

Enabling switches

Catalogue ZB/03



Contents

Some background information	Page 2
Versions available	4
Enabling switch (grip switch), 3 positions, ZSD 5/ZSD 6 type series	6
Enabling switch, 3 positions, ZSD 1... type series	10
Enabling switch, 3 positions, ZSD 2... type series	12
Enabling switch DTAN 5Z...	14
Enabling switch (grip switch), 2 positions, ZSD 4... type series	16
Technical data/electrical specifications	18
Safety relay module SRB-ZB-QS	20
Circuit suggestions ZSD 4..., ZSD 5/6	23

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.

Depending on the risk assessment of the respective application and/or the respective regulations (in the EU these are the harmonised type C EN standards) additional safety measures may need to be taken when using enabling switches. “Safe” signal processing will be required in all instances.



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
- incorporated 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.

Regulations and standards

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

- **EN 292-1:** Safety of machinery – Basic concepts, general design principles – Part 1: Basic terminology and methods
- **EN 292-2:** 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-22/03.03 – 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. EN 292-1)

** 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 Elan catalogue ZB/03

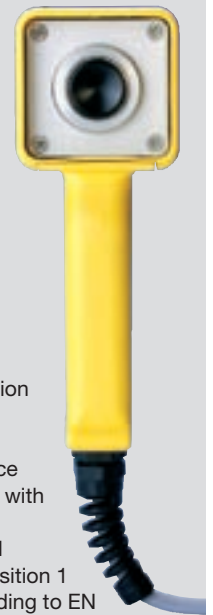
- Type ZSD 5
- 3 positions (OFF – ON – OFF)
- 2 contacts (NO)
- Positive opening (position 2 -> position 3)
- Contacts do not close during reset (position 3 -> position 1)
- Redundant contact configuration permits signal processing with commercially available safety relay modules in control category 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 built into a mobile control device PILOT 10

Technical data/further information:
Refer to Elan catalogue ZB/03

- Type ZSD 1...
- 3 positions (OFF – ON – OFF)
- 2 contacts (NC/NO combination)
- Positive opening (position 2 -> position 3)
- ATTENTION: Contacts close during reset (position 3 -> position 1). Device may only be operated in connection with an analysis module SRB-ZB-QS.
- Contact configuration permits signal processing in control category 2 (position 1 <-> 2) or 4 (positions 2 <-> 3) according to EN 954-1
- Class of protection IP 65
- BG prototype testing (in connection with SRB-ZB-QS)
- 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 Elan catalogue ZB/03

- Type ZSD 6
- Design features: see above
- 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



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

Technical data/further information:
Refer to Elan catalogue ZB/03

- Type ZSD 2...
- Design features: see above
- With 2 additional pushbuttons (1 NO each) in operating panel
- Upon request: optionally with different cable length, 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 Elan catalogue ZB/03

- Type ZSD 4...
- 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 = 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: optionally with cable set, 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).

**Safety relay module
SRB-ZB-QS (for ZSD 1...,
ZSD 2..., DTAN 5Z...)**



Technical data/further information:
Refer to Elan catalogue ZB/03

- Reliable signal processing in control category 4 according to EN 954-1
- Differentiated shutdown (in position 1 and position 3)
- 2 safety enabling contacts “Enabling Mode”
- 1 safety enabling contact “Emergency STOP”
- 2 auxiliary NC contacts
- 1 auxiliary NO contact
- Cross short recognition
- Glass tube fuse cartridge
- Operating voltage 115 VAC/230 VAC
- BG prototype testing (in connection with ZSD 1..., ZSD 2... and DTAN 5Z..)

**Enabling switch, 3 positions
for direct front panel
installation**



Technical data/further information:
Refer to Elan catalogue ZB/03

- Type DTAN 5Z...
- For bore holes with 30.5 mm diameter
- 3 positions (OFF – ON – OFF)
- 2 contacts (NO/NC combination)
- Positive opening (position 2 -> position 3)
- ATTENTION: Contacts close during reset (position 3 -> position 1). Device may only be operated in connection with an analysis module SRB-ZB-QS.
- Contact configuration permits signal processing in control category 2 (positions 1<-> 2) or 4 (positions 2 <-> 3) according to EN 954-1
- Class of protection IP 65 (front side)
- BG prototype testing (in connection with SRB-ZB-QS)

**Safe signal processing
with commercially available
safety relay modules
(for ZSD 4..., ZSD 5..., ZSD 6...)**



Technical data/further information:
Refer to Elan catalogue ZB/03

For example with PROTECT-SRB modules:

- Safe signal processing in control category 4 according to EN 954-1 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) ZSD 5/ZSD 6



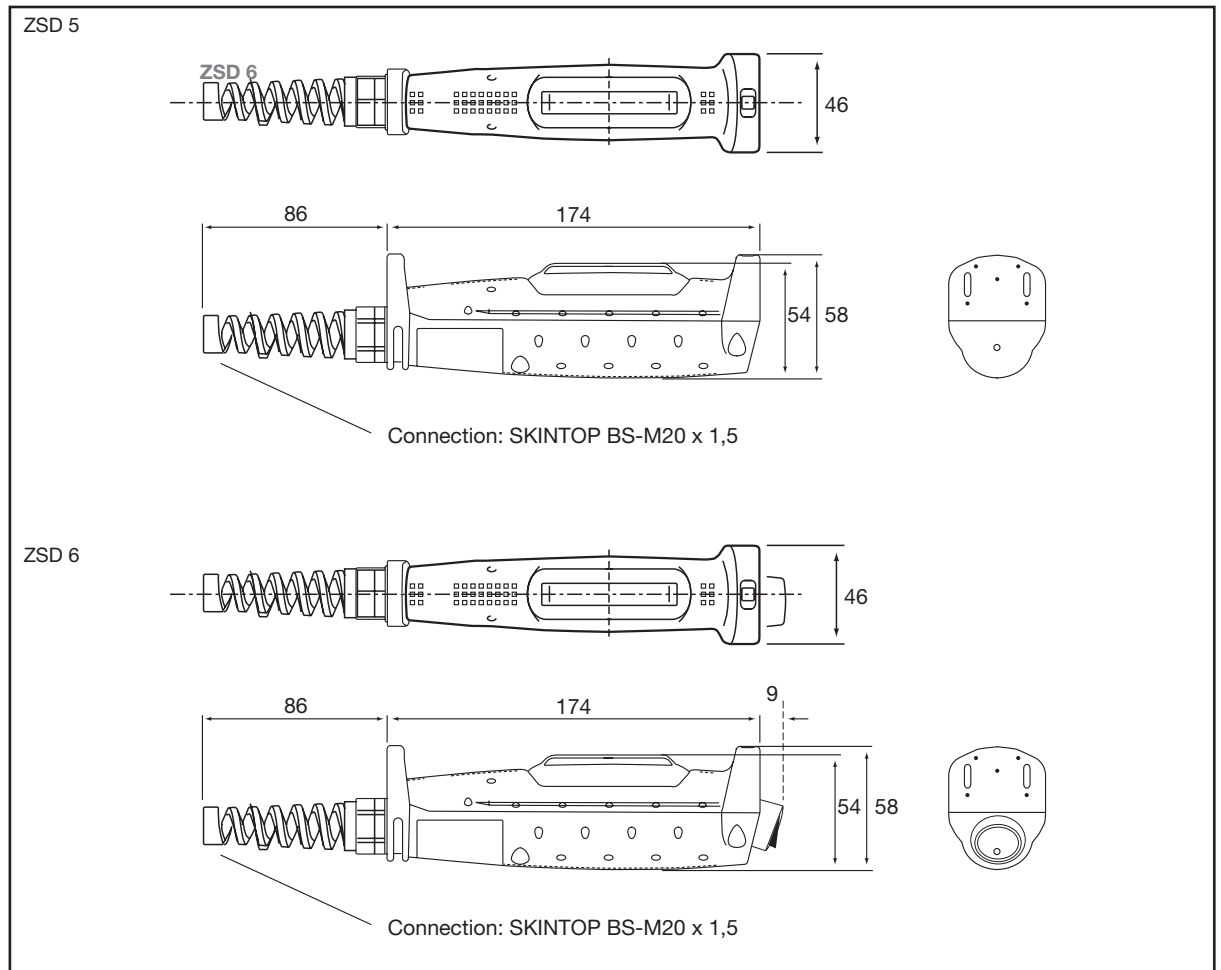
Enabling switch, 3 positions, performed as grip switch

