Altech Corp.®

Serving the Automation & Control Industry since 1984

Quality System

Quality Endorsed Company



Altech Corp.®
by BERNSTEIN

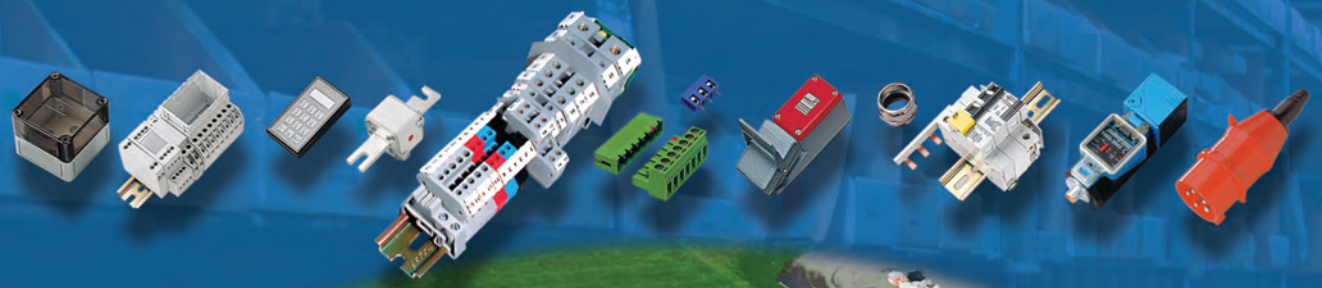
Control & Safety Switches

Control and Safety Switches

Since 1984, Altech Corporation has grown to become a leading supplier of automation and industrial control components. Headquartered in Flemington, NJ, Altech has an experienced staff of engineering, manufacturing and sales personnel to provide the highest quality products with superior service. This is the Altech Commitment!

With the Bernstein line of safety products, Altech offers electrical and electronic switching, sensing and enclosure systems. The 25,000 switch, sensor and enclosure products are high quality, durable and innovative.

Our well trained technical experts welcome the opportunity to answer your technical questions and provide solutions to your automation and control needs. Give us a call or visit www.altechcorp.com.





Quality Commitment

Altech's control components meet diverse national and international standards such as UL, NEC, CSA, IEC, VDE and more. Altech provides superior customer service and delivery through Total Quality Management and Continuous Process Improvement. Altech is ISO 9001 approved. We perform these services with honesty and integrity and are committed to achieve these goals.



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Safety and Standard Position Switches

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Switch Systems



Switches are an integral part of modern processes

The primary purpose of a switch is to convert mechanical movement into electrical signals that are processed in machine and control systems.

BERNSTEIN switches are configured by combining different types of enclosures, switch systems and actuators. Depending on the environmental and operating conditions, the switches are available in a metal or plastic enclosures.

The switching system is selected based on the function (slow-action or snap-action contact) and the required contact configuration. The actuator is also selected corresponding to the type and direction of actuation. Thanks to the large number of possible combinations, the scope of applications is considerable.

The applications in which limit switches are used have changed in line with increasing automation. Not too long ago limit switches were mainly used for monitoring position, today they also often assume a safety function.

Switches directly connected to bus systems are also becoming increasingly popular in modern applications where mechanical movement is converted into digital information.

Switch systems – Economy meets safety

BERNSTEIN AG is an established manufacturer of high quality electromechanical low voltage switching devices. Our products are used in a large variety of applications, including the elevator, wood-working, packaging, food processing, metal and machine tool industries.

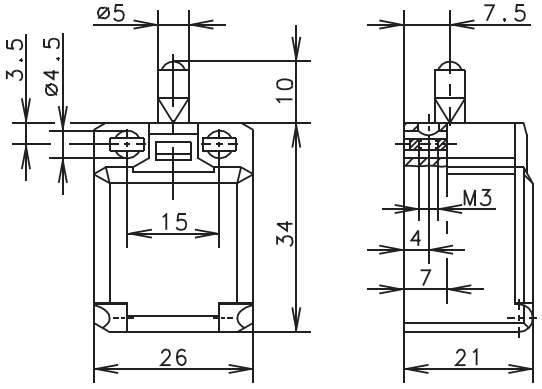
In addition to functional reliability and high quality, BERNSTEIN switch systems also efficiently save time in terms of installation and maintenance. These advantages further enhance the benefits of the end products as they drastically reduce downtimes for servicing and maintenance purposes.

