

B-COMMAND[®]

ACCEPT ENABLING SWITCHES



Product overview

Enabling Switches Panel Mounted - Accept A



ZA1

Enabling Switches
Small configuration, side and top mounting type

page 5



ZA2

Redundant Enabling Switches with and without rubber cap,
optional auxiliary contacts

page 6 - 7



ZA3

Redundant Enabling Switches with or without rectangular rubber cap,
Ø 16mm mounting diameter

page 8 - 9



ZA5

Redundant Enabling Switches with or without round
rubber cap, Ø 16mm mounting diameter

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ZA6

Redundant Enabling Switches with or without rubber cap

page 10 - 11

Enabling Switches Grip Type – Accept B



ZB1

Redundant Enabling Switches, with hand grip, optional
Emergency-Stop-Button

page 12 - 13



ZB2

Redundant Enabling Switches, with hand grip, Emergen-
cy-Stop-Button and 2 buttons optional

page 14 - 15

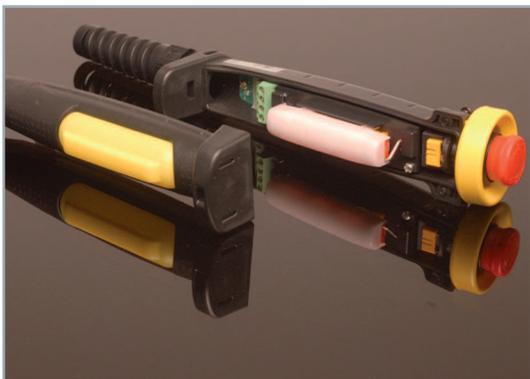


B-COMMAND – Quality and Reliability

Why 3-position enabling switches are so important

If personal protection in the area of human-machine interaction is necessary, there is a distinction between normal and specific operations. Normal operation for robots, stands for automatic functions in which the operational protection mechanisms are active.

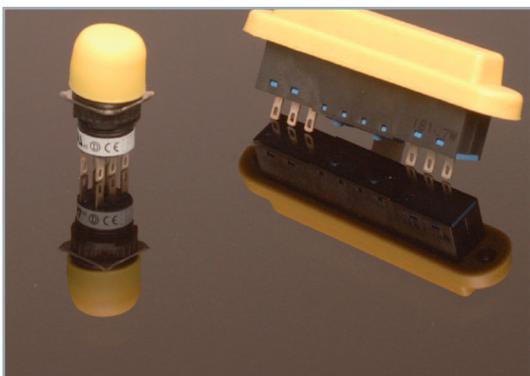
The specific operation covers the installation, programming, troubleshooting and maintenance. During this work, the effect of the normal protection scheme must be repealed. To ensure personal security in this mode, additional measures must be taken. These include the usage of enabling switches.



According to international standards, an enabling switch must be provided with 3 positions (OFF-ON-OFF). From an ergonomic point of view an operator in a shock situation either releases the switch or he pushes it firmly. If the switch is released, all versions of B-COMMAND enabling switches will shut down the machine. If the switch is pressed through, only the 3-position switch ensures a shutdown and avoids the risk of an injury. Another security requirement for an enabling switch is avoiding to turn ON while being released from position 3 (OFF) to position 1 (OFF) (IEC60204-1, 9.2.5.8).

The enabling switches of B-COMMAND are characterized by the following advantages:

- Ideal ergonomics
- Light weight
- Stable pressure point
- 2 power circuits (redundancy)
- Auxiliary contacts for monitor functions
- Tamper-proof

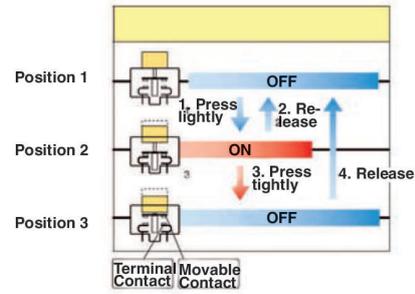


TECHNOLOGY

Mechanics of 3-Position Switches

By using an enabling switch the operator is able to prevent damage to people and equipment, in the case of an unpredictable behaving machine.

Panicking people normally respond either by pressing firmly or by releasing the button: Both ways shutdown the machine reliably.

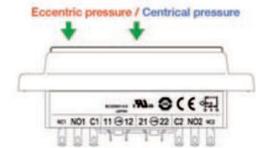
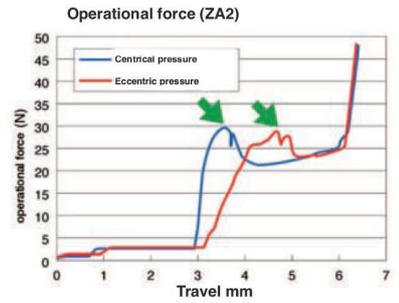
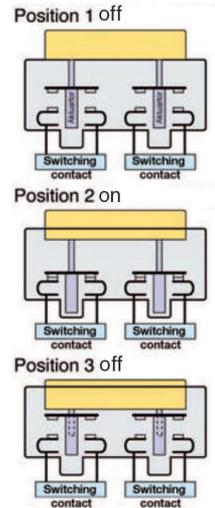


PRODUCTS

Highest Production Excellence and Reliability

The enabling switches have redundant switching contacts and redundant actuators. With a suitable circuit the deviation of the switching states of both contacts can be detected as an error and the machine can be decommissioned, in spite of possibly damaged contacts.

For an optimal ease of use the actuating force from position 2 to 3 for the centric and the eccentric pressure is absolutely identical: Even switching with only one finger on the outer end is easily possible. Even after the 10,000 activations the necessary workforce only changes marginal.



STANDARDS

IEC 60947-5-8 already published

Although international rules require the use of 3-Position enabling switches, nothing was determined regarding the operating force and the lifetime of a switch. Both are of crucial, ergonomic importance.

