

Enabling switches

Catalogue ZB/10 – Type series ZSD



SCHMERSAL



Contents

Some background information	Page 2
Versions available	4
Enabling switch (grip switch), 3 positions, ZSD5/ZSD6 type series	6
Enabling switch, 3 positions, ZSD1LC..., ZSD1.1LC type series	10
Enabling switch, 3 positions, ZSD2LC..., ZSD2.1LC type series	12
Enabling switch HE3B-M2PY	14
Enabling switch (grip switch), 2 positions, ZSD4... type series	16
Technical data/electrical specifications	18
Circuit suggestions ZSD1LC..., ZSD1.1LC..., ZSD2LC..., ZSD2.1LC..., ZSD4..., ZSD5/6	20

Subject to technical modifications and error. The data specified in this catalogue are carefully checked typical standard values.

Or as the ancient Greeks already knew:

The Gods do not reveal everything to mortals from the very beginning. But during the course of time our search will show us what is better.

Xenophanes
 (Greek philosopher,
 580/577 B.C.)

Descriptions of technical correlations, details on external control units, installation and operating instructions or similar have been provided to the best of our knowledge. However, this does not mean that warranted characteristics or other properties under liability law may be assumed which extend beyond the

“General Terms of Delivery of Products and Services of the Electrical Industry”. We trust you will understand that the user must therefore check our information and recommendations before using our equipment.

Enabling switches

Some background information

Application

If a machine is running in a special operation mode an entire or partial bypass of the protective devices might be required. In such conditions manually operated enabling switches – possibly together with other safety measures – serve to protect the operator from hazardous situations.

Although safeguards are designed to provide appropriate protection in all operating modes, exceptions are admissible if it is otherwise not possible to operate a machine practically. These exceptions will typically include the setting up of a machine, service work or observing operating processes, so-called process observation.

In these cases additional actions must be taken to guarantee personal protection of individuals even in special operating modes. Enabling switches are frequently used in such situations.

They serve to permit commands (for example for hazardous movements) from other control stations. Start signals for hazardous movements must not be triggered by an enabling switch alone.

If the operator releases the pushbutton, or in the case of the 3-position version, the operator overpresses the trigger point of the pushbutton then the “Go” signal is interrupted by a forced open NC contact.

Product range

Although the field of application for enabling switches is relatively clear, there is no universal solution because specific functional and ergonomic requirements in particular may differ from case to case or may be weighted differently.

Elan therefore offers various solutions when an “enabling mode” is required.

Enabling switches are available in different versions:

- as grip switch
- built-in in a mobile control housing, with optional additional functions
- as stand-alone version.

Three-position devices are the most common.



2 or 3-position device versions

Deciding which solution of the two, i.e. 2 or 3 position, is the most appropriate will depend on the individual application.

From the safety point of view, a 3-position enabling switch will always be the better solution. However, there are ergonomic reservations when working with these devices for a longer period of time.

The advantage of 3-position enabling switches is that the operator has two options (releasing or pressing down) to switch off the machine reliably in the case of an emergency situation caused by a sudden hazardous movement. It should be remarked that empirical studies have shown that in panic situations a person will tend to freeze, i.e. will be more likely to press the button down rather than to release it.

According to EN 775, the installation of enabling switches for roboter movements is only allowed in 3-stage versions!

Regulations and standards

The subject of enabling switches is addressed in the following standards and regulations.

- **DIN EN ISO 12100-1:** Safety of machinery – Basic concepts, general design principles – Part 1: Basic terminology and methods
- **DIN EN ISO 12100-2:** Safety of machinery– Basic concepts, general design principles – Part 2: Technical principles and specifications
- **EN 60204-1:** Safety of machinery – Electrical equipment of machines – Part 1 General requirements.
- **EN 775:** Industrial robots, safety
- **prEN 11161:** Industrial automation systems – Safety of integrated production systems – Basic requirements.
- **GS-ET-22/11.05 – BG** Principles for the testing of moving electromechanical enabling switches.

A distinction is made between 2- and 3-position enabling switches

	2-position enabling switch	3-position enabling switch
Position 1	OFF function (actuator not depressed)*	OFF function (actuator not depressed)*
Position 2	Enabling function (actuator depressed)	Enabling function (actuator depressed)
Position 3	– not existing –	OFF function (actuator pressed down exceeding the middle position)**
Additionally:	EMERGENCY-STOP push-button in direct vicinity	– not applicable –

* The reset of the actuator may be spring powered (cf. DIN EN ISO 12100-1)

** When resetting the actuator from position 3 through position 2 to position 1 this must not generate a restart pulse..



Enabling switches

Scope

Enabling switch, 3 positions, performed as grip switch

Technical data/further information: refer to page 6

- Type ZSD5
- 3 positions (OFF – ON – OFF)
- 2 contacts (NO)
- Positive opening (position 2 ↔ position 3)
- Contacts do not close during reset (position 3 ↔ position 1)
- Redundant contact configuration permits signal processing with commercially available safety relay modules. Contact configuration permits signal processing acc. PL e (position 2 ↔ 3) or PL c (position 2 ↔ 1) of EN ISO 13849.
- 1 auxiliary contact (NC), position 2 ↔ 3
- Class of protection IP 65
- Especially suitable for robot application in compliance with ANSI Robotics Standard
- BG prototype testing
- Option: mounting bracket
- Upon request: with cable set



Enabling switch, 3 positions built into a mobile control device PILOT 10

Technical data/further information: refer to page 10

- Type ZSD1LC..., ZSD1.1LC
- 3 positions (OFF – ON – OFF)
- 2 contacts (NC/NO combination)
- Positive opening (position 2 ↔ position 3)
- Redundant contact configuration permits signal processing with commercially available safety relay modules. Contact configuration permits signal processing acc. PL e (position 2 ↔ 3) or PL c (position 2 ↔ 1) of EN ISO 13849.
- Contact configuration permits signal processing acc. PL c (position 2 ↔ 1) or PL e (position 2 ↔ 3) of EN ISO 13849-1
- Class of protection IP 65
- With 5 m cable set
- Upon request: electrically monitored “parking position” with safety switches TZG, actuator mounted in PILOT housing (for illustrative example refer to page 2).



Enabling switch, 3 positions performed as grip switch additionally with 1 pushbutton

Technical data/further information: refer to page 6

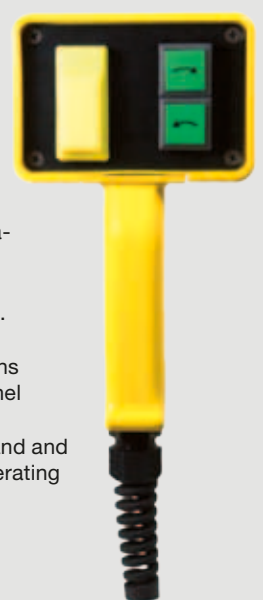
- Type ZSD6
- Design features: see above
- With additional pushbutton (1 NO contact) in device head
- Upon request: with cable set



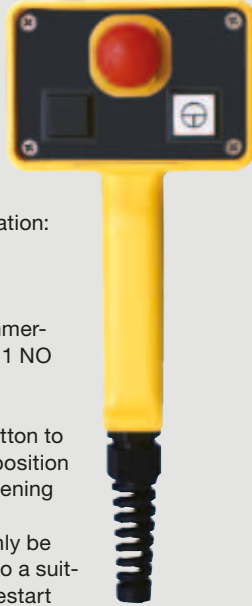
Enabling switch, 3 positions, additionally 2 pushbuttons, built into a mobile control device PILOT 20

Technical data/further information: refer to page 12

- Type ZSD2LC..., ZSD2.1LC...
- Design features: see above
- With 2 additional pushbuttons (1 NO each) in operating panel
- Upon request: with cable or equipped with other command and indicating devices in the operating panel



Enabling switch, 2 positions, additionally with 1 Emergency STOP pushbutton plus 1 pushbutton, built into a mobile control device PILOT 20



Technical data/further information: refer to page 16

- Type ZSD4...
- Enabling function (with commercially available pushbutton, 1 NO contact)
- 2 positions (OFF – ON)
- 1 emergency STOP pushbutton to EN 418 (as a substitute for position 3 $\hat{=}$ STOP with positively opening effect)
- ATTENTION: Device may only be operated when connected to a suitable follow-up circuit with restart prevention.
- With 1 additional pushbutton (1 NO contact) in operating panel
- Upon request: with cable set or equipped with other command and signalling devices in the operating panel
- Upon request: Electrically monitored “parking position” with safety switches TZG, actuator mounted in PILOT housing (for illustrative example refer to page 2).