Products like the active ASi bus interface components in, addition to shortening installation times, also reduce the number of hardware components and space requirement in machines.

Altech Corp.® by BERNSTEIN

C2 Series





Recommended use

Ideal for safety applications and position monitoring in confined spaces.

Product advantages

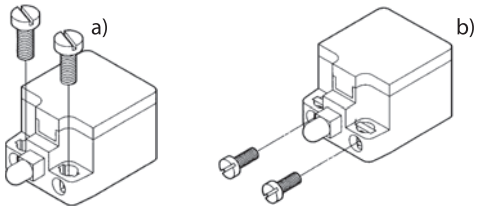
- Miniature switch for safety applications
- Two-channel safety monitoring possible
- With captive snap-on cover
- Small hysteresis in snap action system

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC / 1NO, 2 NC, 2 NO
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- Also suitable for front mounting (depending on type)



- a) 2 round holes for M4 screws
- b) 2 Integrated nuts for front mounting for M3 screws (depending on type)

Installation advantages

- Snap-on cover can be released with screwdriver
- Cover opening range 180° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with clamping plates
- Transparent cover for adjustment and visual inspection
- Easy to install cover lock (close and press)

Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category	U_e/I_e	AC-15, U_e/I_e 240 V/3 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fiber-reinforced (UL 94-V0)
Ambient temperature		–30 °C to +80 °C
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 100/min
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 – 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		Rectangle 8.5 x 3.5 mm
Protection class		IP20 conforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Drawing dimensions in mm

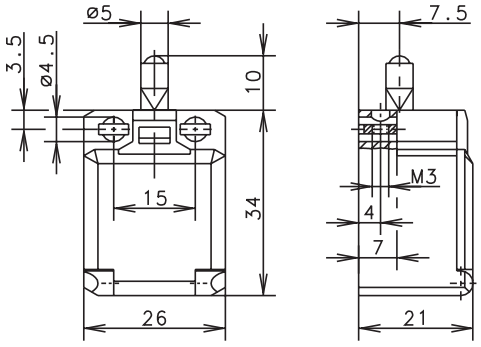
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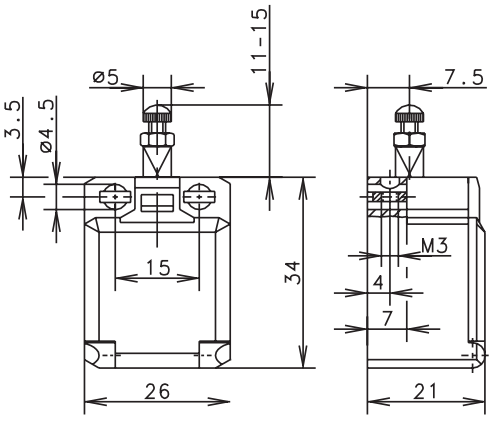
C2 Series



W



ST



Switching Operation	W – Slow Action	W – Snap Action	ST – Slow Action	ST – Snap Action
1 NC / 1 NO Contacts	**600.8101.001** C2-U1Z	**600.8351.002** C2-SU1Z	**600.8104.025** C2-U1Z ST	**600.8354.026** C2-SU1Z ST
2 NC Contacts	**600.8801.003** C2-A2Z	**600.8851.004** C2-SA2Z	**600.8804.027** C2-A2Z ST	- -
2 NO Contacts	**600.8801.005** C2-E2	**600.8851.006** C2-SE2	**600.8804.029** C2-E2 ST	**600.8854.030** C2-SE2 ST
1 NC / 1 NO Contacts Overlapping	- -	- -	- -	- -

Technical Information	W – Slow Action	W – Snap Action	ST – Slow Action	ST – Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP20	IP20	IP20	IP20
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals	cULus		cULus	