All enabling switches of B-COMMAND were designed and tested with special attention to long life and maximum safety. The special requirements of IEC 60947-5-8 constituted the basis of the product.

Icon	Standard	Description
ISO	ISO 12100-1 (2003) Reliability of machinery - basic principles, general arrangement guidelines – Part 1: Basic terminology and methodology	3.26.2 permission-switch unit
	ISO 12100-2 (2003) Safety of machinery - Basic concepts, general principles for design, Part 2: Technical principles and specifications	4.11.9 operating mode adjustment, educate, modification and maint. cleaning, troubleshooting
	ISO 10218-1 (2006) industrial robot – safety requirement - Part 1: Robot	5.8.3 permission-switch unit
IEC	IEC 60204-1 (2005) machine safety – Electrical equipment of machines Part 1: General requirements	10.9 permission-switch unit
	IEC 60947-5-8 (2006) Low-voltage – switchgear- Part 5-8: control unit and switching elements- 3-position enabling switch	3-position enabling switch
ANSI	ANSI/RIA/ISO 10218-1 (2007) industrial robot – safety requirement – Part 1: robot	5.8.3 permission-switch unit
	ANSI/RIA R15.06 (1999) Industrial robot & robot requirement – safety requirement	4.7.3 permission-switch unit
	ANSI B11.19 (2003) performance conditions for protection device	12.3 permission-switch unit
NFPA	NFPA79 (2007) electrical standard for industrial machines	9.2.5.7 permission-switch unit
CSA	CAN/CSA Z434-03 (2003) industrial robot and robot system – general safety requirement	4.7.4 permission-switch unit
semi	SEMI S2-0706 (2006) Environment-, health-, and security policy in semiconductor production	20.4 industrial robot and industrial robot systems
UL	UL 1740 (1998) Robot and robot equipment	41.5 operator terminal
JIS	JIS B 9700-1 (2004) Reliability of machinery - basic principles, general arrangement guidelines Part1: Basic terminology and methodology	3.26.2 permission-switch unit
	JIS B 9700-2 (2004) Reliability of machinery - basic principles, general arrangement guidelines Part 2: Technical principles and specifications	4.11.9 operating mode adjustment, educate, modification, troubleshooting, cleaning and maintenance
	JIS B 9960-1 (1999) machine safety – electrical equipment of machinery	9.2.5.8 permission-switch unit



Enabling Switch ZA1

- 3 positions (OFF - ON - OFF)
- Ideal as enabling switch on input devices
- 1 main contact (NO)
- Small size
- Positive opening (Level 2 - Level 3)
- The switch does not turn ON while being released from position 3 (OFF when pressed) to position 1 (OFF when released)

General Data

Instructions and approvals



IEC 60947-5-1, EN 60947-5-1 (DEMKO

approval) UL508 (UL recognized),
CSA C22.2, No. 14 (c-UL recognized),
JIS C8201-5-1 ISO 12100 / EN 292, IEC

60204-1 / EN 60204-1 ISO 11161 / prEN
11161, ISO 10218 / EN 775, ANSI/RIA
R15.06, ANSI B11.191

- Operating temperature -20 to +60 °C (no freezing)
- Storage temperature -40 to +80 °C (no freezing)
- Relative humidity 45 to 85% (no condensation)
- Pollution degree 2 (IEC947-1)
- Contact resistance 50 mΩ (initial value)
- Insulation resistance 100 MΩ min. (Megger DC 500 V)
- Dielectric strength 2,5 kV
- Operating frequency 1.200 operations per hour
- Mechanical lifetime Position 1—2—1: 10⁶ operations min.
Position 1—2—3—1: 10⁵ operations min.
10⁵ operations minimum
- Electrical lifetime
- Shock resistance Operation: 150 m/s²
Destruction: 1.000 m/s²
- Vibration resistance Operation: 5 to 55 Hz, amplitude 0,5 mm min.
Destruction: 16,7 Hz, amplitude 1,5 mm min.
- Terminal style Solder terminal
- Applicable wire 0,5 mm² max. / cable
- Solder terminal heat resistance 310 to 350°C, 3 seconds max.
- Terminal tensile strength 20 N minimum
- Mounting screw recommended M3 / 0,5 to 0,8 Nm
tightening torque
- Degree of protection IP40 (IEC 60529)
- Conditional short-circuit current 50 A (250 V)
- Rec. short circuit fuse 250 V, 10 A fast acting type fuse for
short-circuit protection (IEC 60127-1)
- Weight approx. 6 g
- Direct opening force 30 N min. (position 2 — 3)
- Operator strength 250 N min.

Electrical Specification

• Rated voltage	250 V AC / DC		
• Operating current	5,0 A		
• Rated data	30 V	125 V	250 V
• Resistive load (AC 12)	—	3,0 A	1,5 A
• Inductive load (AC 15)	—	1,5 A	0,75 A
• Resistive 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	1NO contact		

Min. load: 3 V AC / DC und 5 mA (reference value).

Operation Character

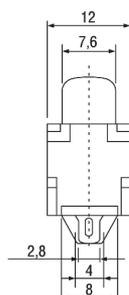
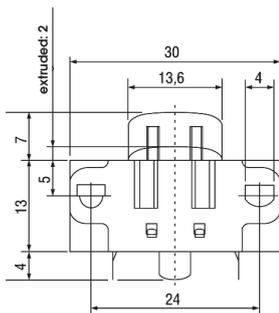
Step	1	2	3
• Actuator travel (mm)	0,0	1,4	2,2 2,7 5,0
• Operating force (N)	0,0	2,3	3,0 15 3,0
• Work contact			

open closed positive opening operation

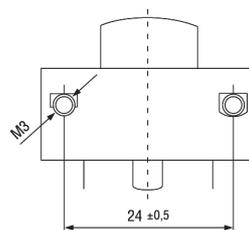
Ordering Information

Picture	Mounting type	Type no.
	Side	ZA1K0-01
	Front	ZA1K0-02

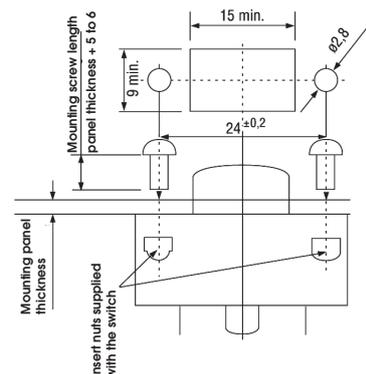
Dimensions (all dimensions in mm)