Enabling switch, 3 positions for direct front panel installation



Technical data/further information: refer to page 14

- Type HE3B-M2PY
- For bore holes with 16 mm diameter
- 3 positions (OFF – ON – OFF)
- Positive opening (position 2 \leftrightarrow position 3)
- Contacts don't close during reset (position 3 \rightarrow position 1)
- Redundant contact configuration permits signal processing with commercially available safety relay modules acc. to control category 3/4 of EN 954-1.
- Contact configuration permits signal processing acc. control category 2 (position 2 \leftrightarrow 1) or 4 (position 2 \leftrightarrow 3) of EN ISO 13849-1
- Class of protection IP 65

Safe signal processing with commercially available safety relay modules (for ZSD1LC..., ZSD1.1LC, ZSD2LC..., ZSD2.1LC, ZSD4..., ZSD5..., ZSD6...)



Technical data/further information: refer to Schmersal catalogue PROTECT-SRBs

For example with PROTECT-SRB modules:

- Safe signal processing in control category 4 according to EN ISO 13849-1 for all versions
- With cross short monitoring
- Plug-in terminals
- Comprehensive visualisation
- Electronic control
- Suitable for all types of protective devices
- BG prototype testing



Enabling switch (grip switch) ZSD5/ZSD6

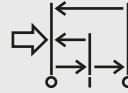


Enabling switch, 3 positions, performed as grip switch

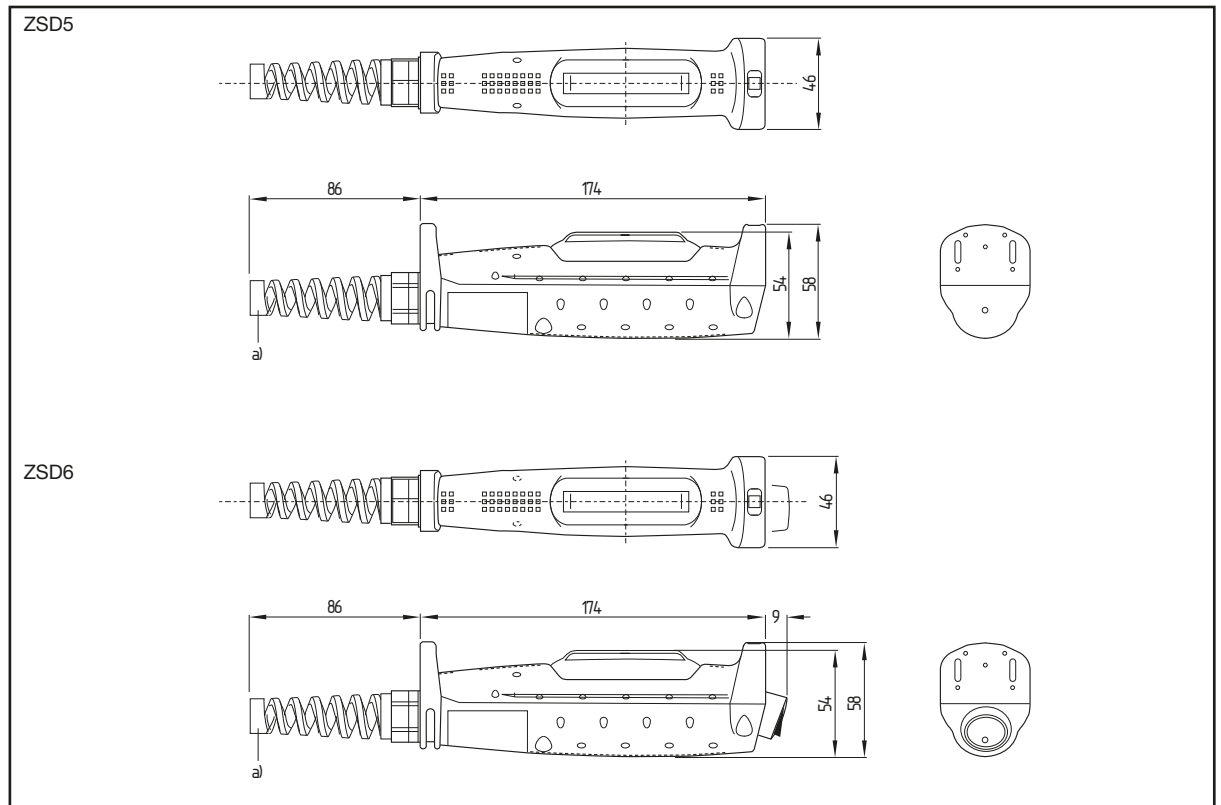
- Type ZSD5
- 3 positions (OFF – ON – OFF)
- 2 contacts (NO)
- Positive opening (position 2 -> position 3)
- Contacts do not close during reset (position 3 -> position 1)
- Redundant contact configuration permits signal processing with commercially available safety relay modules in control category 3/4 according to EN 954-1
- 1 auxiliary contact (NC), position 2 -> 3
- Class of protection IP 65
- Especially suitable for robot application in compliance with ANSI Robotics Standard
- BG prototype testing
- Option: mounting bracket
- Upon request: with cable set

Enabling switch, 3 positions performed as grip switch, additionally with 1 pushbutton

- Type ZSD6
- Design features: see left
- With additional pushbutton (1 NO contact) in device head
- Upon request: optionally with cable set, equipped with other command and indicating devices in the device head



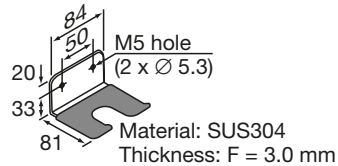
Dimensions



a) Connection: SKINTOP BS-M20 x 1.5

Accessories

Mounting bracket, metallic



Product range

Description	Type	Cat. no.	Part no.
Enabling switch, 3 positions, as grip switch, 2 contacts (NO), 1 auxiliary contact (NC)	ZSD5	063 0000	1199467
Enabling switch, 3 positions, as grip switch, 2 contacts (NO), 1 auxiliary contact (NC) with additional pushbutton (NO) in device head	ZSD6	063 0010	1199480
Mounting bracket, metallic	ZSD-H	063 0200	1193725

Electrical specifications of the basic device ZSD5/ZSD6

Rated voltage	250 VAC/VDC		
Rated operating current (thermal)	3.0 A		
Rated data	30 V	125 V	250 V
Contacts			
– ohmic load (AC-12)	–	3.0 A	1.5 A
– inductive load (AC-15)	–	1.5 A	0.75 A
– ohmic load (DC-12)	2.0 A	0.4 A	0.2 A
– inductive load (DC-13)	1.0 A	0.22 A	0.1 A
Contact configuration	2 NO		
Auxiliary contact			
– ohmic load (AC-12)	–	2.0 A	1.0 A
– inductive load (AC-15)	–	1.0 A	0.5 A
– ohmic load (DC-12)	2.0 A	0.4 A	0.2 A
– inductive load (DC-13)	1.0 A	0.22 A	0.1 A
Contact configuration	1 NC		

Electrical contact data for additional pushbutton at ZSD6

Ohmic load AC-12	1.5 A	0.5 A	–
– inductive load AC-15	1.0 A	0.3 A	–
Ohmic load DC-12	1.0 A	0.2 A	–
Inductive load DC-13	0.7 A	0.1 A	–

NB: AC inductive load: $\cos \varphi = 0.6-0.7$, DC ohmic load: $L/R = 40$ ms

Min. switchable load (reference value): 5 V, 1 mA AC/DC (range dependent on operating conditions and load).