Special features / variants

- Actuator length adjustable with threaded screw

Drawing dimensions in mm

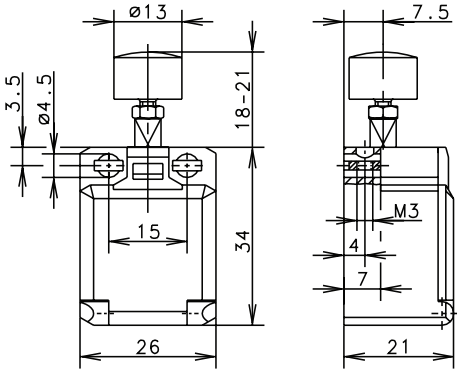
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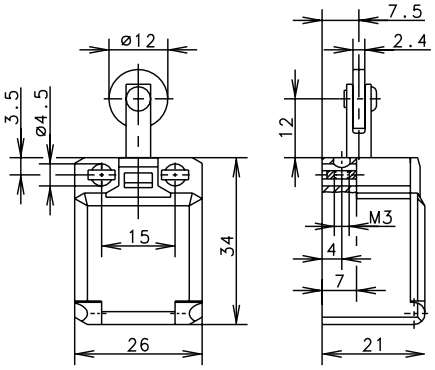
C2 Series



K



R



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**600.8107.019** C2-U1Z K 11–12, 23–24	**600.8357.020** C2-SU1Z K 13–14, 21–22	**600.8116.013** C2-U1Z R 11–12, 23–24	**600.8366.014** C2-SU1Z R 13–14, 21–22
2 NC Contacts	**600.8807.021** C2-A2Z K 11–12, 21–22	**600.8857.022** C2-SA2Z K 11–12, 21–22	**600.8816.015** C2-SU1Z R 11–12, 21–22	**600.8866.016** C2-SA2Z R 11–12, 21–22
2 NO Contacts	– -	– -	**600.8816.017** C2-E2 R 13–14, 23–24	– -
1 NC / 1 NO Contacts Overlapping	– -	– -	– -	– -

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP20	IP20	IP20	IP20
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals	cULus		cULus	

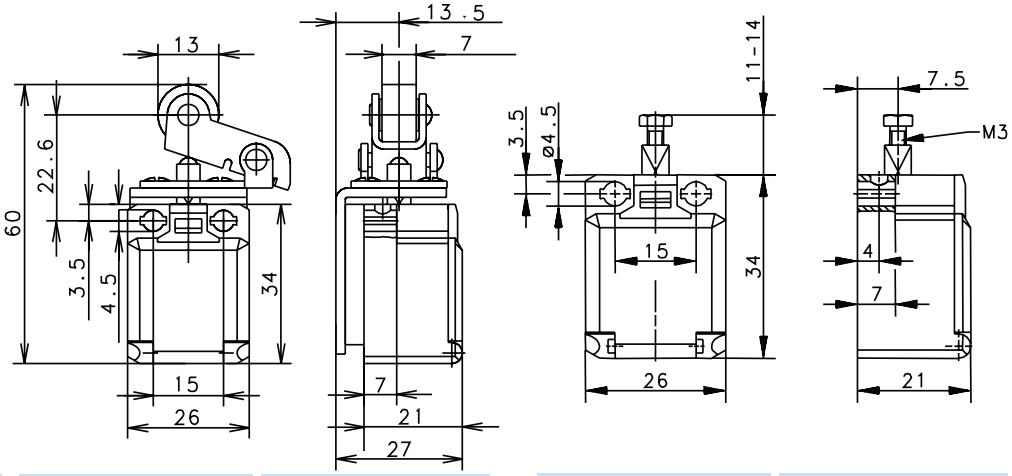
Drawing dimensions in mm

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C2 Series





	O.M.		Latching O.M.	
Switching Operation	**Slow Action**	**Snap Action**	**Slow Action**	**Snap Action**
1 NC / 1 NO Contacts	**600.8101.007+** 391.0190.259 C2-U1Z 11 12 23 24	**6008351008+** 391.0190.259 C2-SU1Z 13 14 21 22		**610.8351.008** C2-SU1Z LATCHING O.M. 13 14 21 22
2 NC Contacts	–	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–

Technical Information	**Slow Action**	**Snap Action**	**Slow Action**	**Snap Action**
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP20	IP20	IP20	IP20
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals	cULus CSAus		cULus CSAus	