ZA1K0-01
(side mounting type)



ZA1K0-02
(top mounting type)





Enabling Switch ZA2

- 3 positions (OFF - ON - OFF)
- Ideal as enabling switch on input devices
- 2 contacts (changeover)
- Positive opening of the auxiliary contacts (Level 2 - Level 3)
- The switch does not turn ON while being released from position 3 (OFF when pressed) to position 1 (OFF when released)
- Redundant contact configuration fulfills safety category 4
- Auxiliary contacts for monitor functions
- With rubber cap IP65

General Data

Instructions and approvals



IEC 60947-5-1, EN60947-5-1 (DEMKO approval), UL508 (UL recogni-

CSA C22.2, No. 14 (c-UL recognized), JIS C8201-5-1, ISO 12100 / EN 292, IEC 60204-1 / EN 60204-1, ISO11161 / prEN 11161, ISO10218 / EN 775, ANSI /

RIA

- Operating temperature -25 to +60 °C (no freezing)
- Storage temperature -40 to +80 °C (no freezing)
- Relative humidity 45 to 85% RH (no condensation)
- Pollution humidity 2 (inside panel, operator side)
3 (outside panel, operator side)
- Contact resistance 50 mΩ maximum (initial value)
- Insulation resistance 100 MΩ minimum (500 V DC megger)
- Dielectric strength 2,5 kV
- Operating frequency 1.200 operations per hour
- Mechanical lifetime Position 1—2—1: 10⁵ operations min.
Position 1—2—3—1: 10⁵ operations min.
- Electrical lifetime 10⁵ operations minimum
- Shock resistance Operation: 150 m/s²
Destruction: 1.000 m/s²
- Vibration resistance Operation: 5 to 55 Hz, amplitude 0,5 mm min.
Destruction: 16,7 Hz, amplitude 1,5 mm min.
- Terminal style Solder terminal
- Applicable wire 0,5 mm² maximum / cable
- Solder terminal heat resistance 310 to 350°C, 3 seconds maximum
- Terminal tensile strength 20 N minimum
- Mounting screw recommended M3 / 0,5 to 0,8 Nm
- Degree of protection IP40 (without rubber cap) / IP65 (with)
- Conditional short-circuit current 50 A (250 V)
- Rec. short circuit fuse Use 250 V/10 A fast acting (IEC 60127-1)
- Weight 26 g (without rubber cap)
30g (with rubber cap)
- Direct opening force 60 N min.
- Operator strength 500 N min.

Electrical Specification

• Rated voltage	250 V AC / DC		
• Operating current	3,0 A		
• Rated data	30 V	125 V	250 V
Working contacts			
• Resistive load (AC 12)	—	1,0 A	0,5 A
• Inductive load (AC 15)	—	0,7 A	0,5 A
• Resistive load (DC 12)	1,0 A	0,2 A	—
• Inductive load (DC 13)	0,7 A	0,1 A	—
• Contact configuration	2 changeover contacts		

Auxiliary contacts

• Resistive load (AC 12)	—	2,0 A	1,0 A
• Inductive load (AC 15)	—	1,0 A	0,5 A
• Resistive 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	0-4 NC contacts		

Min. load: 3 V AC / DC and 5 mA (reference value).

Operating characteristics

	1	2	3			
• Actuator travel (mm)	0,0	1,4	2,4	3,6	4,2	6,0
• Operating force (N)*	0,0	4,0	4,5	30	24	26
• working contact 1 (NO1-C1)	[Bar chart showing closed state]					
• working contact 1 (NO2-C2)	[Bar chart showing closed state]					
• 1 auxiliary contact (11-12)	[Bar chart showing positive opening operation]					
• 2 auxiliary contact (21-22)	[Bar chart showing positive opening operation]					
• 3 auxiliary contact (31-32)	[Bar chart showing positive opening operation]					
• 4 auxiliary contact (41-42)	[Bar chart showing positive opening operation]					

□ open ■ closed ⊞ positive opening operation

*Please note: The operating forces gives a refer to a switch without a rubber cap.

Ordering Data

Image	Operating Contacts	Auxiliary Contacts		Serial Number
		„Actuator not operated“*	„Actuator operated“**	
 with rubber cap	2	0	0	ZA2**0-01
	2	1	1	ZA2**2-01
	2	2	2	ZA2**4-01
 without rubber cap	2	0	0	ZA2K0-01
	2	1	1	ZA2K2-01
	2	2	2	ZA2K4-01
 rubber cap	Rubber cap ZA2, black			ZA2-01
	Rubber cap ZA2, black, silicone free			ZA2-02
	Rubber cap ZA2, grey, silicone free			ZA2-03
	Rubber cap ZA2, yellow			ZA2-04
	Rubber cap ZA2, yellow, silicone free			ZA2-05

Please note:

* „Actuator not operated“ and „Actuator operated“ describe auxiliary contacts, by which the switching status can be signalled.

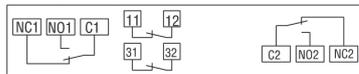
** Insert letter Y: yellow or S: black for the desired colour.