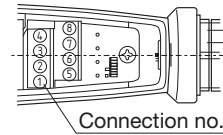
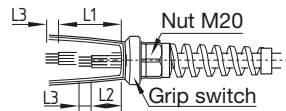
Contact travel chart	1	2	3	
Contact 1-2	□	■	□	⊖
Contact 3-4	□	■	□	⊖
Auxiliary contact 5-6	■	■	□	⊖

Open: □, closed: ■, ⊖ = Positive opening

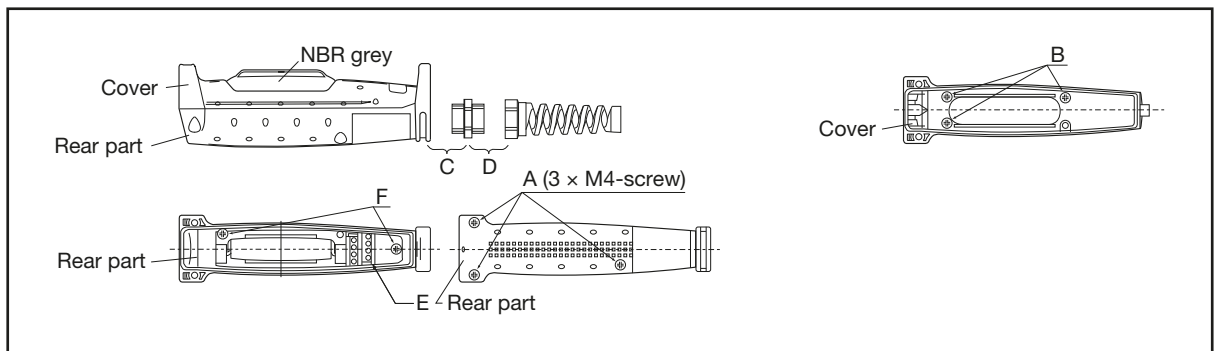
Assembly instructions

Wire length	Connection 1-4	Connection 5-8
L1, L2	L1 = 40 mm	L2 = 27 mm
L3	L3 = 6 mm	

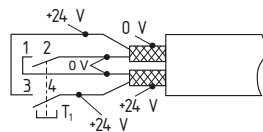
N.B.: Wire cross-section 0.14 ... 1.5 mm²
(1 wire per connection)



Device structure



Component	Description	Torque
A	Housing screws	1.2 ± 0.1 Nm
B	Rubber cap screws ¹⁾	–
C	Gland	4.0 ± 0.3 Nm
D	Strain relief device	4.0 ± 0.3 Nm
E	Screw terminal	0.5 ... 0.6 ± 0.2 Nm
F	Board screws ¹⁾	–



The monitoring device must have the facility to monitor cross-shorts. In addition, the enabling channels are to be laid and wired within the connection cable as shown in the left. It's to use a 4-stranded, double-screened shroud line.

1) From factory

General data ZSD5/ZSD6	
Regulations and approvals	ISO 12 100, ISO 11 161, ISO 10216, IEC EN 60947-5-1, IEC 60204-1, EN ISO 12100, EN 775, EN 60204-1, prEN ISO 11 181, IEC EN 60947-5-1, UL 508, JIS C8201-5-1, ANSI/RIA R15.06
Ambient temperature	–10 ... +60 °C (no ice-up)
Storage temperature	–40 ... +80 °C (no ice-up)
Relative air humidity	45 ... 85% (no condensation)
Pollution degree	3
Contact resistance	100 mΩ (in new state)
Isolation resistance	100 mΩ min. (Megger DC 500 V)
Electric strength	2.5 kV
Switching frequency	1,200 switching operations/hour
Mechanical serviceable life of the switching insert contact	Position 1–2–1: 10 ⁶ switching operations min. Position 1–2–3–1: 10 ⁵ switching operations min.
Electrical serviceable life	10 ⁵ switching operations (under full load)
Positive opening path	7.4 mm
Minimum force for positive opening	90 N
Shock resistance	Operation: 100 m/s ² Destruction: 1,000 m/s ²
Vibration resistance	Operation: 5 ... 55 Hz, amplitude 0.5 mm min. Destruction: 16.7 Hz, amplitude 1.5 mm min.
Connection system	Screw terminals
Terminal cross-section	0.14 ... 1.5 mm ²
Cable diameter	7 ... 13 mm
Cable gland	M20
Tensile strength of the connection	20 N min.
Recommended screw torque	0.5 ... 0.6 N/m
Protection class	IP 65
Short-circuit strength	50 A (250 V)
Recommended short-circuit fuse	250 V/10 A fast blowing (IEC 60 127-1)
Weight	ZSD5: approx. 210 g ZSD6: approx. 240 g

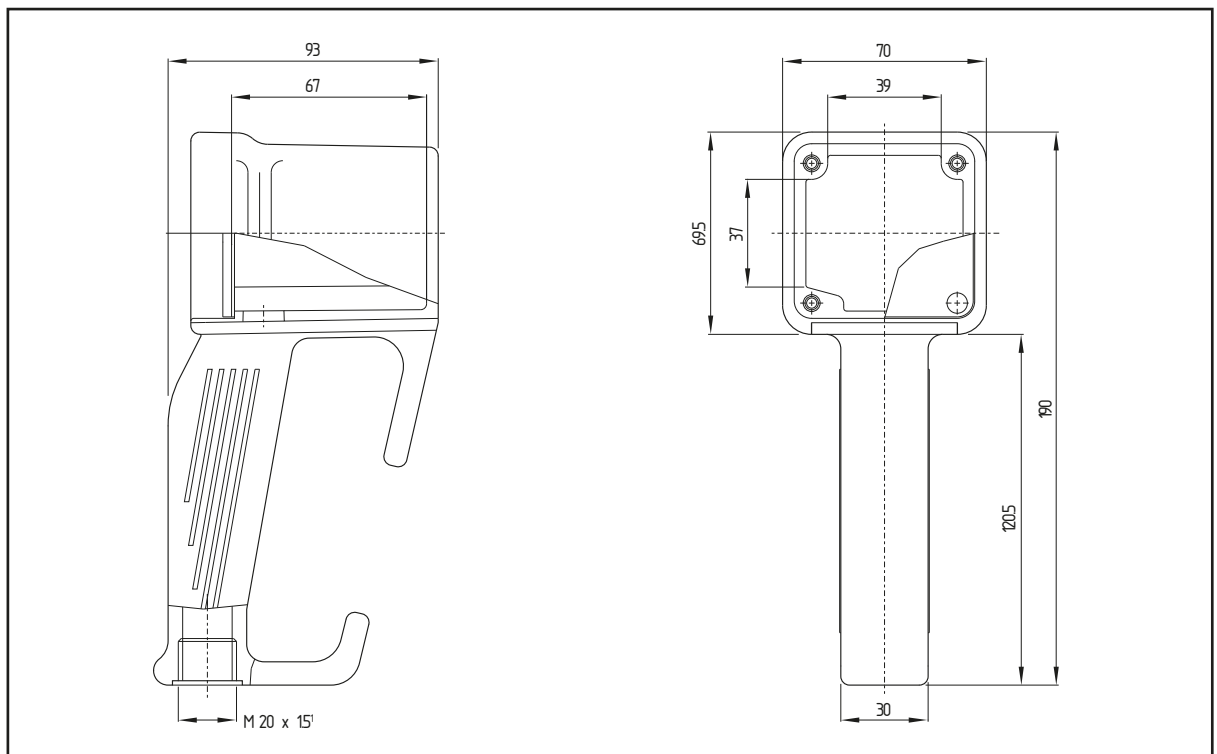
Enabling switch, 3 positions, type series ZSD1LC..., ZSD1.1LC built into a mobile control device PILOT 10