Special features / variants

- Actuator length adjustable with threaded screw

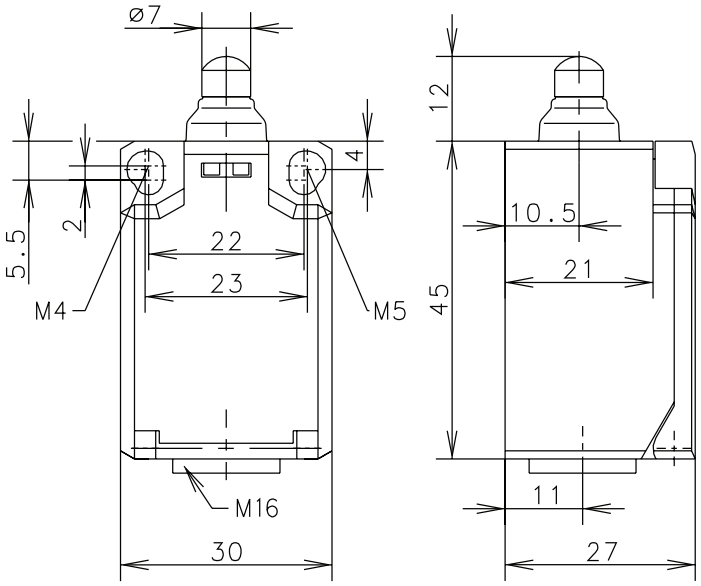
Drawing dimensions in mm

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Ti2 Series





Recommended use

Ideal for safety applications and position monitoring in confined spaces with an IP65 protection rating.

Product advantages

- Compact IP65 switch for safety applications
- Optimized size with a tried-and-tested connection system
- Two-channel safety monitoring possible
- With captive snap-on cover
- 2 mm contact opening width of slow-action system conforming to EN 81-1 for lift construction
- Small hysteresis in snap action system
- Actuator can be repositioned by 4 x 90°

Options

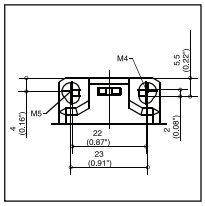
- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated change-over contact)

Mounting

- Mounting dimensions conforming to DIN EN 50047
- 2 slots for adjustment with M4 screws (distance between centers 22 mm)



- Fixed positioning for safety applications with two M5 screws (distance between centers 23 mm)

Installation advantages

- Snap-on cover can be released with screwdriver
- Cover protects switching element during installation
- Screw connections with clamping plates
- Transparent cover for adjustment and visual inspection
- Easy to install cover lock (close and press)

Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category	U_e/I_e	AC-15, U_e/I_e 240 V/3 A; DC-13, U_e/I_e 240 V/0,27 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced (UL 94-V0)
Ambient temperature		-30 °C to +80 °C
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		1 x M16 x 1,5
Protection class		IP65 conforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Drawing dimensions in mm

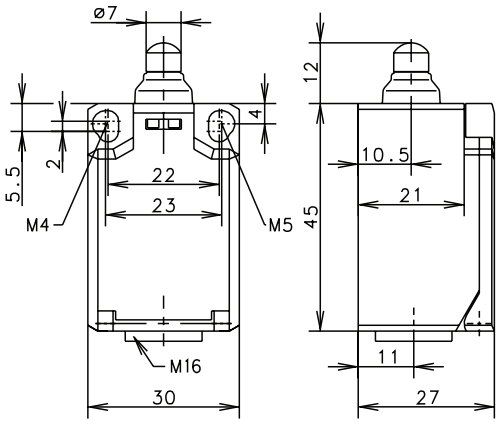
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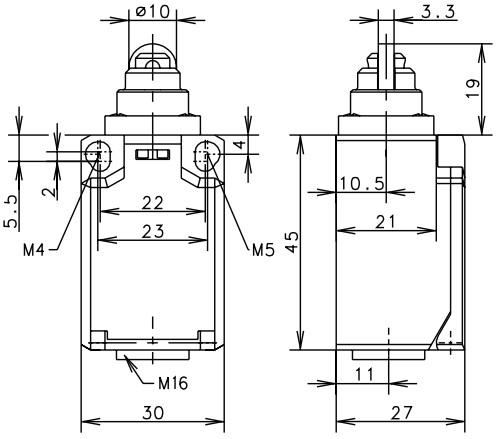
Ti2 Series



W (Form B)



RIW (Form C)