Terminal Arrangement

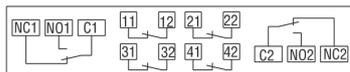
Bottom View



ZA2K0-01



ZA2K2-01



ZA2K4-01

1. NO1-C1, NO2-C2: Connections of operating contact
2. 11-12, 21-22: Connections of auxiliary contacts „Actuator operated“
3. 31-32, 41-42: Connections for auxiliary contacts „Actuator operated“

Ordering Information

Z A 2 _____ **-01**

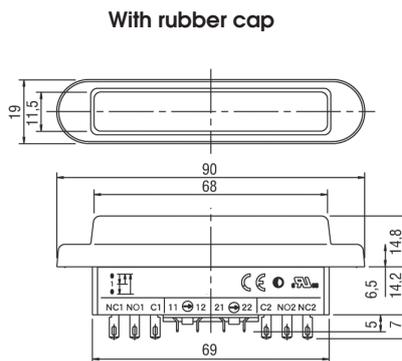
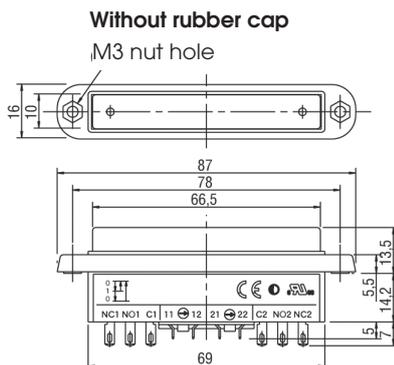
Rubber cap

K = no rubber cap
 Y = yellow
 S = black
 G = grey, silicone-free
 SF = black, silicone-free
 YF = yellow, silicone-free

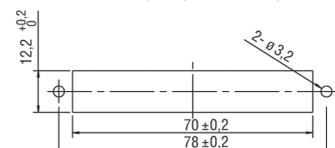
Auxiliary Contacts

0 = without
 2 = 2 Auxiliary contact
 4 = 4 Auxiliary contact

Dimensions (all dimensions in mm)



Mounting hole layout





Enabling Switch ZA3 / ZA5

- Dimension Ø 16 mm
- 3 positions (OFF - ON - OFF)
- Ideal as enabling switch on input devices
- 2 contacts (changeover)
- The switch does not turn ON while being released from position 3 (OFF when pressed) to position 1 (OFF when released)
- Redundant contact configuration fulfils safety category 4
- With rubber cap IP65

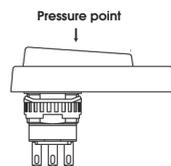
General Data

Instructions and approvals



- Operating temperature: Silicone: -25°C to +60°C (no freezing)
PVC: -10°C to +60°C (no freezing)
-40°C to +80°C (no freezing)
45 to 85% (no condensation)
- Storage temperature: 3
- Relative humidity: 50 mΩ (initial value)
- Pollution degree: 100 MΩ min. (500 V DC megger)
- Contact resistance: 1,5 kV
- Insulation resistance: 1.200 operations/hour
- Dielectric strength: Position 1—2—1: 10⁶ operations min.
Position 1—2—3—1: 10⁵ op. min.
- Switching frequency: 10⁵ operations (full load)
- Mechanical lifetime: Operation: 150 m/s²
Destruction: 500 m/s²
- Electrical durability: Operation: 5 to 55 Hz, amplitude 0,5 mm min.
Destruction: 16,7 Hz, amplitude 1,5 mm min.
- Shock resistance: Solder terminal
- Vibration resistance: 0,5 mm² maximum / cable
- Terminal style: 310°C to 350°C, 3 seconds max.
- Applicable wire: 20 N min.
- Solder terminal heat resistance: 0,68 to 0,88 Nm
- Tensile strength of terminal: with rubber cap: IP65
without rubber cap: IP40 (IEC 60529)
- Locking ring recommended: 50 A (250 V)
- Tightening torque: 250 V, 10 A flink (IEC 60127-1)
- Protection degree: ZA3 with rubber cap: approx. 18 g
ZA3 without rubber cap: approx. 14 g
ZA5 with rubber cap: approx. 9 g
ZA5 without rubber cap: approx. 7 g
- Conditional short-circuit current: 500 N min.
- Rec. shorting fuse
- Weight
- Max. perm. operating force

The pressure point shown on the right applies for the operational characteristics of the ZA3



Electrical Specifications

• Rated voltage	125 V AC / DC			
• Operating current	3,0 A			
	ZA3		ZA5	
• Rated data	30 V	125 V	30 V	125 V
• Resistive load (AC 12)	—	1,0 A	—	0,5 A
• Inductive load (AC 15)	—	0,7 A	—	0,3 A
• Resistive load (DC 12)	1,0 A	0,2 A	1,0 A	—
• Inductive load (DC 13)	0,7 A	0,1 A	0,7 A	—
• Contact configuration	2 changeover contacts			

Min. load: 3 V AC / DC and 5 mA (reference value).

Operating Characteristics

		1	2	3		
• Actuator travel (mm)	ZA3	0,0	0,8	1,8	1,7	1,9
	ZA5	0,0	2,3	3,0	3,6	5,0
• Operating force (N)*	ZA3	0,0	3,0	20		
	ZA5	0,0	3,0	2		
• Contact 1 (NO1-C1)						
• Contact 1 (NO2-C2)						

□ open ■ closed

Ordering Information

Z A3 -01

Rubber cap

K0 = Without
Y0 = Yellow
G0 = Grey, silicone-free
S0 = Black

Z A5 -01

Rubber cap

K0 = Without
Y0 = Yellow
G0 = Grey, silicone-free
S0 = Black

02 = incl. handle



Enabling Switch ZA6

- 3 positions (OFF - ON - OFF)
- Ergonomic design
- 2 contacts
- The switch does not turn ON while being released from position 3 (OFF when pressed) to position 1 (OFF when released)
- Redundant contact configuration fulfils safety category 4
- Degree of protection IP65