- Type ZSD 5
- 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

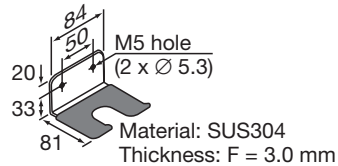
- Type ZSD 6
- Design features: see left
- With additional pushbutton (1 NO contact) in device head
- Upon request: optionally with cable set, equipped with other command and indicating devices in the device head

Dimensions



Accessories

Mounting bracket, metallic



Product range

Description	Type	Part no.
Enabling switch, 3 positions, as grip switch, 2 contacts (NO), 1 auxiliary contact (NC)	ZSD 5	063 0000
Enabling switch, 3 positions, as grip switch, 2 contacts (NO), 1 auxiliary contact (NC) with additional pushbutton (NO) in device head	ZSD 6	063 0010
Mounting bracket, metallic	ZSD-H	063 0200

Electrical specifications of the basic device ZSD 5 (without pushbutton)

Rated voltage	250 VAC/VDC		
Rated operating current	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 (AC 12)	2.0 A	0.4 A	0.2 A
- inductive load (AC 15)	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 (AC 12)	2.0 A	0.4 A	0.2 A
- inductive load (AC 15)	1.0 A	0.22 A	0.1 A
Contact configuration	1 NC		

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

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

Data (excerpt¹⁾)

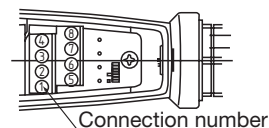
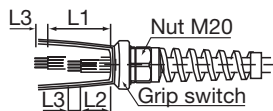
Min./max. cable cross section	0.14 ... 1.5 mm ²
Rated operating voltage U _e	125 V
Rated isolation voltage U _i	125 V
Rated operating current I _e depending on utilization category and test voltage	AC 12: 0.5 A/24 V DC 12: 1 A/24 V
Short circuit protection	gG 3 A
Switching of low loads	5 V/1 mA

1) Additional data on request

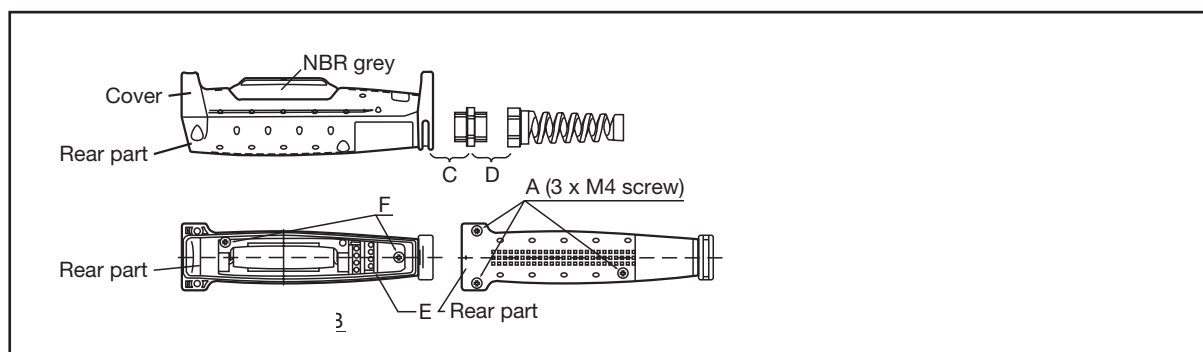
Assembly instructions

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)



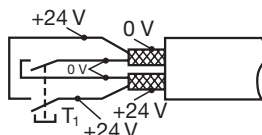
Device structure



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⁾	–



ATTENTION



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.

1) From factory

General data ZSD 5/ZSD 6	
Regulations and approvals	IEC EN 60947-5-1, IEC EN 60204-1, EN 292, ISO 12100, ISO 11161, ISO 10218, EN 775, UL 508, CSA C22.2 Nr. 14, JIS C8201-5-1, ANSI/RIA R15.06
Ambient temperature	-10 ... +60 °C (no moisture condensation)
Storage temperature	-40 ... +80 °C (no moisture condensation)
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	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: 10 g Destruction: 100 g
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 x 1.5
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 60127-1)
Weight	ZSD 5: approx. 210 g ZSD 6: approx. 240 g

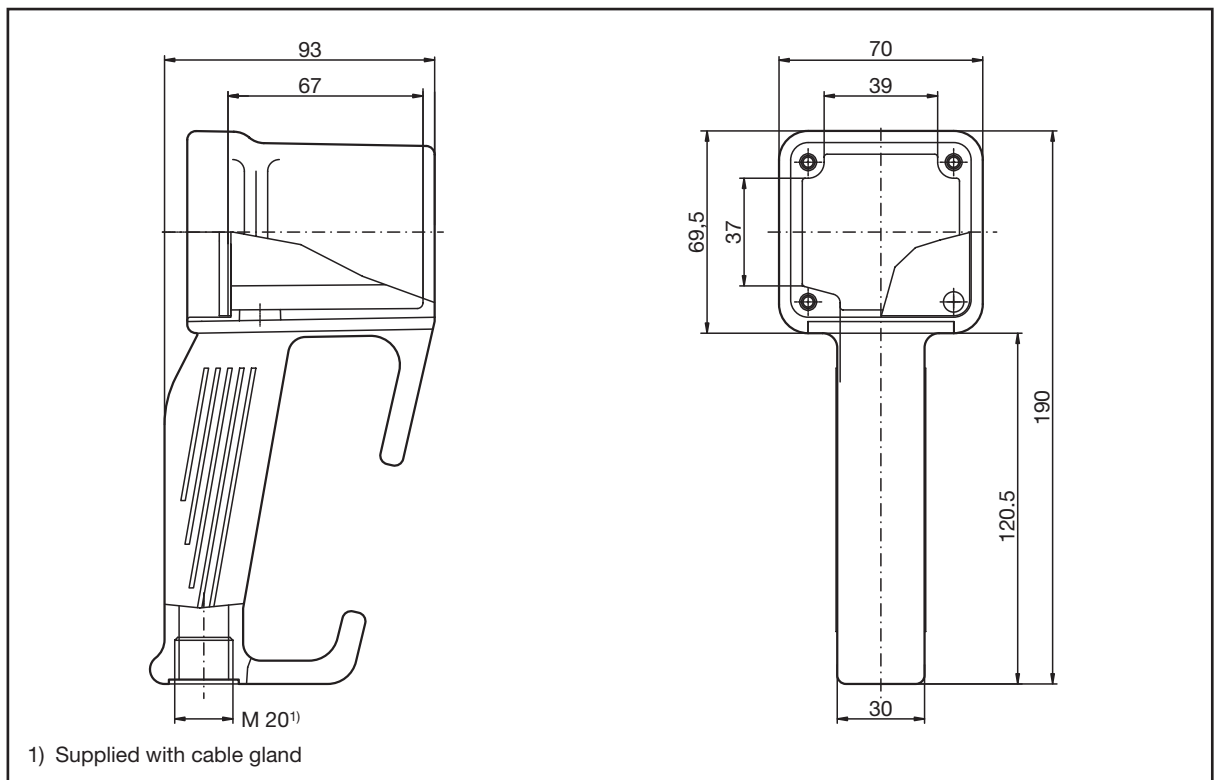
Enabling switch, 3 positions, type series ZSD 1... built into a mobile control device PILOT 10

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

- Type ZSD 1...
- With enabling switch DTAN 5Z...
- 3 positions (OFF – ON – OFF)
- 2 contacts (NC/NO combination)
- Positive opening (position 2 -> position 3)
- ATTENTION: Contacts close during reset (position 3 -> position 1). Device may only be operated in connection with an analysis module SRB-ZB-QS (see page 20).
- Contact configuration permits signal processing in control category 2 (position 1 <-> 2) or 4 (positions 2 <-> 3) according to EN 954-1
- Class of protection IP 65
- BG prototype testing (in connection with SRB-ZB-QS)
- With 5 m cable set