Switching Operation	W (Form B) Slow Action	W (Form B) Snap Action	RIW (Form C) Slow Action	RIW (Form C) Snap Action
1 NC / 1 NO Contacts	**608.8103.001** TI2-U1Z W	**608.8153.002** TI2-SU1Z W	**608.8117.007** TI2-U1Z RIW	**608.8167.008** TI2-SU1Z RIW
2 NC Contacts	**608.8803.003** TI2-A2Z W	**608.8853.004** TI2-SA2Z W	**608.8817.009** TI2-A2Z RIW	**608.8867.010** TI2-SA2Z RIW
2 NO Contacts	**608.8803.005** TI2-E2 W			**608.8867.012** TI2-SE2 RIW
1 NC / 1 NO Contacts Overlapping	–	–	–	–

Technical Information	W (Form B) Slow Action	W (Form B) Snap Action	RIW (Form C) Slow Action	RIW (Form C) Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals				

Special features / variants

- Available with greater switching force

Special features / variants

- Available with greater switching force
- Available different actuator direction
- Activation direction can not be rotated by user

Drawing dimensions in mm

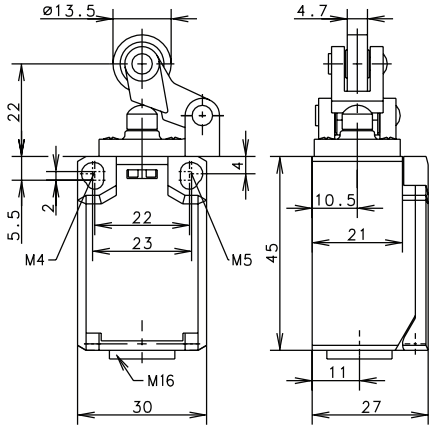
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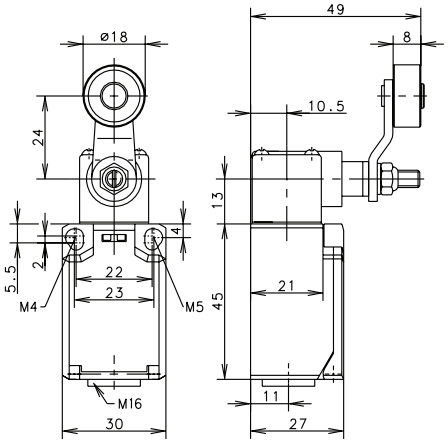
Ti2 Series



HW (Form E)



AH (Form A)



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC /1 NO Contacts	**608.8121.015** TI2-U1Z HW	**608.8171.016** TI2-SU1Z HW	**608.8135.021** TI2-U1Z AH	**608.8185.022** TI2-SU1Z AH
2 NC Contacts	**608.8821.017** TI2-A2Z HW	**608.8871.018** TI2-SA2Z HW	**608.8835.023** TI2-A2Z AH	**608.8885.024** TI2-SA2Z AH
2 NO Contacts	–	**608.8871.020** TI2-SE2 HW	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.8191.547**		**391.8351.166**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals				

Special features/variants
(on request)

- Available with different actuating directions
- Various roller diameters
- With steel roller

Special features/variants
(on request)

- Available with different actuating directions
- With steel roller
- Various roller diameters
- Offset or straight lever
- Various lever lengths
- With roller over switch

Drawing dimensions in mm

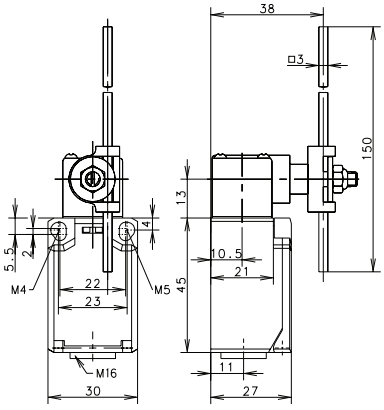
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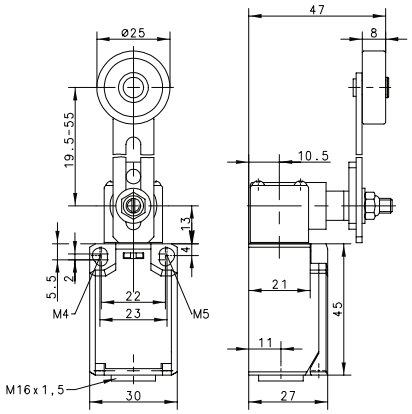
Ti2 Series