Enabling switch, 3 positions built into a mobile control device PILOT 10

- Type ZSD1.1LC...
- With enabling switch HE3B-M2PY
- 3 positions (OFF – ON – OFF)
- 2 contacts (NC/NO combination)
- Positive opening (position 2 ↔ position 3)
- Contacts don't close at reset (position 3 ↔ position 1)
- Redundant contact configuration permits signal processing acc. control category 3/4 of EN ISO 13849-1
- Contact configuration permits signal processing acc. control category 2 (position 2 ↔ 1) or 4 (positions 2 ↔ 3) of EN ISO 13849-1
- Class of protection IP 65
- With 5 m cable set



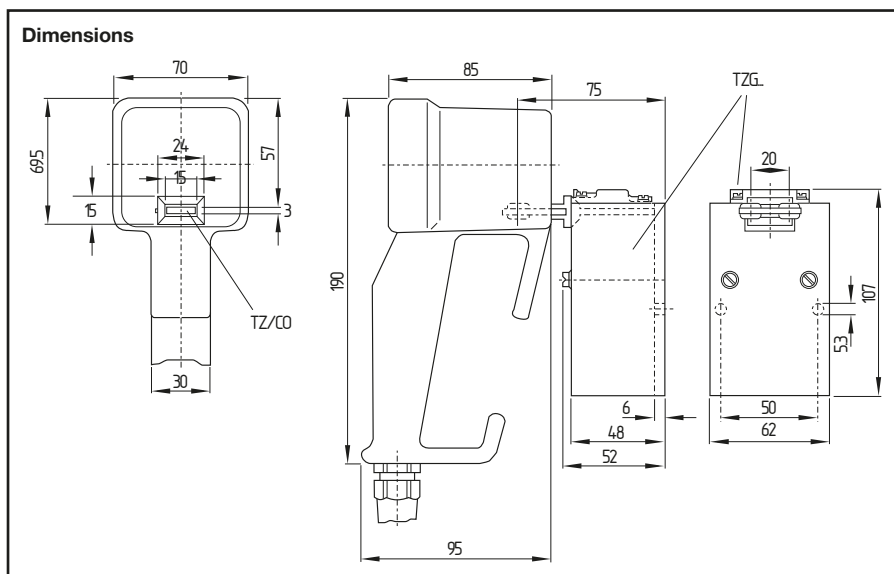
Dimensions



1) Cable gland belongs to scope of delivery

Accessories

- Electrically monitored “parking position” with safety switch TZG...
- Optionally 1 NC/1 NO or 2 NC
- Interlocking device with separate actuator according to EN 1088
- With protective cover (metal, not illustrated)
- Actuator integrated in PILOT control device
- Other technical data/electrical specifications (abbreviated): refer to page 18



Product range

Description	Type	Cat. no.	Part no.
Enabling switch, 3 positions, built into a mobile control device PILOT 10, with 5 m cable set	ZSD1.1LC	0640021	1212189
Ditto, with 5 m cable set, with separate actuator TZ/CO (mounted)	+ TZG 103/ZSD ZSD1LC/TZG103	0640011	1212187
	+ TZG 110/ZSD ZSD1LC/TZG110	0640012	1212188
Safety switch, 1 NC contact, 1 NO contact	TZG 103/ZSD	1347004	1019264
Ditto, 2 NC contacts, with 5 m cable set	TZG 110/ZSD	1347005	1025324

Technical data/electrical specifications of the basic device ZSD1LC..., ZSD1.1LC (HE3B-M2PY)

Refer to page 18

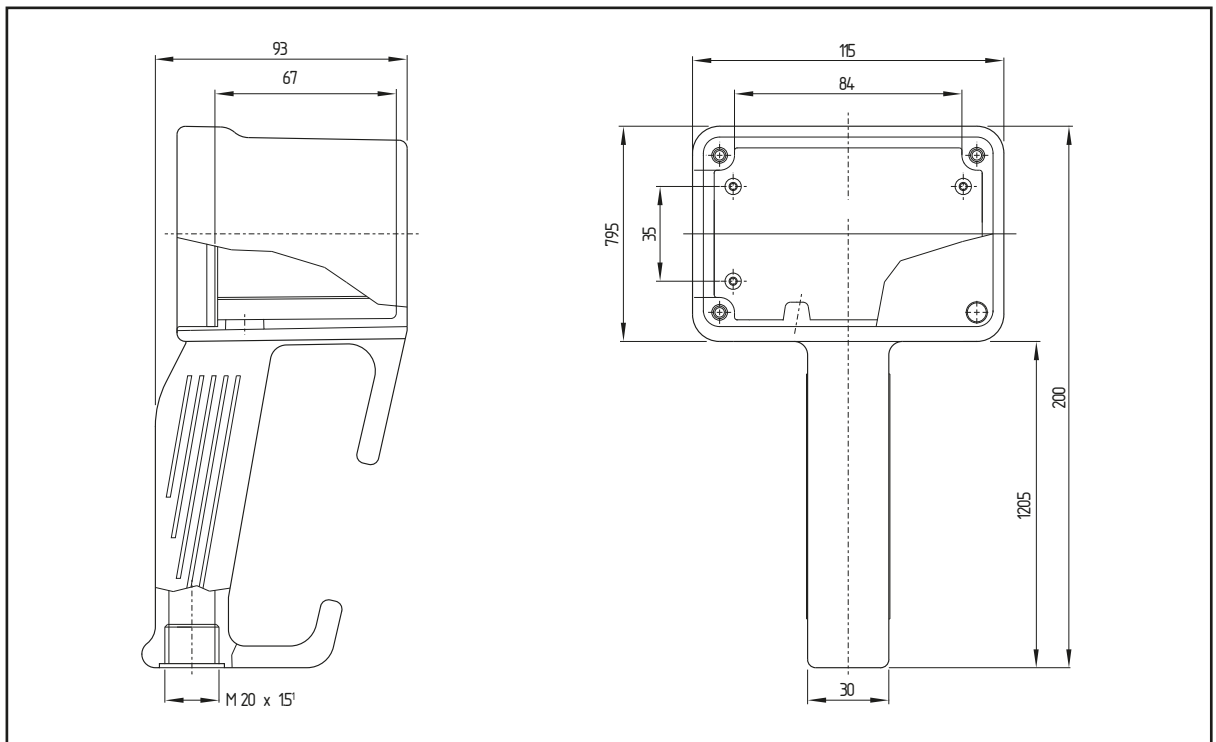
Enabling switch, 3 positions, type series ZSD2LC..., ZSD2.1LC built into a mobile control device PILOT 20