General Data

Instructions and approvals



<ul style="list-style-type: none"> • Operating temperature • Storage temperature • Relative humidity • Pollution degree • Contact resistance • Insulation resistance • Dielectric Strength • Operating frequency • Mechanical lifetime • Electrical lifetime • Shock resistance • Vibration resistance • Terminal style • Terminal screw tightening torque • Solder terminal heat resistance • Terminal tensile strength • Mounting screw tightening torque • Protection degree • Conditional short-circuit current • Rec. short circuit protection • Weight • Terminal tensile strength 	<p>IEC 60947-5-1/EN60947-5-1 IEC 60947-5-8/EN60947-5-8 (TÜV approved) UL508 (UL recognized) CSA C22.2 No.14 (c-UL recognized) ISO 12100/EN ISO 12100, IEC 60204-1/EN 60204-1, ISO 11161/EN ISO 11161, ISO 10218-1/EN ISO 10218-1, ANSI/RIA/ISO 10218-1, ANSI/RIA/R15.06, ANSI B 11.19 ISO 13849-1/EN ISO 13849-1</p> <p>-25°C to +60°C (no freezing) -40°C to +80°C (no freezing) 45 to 85% (no condensation) 2 (inside panel, terminal side) 3 (outside panel, operator side) 50 mΩ maximum (initial value) 100 MΩ min. (Megger DC 500 V) 1,5 kV (3 position switch) 2,5 kV (monitor switch) 1.200 operations/hour position 1—2—1: 10⁶ operations min. pos. 1—2—3—1: 10⁵ operations min. 10⁵ operations minimum</p> <p>Operation 150 m/s² Destruction 500 m/s²</p> <p>Operation 5 to 55 Hz, Amplitude 0,5 mm min. Destruction 16,7 Hz, Amplitude 1,5 mm min.</p> <p>solder terminal 0,5 mm² max.</p> <p>310°C to 350°C, 3 sec. max. 20 N min. M3 / 0,5 to 0,8 Nm</p> <p>IP 65 50 A (250 V) 50 A (125 V) working contacts 50A (250 V) auxiliary contacts 250 V, 10 A flink (IEC 60127-1) 17g 250 N min.</p>
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Electrical Specifications

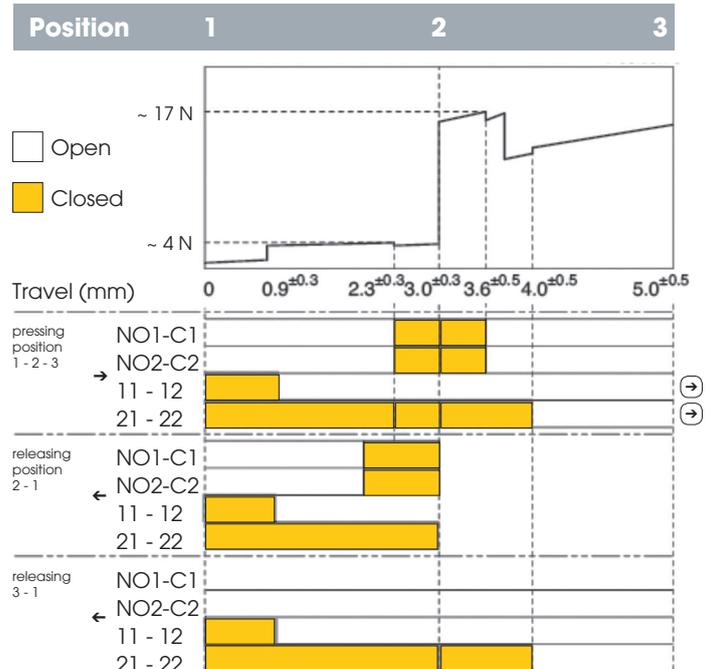
• Rated voltage	250 V AC / DC		
• Operating current	5,0 A		
• Rated data	30 V	125 V	250 V
Working contacts			
• Resistive load (AC 12)	—	0,5 A	—
• Inductive load (AC 15)	—	0,3 A	—
• Resistive load (DC 12)	1,0 A	—	—
• Inductive load (DC 13)	0,7 A	—	—
• Contact Configuration	2 NO contacts		

Auxiliary contacts

• Resistive load (AC 12)	—	2,0 A	1,0 A
• Inductive load (AC 15)	—	1,0 A	0,5 A
• Resistive 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	0-2 NC contacts		

Min. Load: 3 V AC / DC and 5 mA (guidance value)

Operating Characteristics



- When a rubber cap is used, the operating force depends on the operating temperature.
- The operating force to move the button from position 2 to position 3 can be changed.

Ordering Information

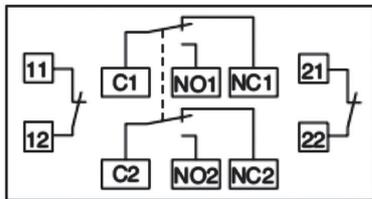
Image	Contacts	Auxiliary contacts	Auxiliary contacts	Serial Number	
 Black rubber cap		„Actuator not operated“*	„Actuator operated“*		
	2	0	0	ZA6S0-01	
 yellow rubber cap	2	1	1	ZA6S2-01	
	2	0	0	ZA6Y0-01	
 Rubber cap	2	1	1	ZA6Y2-01	
				Rubber cap ZA6, black	ZA6-01
				Rubber cap ZA6, yellow	ZA6-02

Please note:

* „Actuator not operated“ and „Actuator operated“ describe auxiliary contacts by which the switching status can be signalled.

