

## Types ZSA, ZSR, ZSE



# Enabling Switches

## General

Enabling switches are manually operated control devices which are intended for use by persons working in danger areas of machines and installations.

In „Manual mode“, the protective effect of movable safety guards may be disabled under certain conditions.

Authorized personnel can then enter dangerous areas with the enabling switch, subject to observance of certain preconditions, in order to perform programming, set-up work, testing or service work, for example.

Enabling switches can perform their task properly only if safe handling is possible for long periods, e.g. during observation of production sequences, without the operator becoming tired.

Besides an absolute safe function we put specific attention to a perfect and balanced ergonomics of the EUCHNER enabling switches, in order to be able offering a product which can be operated pleasantly in order to reduce readiness for manipulation.

## Design

All EUCHNER enabling switches have a robust plastic housing offering a high degree of protection. The fully-developed design is characterized by the following features:

- **perfect ergonomics**
- **light weight**
- **easily switched from hand to hand**
- **light and stable action point**
- **redundant make circuits**
- **reliable line monitoring for cross shorts**
- **tamper resistant**

EUCHNER enabling switches are available in

- **different hand versions and**
- **different built-in versions**

each with different switching element configurations in each case.

The hand versions are available with three different cable types, namely 5 m or 10 m straight cable or 5 m coiled cable, and also as a kit.

The patented cables of the enabling switches possess individually shielded conductors to permit effective cross-short monitoring. The shields must be connected with the PE system of the machine or installation.

If the cables are then crushed, for example, short circuits will be detected and the control switched off immediately by tripping of the short-circuit protective device. This eliminates the need for an additional evaluation device for line monitoring.

## Function

The functional sequence of EUCHNER enabling switches meets the requirements for 2-stage and 3-stage enabling switches in accordance with **EN 775** and **VDI 2854**.

Functional sequence of 3-stage enabling switches:

- Stage 1: OFF function** (actuating element not pressed)
- Stage 2: Enabling function** (actuating element pressed to center position)
- Stage 3: OFF function with positive opening operation** (actuating element pressed down fully past the center position)

A patented switch mechanism prevents the enabling function from being activated when the switch returns from stage 3 to stage 1.

The exact functional sequence is shown in the switching diagrams of the respective enabling switches.

## Application

Enabling switches are used in automated production installations, for example, which are operated in „Manual mode“ in accordance with the regulation EN775 and VDI 2854. This operating mode must be defined by means of lockable selector switches as stipulated in EN 60204 T1 (DIN VDE 0113 T1).

Safety guards are partially disabled in this mode. For this reason, the person working in the dangerous area with the enabling switch must be able to recognize dangerous conditions in good time and initiate corresponding counter-measures.

## Important:

Commands for dangerous operations must not be initiated with the enabling switch **alone**. A „second, conscious“ start instruction is necessary for this purpose. Each person to be in the dangerous area has to have an own Enabling Switch.

## Approvals

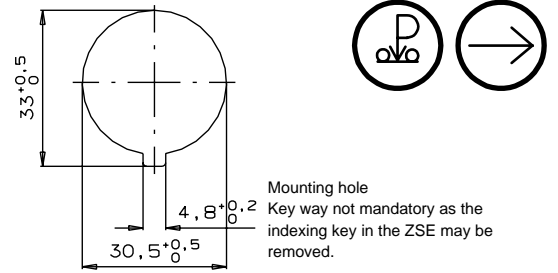
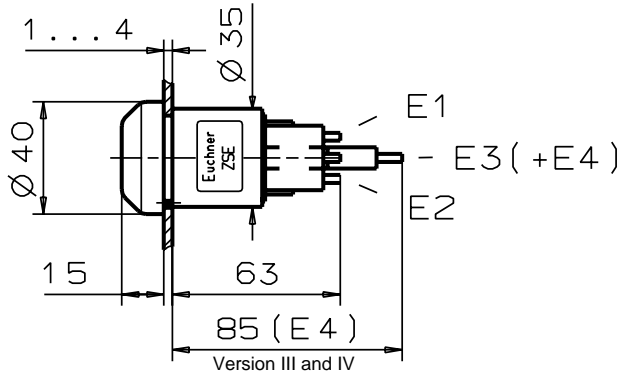
EUCHNER enabling switches have the following approvals:

**BIA, Germany**  
**SUVA, Switzerland**  
**SAQ, Sweden**

as well as approval by the automotive industry (see Appendix A III for further details).

# Enabling Switches - Type ZSE (single channel / dual channel)

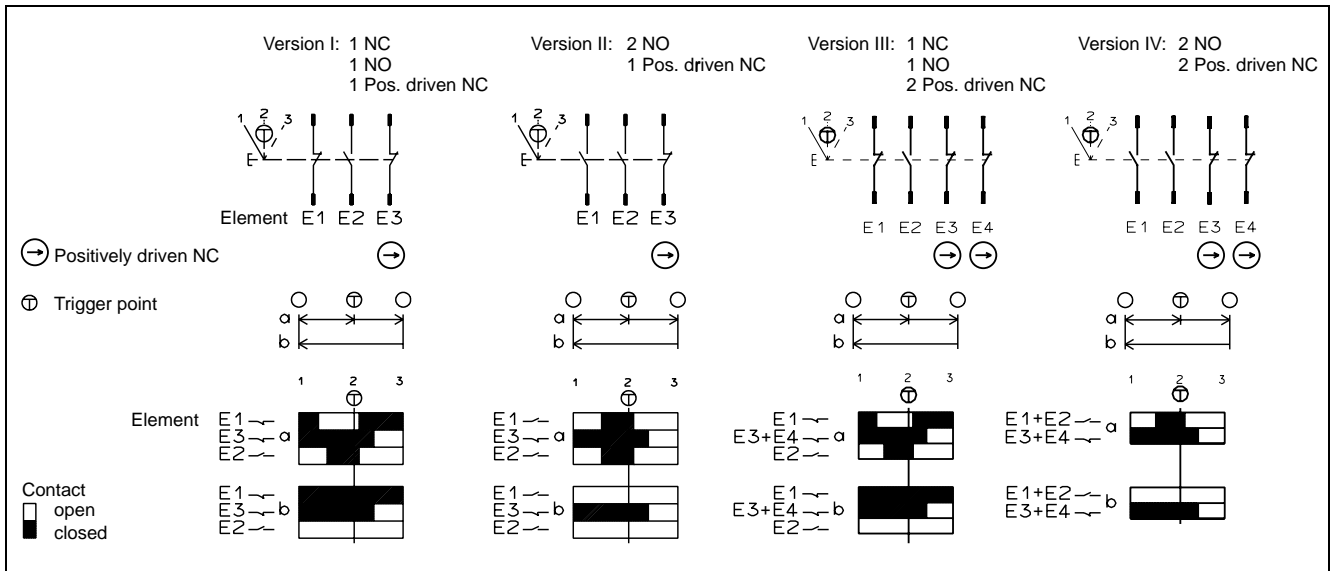
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Fastening hole	D30 to IEC 947-5-1	
Environmental protection to IEC 529	IP 65 front	
Ambient temperature	- 5 to + 60	°C
Switching elements	see ordering table Version I to IV	
Switching principle	Slow-action-Switch	
Utilization category to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A      DC-13 U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connection type	Spade type connector 2,8 - 0,8 mm to IEC 760	
Fuse	6 A quick action	A
Weight	approx. 0.1	kg

## Wiring diagram/Switching diagram

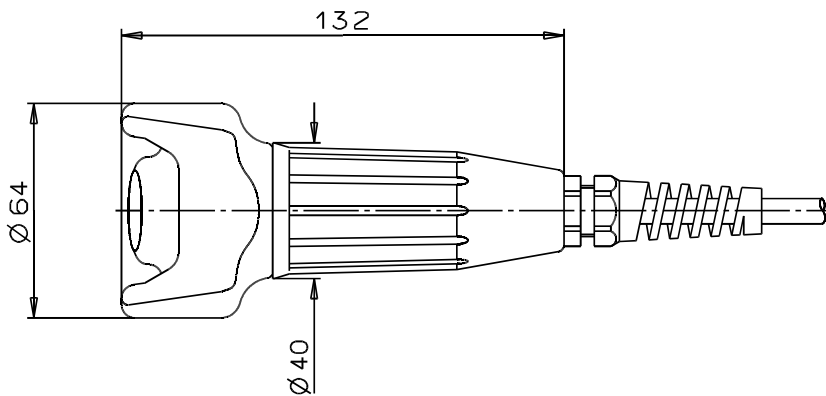
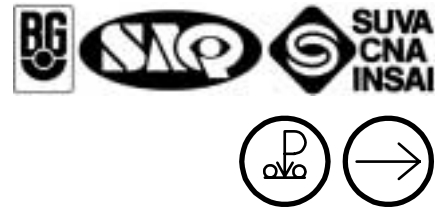


## Ordering table

	Contacts	Version	Types	Cat. No.
I	1 NC + 1 NO + 1 NC (→)	single channel	ZSE2-1	052 448
II	2 NO + 1 NC (→)	single channel	ZSE2-2	052 449
III	1 NC + 1 NO + 2 NC (→)	double channel	ZSE2-3	070 782
IV	2 NO + 2 NC (→)	double channel	ZSE2-4	070 762