Enabling switch, 3 positions, built into a mobile control device PILOT 20

- Type ZSD2LC...
- With enabling switch HE3B-M2PY
- 3 positions (OFF – ON – OFF)
- 2 contacts (NO/NC combination)
- Positive opening (position 2 ↔ position 3)
- Contacts don't close at reset (position 3 ↔ position 1).
- Redundant contact configuration permits signal processing with commercially available safety relay modules acc. to control category 3/4 of EN ISO 13849-1
- Contact configuration permits signal processing acc. control category 2 (positions 2 ↔ 1) or 4 (positions 2 ↔ 3) of EN ISO 13849-1
- Class of protection IP 65
- Without cable
- With 2 additional pushbuttons (1 NO each) in operating panel
- Upon request: Either with connection cable or other command devices



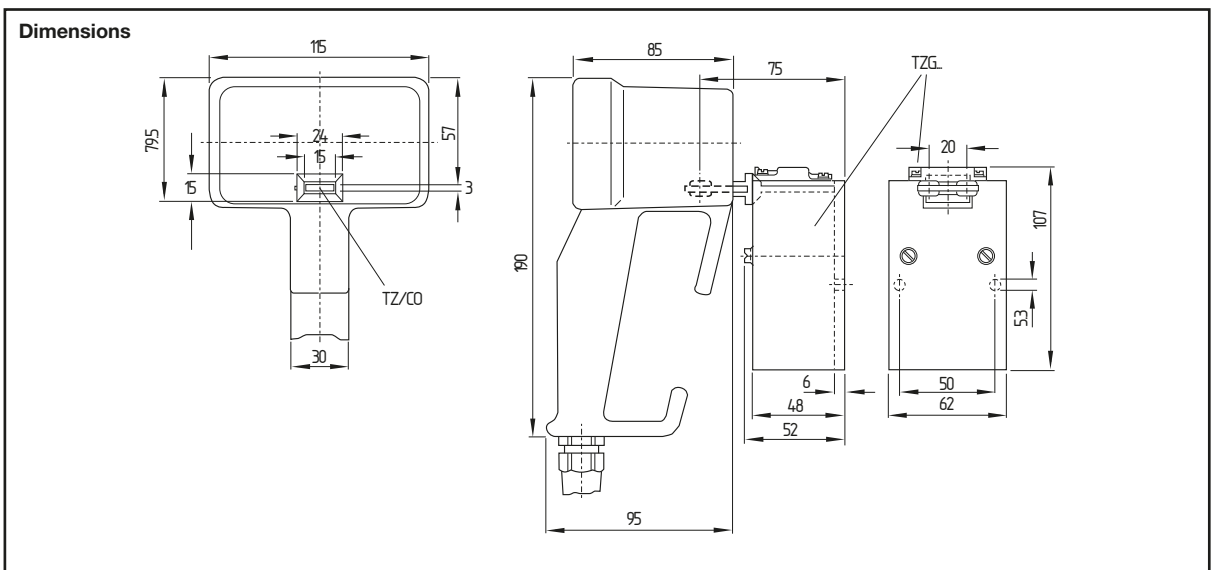
Dimensions



1) Cable gland belongs to scope of delivery

Accessories

- Electrically monitored “parking position” with safety switch TZG...
- Optionally 1 NC/1 NO or 2 NC contacts
- Interlocking device with separate actuator according to EN 1088
- With protective cover (metal, not illustrated)
- Actuator built into PILOT control device
- Other technical data/electrical specifications (abbreviated): refer to page 18
- Figure (example): refer to page 11



Product range

Description	Type	Cat. no.	Part no.
Enabling switch, 3 positions, built into a mobile control device PILOT 20, with 2 additional pushbuttons (1 NC each) – without connection cable (without TZ/CO / without TZG ...)	ZSD2.1LC	064 0051	121 2193
Ditto, without connection cable, with separate actuator TZ/CO (mounted)	+ TZG 103/ZSD	ZSD2LC/TZG 103	064 0041 121 2190
	+ ZTG 110/ZSD	ZSD2LC/TZG 110	064 0042 121 2192
Safety switch, 1 NC contact, 1 NO contact	TZG 103/ZSD	134 7004	101 9264
Ditto, 2 NC contacts, without connection cable	TZG 110/ZSD	134 7005	102 5324

Technical data/electrical specifications of the basic device ZSD2LC... (HE3B-M2PY)

Refer to page 18

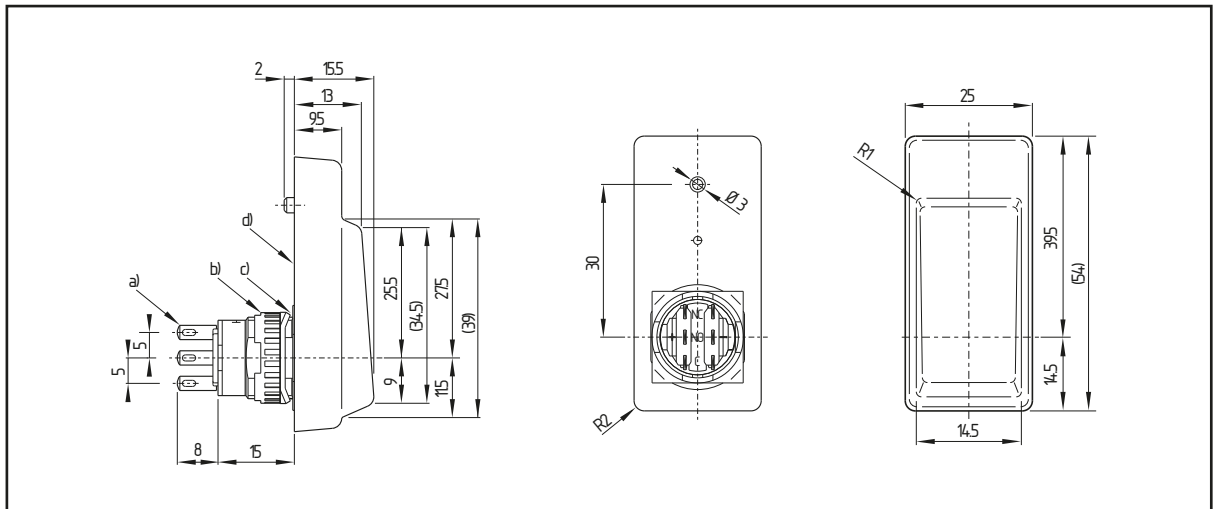
Enabling switch HE3B-M2PY for direct front panel installation

Enabling switch, 3 positions for direct front panel installation

- Type HE3B-M2PY
- For bore holes with 16 mm diameter
- 3 positions (OFF – ON – OFF)
- 2 contacts (NO/NC combination)
- Positive opening (position 2 ↔ position 3)
- Contacts don't close at reset (position 3 ↔ position 1)
- Redundant contact configuration permits signal processing with commercially available safety relay modules acc. control category 3/4 of EN ISO 13849-1
- Contact configuration permits signal processing acc. control category 2 (positions 2 ↔ 1) or 4 (positions 2 ↔ 3) of EN ISO 13849-1
- Class of protection IP 65 (with rubber cap)



Dimensions



a) Solder terminal width 2.8 × 0.5 t; b) Fastening nut; c) Anti-rotation ring; d) Rubber cover

Product range

Description	Type	Cat. no.	Part no.
Enabling switch, 3 positions, version for direct front panel installation	HE3B-M2PY	064 0000	121 2186