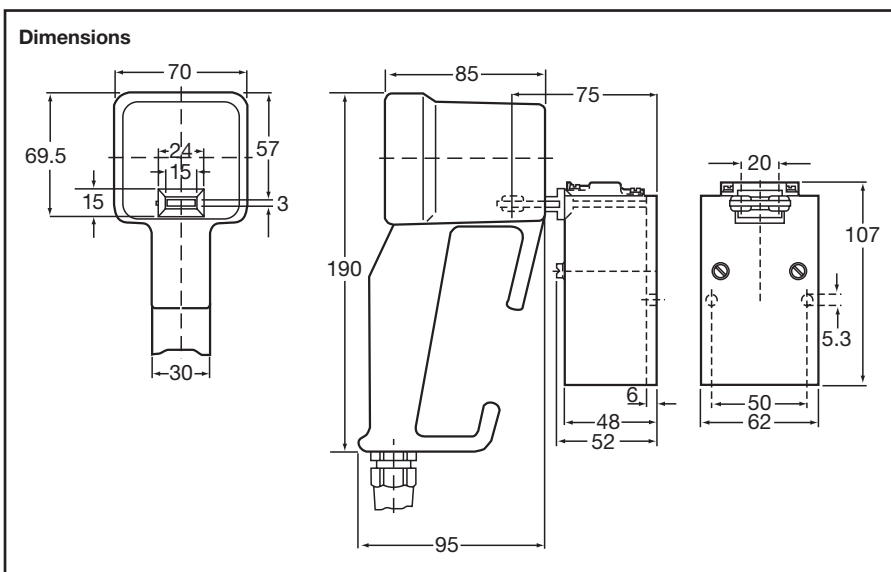


Dimensions



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	Part no.
Enabling switch, 3 positions, built into a mobile control device PILOT 10, with 5 m cable set	ZSD 1.1	064 0020
Ditto, with separate actuator TZ/CO (mounted)	ZSD 1	064 0010
Safety switch, 1 NC contact, 1 NO contact	TZG 103/ZSD	134 7004
Ditto, 2 NC contacts	TZG 110/ZSD	134 7005

Technical data/electrical specifications of the basic device ZSD 1... (DTAN 5Z...)

Refer to page 18

Contact travel chart



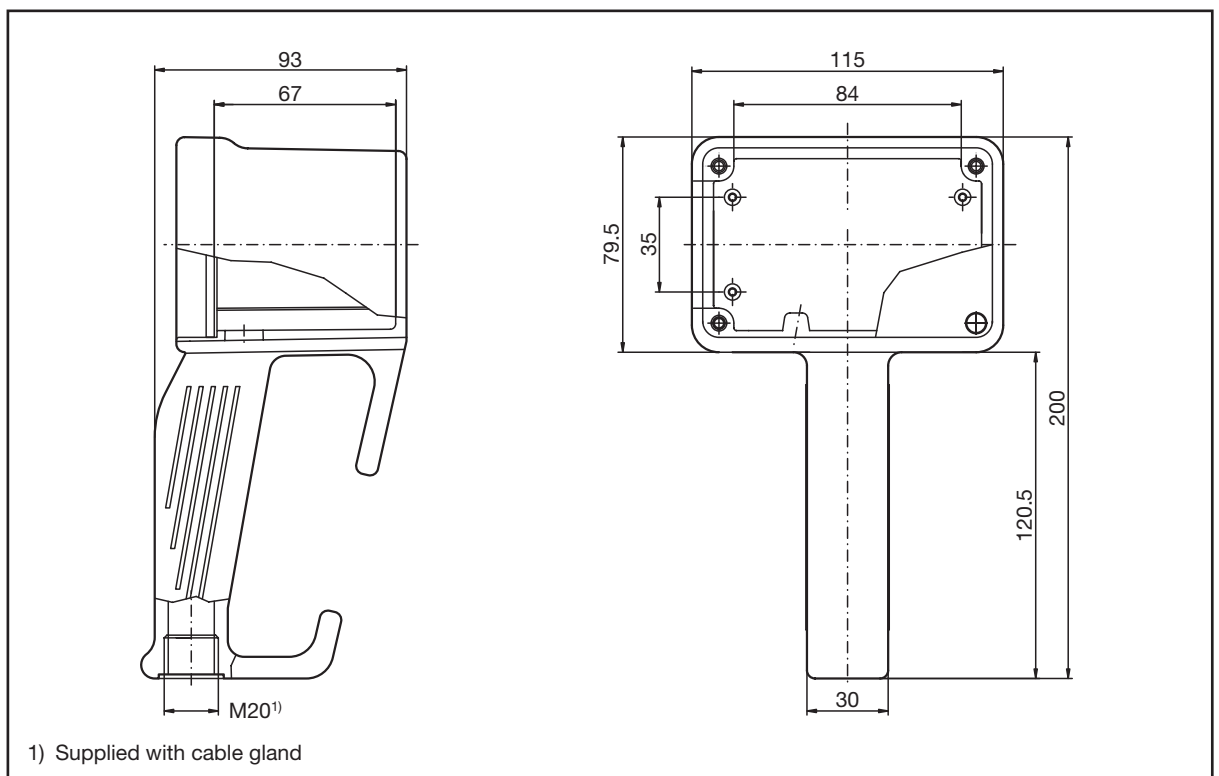
Enabling switch, 3 positions, type series ZSD 2... built into a mobile control device PILOT 20

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

- Type ZSD 2...
- With enabling switch DTAN 5Z...
- 3 positions (OFF – ON – OFF)
- 2 contacts (NO/NC combination)
- Positive opening (position 2 -> position 3)
- ATTENTION: Contacts close during reset (position 3 -> position 1). Device may only be operated in connection with an analysis module SRB-ZB-QS (see page 20).
- Contact configuration permits signal processing in control category 2 (positions 2 <-> 3) according to EN 954-1
- Class of protection IP 65
- BG prototype testing (in connection with SRB-ZB-QS)
- With 5 m cable set
- With 2 additional pushbuttons (1 NO each) in operating panel
- Upon request: either with other cable length, other command and indicating devices in operating panel

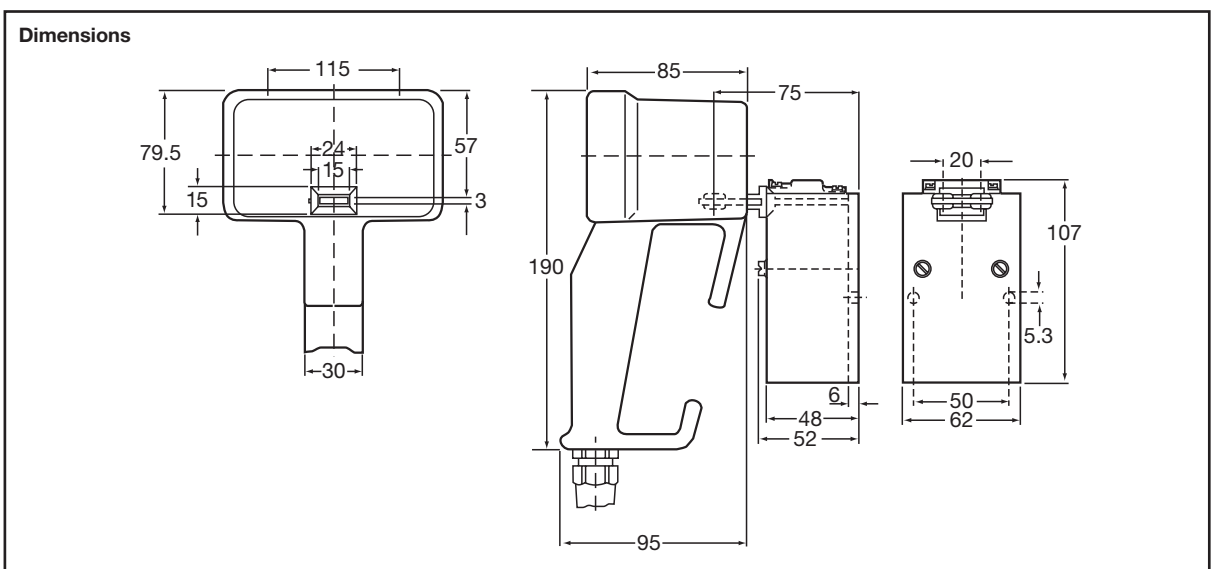


Dimensions



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	Part no.
Enabling switch, 3 positions, built into a mobile control device PILOT 20, with 2 additional pushbuttons (1 NC each), with 5 m cable set	ZSD 2.1	064 0050
Ditto, with separate actuator TZ/CO (mounted)	ZSD 2	064 0040
Safety switch, 1 NC contact, 1 NO contact	TZG 103/ZSD	134 7004
Ditto, 2 NC contacts	TZG 110/ZSD	134 7005

Technical data/electrical specifications of the basic device ZSD 2... (DTAN 5Z...)