# Enabling Switches - Type ZSA (3-stage / single channel)

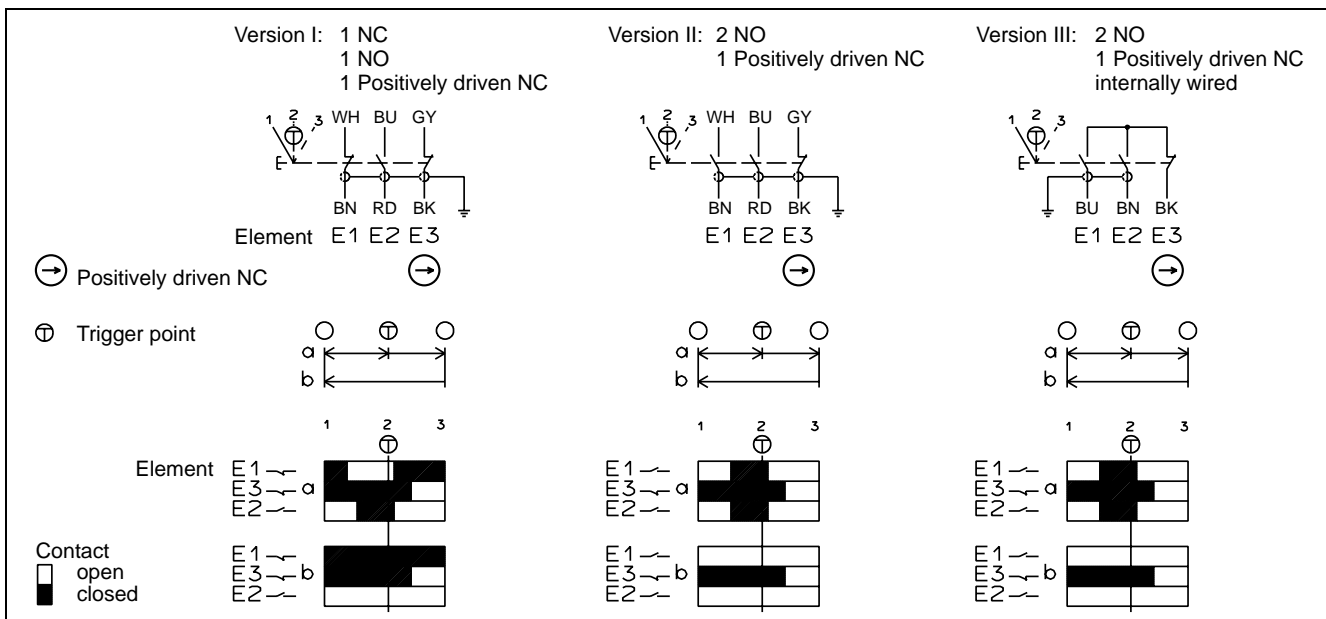
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 67	
Ambient temperature	- 5 to + 60	°C
Switching elements	see ordering table Version I to III	
Switching principle	Slow-action Switch	
Utilization category to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A      DC-13 U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connection	Version I and II 6 x 0,34mm <sup>2</sup> Version III 3 x 0,75mm <sup>2</sup>	
Fuse	6 A quick action	A
Weight	approx. 1.1	kg

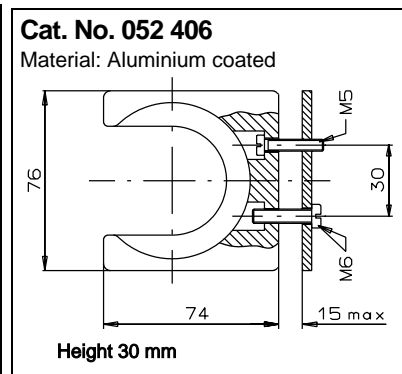
## Wiring diagram/Switching diagram



## Ordering table

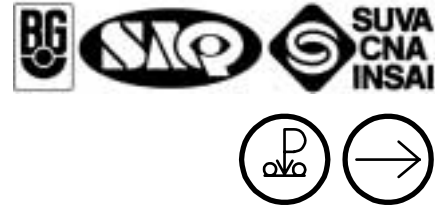
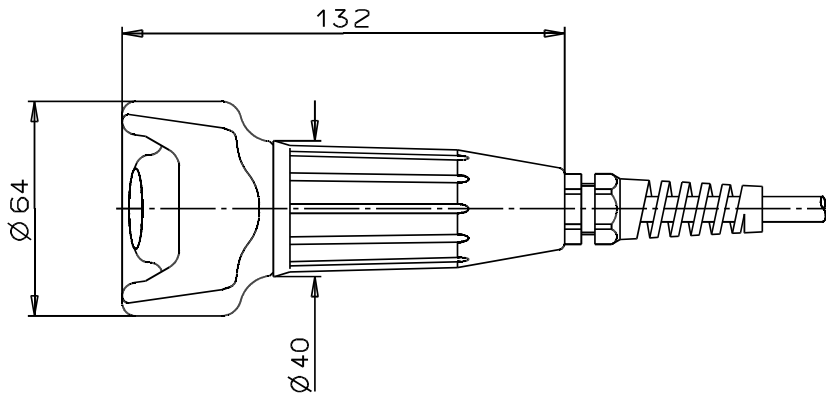
	Contacts	Cable			Types	Cat. No.
		5 m straight	10 m straight	5 m coiled		
I	1 NC + 1 NO + 1 NC ⊕	x			ZSA2A1G05A	055 402
			x		ZSA2A1G10A	055 403
				x	ZSA2A1S05A	055 404
II	2 NO + 1 NC ⊕	x			ZSA2A2G05A	055 406
			x		ZSA2A2G10A	055 407
				x	ZSA2A2S05A	055 408
III	2 NO + 1 NC ⊕ intern verdrahtet	x			ZSA2B2G05A	055 410
			x		ZSA2B2G10A	055 411

## Fixing bracket for type ZSA



# Enabling Switches - Type ZSA (3-stage / dual channel)

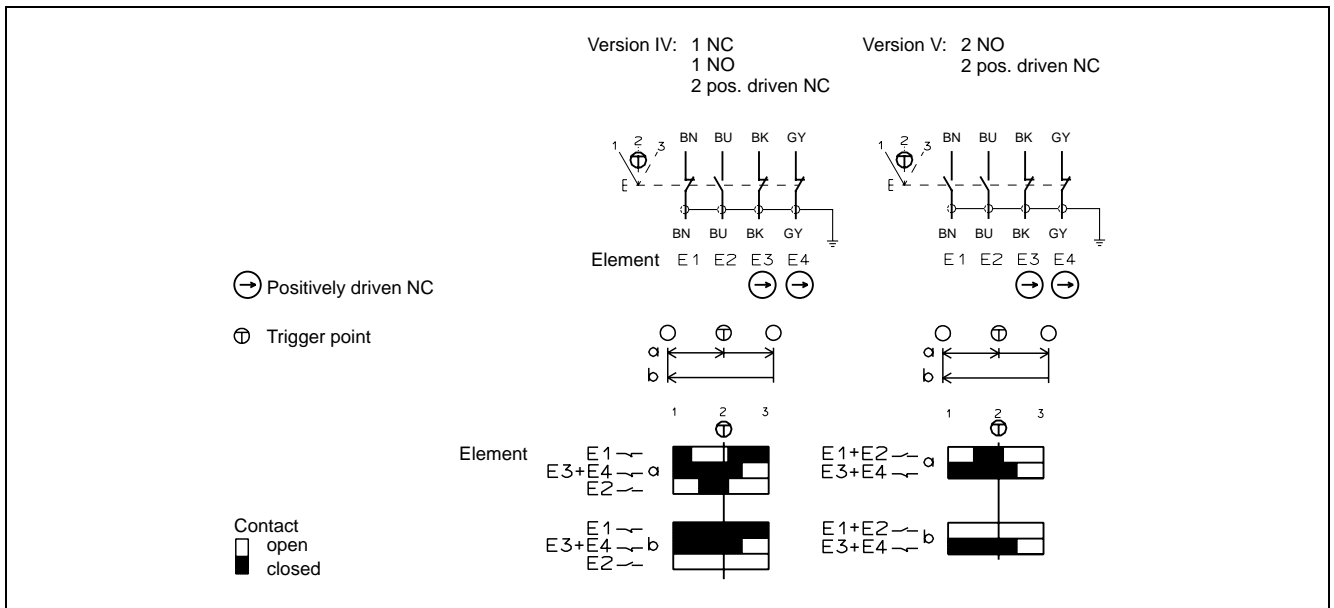
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 67	
Ambient temperature	- 5 to + 60	°C
Switching elements	see ordering table version IV and V	
Switching principle	Slow-action Switch	
Utilization category to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A      DC-13 U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connection	Version IV and V: 8 x 0,34mm <sup>2</sup>	
Fuse	6 A quick action	A
Weight	approx. 1.1	kg