AD



AV



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC /1 NO Contacts	**608.8137.027** TI2-U1 AD 11–12, 23–24	**608.8187.028** TI2-SU1 AD 13–14, 21–22	**608.8136.033** TI2-U1 AV 11–12, 23–24	**608.8186.034** TI2-SU1 AV 13–14, 21–22
2 NC Contacts	**608.8837.029** TI2-A2 AD 11–12, 21–22	**608.8887.030** TI2-SA2 AD 11–12, 21–22	**–** -	**608.8886.036** TI2-SA2 AV 11–12, 21–22
2 NO Contacts		**608.8887.032** TI2-SE2 AD 13–14, 23–24	**608.8836.037** TI2-E2 AV 13–14, 23–24	**608.8886.038** TI2-SE2 AV 13–14, 23–24
1 NC / 1 NO Contacts Overlapping	**–** -	**–** -	**–** -	**–** -
Replacement actuator:	**391.8370.986**		**391.8360.984**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals				

Special features/variants
(on request)

- Available with different actuator directions
- With various actuator lengths
- Available with increased switch force

Special features/variants
(on request)

- Available with different actuator directions
- Various roller diameters & lever lengths
- With roller over switch

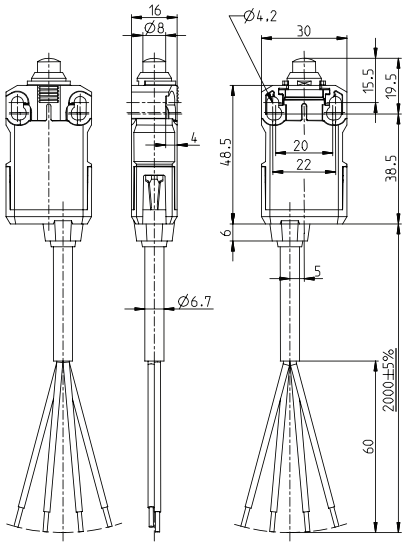
Drawing dimensions in mm

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IF Series





Recommended use

Ideal for installation in confined areas where a high protection rating is required. With 6 1/2 foot molded cable, this series is rated to IP67. Suitable for position monitoring and safety applications, the slim design allows these switches to be installed in a wide range of applications.

Product advantages

- Slim line design
- With 6 1/2' (2 Meter) cable or AMP4 connector
- High quality plastic enclosure
- Metal actuator and mounting clip
- Small hysteresis in snap action system
- Actuator can be repositioned by 4 x 90°
- Compact IP67 switch for safety applications
- Two-channel safety monitoring possible
- Other cable lengths available on request



Options

- Various cable lengths available on request
- Can be preassembled with customized connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO
- All NC contacts with ⊕ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- Two M4 screws for adjustment with slots
- Two M5 screws for safety applications; front mounting depending on type

Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		PA6 (glass fibre-reinforced)
Ambient temperature		-25 °C to +70 °C (Connection cable installed)
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 30/min.
Type of connection		Cable 4 x 0.75 mm²
Protection class		IP67 conforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Drawing dimensions in mm

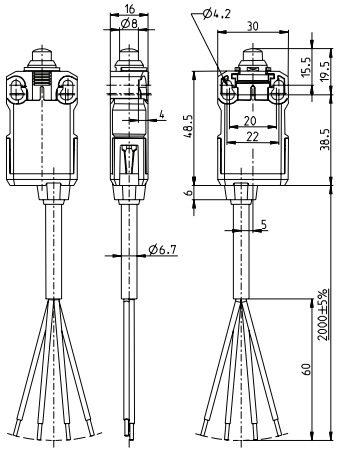
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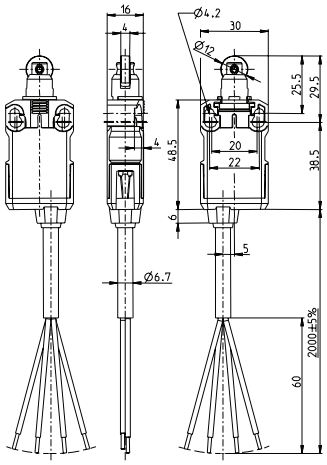
IF Series