Technical data/electrical specifications of the basic device HE3B-M2PY

Refer to page 18

Operating characteristics

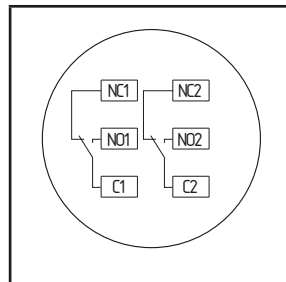
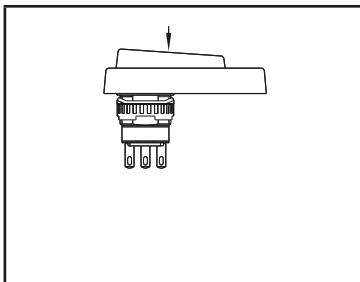
Position	1		2		3	
Actuating path	0.0	0.8	1.8	1.7		1.9
Actuating force (N)	0.0	3.0		20		
Working contact (NO1-C1)						
Working contact (NO2-C2)						

Open: ; closed:

For the operating characteristics of the HE3B-M2PY the shown pressure point is valid:

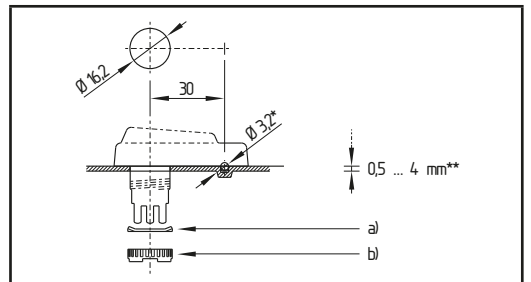
Circuit diagram

NO1-C1, NO2-C2: connection of the working contacts



Mounting instructions

Recommended lock nut torque: 0.68 ... 0.88 Nm. Remove the rubber cover projection if you do not want a positioning hole (to retain the switches waterproof performance, do not penetrate the rubber cover!).



* Positioning hole; ** Mounting panel thickness; a) Anti-rotation ring; b) Locking ring

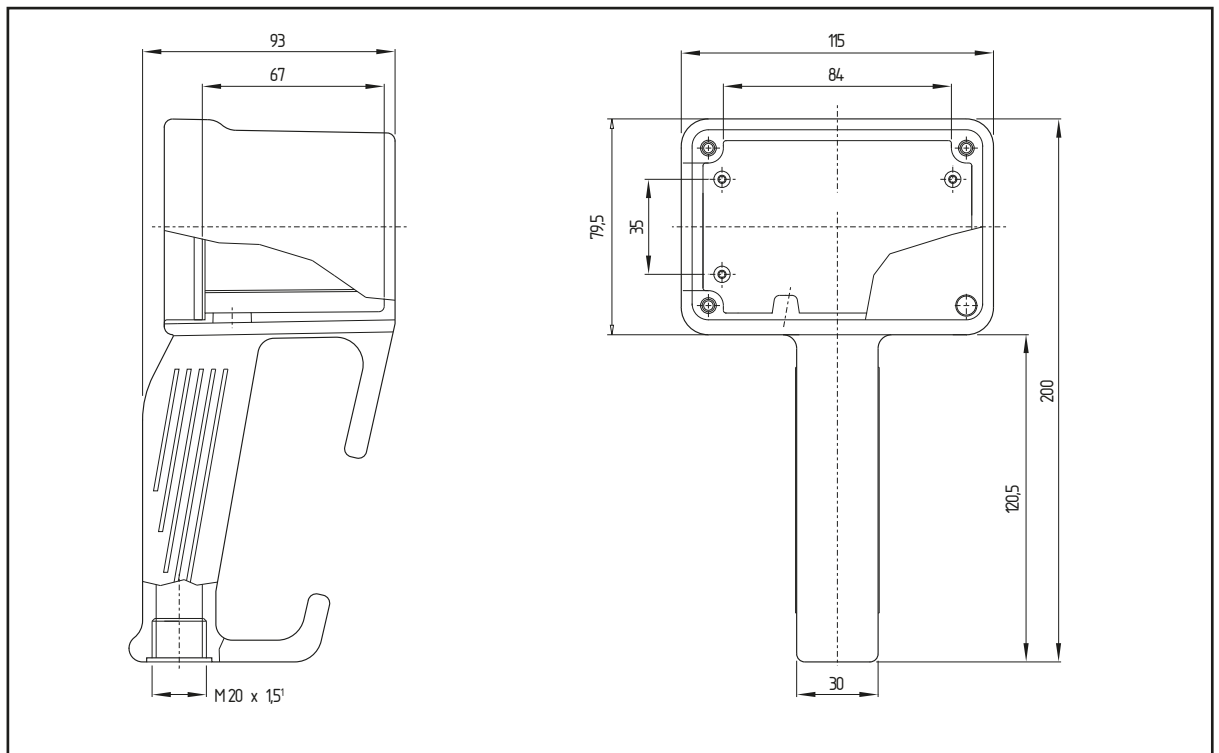
Enabling switch (grip switch) ZSD4... built-in in a mobile control device PILOT 20

Enabling switch, 2 positions, additionally with 1 emergency STOP pushbutton plus 1 pushbutton, built-in in a mobile control device PILOT 20

- Type ZSD4...
- Enabling function (with commercially available pushbutton, 1 NO contact)
- 2 positions (OFF – ON)
- 1 emergency STOP pushbutton acc. to EN 13850 (as a substitute for position 3 $\hat{=}$ STOP with positively opening effect)
- ATTENTION: Device may only be operated when connected to a suitable follow-up circuit with restart prevention, circuit suggestions refer to page 20.
- With 1 additional pushbutton (1 NO contact) in operating panel
- Upon request: optionally with cable set, equipped with other command and signalling devices in the operating panel.



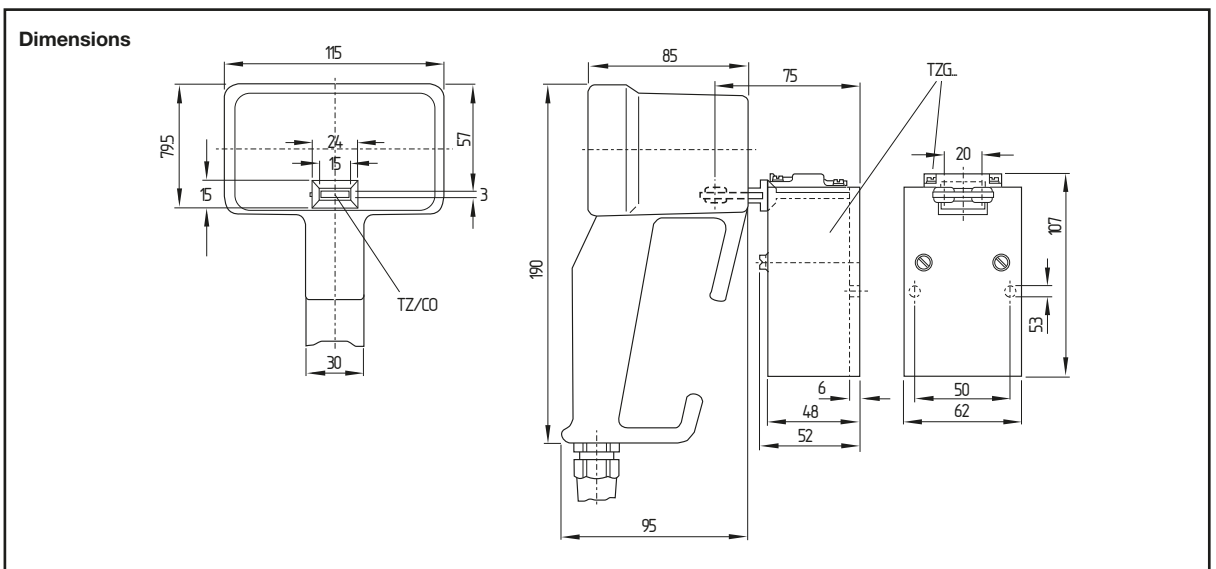
Dimensions



1) Cable gland belongs to scope of delivery

Accessories

- Electrically monitored “parking position” with safety switch TZG...
- Optionally 1 NC/1 NO contacts or 2 NC contacts
- Interlocking device with separate actuator according to EN 1088
- With protective cover (metal, not illustrated)
- Actuator integrated in PILOT control device
- Other technical data/electrical specifications (abbreviated): refer to page 19
- Figure (example): refer to page 11