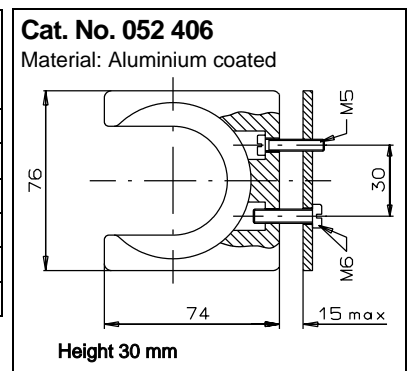
## Wiring diagram/Switching diagram



## Ordering table

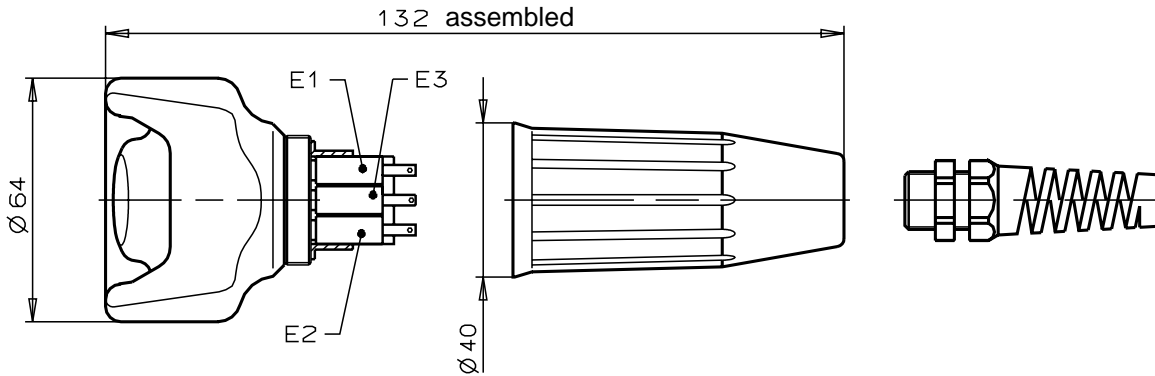
	Contacts	Cable			Types	Cat. No.
		5 m straight	10 m straight	5 m coiled		
IV	1 NO + 1 NC + 2 NC ⊕	x			ZSA2A3G05A	070 784
			x		ZSA2A3G10A	070 785
				x	ZSA2A3S05A	070 786
V	2 NO + 2 NC ⊕	x			ZSA2A4G05A	070 764
			x		ZSA2A4G10A	070 765
				x	ZSA2A4S05A	070 766

## Fixing bracket for type ZSA



# Enabling Switches - Kit Type ZSA (2-stage)

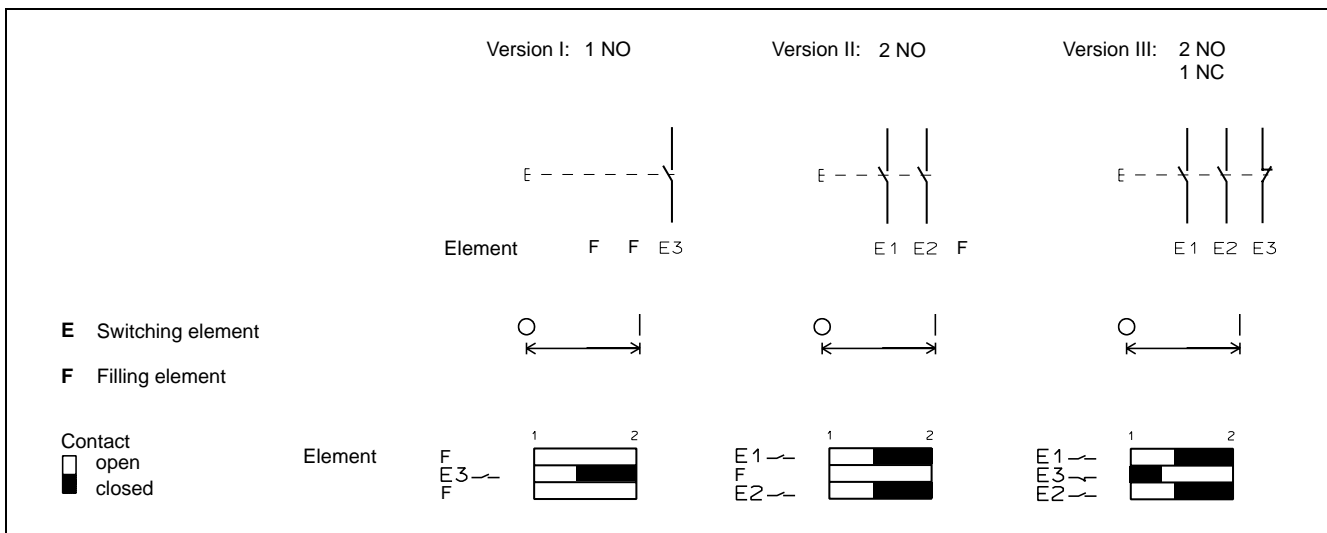
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 67	
Ambient temperature	- 5 to + 60	°C
Switching elements	see ordering table Version I to III	
Switching principle	Slow-action Switch	
Utilization category to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A   DC-13 U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connection cable	3.5 - 8.0 mm, connection with Skintop BS9	
Connection type	flat connection 2.8 - 0.8 mm according to IEC 760 or soldered connection	
Fuse	6 A quick action	A
Weight	approx. 0.4	kg

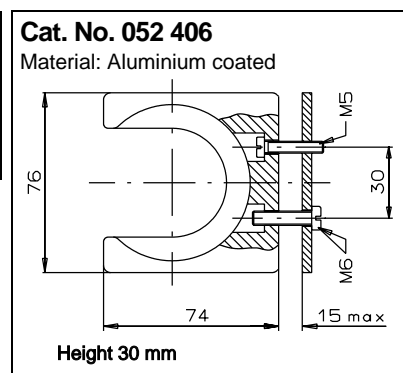
## Wiring diagram/Switching diagram



## Ordering table

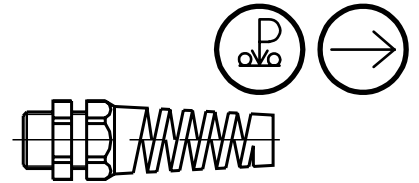
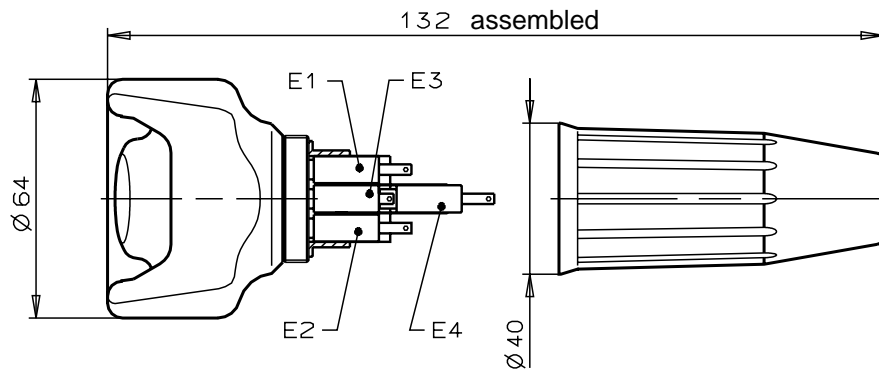
	Contacts	Skintop connector included	Types	Cat. No.
I	1 NO	without cable	ZSA1-1	070 750
II	2 NO	without cable	ZSA1-2	070 800
III	2 NO + 1 NC	without cable	ZSA1-3	070 736

## Fixing bracket for type ZSA



# Enabling Switches - Kit Type ZSA (3-stage)

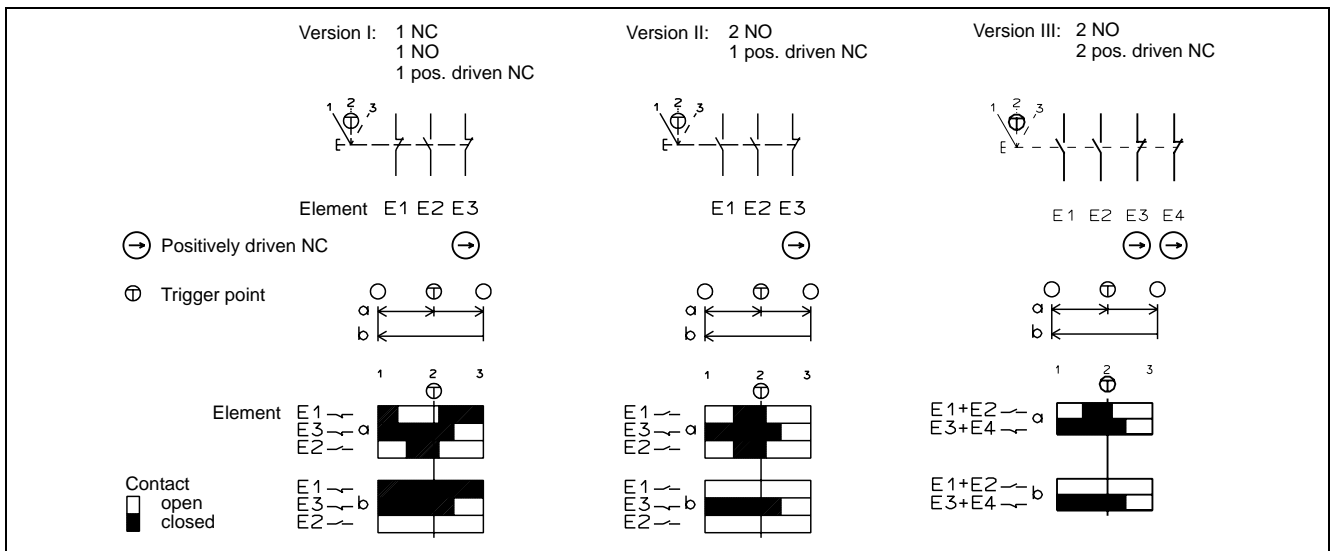
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 67	
Ambient temperature	- 5 to + 60	°C
Switching elements	see ordering table Version I to III	
Switching principle	Slow-action Switch	
Utilization category to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A      DC-13 U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connection cable	3.5 - 8.0 mm, connection with Skintop BS9	
Connection type	flat connection 2.8 - 0.8 mm according to IEC 760 or soldered connection	
Fuse	6 A quick action	A
Weight	approx. 0.4	kg