Refer to page 18

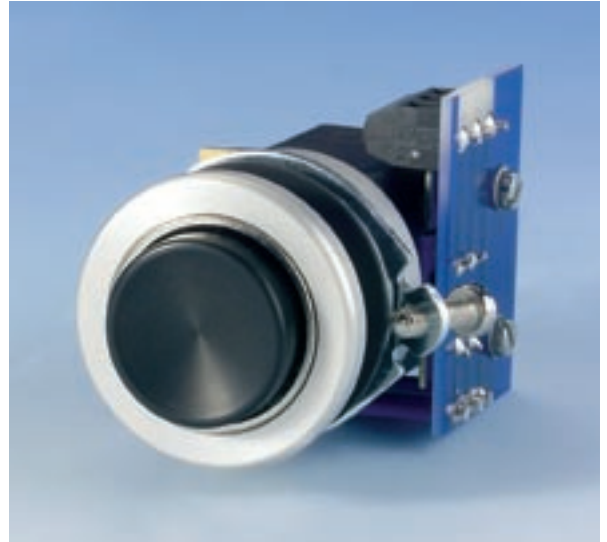
Contact travel chart



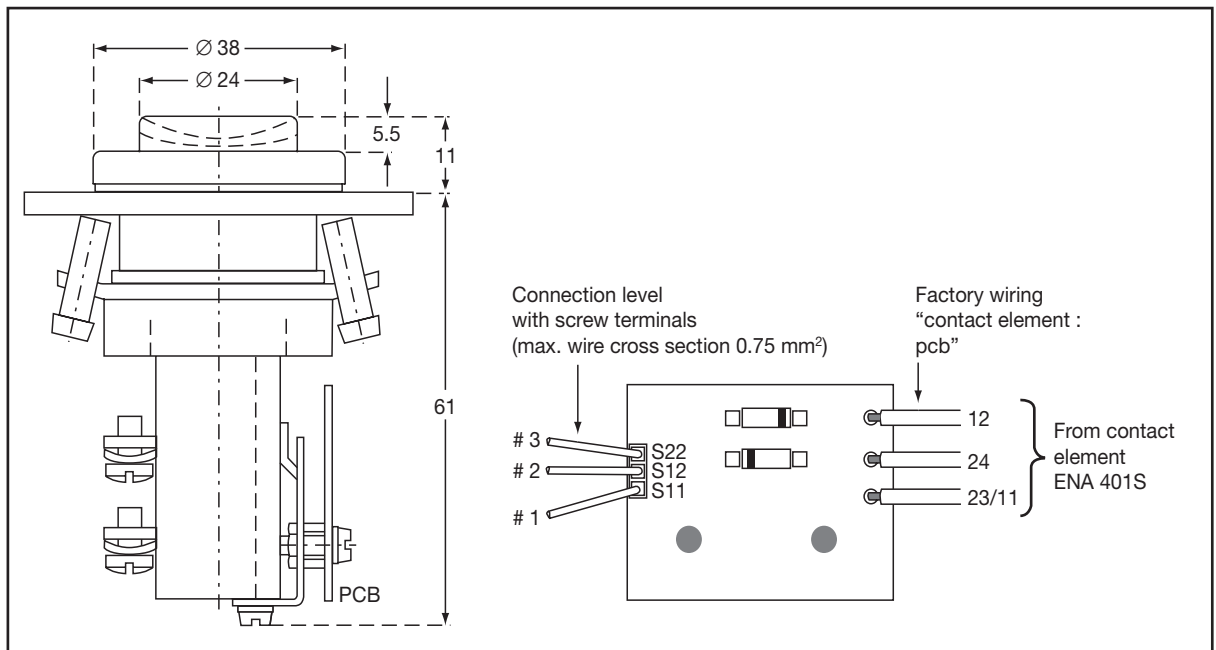
Enabling switch DTAN 5Z... for direct front panel installation

Enabling switch, 3 positions for direct front panel installation

- Type DTAN 5Z...
- For bore holes with 30.5 mm diameter
- 3 positions (OFF – ON – OFF)
- 2 contacts (NO/NC combination)
- Positive opening (position 2 -> position 3)
- ATTENTION: Contacts close during reset (position 3 -> position 1). Device may only be operated in connection with an analysis module SRB-ZB-QS.
- Contact configuration permits signal processing in control category 2 (positions 1<-> 2) or 4 (positions 2 <-> 3) according to EN 954-1
- Class of protection IP 65 (front side)
- BG prototype testing (in connection with SRB-ZB-QS)



Dimensions



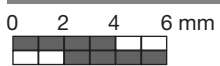
Product range

Description	Type	Part no.
Enabling switch, 3 positions, version for front panel installation	DTAN 5Z.401LP	052 1405

Technical data/electrical specifications of the basic device DTAN 5Z...

Refer to page 18

Contact travel chart



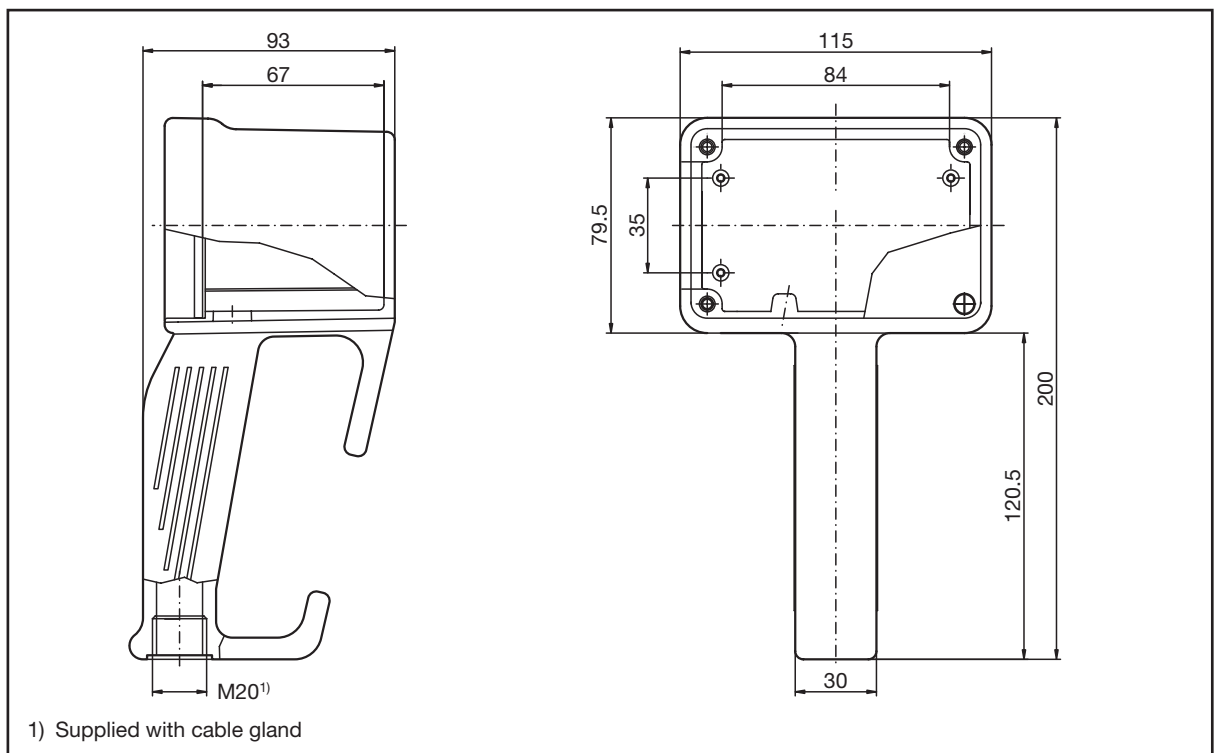
Enabling switch (grip switch) ZSD 4... incorporated in a mobile control device PILOT 20

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

- Type ZSD 4...
- 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 = 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: optionally with cable set, 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.