Product range

Description	Type	Cat. no.	Part no.
Enabling switch, 2 positions, additionally with 1 emergency STOP pushbutton, 1 additional pushbutton, built into a mobile control device PILOT 20 – without connection cable (without TZ/CO / without TZG...)	ZSD4.1	064 0092	117 9350
Ditto without connection cable, with separate actuator TZ/CO (mounted) + TZG 103/ZSD	ZSD4/TZG 103	064 0094	117 9367
Ditto without connection cable, with separate actuator TZ/CO (mounted) + TZG 110/ZSD	ZSD4/TZG 110	064 0093	121 3825
Safety switch, 1 NC contact, 1 NO contact	TZG 103/ZSD	134 7004	101 9264
Ditto, 2 NC contacts	TZG 110/ZSD	134 7005	102 5324

Technical data/electrical specifications of the basic device ZSD4...

Refer to page 19

Technical data/electrical specification

Basic device ZSD1..., ZSD2..., ZSD4... und HE3B-M2PY

Mobile control device "PILOT"	
Material	Housing body: polyamide – yellow similar to RAL 1021 Front panel: aluminium
Cable entries	Polyamide cable gland M20 with bend and strain relief, supplied loosely
Protection class	IP 65 to EN 60529
Impact resistance	All housings 7 Nm to EN 50014
Weight	Pilot 10: approx. 350 g (depending on version) Pilot 20: approx. 400 g (depending on version)

Enabling switch HE3B-M2PY	
Regulations and approvals	ISO 12 100, ISO 11 161, ISO 10218, IEC 60204-1, IEC EN 60947-5-1, EN 292, EN 775, prEN 11 161, UL 508, JIS C8201-5-1, ANSI/RIA R15.06
Ambient operating temperature	Silicone: –25 ... +60 °C (no freeze) PVC: –10 ... +60 °C (no freeze)
Storage temperature	–40 ... +80 °C (no freeze)
Relative humidity	45 ... 85 % (no condensation)
Pollution degree	3
Contact resistance	50 mΩ (start value)
Isolation resistance	100 mΩ min. (Megger DC 500 V)
Voltage resistance	1.5 kV
Switching frequency	1,200 s/h
Mechanical life durability	Position 1–2–1: 10 ⁶ switches min. Position 1–2–3–1: 10 ⁵ switches min.
Electrical durability	10 ⁵ switches (at full load)
Shock resistance	Operation: 100 m/s ² Destruction: 500 m/s ²
Vibration resistance	Operation: 5 ... 55 Hz, amplitude 0.5 mm min. Destruction: 16.7 Hz, amplitude 1.5 mm min.
Type of connection	solder
Connection diameter	0.5 mm ² max./wire
Max. solder temperature	260 °C / 3 seconds max.
Terminal pulling strength	20 N min.
Recommended screw torque	0.68 ... 0.88 Nm
Protection class	with rubber cover: IP 65 without rubber cover: IP 40 (IEC 60529)
Conditional short-circuit current	50 A (250 V)
Recommended short-circuit protection	250 V / 10 A fast blow fuse (IEC 60127-1)
Weight	approx. 18 g
Max. circuit opening force	500 N min.
Electrical specifications	
Rated operating voltage	125 VAC / VDC
Rated operating current	3.0 A
Rating	30 V 125 V
Ohmic load (AC-12)	– 1.0 A
Inductive load (AC-15)	– 0.7 A
Ohmic load (DC-12)	1.0 A 0.2 A
Inductive load (DC-13)	0.7 A 0,1 A
Contact configuration	2 changeover contacts
Low voltage capability	3 VAC / VDC and 5 mA (reference value)

Technical data

Continued

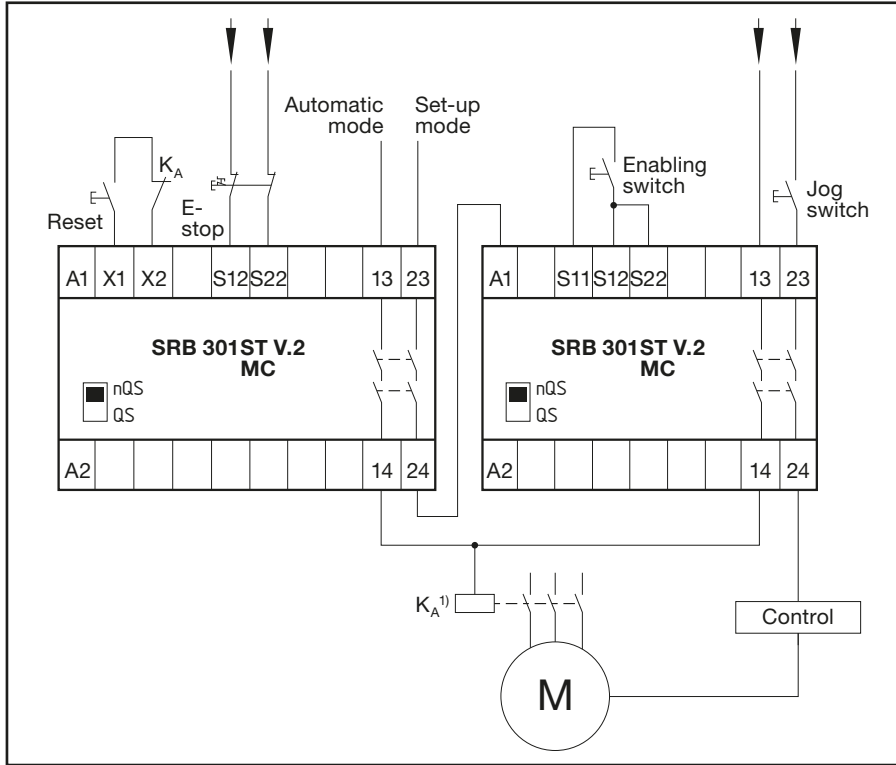
Built-in devices for ZSD1..., ZSD2... and ZSD4... (abbreviated form)¹	
Regulations	IEC EN 60947-5-1/-5
Front side	Plastic-encapsulated, class of protection IP 65
Contacts	Cross-point contacts as NC contacts or NO contacts depending on version, NC contacts positively opening, to IEC EN 60947-5-1/-5
Temperature range	0 ... +65 °C
Connection system and min./max. cable cross section	0.14 ... 1.5 mm ²
Rated operating voltage U _e	125 V
Rated isolation voltage U _i	125 V
Rated operating current I _e depending on utilisation category and test voltage	AC 12: 0.5 A/24 V DC 12: 1 A/24 V
Short circuit protection	gG 3 A
Low voltage capability	5 V/1 mA
Further data	a) see left (Technical daten/electrical specifications of the basic units) b) see Elan-catalogue D-16Z/VZ/07 or upon request
Safety switch TZG... (abbreviated form)¹	
Regulations	IEC EN 60947-5-1
Class of protection	IP 67 (switching chamber) IP 00 (device head)
Actuating forces	Entering actuator: 10 N Withdrawing actuator: 20 N
Ambient temperature range	0 ... +65 °C
Materials used	Glass-fibre reinforced thermoplastic with self-extinguishing properties to UL 94-V-0, metal parts corrosion protected, with protective cover (metal)
Cable entries	M 20 x 1.5
Connection system	Self-lifting screw terminals with double slot screws
Wire connection	Min. 0.5 mm ² , max. 2 x 2.5 mm ² rigid and 2 x 1.5 mm flexible with wire-end-ferrules
Terminal labeling	DIN EN 50005/50013
Mechanical serviceable life	Minimum 1 x 10 ⁶ switching cycles
Shock resistance	> 30 g/18 ms
Vibration resistance	> 15 g/10 ... 200 Hz
Climatic resistance to EN 60068	Part 2-30
Rated operating voltage U _e max.	400 V ²⁾
Rated isolation voltage U _i	400 V ²⁾
Thermal rated current I _{the} ²⁾	10 A ²⁾
Rated operating current U _e depending on utilisation category and test voltage	250 V ~/8 A
Electronic control circuits	24 V/10 mA
Isolation group	C to VDE 0110
Air clearance and creepage to DIN VDE 0110-1 (04/97)	4 kV/3
Short circuit protection	gG 10 A slow-blowing ²⁾