Wiring Diagram

ZA6...61-01



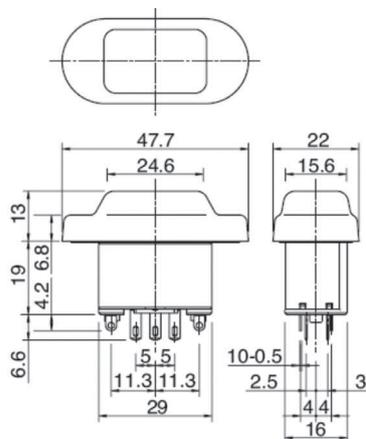
Ordering Information

Z A6 - -01

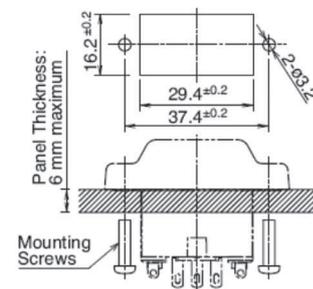
Rubber cap
Y = yellow
S = black

Auxiliary Contacts
0 = without
2 = 2 Auxiliary Contacts

Dimensions (all dimensions are in mm)



Mounting hole layout



- Mounting screws: M3 screw × 2 (not attached and must be supplied by the user)
- Mounting screw length: 5 to 6 mm (panel thickness + gasket)



Enabling Switch ZB1

- 3 positions (OFF - ON - OFF)
- Ideal as an enabling switch in a special operation area
- 2 contacts (NO)
- Positive opening (Level 2 - Level 3)
- The switch does not turn ON while being released from position 3 (OFF when pressed) to position 1 (OFF when released)
- Redundant contact configuration fulfils safety category 4
- 1 auxiliary contact (NC)
- Emergency-Stop Button optional
- Degree of protection IP66
- Particularly suitable for robot applications (ANSI Robotic Standards)

General Data

Instructions and approvals



ISO12100, ISO11161, ISO10218, IEC60947-5-1, IEC60204-1, EN292, EN775, EN60204-1, prEN11161, EN60947-5-1, UL508, CSA C22.2 Nr. 14, JIS C8201-5-1, ANSI/RIA R15.06

- Operating temperature -25°C to +60°C (no freezing)
- Storage temperature -40°C to +80°C (no freezing)
- Relative humidity 45 to 85% (no condensation)
- Pollution degree 3
- Contact resistance 100 mΩ (initial value)
- Insulation resistance 100 MΩ min. (Megger DC 500 V)
- Dielectric strength 2,5 kV
- Operating frequency 1.200 operations / hour
- Mechanical lifetime pos. 1—2—1: 10⁶ operations min. pos. 1—2—3—1: 10⁵ oper. min. 10⁵ operations
- Electrical lifetime 10⁵ operations
- Shock resistance Operation 150 m/s² Destruction 1.000 m/s²
- Vibration resistance Operation 5 bis 55 Hz, Amplitude 0,5 mm min. Destruction 16,7 Hz, Amplitude 1,5 mm min.
- Connection type Screw terminal
- Applicable wire 0,14 to 1,5 mm²
- Cable outside diameter 7 to 13 mm
- Conduit size M 20
- Terminal tensile strength 20 N min.
- Locking ring recommended tightening torque 0,5 to 0,6 N / m
- Degree of protection ZB1Y0-01= IP66 ZB1Y0-02= IP65
- Conditional Short-circuit current 50 A (250 V)
- Rec. short circuit protection 250 V, 10 A fast acting type fuse (IEC 60127-1)
- Weight ZB1Y0-02 approx. 250 g. ZB1Y1-01 approx. 210 g.

Electrical Specifications

• Rated voltage	250 V AC / DC		
• Operating current	3,0 A		
• Rated data	30 V	125 V	250 V

Working contacts

• Resistive load (AC 12)	—	3,0 A	1,5 A
• Inductive load (AC 15)	—	1,5 A	0,75 A
• Resistive 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 contacts		

Auxiliary contacts

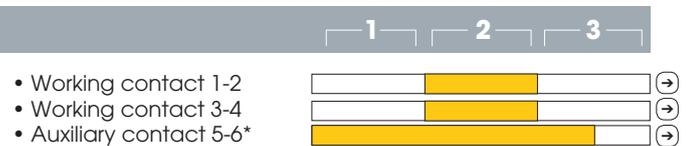
• Resistive load (AC 12)	—	2,0 A	1,0 A
• Inductive load (AC 15)	—	1,0 A	0,5 A
• Resistive load (DC 12)	2,0 A	0,4 A	0,2 A
• Inductive load (DC 13)	1,0 A	0,22 A	0,1 A
• Contact Configuration	1 NC contact		

Emergency-Stop Button

• Resistive load (AC 12)	—	—	—
• Inductive load (AC 15)	—	—	0,5 A
• Resistive load (DC 12)	—	—	—
• Inductive load (DC 13)	—	—	0,1 A
• Contact Configuration	2 NC contacts		

Min. Load: 3 V AC / DC and 5 mA (guidance value)

Operating Characteristics



- Working contact 1-2
- Working contact 3-4
- Auxiliary contact 5-6*

- Emergency-Stop Button 5-6** NC
- Emergency-Stop Button 7-8** NC

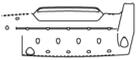
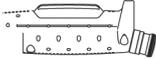
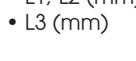
Open Closed positive operation

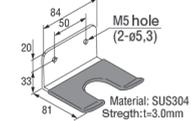
Note:

* Applies only for ZB1Y1-01

** Applies only for ZB1Y0-02

Ordering Information

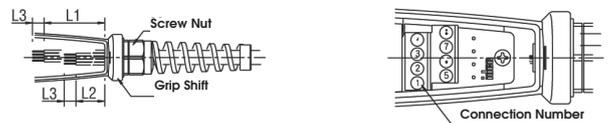
Image	Description	Serial Number
	2 contacts, 1 auxiliary contact (NC), push button; grey, silicone free rubber cap	ZB1G1-01
	2 contacts, push button; yellow rubber cap	ZB1Y0-01
	2 contacts, 1 auxiliary contact (NC); yellow rubber cap	ZB1Y1-01
	2 contacts, 1 auxiliary contact (NC), push button; yellow rubber cap	ZB1Y1-02
	2 contacts, 1 Emergency-Stop Button (2NC); yellow rubber cap	ZB1Y0-02
	Rubber cap, yellow	ZB1-01
	Rubber cap silicone-free, grey	ZB1-02
	Mounting brackets, metal	ZB1-03