## Wiring diagram/Switching diagram



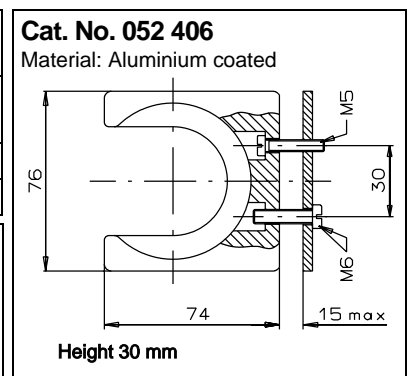
## Ordering table

	Contacts	Skintop connector included	Types	Cat. No.
I	1 NC + 1 NO + 1 NC ⊖	without cable	ZSA2-1	070 734
II	2 NO + 1 NC ⊖	without cable	ZSA2-2	070 735
III	2 NO + 2 NC ⊖	without cable	ZSA2-4	070 792

The above mentioned approvals only apply if hazardous situations caused by crushed or cut cables can be monitored by use of:

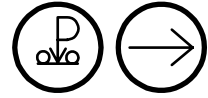
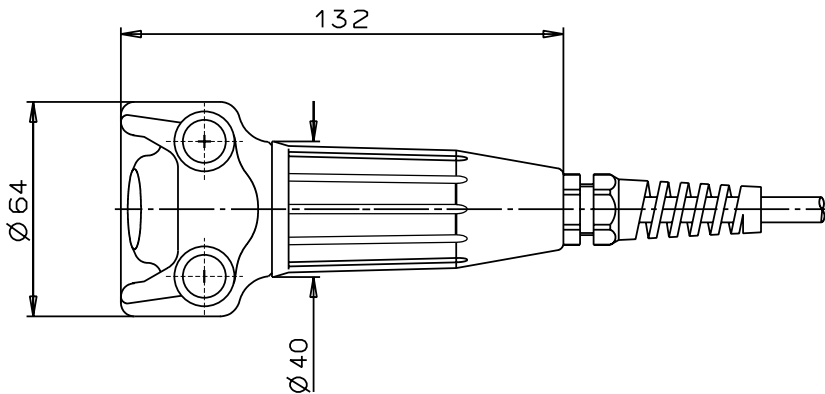
- protective circuits
- short circuit evaluation unit
- cable with separately shielded wires. Shields must be connected with the machine ground. Short circuits can be detected and the control unit will shut down immediately.

## Fixing bracket for type ZSA



# Enabling Switches - Type ZSB (3-stage / single channel)

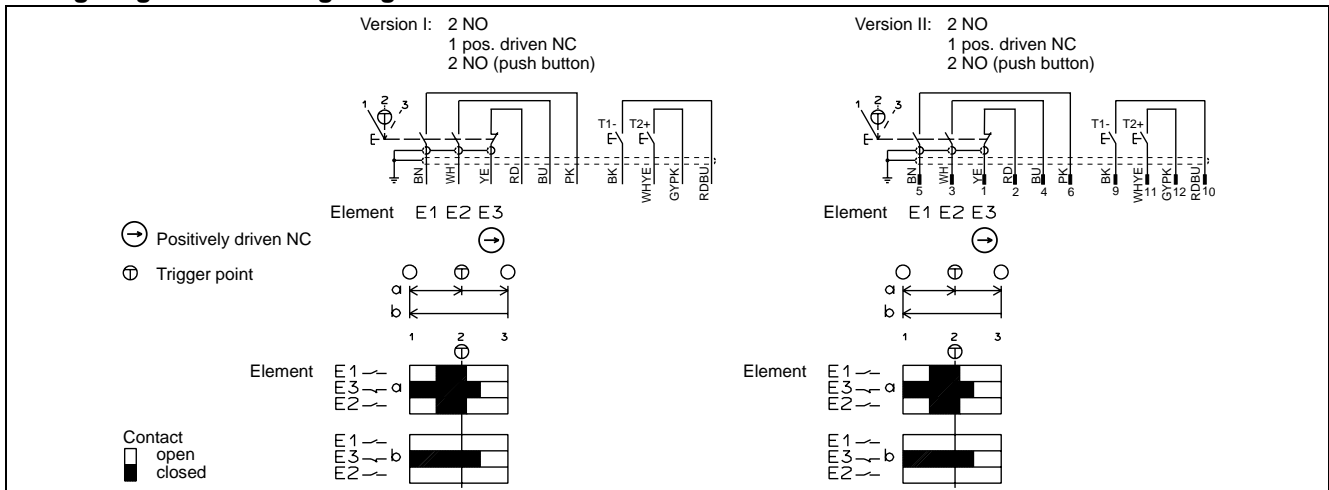
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 65	
Ambient temperature	- 5 to + 60	°C
Switching elements	2 NO + 1 NC ⊖ + 2 NO (push button)	
Switching principle (E1 - E3)	Slow-action Switch	
Utilization category to IEC 947-5-1	E1 - E3 AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A	
	DC-13 U <sub>e</sub> 230 V I <sub>e</sub> 0,3 A / U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
	T1 - T2 32 V AC 400 mA, 50 V DC 100 mA	
Plug connector	U <sub>i</sub> = 32 V, degree of soiling 3	
Connection type	Cable 4 x 0.5 mm <sup>2</sup> single shielded + 4 x 0.5 mm <sup>2</sup> + 8 x 0.14 mm <sup>2</sup>	
Fuse	6 A quick action	A
Weight	approx. 1.1	kg

## Wiring diagram/Switching diagram

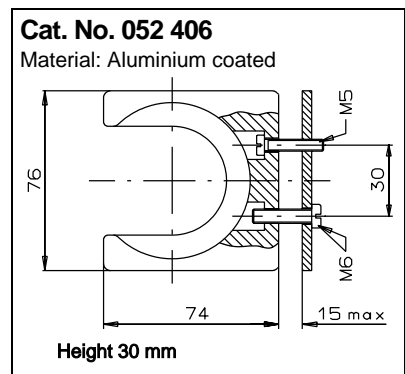


## Ordering table

	Contacts	free cable end		Types	Cat. No.
		5 m straight	10 m straight		
I	2 NO + 1 NC ⊖ + 2 NO (push button)	x		ZSB2A2G05A	073 260
			x	ZSB2A2G10A	073 261

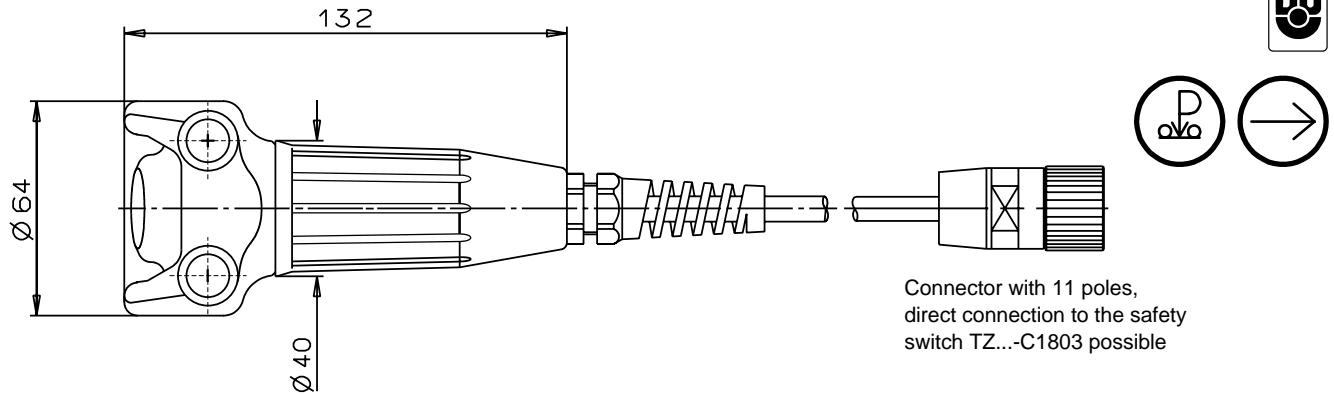
	Contacts	12 pin connector Coninvers		Types	Cat. No.
		5 m straight	10 m straight		
II	2 NO + 1 NC ⊖ + 2 NO (push button)	x		ZSB2A2G05C	073 264
			x	ZSB2A2G10C	073 265

## Fixing bracket for type ZSB



# Enabling Switches - Type ZSB (3-stage / dual channel)

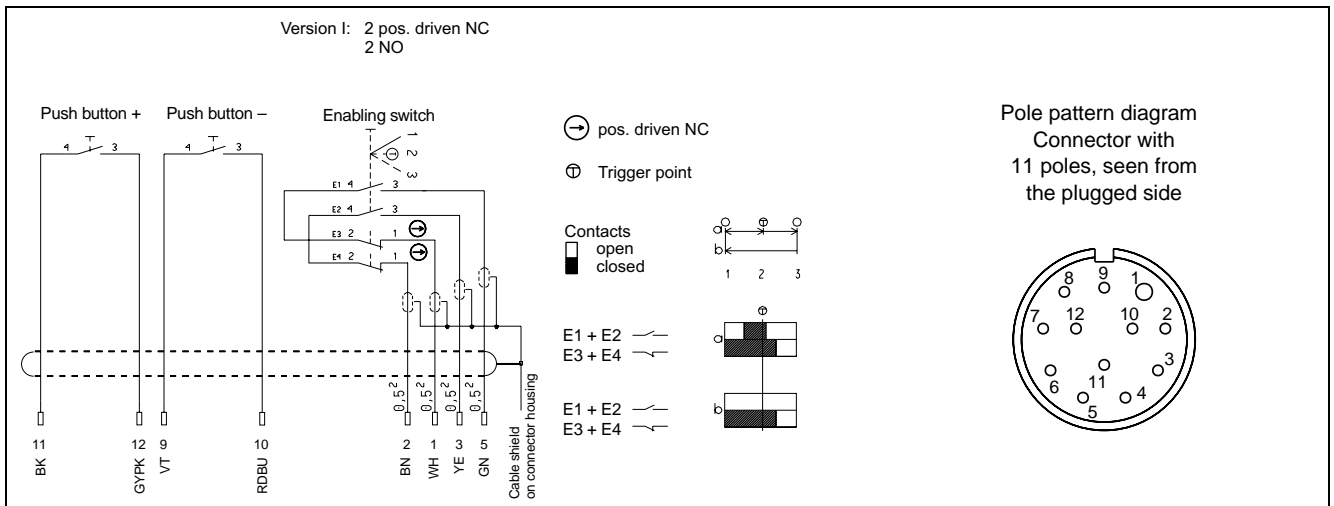
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 65	
Ambient temperature	- 5 to + 60	°C
Switching elements	2 NO, 2 NC ⊖	
Switching principle	Slow-action Switch	
Utilization category E1 - E3 to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A DC-13 U <sub>e</sub> 230 V I <sub>e</sub> 0.3 A / U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connector	U <sub>e</sub> 32 V degree of soiling 3	
Connection	Cable 4 x 0.5 mm <sup>2</sup> (single shielded) + 4 x 0.5 mm <sup>2</sup> + 8 x 0.14 mm <sup>2</sup> with plug connector 12 pole., Type Coninvers	
Fuse	6 A quick action	A
Weight	approx. 1.3	kg