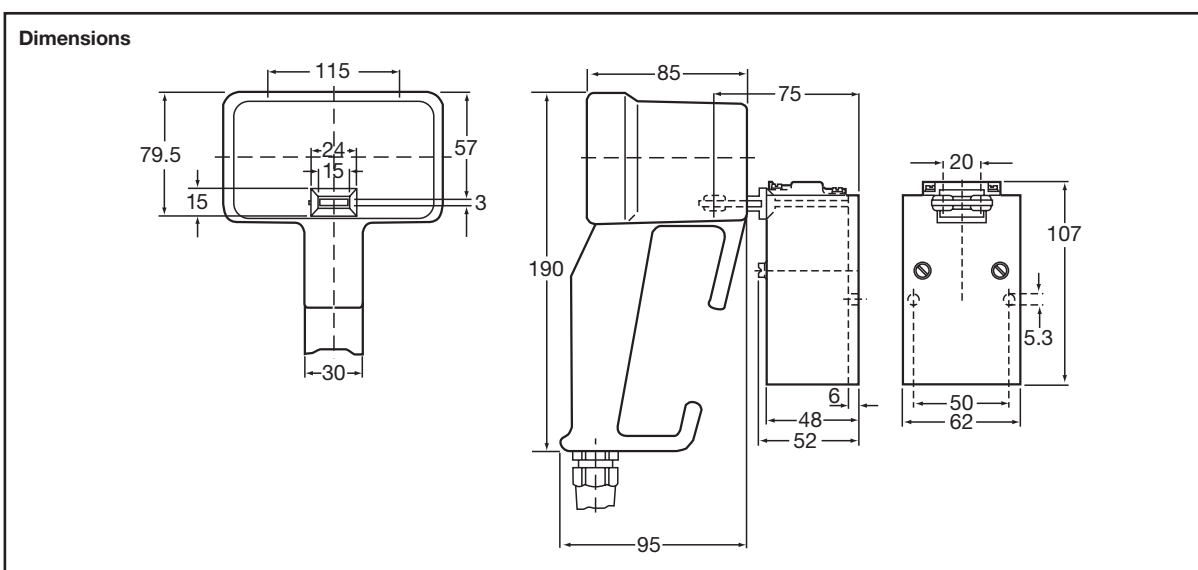


Dimensions



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



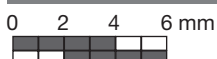
Product range

Description	Type	Part no.
Enabling switch, 2 positions, additionally with 1 emergency STOP pushbutton, 1 additional pushbutton, built into a mobile control device PILOT 20	ZSD 4.1	064 0092
Ditto, with separate actuator TZ/CO (mounted)	ZSD 4	064 0094
Safety switch, 1 NC contact, 1 NO contact	TZG 103/ZSD	134 7004
Ditto, 2 NC contacts	TZG 110/ZSD	134 7005

Technical data/electrical specifications of the basic device ZSD 4...

Refer to page 19

Contact travel chart



Technical data/electrical specification

Basic device ZSD 1..., ZSD 2..., ZSD 4... und DTAN 5Z...

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 DTAN 5Z...	
Regulations	IEC EN 60947-5-1/-5
Protection class operating head, front	IP 65
Temperature range	0 ... +65 °C
Climatic resistance to EN 60068	Part 2-30
Air clearance and creepage to DIN VDE 0110-1 (04/97)	4 kV/2
Positive opening path (pos. 2 → pos. 3)	Approx. 2 mm after reaching opening point
Proof of positive opening (position 2 → position 3)	2.5 kV impulse voltage
Mounting position	optional
Mechanical serviceable life to DIN VDE 0660 Part 200	30 x 10 ⁶ switching cycles
Switching frequency to DIN VDE 0660 P. 200	Max. 3,600 cycles/hour
Shock resistance	30 g/18 msec.
Vibration resistance	20 g/10 ... 200 Hz
Housing material	Operating element: aluminium Switching element: PA GV self-extinguishing, hardly flammable
Connection system	Screw terminal on printed circuit board, max. 1.5 mm ²
Actuating forces	Position 2: 10 N Position 3: 22 N
Other data	Refer to page 20 (follow-up circuitry with SRB-ZB-QS)

ATTENTION: DTAN 5Z... may only be operated in stand alone mode with SRB-ZB-QS!

Technical data

Continued

Built-in devices for ZSD 1..., ZSD 2... and ZSD 4... (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
Switching of small loads	5 V/1 mA

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 _{the2}	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

Safety relay module SRB-ZB-QS

Circuit diagram, additional informations

Safety relay module SRB-ZB-QS (for ZSD 1..., ZSD 2..., DTAN 5Z...)

- Reliable signal processing in control category 4 according to EN 954-1
- Differentiated shutdown (in position 1 and position 3)
- 2 safety enabling contacts "Enabling Mode"
- 1 safety enabling contact "Emergency STOP"
- 2 auxiliary NC contacts
- 1 auxiliary NO contact
- Cross short recognition
- Glass tube fuse cartridge
- Operating voltage 115 VAC/230 VAC
- BG prototype testing (in connection with ZSD 1..., ZSD 2... and DTAN 5Z..)



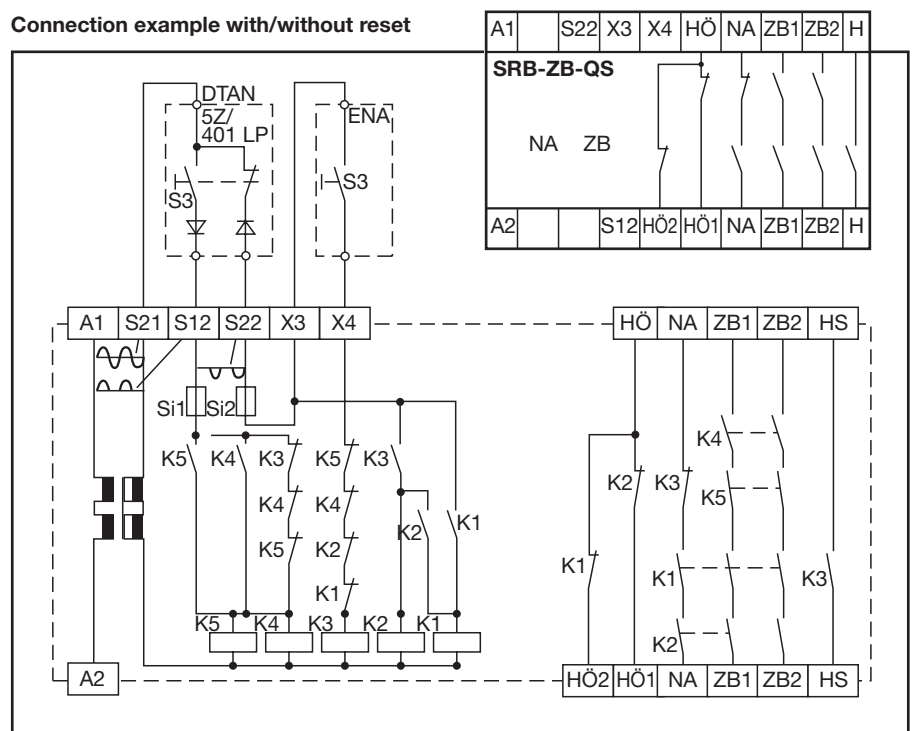
General description

Signal processing of the enabling switches types ZSD 1..., ZSD 2... and DTAN 5Z... is carried out by special safety relay modules type SRB-ZB-QS.

The module SRB-ZB-QS consists of the following functions:

- Elimination of an enabling function by means of momentary impulse when the button returns from position 3 through position 2 to position 1 via an additional relay circuit.
- Fault monitoring of the incoming lines for short-circuits and cross-shorts. Monitoring is performed by diodes which are additionally connected to the contacts of the enabling switch and via additional fusing in the SRB-ZB-QS module.

Connection example with/without reset



Product range

Description

Safety relay module

Type

SRB-ZB-QS

Part no.

600 0800

- Supply voltage 115/230 VAC which is, however, transformed to a safe alternating voltage in the module via a safety transformer. This voltage then supplies the safety circuit for the enabling switch. The integrated diodes convert the alternating current into a pulsating DC.

If, in the case of a short-circuit or a cross-short, the module receives alternating current, integrated fuses prevent the relays, designed for direct voltage anyway, from triggering the safety enabling outputs.

- Triggering of an emergency STOP safety circuit in the event of activating position 3 of the switch. A restart is made optionally by an additional reset signal.

If the reset function is not required, an external jumper is to be provided for terminals X3/X4. The reset of the enabling mode is made without a separate reset signal via the renewed actuation of the switch from position 1 to position 2.

Function of the enabling and auxiliary outputs of the SRB-ZB-QS

Enabling output NA:

The output is closed after actuating the reset button (terminals X3 and X4) or automatically if terminals X3 and X4 are linked with a jumper.

In position 1 (actuator not depressed) the output always remains switched on. *It is shut down only in position 3 (actuator pressed right down).*

Enabling outputs ZB1 and ZB2:

The two outputs are open in position 1 (actuator not depressed).

The outputs are closed if the enabling switch is actuated (position 2). The enabling function is activated.

The outputs are opened if the enabling switch is released (position 1) or the button is overpressed (position 3).

No enabling signal is generated during reset from position 3 to position 1.