Wire Length Terminal No. 1-4 Terminal No. 5-8

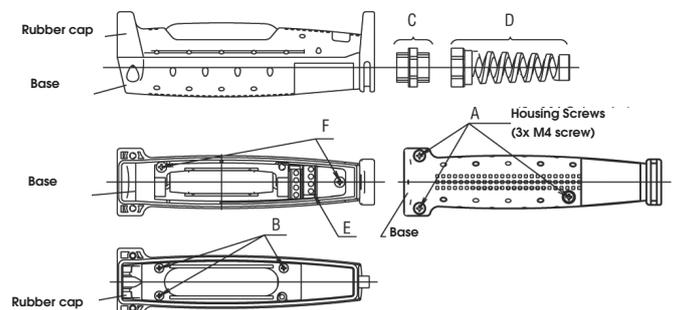
- L1, L2 (mm) L1= 40 mm L2= 27 mm
- L3 (mm) L3= 6 mm

Mounting Instructions

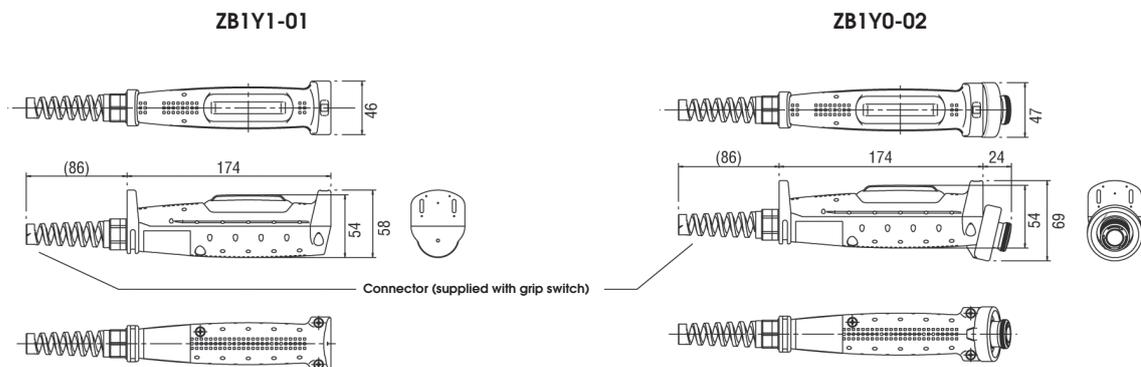


Element Description Torque

- A Housing Screws 1,2 ±0,1 Nm
- B Rubber Cap Screws —
- C Cable Gland 4,0 ±0,3 Nm
- D Cable Relief 4,0 ±0,3 Nm
- E Screw Terminal 0,5-0,6 ±0,2 Nm
- F Circuit Board Screw —



Dimensions (all dimensions in mm)





Enabling Switch ZB2

- 3 positions (OFF - ON - OFF)
- Ergonomic design
- 2 contacts
- The switch does not turn ON while being released from position 3 (OFF when pressed) to position 1 (OFF when released)
- Redundant contact configuration fulfils safety category 4
- Degree of Protection up to IP67
- Optional indicator light
- Optional button or key switch
- Optional Emergency-Stop Button
- Solder terminals

General Data

Instructions and approvals



- Application standards for use: ISO12100/EN ISO12100, IEC60204-1/EN60204-1, ISO11161/EN ISO11161, ISO10218-1/EN ISO10218-1, ANSI/RIA R15.06, ANSI B11.19, ISO13849-1/EN ISO13849-1
- Operating temperature
 - 25°C to +60°C (no freezing) for silicone rubber cap:
 - 10°C to +60°C (no freezing) for NBR/PVC- polyblend rubber cap
- Storage temperature
- Relative humidity
- Pollution degree
- Rated Voltage
 - 250 V
 - 30 V (with pilot light)
- Operating current I_{IH} 3 A (Emergency-Stop-Button 5.0 A)
- Dielectric strength U_{imp} 2,5 kV (push button, 1,5 kV key switch)
- Protection degree
 - Class II (IEC61140), Class III (with pilot light)
- Operating frequency 1.200 operations/hour
- Vibration resistance
 - Operation 150 m/s²
 - Destruction 1.000 m/s²
- Shock resistance
 - Operation 5 to 55 Hz, Amplitude 0,5 mm min.
 - Destruction 16,7 Hz, Amplitude 1,5 mm min.
- Free fall 1,0 m 1 fall
- Protection degree (Based on IEC60068-2-32) IP66, 67 without optional switch and pilot light, IP65 with optional switch and / or pilot light
- Conditional short-circuit current 50 A (250 V)
- Rec. short circuit protection 250 V, 10 A fast acting type fuse
- Direct opening force 60 N min. (monitor switch), 4,7mm min. (Position 3)
- Rec. short circuit protection 500 N min.
- Weight 140 g - 170 g depends on version
- Pilot light Rated operational voltage: 24 V DC, ± 10% Connecting the indicator light at SELV - (Safety Extra Low Voltage) or PELV (Protective Extra Low Voltage) circuits *. 1 Rated current: 15mA Light Source: LED Lighting colour: green, red, yellow, amber, white.