## Wiring diagram/Switching diagram



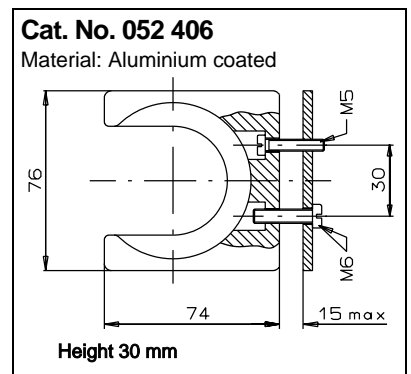
## Ordering table

	Contacts	Cable	Type	Cat. No.
I	2 NO + 2 NC ⊖	5 m straight	ZSB077040	077 040

The enabling switch also can be connected directly to the TZ...-C1803 switch (see page 90) with a connector with 11 poles  
Through the use of the enabling switch the opening contacts of the safety switches are overbridged when the actuating element is pressed, and the installation can be started in manual operation mode with the safety guard open.

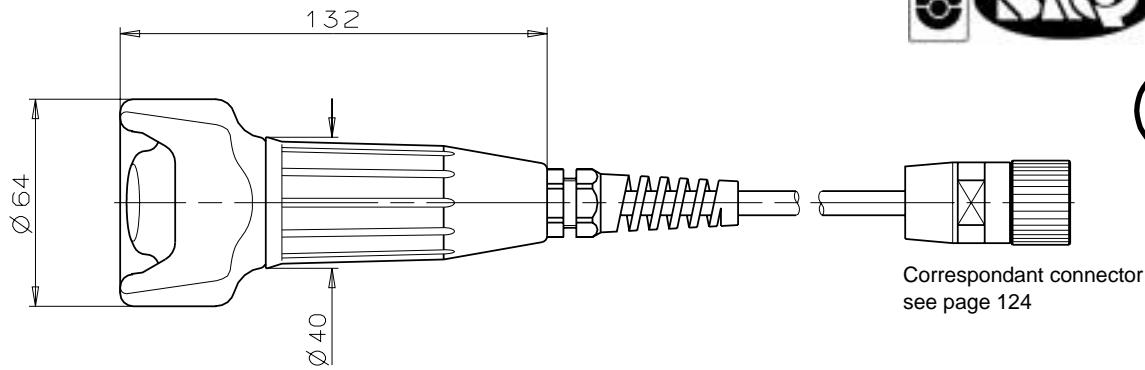
When enabling switches are used, the regulations EN 775 and VDI 2854 have to be kept.

## Fixing bracket for type ZSB



# Enabling Switches - Type ZSA (3-stage / single channel)

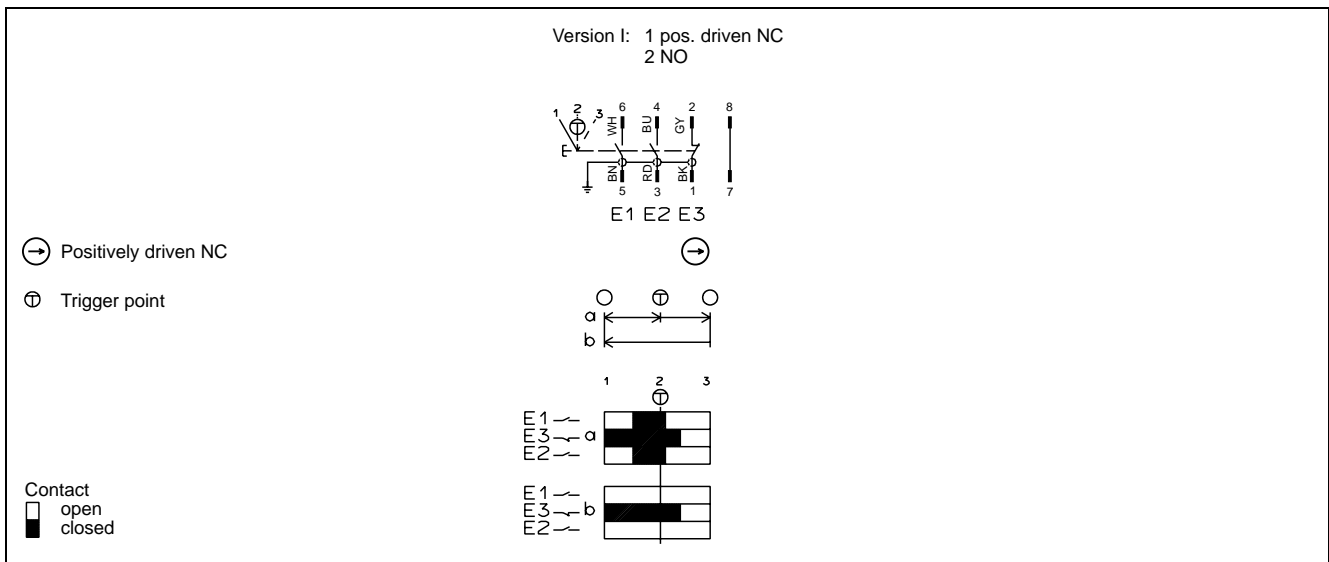
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 67	
Ambient temperature	- 5 to + 60	°C
Switching elements	2 NO, 1 NC ⊕	
Switching principle	Slow-action Switch	
Utilization category E1 - E3 to IEC 947-5-1	AC-15 $U_e$ 230 V $I_e$ 4 A DC-13 $U_e$ 230 V $I_e$ 0.3 A / $U_e$ 24 V $I_e$ 3 A	
Connector	$U_e$ 32 V, degree of soiling 3	
Connection	Cable 8 x 0.34mm <sup>2</sup> with plug connector 12 pin, type Coninvers	
Fuse	6 A quick action	A
Weight	approx. 1.3	kg

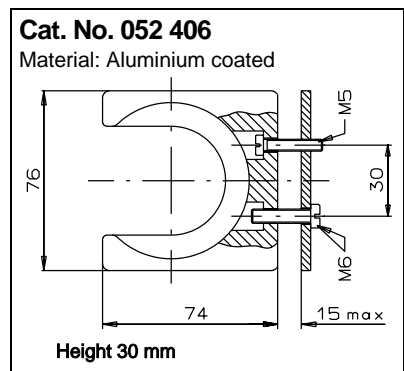
## Wiring diagram/Switching diagram



## Ordering table

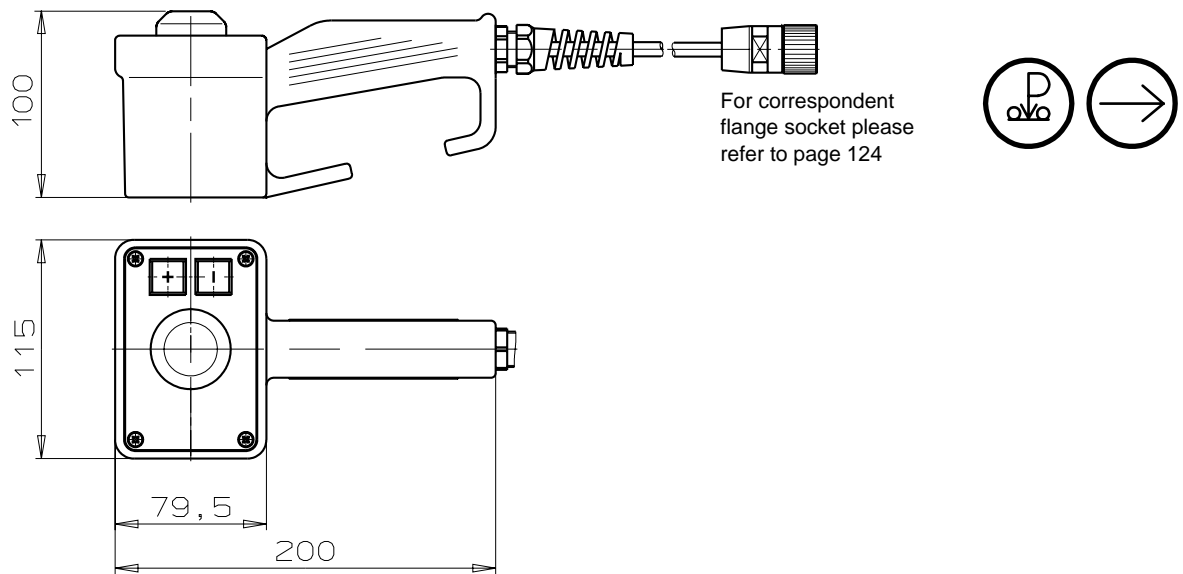
	Contacts	Cable	Type	Cat. No.
I	2 NO + 1 NC ⊕	5 m straight	ZSA2A2G05C-1770	073 289