IW



RIW



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.9102.001** IF-U1Z IW 11 12 / 23 24	**608.9152.006** IF-SU1Z IW 13 14 / 21 22	**608.9117.002** IF-U1Z RIW 11 12 / 23 24	**608.9167.007** IF-SU1Z RIW 13 14 / 21 22
2 NC Contacts	**608.9802.011** IF-A2Z IW 11 12 / 21 22	–	**608.9817.012** IF-A2Z RIW 11 12 / 21 22	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min	≤ 30/min	≤ 300/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP67	IP67	IP67	IP67
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals	c SP us BG		c SP us BG	

Special features / variants

Special features / variants

- Actuator can be turned in steps of 90°

Drawing dimensions in mm

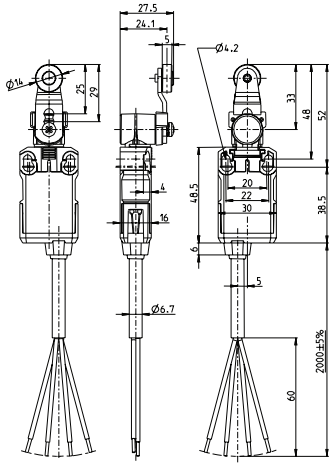
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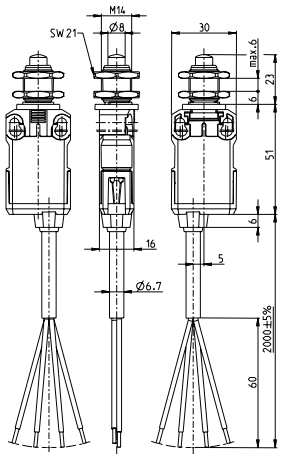
IF Series



AH



IWF



Switching Operation	AH Slow Action	AH Snap Action	IWF Slow Action	IWF Snap Action
1 NC / 1 NO Contacts	**608.9135.003** IF-U1Z AH	**608.9185.008** IF-SU1Z AH	**608.9102.004** IF-U1Z IWF	**608.9152.009** IF-SU1Z IWF
2 NC Contacts	**608.9835.013** IF-A2Z AH	**608.9885.041** IF-SA2Z AH	**608.9802.014** IF-A2Z IWF	**608.9852.043** IF-SA2Z IWF
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–

Technical Information	AH Slow Action	AH Snap Action	IWF Slow Action	IWF Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min	≤ 30/min	≤ 30/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP67	IP67	IP67	IP67
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals				

Special features/variants

- Actuator can be turned in steps of 90°

Special features/variants

- Front mounting

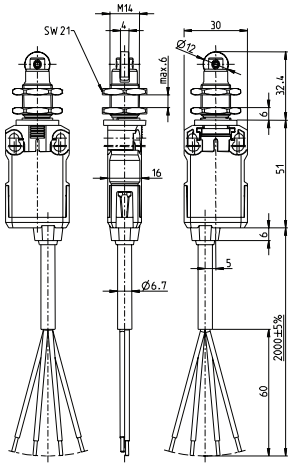
Drawing dimensions in mm

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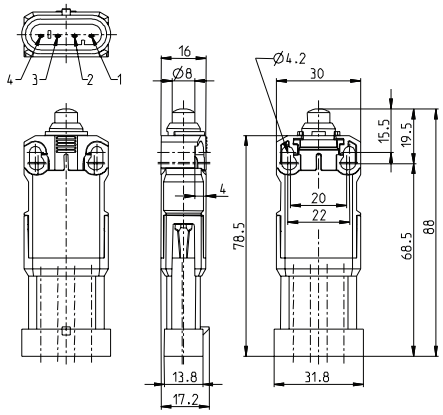
IF Series



RIWF



IW AMP4



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.9117.005** IF-U1Z RIWF 11 12 / 23 24	**608.9167.010** IF-SU1Z RIWF 13 14 / 21 22	**608.9102.016** IF-U1Z IW AMP4 11 12 / 23 24	**608.9152.021** IF-SU1Z IW AMP4 13 14 / 21 22
2 NC Contacts	**608.9817.015** IF-A2Z RIWF 11 12 / 21 22	–	**608.9802.026** IF-A2Z IW AMP4 11 12 / 21 22	–
2 NO Contacts	–	–	–	–
1 NC / 1NO Contacts Overlapping	–	–	–	–

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min	≤ 30/min	≤ 30/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP67	IP67	IP67	IP67
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals				