IEC60947-5-1, EN60947-5-1, JIS C8201-5-1, GS-ET-22, UL508, CSA C22.2 Nr. 14,

Electrical Specifications

- Rated voltage 250 V AC / DC
- Operating current 3,0 A (Emergency-Stop Button 5,0 A)
- Rated data

	30 V	125 V	250 V
Resistive load (AC 12)	—	1,0 A	0,5 A
Inductive load (AC 15)	—	0,7 A	0,5 A
Resistive load (DC 12)	1,0 A	0,2 A	—
Inductive load (DC 13)	0,7 A	0,1 A	—

Working contacts

• Resistive load (AC 12)	—	1,0 A	0,5 A
• Inductive load (AC 15)	—	0,7 A	0,5 A
• Resistive load (DC 12)	1,0 A	0,2 A	—
• Inductive load (DC 13)	0,7 A	0,1 A	—
• Contact configuration			

Auxiliary contacts

• Resistive load (AC 12)	—	2,0 A	1,0 A
• Inductive load (AC 15)	—	1,0 A	0,5 A
• Resistive 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			

Emergency-Stop Button

• Resistive load (AC 12)	—	5,0 A	3,0 A
• Inductive load (AC 15)	—	3,0 A	0,5 A
• Resistive load (DC 12)	2,0 A	0,4 A	0,1 A
• Inductive load (DC 13)	1,0 A	0,22 A	0,1 A
• Contact configuration			

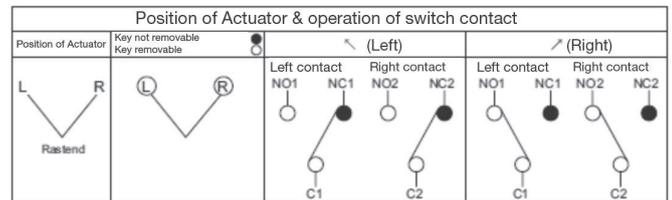
Push button

• Resistive load (AC 12)	—	0,5 A	—
• Inductive load (AC 15)	—	0,3 A	—
• Resistive load (DC 12) 1,0 A	0,2 A	—	—
• Inductive load (DC 13)	0,7 A	0,1 A	—
• Contact configuration	1 or 2 opener		

Min. Load: 3 V AC / DC and 5 mA (reference value).

Terminal Arrangement (bottom view)

Keylock



Wire length in 3positions handgrip-enabling switch

	3 positions Handgrip - Enabling Switch								Push Button Keylock			Emergency-Stop Button		Signal Lamp		
	NO1	C1	I1	I2	31	32	NO2	C2	C	NO	NC	1	2	+	-	
Core length L1 (mm)	40	45	50	60	50	60	85	80		120			110		115	
Isolating length L2 (mm)	L2 = 5 mm															

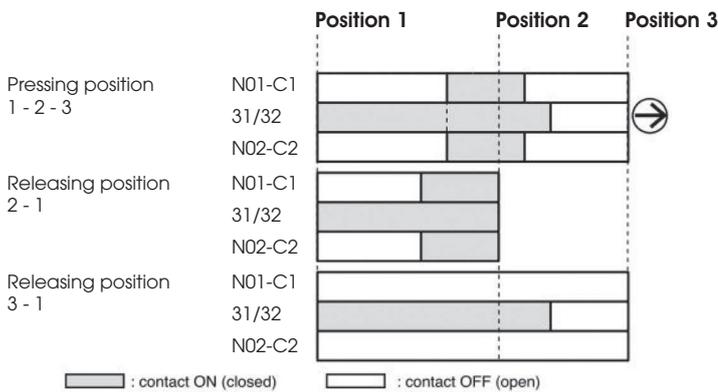
Ordering Information

Contact Configuration	Additional Control Devices	Rubber Cap	Serial Number
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Working contacts Auxiliary contacts Emergency Stop Control Device A Control Device B Signal Lamp

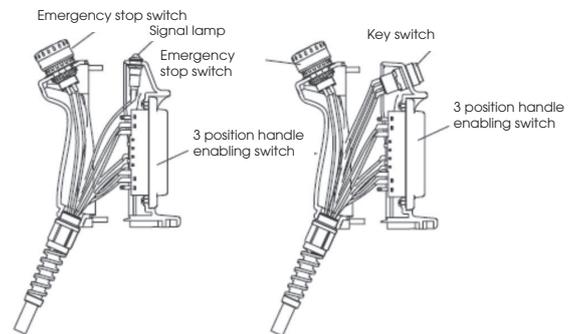
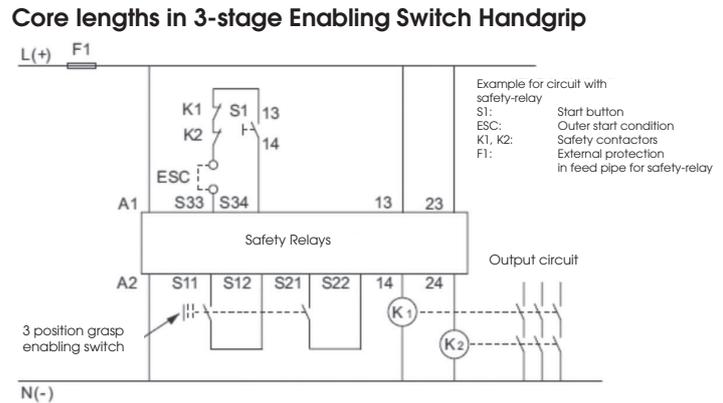
2 contacts	Yes (1NC)	without			yellow /silicone	ZB2Y1-01		
		without			grey /NBR/PVC	ZB2G1-01		
		Yes (2NC)	without		without	yellow /silicone	ZB2Y1-03	
		Yes (2NC)	push button		Yes	yellow /silicone	ZB2Y1-04	
		no	push button	push button		no	yellow /silicone	ZB2Y1-06
		Yes (2NC)		key switch			yellow /silicone	ZB2Y1-05
					yellow /silicone	ZB2Y1-08		

Operating Characteristics



- Reference values without the rubber cap, the measured values for pressing the center of the probe.
- Operating force depending on temperature with rubber cap
- Actuating force for actuating Level 2 - Level 3 can be changed

Connection Example (Safety Category 4)



Dimensions (all dimensions in mm)