## Fixing bracket for type ZSA



# Enabling Switches - Type ZSB (3-stage / dual channel)

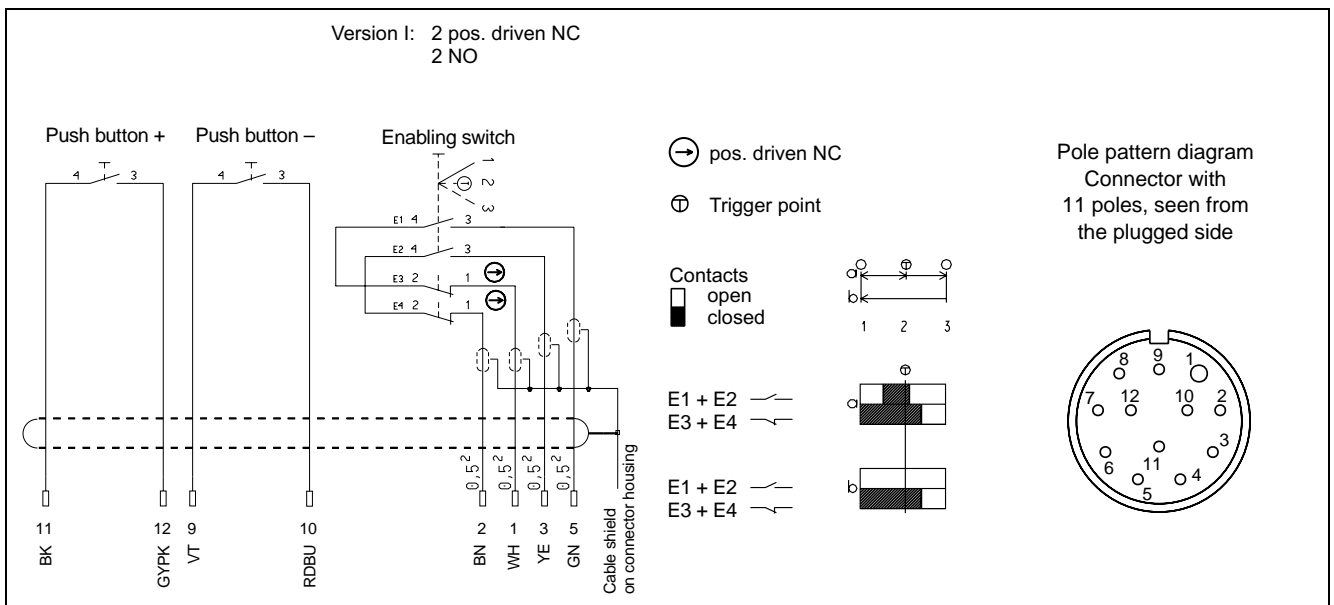
## Dimension drawing



## Technical data

Parameter	Value		Unit
Housing material	Plastic		
Environmental protection to IEC 529	IP 65		
Ambient temperature	- 5 to + 60		°C
Switching elements	see ordering table version I		
Switching principle	Slow-action Switch		
Utilization category to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A	DC-13 U <sub>e</sub> 230 V I <sub>e</sub> 0.3 A DC-13 U <sub>e</sub> 240 V I <sub>e</sub> 3 A	
Connection	Cable 4 x 0.5 mm <sup>2</sup> (single shielded) + 4 x 0.5 mm <sup>2</sup> + 8 x 0.14 mm <sup>2</sup> with plug connector 12 pin. (Type Coninvers)		
Fuse	6 A quick action		A
Weight	approx. 1.5		kg

## Wiring diagram/Switching

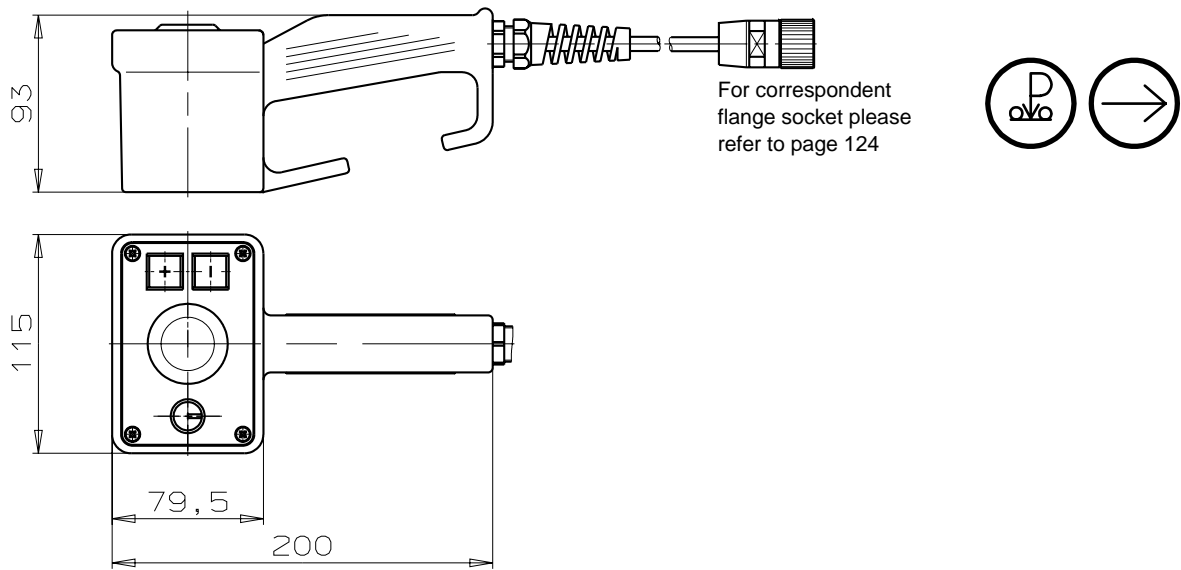


## Ordering table

	Contacts	Cable			Type	Cat. No.
		3 m straight	5 m straight	12 m straight		
I	2 NO + 2 NC (arrow)		x		ZSB077029	077 029

# Enabling Switches - Type ZSB (3-stage / single channel)

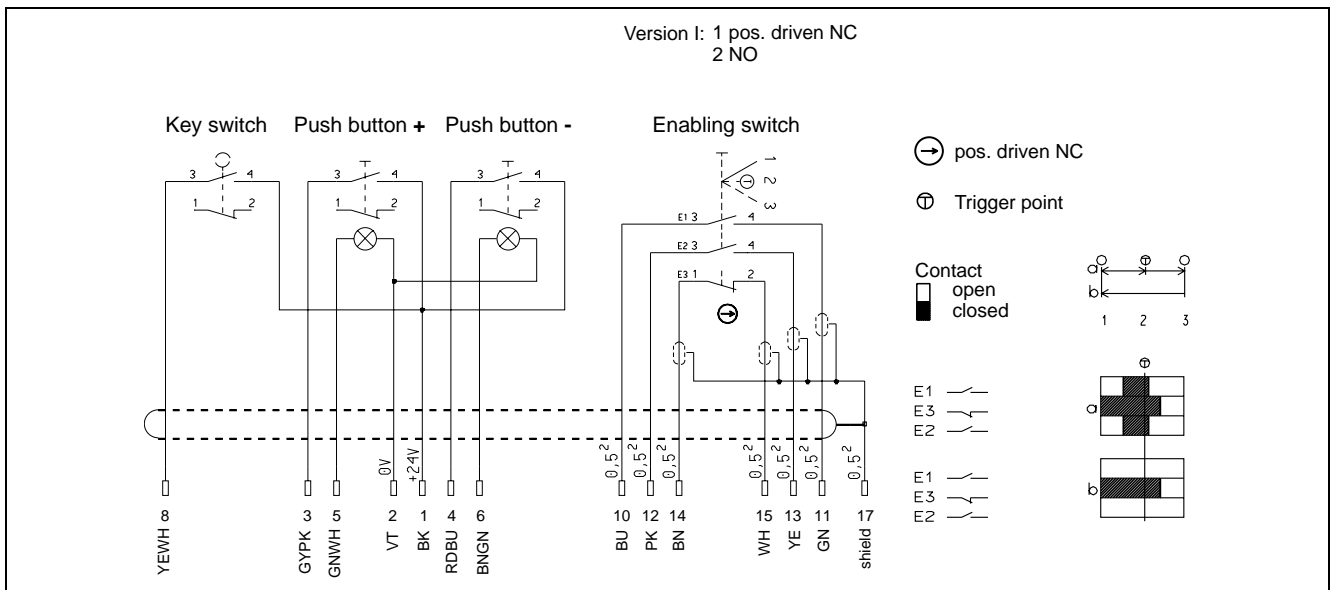
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 65	
Ambient temperature	- 5 to + 60	°C
Switching elements	see ordering table version I	
Switching principle	Slow-action Switch	
Utilization category to IEC 947-5-1	AC-15 U <sub>e</sub> 32 V I <sub>e</sub> 4 A      DC-13 U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connection	4 x 0,5 mm <sup>2</sup> (shielded) + 4 x 0,5 mm <sup>2</sup> + 8 x 0,14 mm <sup>2</sup>	
	Plug connector 16 + PE (type Coninvers)	
Fuse	6 A quick action	A
Weight	approx. 1.5	kg