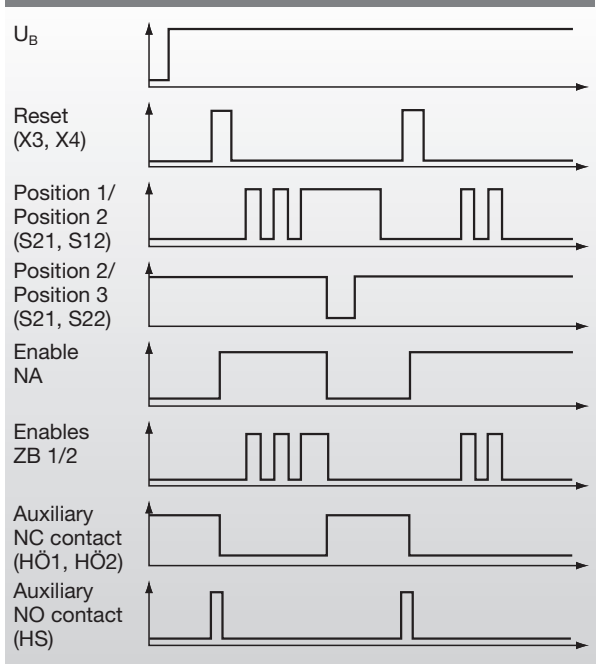
Auxiliary output HÖ1/HÖ2 (auxiliary NC contact):

The status of the enabling output NA is indicated via the auxiliary output HÖ2.

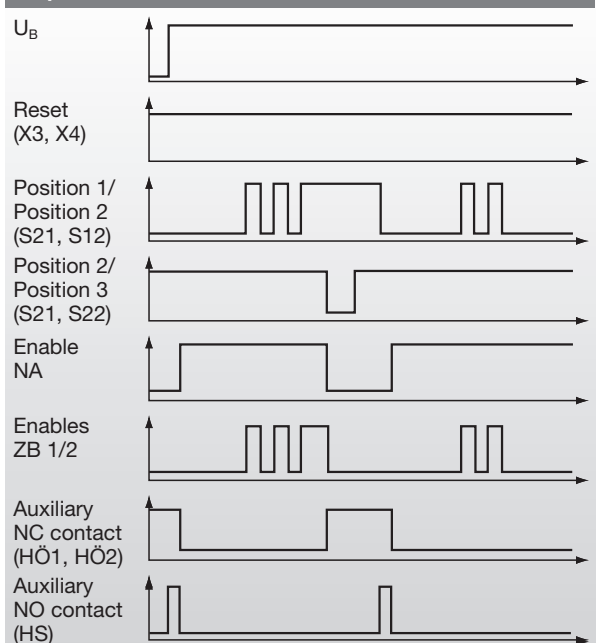
Auxiliary output HS (auxiliary NO contact):

The output HS generates a momentary impulse during the start process.

Sequence chart SRB-ZB-QS with additional reset



Sequence chart SRB-ZB-QS without additional reset

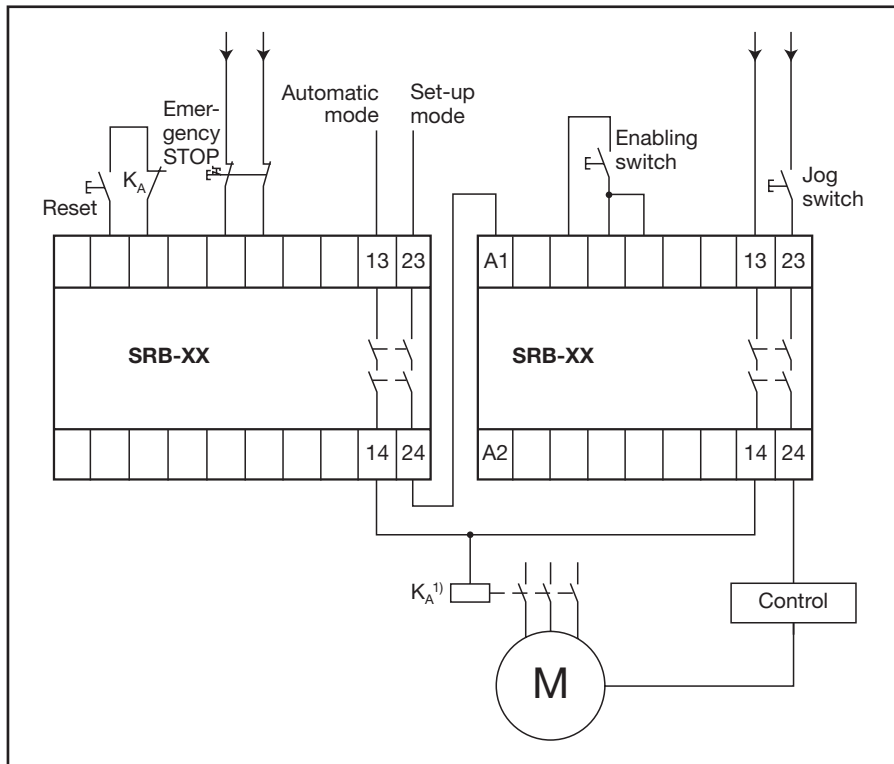


Technical data/electrical specification SRB-ZB-QS	
Rated operating voltage	115 VAC/230 VAC –15%/+6%
Frequency range	50/60 Hz
Fuse (power supply)	T 32 mA (230 VAC), T 63 mA (115 VAC)
Power consumption	max. 6 VA
Switching capacity of the enabling contacts	230 VAC, 6 A ohmic (inductive with suitable suppressor circuit)
Fuse enabling contacts	6 A slow-blowing
Switching capacity of the auxiliary contacts HÖ, HS, NA	24 VDC, 2 A
Fuse auxiliary contacts	2 A slow-blowing
Utilisation categories	AC 15/DC 13, DIN VDE 0660 Part 200
Pickup delay	≤ 20 ms
Dropout delay	≤ 200 ms
Contact material/contacts	AgSnO, self-cleaning, positively driven
Contact resistance	max. 100 mΩ in new state
Air clearance and creepage	DIN VDE 0110-1 (04.97), 4 kV/2
Cable connections	Self-lifting screw terminals max. 0.6 mm ² , max. 2 x 2.5 mm ² ; individual wire or multicore wire with wire-end ferrule
Dimensions	H/W/D 83/90/127 mm
Weight	750 g
Operating ambient temperature	–25 °C ... 45 °C (derating curve upon request)
Storage temperature	–25 °C ... 70 °C
Mechanical serviceable life	10 ⁷ switching cycles
Terminal designation	DIN EN 50005/DIN 50013
Housing material	Thermoplastic to UL-94-V-0, signal red RAL 3000
Class of protection	Built-in device
Class of protection – housing	IP 40
Class of protection – terminals	IP 20
Monitoring displays	LEDs
Fixing	Top-hat rail DIN EN 50022
Mechanical strength	VDE 0435
Mounting position	optional
ON period	100% ON period
Interference suppression	Built-in suppressor diodes
Prototype tests	BG

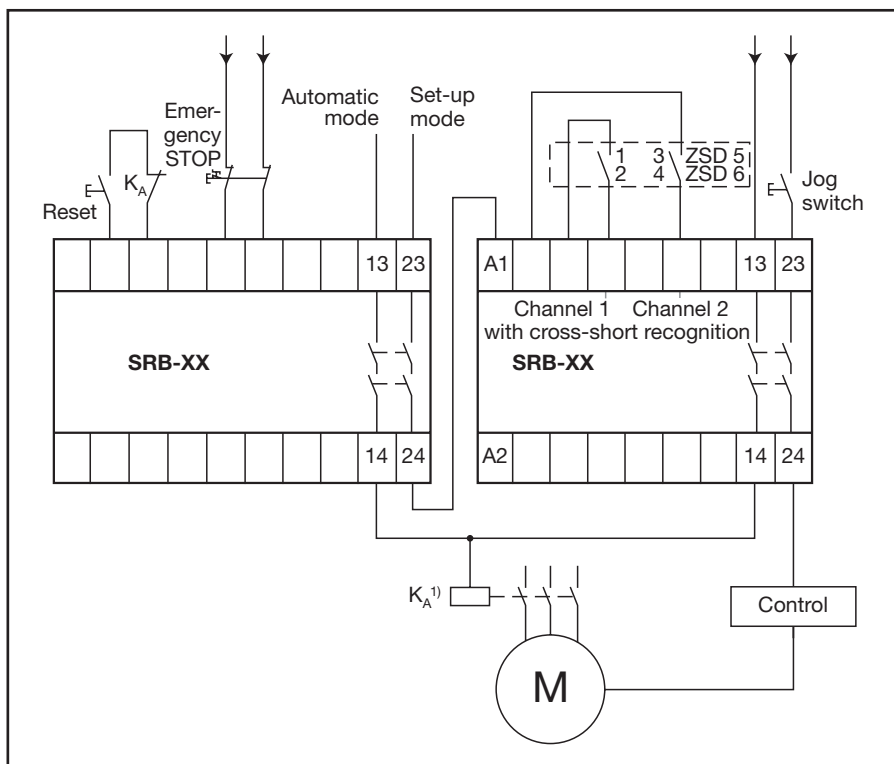
Circuit suggestions

ZSD 4..., ZSD 5... und ZSD 6...