1) Further details: upon request; 2) Slow-action version

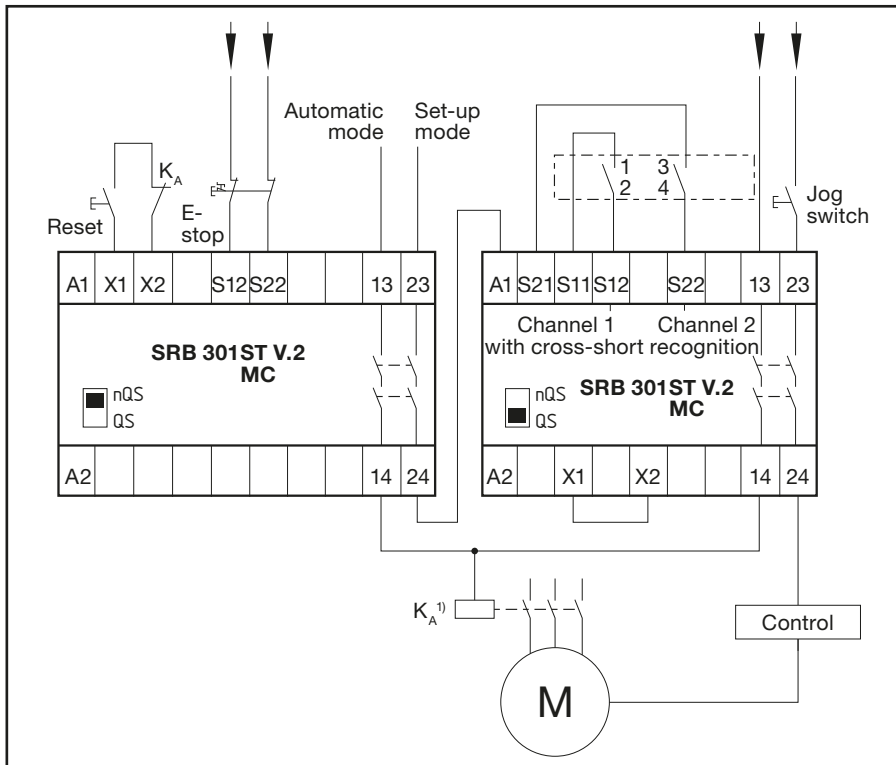
Circuit suggestions

ZSD1LC..., ZSD1.1LC, ZSD2LC..., ZSD2.1LC, ZSD4..., ZSD5... and ZSD6...
 (example with analysis modules SRB 301ST V.2 or SRB 301MC)

Circuit suggestion ZSD4 (2 positions, 1 channel, additionally with 1 emergency STOP pushbutton)



Circuit suggestion ZSD1LC..., ZSD1.1LC, ZSD2LC..., ZSD2.1LC, ZSD5, ZSD6
 with analysis operation



1) Contact amplification or multiplication by relay or contactor with positively driven contacts, possibly 2 channels with positively-driven contacts, category 2, 2-channelled (2 separate contactors)

Notes

Media


PROTECT SRB+ -
Safety relay modules
with intrinsically safe monitoring circuits Ex i
© protection for ATEX zones 1, 2, 21 and 22

News 08



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PROTECT PSC -
Programmable Modular Safety System
Overview 08



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Sicherheits-Sollstands- und Bewegungswächter
Liste 05B



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POMS -
Protect Drive Monitoring System
Overview 08



Modular system
for safe speed
monitoring of drives

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Befehlsgeräte und Leuchtmelder
Einbau-Durchmesser 30,5 mm
Liste D-20




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AVANTGARDE
Liste D-22-A/09



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Control devices and indicator lights
for 22,3 mm installed diameter
© Explosion protection for ATEX zones 1, 2, 21 and 22
Catalogue D-22 Ex-R




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Befehls- und Meldegeräte
für Norm-Einbau-Durchmesser 16,2 mm
und Einbau-Raster 25 x 25 mm
Liste D-16ZVZ/09




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Liste A20/09



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Control devices and indicator lamps
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Catalogue D-22E/08



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Control devices and indicator lights
for 22,3 mm installed diameter
Heavy duty series
Catalogue D-20H



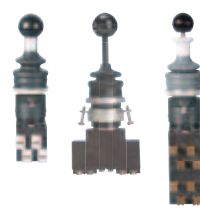
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Control Devices and Indicator Lights
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22,3 mm Diameter Installation
Catalogue N-09 - Type series H



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Spring-return joystick switches,
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Catalogue K/08



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Enabling switches
Catalogue 25/07




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Isoliertekapselte Positionsschalter
Liste S-IP/09



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Leichtmetallgekapselte Positionsschalter
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Reihen-Positionsschalter nach DIN 43 697
Liste RPO/08



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Cams, T-slot trip dogs
Catalogue N-NT/08



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Radial cams, T-slot cam semicircles/T-slot cam drums
Catalogue N-TR/08



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Sub-assemblies for two-hand control consoles
Catalogue DMS/08



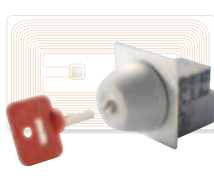
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ESALAN Wireless - Safety-oriented radio link
Product overview WS/09



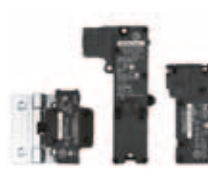
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RFID-supported key-operated selector switch
Product overview ESD/11



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Interlocking devices with and without guard locking
T04 catalogue



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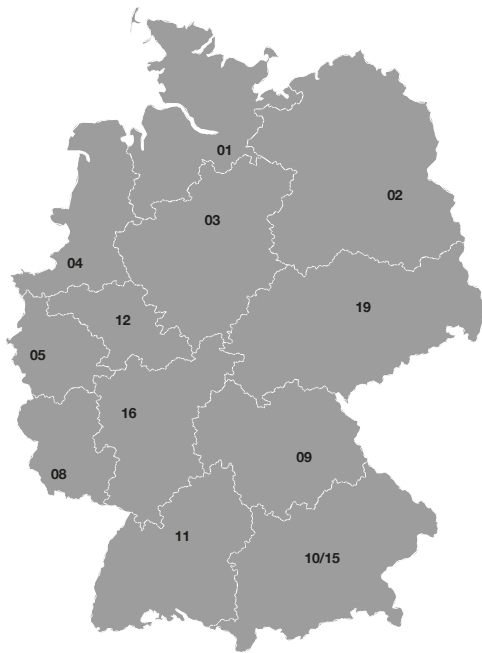
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