization category according to EN 60947-5-1	AC-15	I_e 2 A U_e 24 V		
	DC-13	I_e 2 A U_e 24 V		

Plug connector MR7 connection

Parameter		Value	Unit
Connection		Male connector	
Version		MR7 (7-pin)	
Connection cable conductor cross-section		No cable	
Degree of protection to IEC 60529		IP 65 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according 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 60947-5-1	DC-13	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs	AC-15	24 V 400 mA	
according to EN 60947-5-1	DC-13	24 V 100 mA	

Plug connector MR8 connection

Parameter		Value	Unit
Connection		Male connector	
Version		MR8 (8-pin)	
Connection cable conductor cross-section		No cable	
Degree of protection to IEC 60529		IP 65 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according 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 60947-5-1	DC-13	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs	AC-15	24 V 400 mA	
according to EN 60947-5-1	DC-13	24 V 100 mA	

Plug connector MR10 connection

Parameter		Value	Unit
Connection		Male connector	
Version		MR10 (10-pin)	
Connection cable conductor cross-section		No cable	
Degree of protection to IEC 60529		IP 65 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according 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 60947-5-1	DC-13	I_e 2 A U_e 24 V	

[1] Only screwed tight with the related plug connector from page 36ff

Plug connector HAN10 connection

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

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 to IEC 60529		IP 67 / IP 65 with additional elements [1]		
Rated impulse withstand voltage U_{imp}		0.8		kV
Short circuit protection according to IEC 60269-1 (control circuit fuse)		2		A gG
Utilization category enabling switch according to EN 60947-1-5	AC-15	I_e 2 A U_e 24 V		
	DC-13	I_e 2 A U_e 24 V		
Utilization category buttons and LEDs according to EN 60947-1-5	AC-15	24 V 400 mA	-	
	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 to IEC 60529		IP 65 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according to IEC 60269-1 (control circuit fuse)		2	A gG
Utilization category enabling switch according to EN 60947-1-5	AC-15	I_e 2 A U_e 24 V	
	DC-13	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs according to EN 60947-1-5	AC-15	24 V 400 mA	
	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 to IEC 60529		IP 67 or IP 65 with additional elements [1]		
Rated impulse withstand voltage U_{imp}		0.8		kV
Short circuit protection according to IEC 60269-1 (control circuit fuse)		2		A gG
Utilization category enabling switch according to EN 60947-1-5	AC-15	I_e 2 A U_e 24 V		
	DC-13	I_e 2 A U_e 24 V		
Utilization category buttons and LEDs according to EN 60947-1-5	AC-15	24 V 400 mA		
	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	mm^2
Degree of protection to IEC 60529		IP 67 or IP 65 with additional elements [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according to IEC 60269-1 (control circuit fuse)		2	A gG
Utilization category enabling switch according to EN 60947-1-5	AC-15	I_e 2 A U_e 24 V	
	DC-13	I_e 2 A U_e 24 V	
Utilization category buttons and LEDs according to EN 60947-1-5	AC-15	24 V 400 mA	
	DC-13	24 V 100 mA	

[1] Only screwed tight with the related plug connector from page 36ff

Plug connector VP19 connection

Parameter		Value	Unit
Connection		Male connector	
Version		VP19 (19-pin)	
Connection cable conductor cross-section		8 x 0.5 + 8 x 0.14	mm^2
Degree of protection to IEC 60529		IP 65 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according 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 to IEC 60529		IP 67 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according 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	

Plug connector TB24 connection

Parameter		Value	Unit
Connection		Male connector	
Version		TB24	
Connection cable conductor cross-section		8 x 0.5 + 8 x 0.14	mm^2
Degree of protection to IEC 60529		IP 65 [1]	
Rated impulse withstand voltage U_{imp}		0.8	kV
Short circuit protection according 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 36ff

Key-operated switch

Parameter	Value	Unit
Housing material	PA black	
Ambient temperature	-25 to + 70	°C
Degree of protection, front (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
Degree of protection, front (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
Degree of protection, front (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 switch

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

Emergency stop switching element

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

Plug connector series SS4 and BD4

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

Plug connector 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 connector	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 connector	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 VP19

Parameter	Value	Unit
Housing material	Metal	
Number of pins	19	
Nominal voltage max.	500	V AC
Degree of protection according to IEC 60529 (inserted)	IP 65	
Connection	Crimp contacts 1.0 mm^2	

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	

Plug connector series TB24

Parameter	Value	Unit
Housing material	Plastic	
Number of pins	24	
Nominal voltage max.	230	V AC
Degree of protection according to IEC 60529 (inserted)	IP 65	
Connection	Crimp contacts 0.25 - 0.5 mm^2	

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- Safety Switches NX/TX

Safety Switches, Plastic Housing
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- Safety Switches STM
- Safety Switches STP

Non-Contact Safety Switches
- Non-Contact Safety Switches CES/CEM, Transponder Coding
- Non-Contact Safety Switches CMS, Magnetic Coding

Safety Products with integrated Bus Interface

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- Safety Relays ESM
- Modular Safety System ESM-F

Rope Pull Switches

ManMachine

Joystick Switches

Electronic Handwheels

Pendant Stations
- Pendant Stations HBA
- Pendant Stations HBE/HBL

Electronic-Key-System

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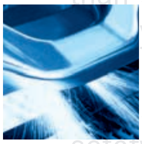
Automation



Safety

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