Circuit suggestion ZSD 4 (2 positions, 1 channel, additionally with 1 emergency STOP pushbutton)



Circuit suggestion ZSD 5/ZSD 6 with analysis operation, control category 3 (4) to EN 954-1



1) Contact amplification or multiplication by relay or contactor with positively driven contacts, possibly 2 channels.

German agencies

- K.A. Schmersal GmbH
Industrielle Sicherheitssysteme
Postfach 24 02 63, 42232 Wuppertal
Mödinghofe 30
42279 Wuppertal
Telephone: +49-(0) 2 02-64 74-0
Facsimile: +49-(0) 2 02-64 74-1 00
E-Mail: info@schmersal.de
Internet: www.schmersal.com
- 01 Hamburg**
K.A. Schmersal GmbH
Geschäftsstelle Hamburg
Zunftstraße 8
21244 Buchholz i.d.N.
Telephone: +49-(0) 41 81-9 22 0-0
Facsimile: +49-(0) 41 81-9 22 0-20
E-Mail: gshamburg@schmersal.de
- 02 Berlin**
KSA Komponenten der Steuerungs-
und Automatisierungstechnik GmbH
Buchholzer Straße 62-65
13156 Berlin
Telephone: +49-(0) 30-47 48 24 00
Facsimile: +49-(0) 30-47 48 24 05
E-Mail: info@ksa-gmbh.de
Internet: www.ksa-gmbh.de
- 03 Hannover**
ELTOP GmbH
Robert-Bosch-Straße 8
30989 Gehrden
Telephone: +49-(0) 51 08-92 73 20
Facsimile: +49-(0) 51 08-92 73 21
E-Mail: eltop@eltop.de
Internet: www.eltop.de
- 04 Münster**
K.A. Schmersal GmbH
Geschäftsstelle Münster
Am Vechte Ufer 22
48629 Metelen
Telephone: +49-(0) 25 56-9 38 30
Facsimile: +49-(0) 25 56-93 83 73
E-Mail: gsmuenster@schmersal.de
- 05 Köln**
Stollenwerk
Technisches Büro GmbH
Scheuermühlenstraße 40
51147 Köln
Telephone: +49-(0) 22 03-9 66 20-0
Facsimile: +49-(0) 22 03-9 66 20-30
E-Mail: info@stollenwerk.de
- 14 Ruhrgebiet**
K W S Elektronik Schumacher
Saarstraße 19a
53919 Weilerswist
Telephone: +49-(0) 22 54-33 80
Facsimile: +49-(0) 22 54-18 58
E-Mail: k-w-s-@t-online.de
- 12 Siegen**
Siegfried Klein
Elektro-Industrie-Vertretungen
Schloßblick 38
57074 Siegen
Telephone: +49-(0) 2 71-67 78
Facsimile: +49-(0) 2 71-67 70
E-Mail: info@sk-elektrotechnik.de
- 16 Frankfurt**
K.A. Schmersal GmbH
Geschäftsstelle Frankfurt
Kilianstädter Straße 38
61137 Schöneck
Telephone: +49-(0) 61 87-9 09 56-0
Facsimile: +49-(0) 61 87-9 09 56-6
E-Mail: gsfrankfurt@schmersal.de

International agencies

- Argentina – Argentinien
Hellermann Tyton
Monteagudo Street # 760 (B1672 AFP)
Villa Lynch
1672 Buenos Aires
Telephone: +54-11-47 54 54 00
Facsimile: +54-11-47 52 03 74
E-Mail: gianowski@hellermantyton.com.ar
- Australia – Australien
NHP Electrical Engineering
Products Pty. Ltd.
43-67 River Street
PO Box 199
Richmond 3121
Melbourne, Victoria
Telephone: +61-(0) 3-94 29 29 99
Facsimile: +61-(0) 3-94 29 10 75
E-Mail: products@nhp.com.au
Internet: www.nhp.com.au
- Austria – Österreich
AVS-Schmersal Vertriebs Ges. m.b.H.
Biróstraße 17
1232 Wien
Telephone: +43-(0) 1-6 10 28
Facsimile: +43-(0) 1-6 10 28-1 30
E-Mail: info@avs-schmersal.at
Internet: www.avs-schmersal.co.at
- Belgium – Belgien
Schmersal Belgium NV/SA
Nieuwlandlaan 16B
Industriezone B413
3200 Aarschot
Telephone: +32-(0) 16-57 16 18
Facsimile: +32-(0) 16-57 16 20
E-Mail: info@schmersal.be
- Brazil – Brasilien
ACE Schmersal
Eletroeletrônica Industrial Ltda.
Rodovia Boituva – Porto Feliz, Km 12
Vila Esplanada – CEP 18550-000
Boituva – SP
Telephone: +55-(0) 15-32 63-98 00
Facsimile: +55-(0) 15-32 63-98 90
E-Mail: export@aceschmersal.com.br
Internet: www.aceschmersal.com.br
- Chile – Chile
NDU Ingeniería
Santa Elisa 498
7160269 La Cisterna
Santiago de Chile
Telephone: +56-2-5 26-66 46
Facsimile: +56-2-5 26-50 46
E-Mail: matelec@ndu.cl
- Colombia – Kolumbien
Cimpex Ltda.
Apartado Aereo 2429
Medellin
Telephone: +57-4-2 51-59 72
Telephone: +57-4-2 51-59 87
Facsimile: +57-4-2 51-46 08
E-Mail: cimpex@supernet.com.co
- Costa Rica – Costa Rica
Euro-Tec, S.A.
Apartado Postal 477
1250 Escazú
San José
Telephone: +5 06-2 20-28 08
Telephone: +5 06-3 84-78 69
Facsimile: +5 06-2 96-15 42
E-Mail: eurotec@amnet.co.cr
- PR China – VR China
Schmersal Industrial Switchgear
Co. Ltd.
Central Plaza 1001
Huang Pi Bei Road 227
200003 Shanghai
Telephone: +86-21-63 75 82 87
Facsimile: +86-21-63 75 82 97
E-Mail: sales@schmersal.com.cn
Internet: www.schmersal.com.cn
- Czech Republic –
Tschechische Republik
Mercom Componenta spol. s.r.o.
Ruská 67
100 00 Praha 10
Telephone: +4 20-(0) 2-67 31 46 40
Telephone: +4 20-(0) 2-67 31 46 41
Facsimile: +4 20-(0) 2-71 73 32 11
E-Mail: mercom@bohem-net.cz
- Denmark – Dänemark
Schmersal Danmark A/S
Lindegårdsvej 17A
2920 Charlottenlund
Telephone: +45-70 20 90 27
Facsimile: +45-70 20 90 37
E-Mail: linde@schmersal.dk
Internet: www.schmersal.dk
- Finland – Finnland
Advantecet Oy
Malminkaari 10B
00700 Helsinki
PO Box 149
00701 Helsinki
Telephone: +3 58-(0) 9-3 50 52 60
Facsimile: +3 58-(0) 9-35 05 26 60
E-Mail: advantecet@advantecet.fi
Internet: www.advantecet.fi
- France – Frankreich
Automatisme et Contrôle
8, rue Raoul Follereau
38181 Seyssins Cedex
BP 18
38180 Seyssins
Telephone: +33-4 76 84 23 20
Facsimile: +33-4 76 48 34 22
E-Mail: info@automatisme-et-contrôle.fr
Internet: www.automatisme-et-contrôle.fr
- Greece – Griechenland
Kalamarakis Sapounas S.A.
Ionias & Neromilou
PO Box 46566
13671 Chamomilos Acharnes
Athens
Telephone: +30-(0) 210-2 40 60 06
Facsimile: +30-(0) 210-2 40 60 07
E-Mail: ksa@ksa.gr
- Honduras – Honduras
Lusitana Int'l
Distribuciones – Representaciones
Apdo. Postal # 783
21105 San Pedro Sula
Telephone: +5 04-6 69-14 46
Facsimile: +5 04-6 69-14 46