## Wiring diagram/Switching diagram

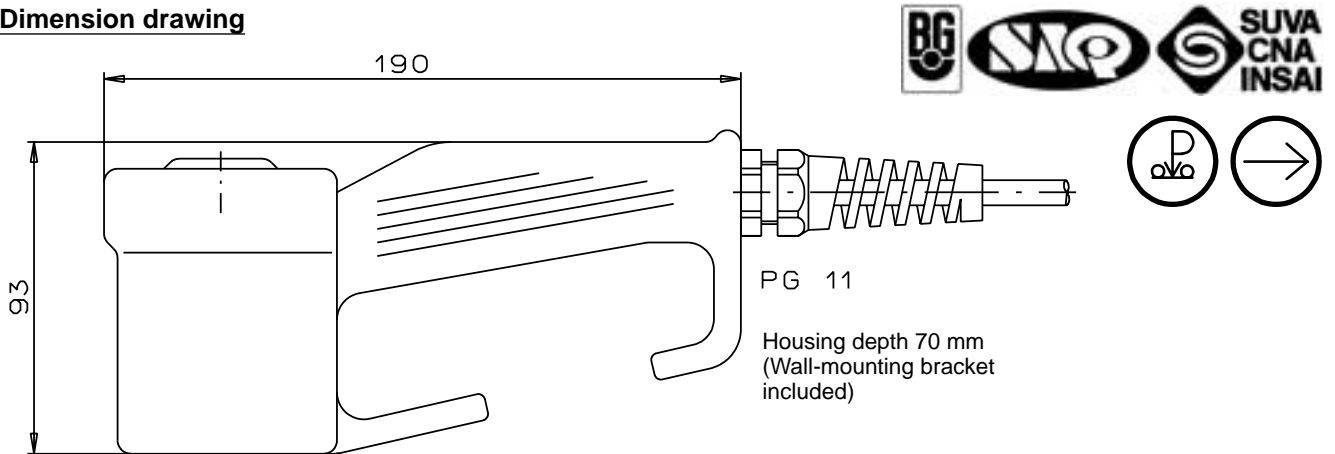


## Ordering table

	Contacts	Cable			Types	Cat. No.
		3 m straight	5 m straight	12 m straight		
I	2 NO + 1 NC ⊕	x			ZSB070904	070 904
			x		ZSB072645	072 645
				x	ZSB072403	072 403

# Enabling Switches - Type ZSR (3-stage / single channel)

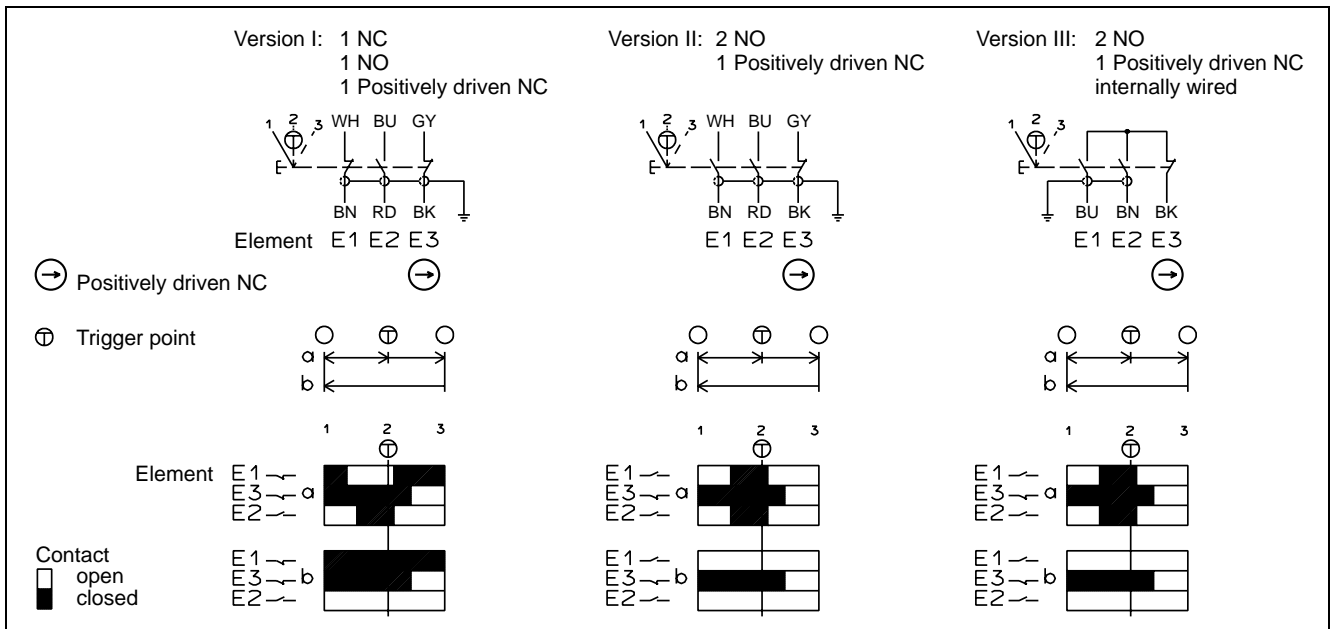
## Dimension drawing



## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 65	
Ambient temperature	- 5 to + 60	°C
Switching elements	see ordering table version I to III	
Switching principle	Slow-action-Switch	
Utilization category to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A      DC-13 U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connection	Version I and II 6 x 0.34 mm <sup>2</sup> Version III 3 x 0.75 mm <sup>2</sup>	
Fuse	6 A quick action	A
Weight	approx. 1.2	kg

## Wiring diagram/Switching diagram

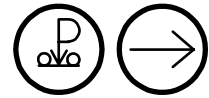


## Ordering table

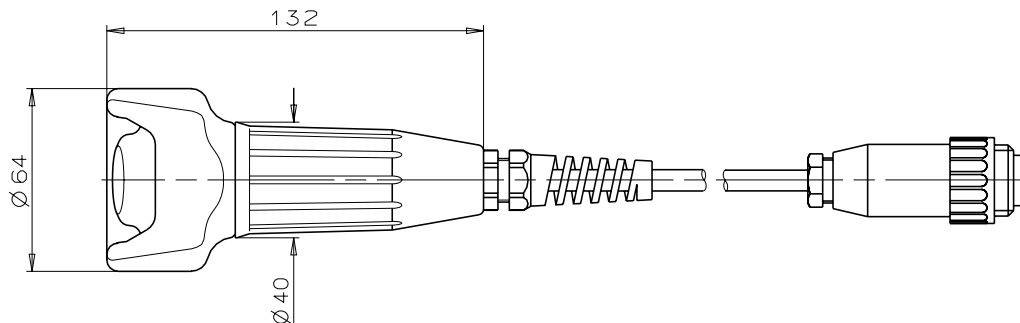
	Contacts	Cable			Types	Cat. No.
		5 m straight	10 m straight	5 m coiled		
I	1 NC + 1 NO + 1 NC ⊖	x			ZSR2A1G05A	055 423
			x		ZSR2A1G10A	055 424
				x	ZSR2A1S05A	055 425
II	2 NO + 1 NC ⊕	x			ZSR2A2G05A	055 427
			x		ZSR2A2G10A	055 428
				x	ZSR2A2S05A	055 429
III	2 NO + 1 NC ⊕ internally wired	x			ZSR2B2G05A	055 431
			x		ZSR2B2G10A	055 432

# Enabling Switches - Type ZSA - Special version

Version: DaimlerChrysler  
 3-stage / single channel  
 Special feature: Can also be used for safety switches  
 type NZ2VZ-538EC1420 (see page 82)



## Dimension drawing

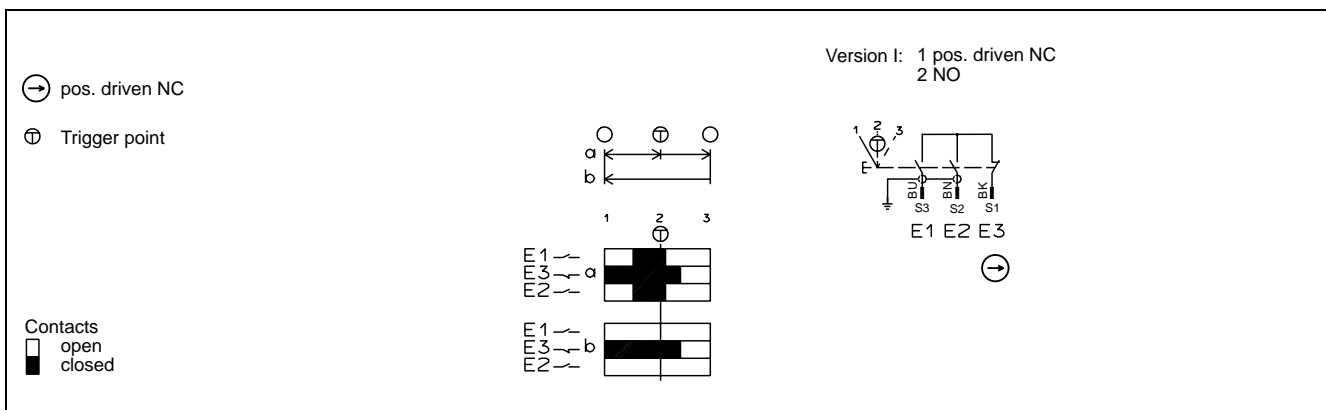


Please order appropriate connector separately.  
 Socket contacts with 7 poles AMPHENOL TUCHEL, type C16-1  
 EUCHNER-part-no. 043861

## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 67	
Ambient temperature	- 5 to + 60	°C
Switching elements	2 NO, 1 NC $\rightarrow$	
Switching principle	Slow-action Switch	
Utilization category E1 - E3 to IEC 947-5-1	AC-15 $U_e$ 230 V $I_e$ 4 A DC-13 $U_e$ 230 V $I_e$ 0.3 A / $U_e$ 24 V $I_e$ 3 A	
Connector	$U_e$ 32 V degree of soiling 3	
Connection	Cable 3 x 0.75 mm <sup>2</sup> with plug connector	
Fuse	6 A quick action	A
Weight	approx. 1.3	kg

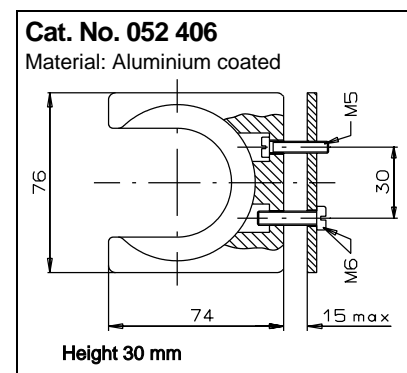
## Wiring diagram/Switching diagram



## Ordering table

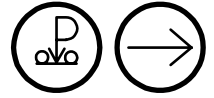
	Contacts	Cable	Type	Cat. No.
I	2 NO + 1 NC $\rightarrow$	10 m straight	ZSA2B2G10B	057 100

## Fixing bracket for type ZSA

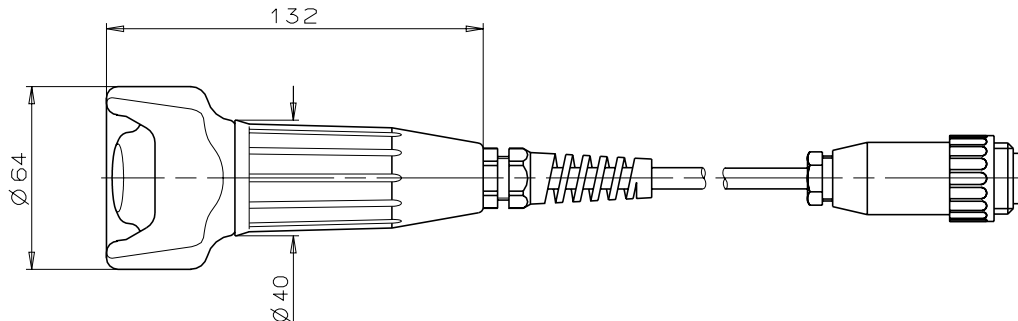


# Enabling Switches - Type ZSA - Special version

Version: DaimlerChrysler  
3-stage / dual channel  
Special feature: Can also be used for safety switches  
type NZ2VZ-538EC1701 (see page 82)



## Dimension drawing

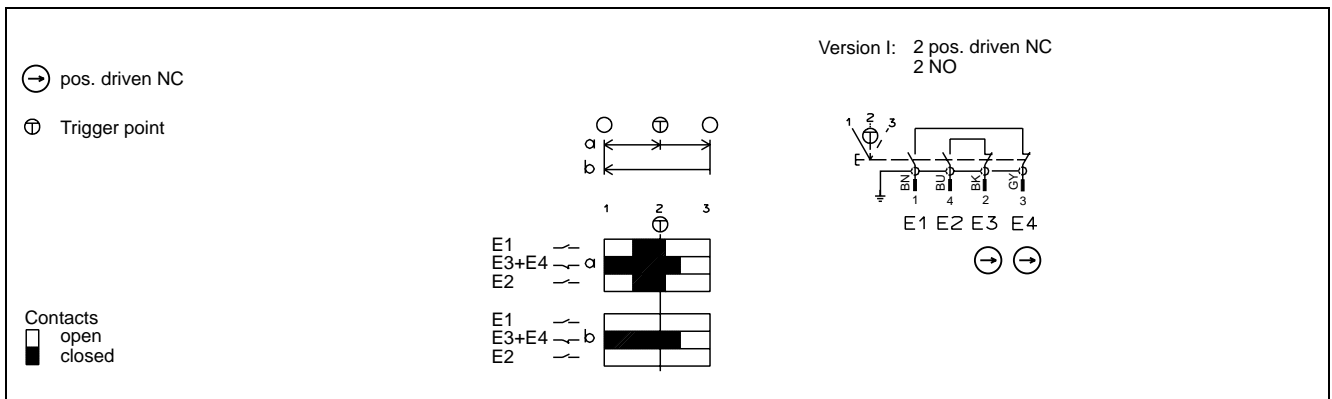


Please order appropriate connector separately.  
Socket contacts with 7 poles  
AMPHENOL TUCHEL,  
type C16-1  
EUCHNER-part-no. 043861

## Technical data

Parameter	Value	Unit
Housing material	Plastic	
Environmental protection to IEC 529	IP 67	
Ambient temperature	- 5 to + 60	°C
Switching elements	2 NO, 2 NC ⊕	
Switching principle	Slow-action Switch	
Utilization category E1 - E3 to IEC 947-5-1	AC-15 U <sub>e</sub> 230 V I <sub>e</sub> 4 A DC-13 U <sub>e</sub> 230 V I <sub>e</sub> 0.3 A / U <sub>e</sub> 24 V I <sub>e</sub> 3 A	
Connector	U <sub>e</sub> 32 V degree of soiling 3	
Connection	Cable 8 x 0.34 mm <sup>2</sup> with plug connector	
Fuse	6 A quick action	A
Weight	approx. 1.3	kg

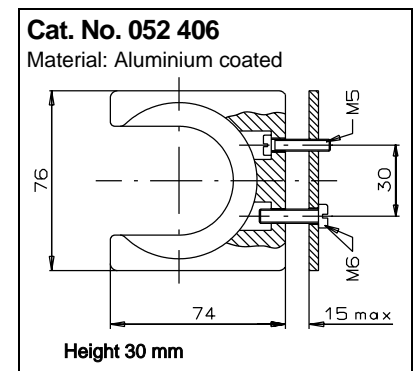
## Wiring diagram/Switching



## Ordering table

	Contacts	Cable	Type	Cat. No.
I	2 NO + 2 NC ⊕	10 m straight	ZSA2B4G10B	070 788

## Fixing bracket for type ZSA



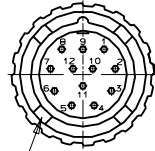
# Accessories - Connectors

## Connectors

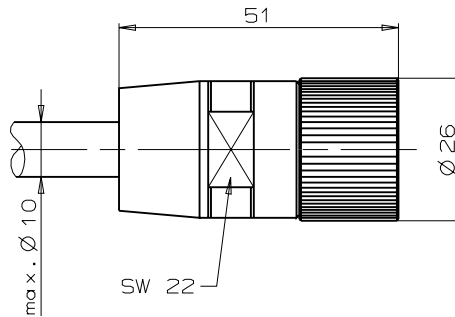
### Metal-encapsulated (12 poles)

#### Male plug

Pinout of male connector plug side



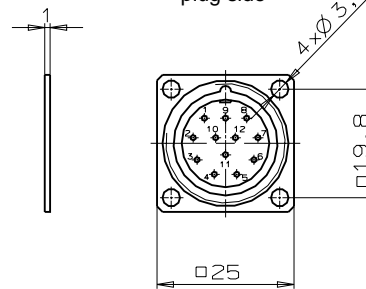
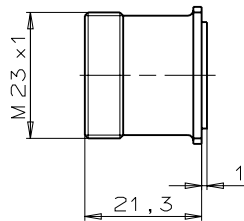
Key pattern for assembly tool RC-Z2099 (Type Coninvers)



#### Female socket

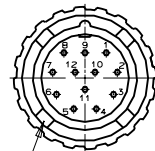
Flat sealing

Pinout of female connector plug side

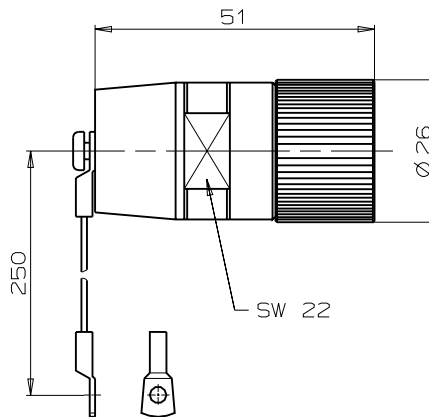


#### Protective plug

Pinout of male connector plug side



Key pattern for assembly tool RC-Z2099 (Type Coninvers)



For special applications our customers themselves can put bridges to single contact.

### Technical data

Housing material	Metal
Number of poles	12 pole, shield connected to housing
Nominal voltage	32 V ~ / = degree of soiling 3
Connection plug	Crimp contacts, included in packaging
Connection socket	Solder terminal, fixed in socket

### Ordering table

Thread	Connector type	Cat. No.
M23 x 1	Male plug	073 294
M23 x 1	Female socket	073 290
M23 x 1	Protective plug	073 293

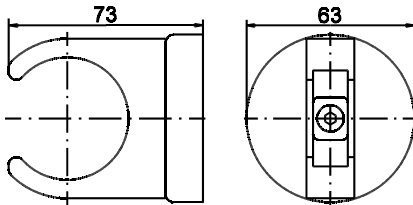
# Accessories - Fixing Brackets for Enabling Switches

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## Fixing Bracket with Magnet

The magnetic fixing bracket enables it to be easily and quickly fixed in any position.

Cat. No. 059 340



## Fixing Bracket Aluminium

The fixing bracket can be permanently fixed to sheet metal with maximum thickness of 15 mm by M5 or M6 screws.

Cat. No. 052 406

Material: Aluminium coated