08 Saarland
Herbert Neundörfer
Werksvertretungen
Saargemünder Straße 68a
66130 Güdingen
Telephone: +49-(0)6 81-87 54 54
Facsimile: +49-(0)6 81-87 54 53
E-Mail: info@herbert-neundoerfer.de
Internet: www.herbert-neundoerfer.de

19 Leipzig
K.A. Schmersal GmbH
Geschäftsstelle Leipzig
Nonnenstraße 11c
04229 Leipzig
Telephone: +49-(0) 3 41-4 87 34 50
Facsimile: +49-(0) 3 41-4 87 34 51
E-Mail: gsleipzig@schmersal.de

09 Bayern Nord
K.A. Schmersal GmbH
Geschäftsstelle Nürnberg
Beethovenstraße 14
91074 Herzogenaurach
Telephone: +49-(0) 91 32-73 70 00
Facsimile: +49-(0) 91 32-73 48 44
E-Mail: gsnuernberg@schmersal.de

10/ Bayern Süd
15 Ing. Adolf Müller GmbH
Industriervertretungen
Elly-Staegmeyr-Str. 15
80999 München
Telephone: +49-(0) 89-8 12 60 44
Telephone: +49-(0) 89-8 12 60 45
Facsimile: +49-(0) 89-8 12 69 25
E-Mail: info@ingam.de

11 Stuttgart
Gerhard Schützing
Labor-Schütz GmbH Industriervertretungen
Postfach 81 05 69, 70522 Stuttgart
Eichwiesenring 6
70567 Stuttgart
Telephone: +49-(0) 7 11-7 15 46-0
Facsimile: +49-(0) 7 11-7 15 46-18
E-Mail: hv@schuetzinger.de
Internet: www.schuetzinger.de



Hungary – Ungarn
NTK Ipari-Elektronikai és
Kereskedelmi Kft
Mészáros L. u. 5
9023 Győr
Telephone: +36-(0) 96-52 32 68
Facsimile: +36-(0) 96-43 00 11
E-Mail: info@ntk-kft.hu
Internet: www.ntk-kft.hu

Italy – Italien
Schmersal Italia s.r.l.
Via Molino Vecchio, 206
25010 Borgosatollo, Brescia
Telephone: + 39-0 30-2 50 74 11
Facsimile: + 39-0 30-2 50 74 31
E-Mail: info@schmersal.it
Internet: www.schmersal.it

Japan – Japan
Elan Japan Branch Office
3-39-8 Shoon, Suginami-ku
Tokyo 167-0054
Telephone: +81-(0) 3-32 47-05 02
Facsimile: +81-(0) 3-32 47-05 37
E-Mail: safety@elanjp.com

Korea – Korea
MEC Mahani Electric Co. Ltd.
576-8, Bisan-2dong
Dongan-Ku
Anyang-City
Kyungki-do 431-821
Telephone: +82-(0) 31-4 63-33 30
Facsimile: +82-(0) 31-4 63-33 98
Facsimile: +82-(0) 31-4 63-33 99
E-Mail: andy@hanmec.co.kr

Malaysia – Malaysia
Ingermark (M) SDN.BHD
No. 29, Jalan KPK 1/8
Kawasan Perindustrian Kundang
48020 Rawang, Selangor Darul Ehsan
Telephone: +6 03-60-34 27 88
Facsimile: +6 03-60-34 21 88
E-Mail: ingmal@tm.net.my

Netherlands – Niederlande
Elan Nederland
Fahrenheitstraat 38-40
3846 BN Harderwijk
Telephone: +31-(0) 3 41-43 25 25
Facsimile: +31-(0) 3 41-42 52 57
E-Mail: info@elanschmersal.nl

Norway – Norwegen
Schmersal Nordiske
Hoffsveien 92
0377 Oslo
Telephone: +47-22 06 00 70
Facsimile: +47-22 06 00 80
E-Mail: smestad@schmersal.no
Internet: www.schmersal.se

Paraguay – Paraguay
Brasguay S.R.L.
Ruta Internacional, 07, Km1
Mingua Guazu
Telephone: +5 95-6 44-2 04 18
Facsimile: +5 95-6 44-2 05 77
E-Mail: kuntz@foznet.com.br

Poland – Polen
Schmersal - Polska Sp.j.
ul. Kremowa 65A
02-969 Warszawa
Telephone: +48-(0) 22-8 16 85 78
Telephone: +48-(0) 22-8 16 85 79
Facsimile: +48-(0) 22-8 16 85 34
E-Mail: office@schmersal.pl

Portugal – Portugal
K. A. Schmersal GmbH
Sucursal em Portugal
Av. das Descobertas, 15-2° D
Quinta do Infantado
2670-383 Loures
Telephone: +3 51-21-9 83 92 83
Facsimile: +3 51-21-9 83 19 37
E-Mail: info@schmersal.pt
Internet: www.schmersal.pt

Serbia – Serbien/Montenegro
Tipteh d.o.o. Beograd
Bulevar Avnoj-a450, lokal 16
11070 Novi Beograd
Telefon: +381-11-3 13 10 57
Telefax: +381-11-3 01 83 26
E-Mail: vecerka@ptt.yu
Internet: www.tipteh.co.yu

Singapore – Singapur
Tong Sim Marine & Electric Co.
46 Kaki Bukit Crescent
Kaki Bukit Techpark 1
Singapore 416269
Telephone: +65-67 43 31 77
Facsimile: +65-67 45 37 00
E-Mail: tongsim@singnet.com.sg

Slovenia – Slowenien
Tipteh d.o.o.
Ulica Ivana Roba 21
1000 Ljubljana
Telephone: +3 86-1-2 00 51 50
Facsimile: +3 86-1-2 00 51 51
E-Mail: info@tipteh.si

Spain – Spanien
Matelco Automatismos Y Control S.L.
Avenida Tibidabo, 23
08022 Barcelona
Telephone: +34-9 34-34 08 77
Facsimile: +34-9 34-34 05 41
E-Mail: mac@matelco.com

South Africa – Südafrika
A+A Dynamic Distributors (Pty) Ltd.
3 Ruarch Street
Park Central Johannesburg
2016 Booyens
Telephone: +27-11-4 93 50 22
Facsimile: +27-11-4 93 07 60
E-Mail: awakseyer@africa.com

Sweden – Schweden
Schmersal Nordiska AB
Klockarns Väg 1
43533 Mölnlycke
Telephone: +46-(0) 31-3 38 35 00
Facsimile: +46-(0) 31-3 38 35 35
E-Mail: solsten@schmersal.se
Internet: www.schmersal.se

Switzerland – Schweiz
Schmersal Schweiz AG
Freilagerstr. 25
8047 Zürich
Telephone: +41-(0) 43-3 11 22 33
Facsimile: +41-(0) 43-3 11 22 44
E-Mail: info@schmersal.ch

Taiwan – Taiwan
Leader Camel Enterprise Co., Ltd.
No. 453-7, Pei Tun Rd.
Taichung, Taiwan
Telephone: +886-4-22 41 32 92
Facsimile: +886-4-22 41 29 23
E-Mail: camel88@ms46.hinet.net
Internet: www.leadercamel.com.tw

UK – Großbritannien
Schmersal UK Ltd.
Unit 1, Beauchamp Business Centre
Enigma Park
Malvern
Worcs WR14 1GL
Telephone: +44-(0) 16 84-57 19 80
Facsimile: +44-(0) 16 84-56 02 73
E-Mail: support@schmersal.co.uk
Internet: www.schmersal.co.uk

USA – USA
Schmersal Inc.
660 White Plains Road, Suite 160
Tarrytown
New York 10591
Telephone: +1-(0) 9 14-347-47 75
Facsimile: +1-(0) 9 14-347-15 67
E-Mail: info@schmersalusa.com
Internet: www.schmersalusa.com

Venezuela – Venezuela
Petro System C.A.
Av. 12 entre 7 y 8 Transv. Qta. Roysbel
Altamira
Caracas
Telephone: +58-2 12-9 63 53 46
Telephone: +58-2 12-9 61 40 76
E-Mail: ventas@petrosystem.com



Elan Schaltelemente GmbH & Co. KG
Im Ostpark 2
D-35435 Wettenberg
Telephone: +49-(0)6 41/98 48-0
Facsimile: +49-(0)6 41/98 48-420
E-Mail: info@elan.schmersal.de
Internet: www.elan.de