Special features/variants

- Front mounting
- Actuator can be turned in steps of 90°

Drawing dimensions in mm

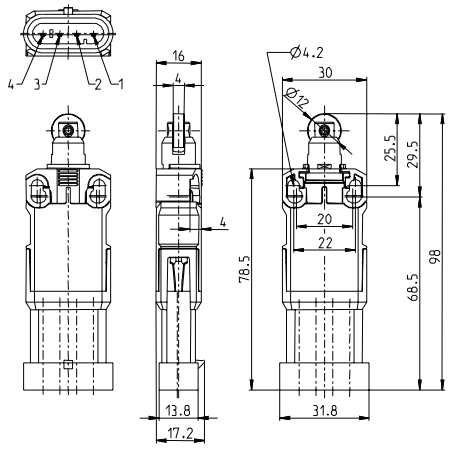
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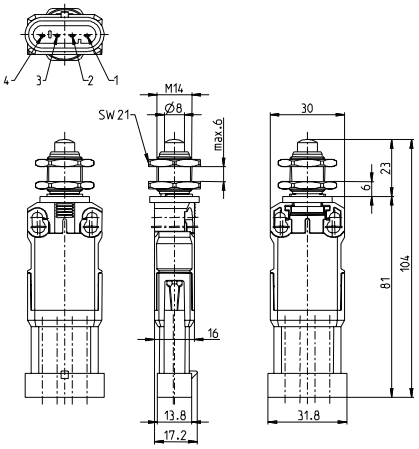
IF Series



RIW AMP4



IWF AMP4



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.9117.017** IF-U1Z RIW AMP4 11 12 / 23 24	**608.9167.022** IF-SU1Z RIW AMP4 13 14 / 21 22	**608.9102.019** IF-U1Z IWF AMP4 11 12 / 23 24	**608.9152.024** IF-SU1Z IWF AMP4 13 14 / 21 22
2 NC Contacts	**608.9817.027** IF-A2Z RIW AMP4 11 12 / 21 22	–	**608.9802.029** IF-A2Z IWF AMP4 11 12 / 21 22	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Maximum Switching Amperage	10A	10A	10A	10A
B10d	6 Million	6 Million	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6	3 x 10^6	3 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min	≤ 30/min	≤ 30/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP67	IP67	IP67	IP67
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC	240VAC	240VAC
Approvals	c SP us BG		c SP us BG	

Special features/variants

- Actuator can be turned in steps of 90°

Special features/variants

- Front mounting
- With roller over switch

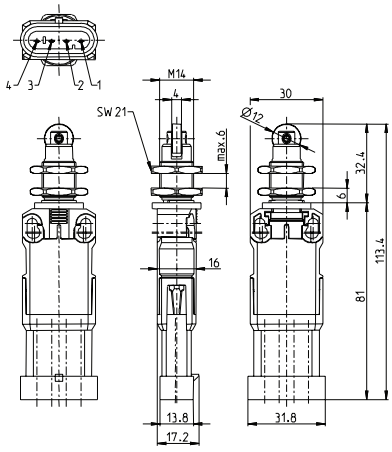
Drawing dimensions in mm

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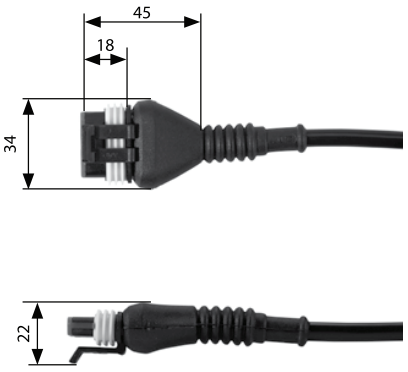
IF Series



RIWF



AMP Connection Cable



Switching Operation	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.9117.020** IF-U1Z RIWF AMP4 11 12 / 23 24	**608.9167.025** IF-SU1Z RIWF AMP4 13 14 / 21 22
2 NC Contacts	**608.9817.030** IF-A2Z RIWF AMP4 11 12 / 21 22	–
2 NO Contacts	–	–
1 NC / 1 NO Contacts Overlapping	–	–

Cable length 3.5 m:
3251204309
AN-KAB.IF 3.5M AMP4

Cable length 5 m:
3251204281
AN-KAB.IF 5M AMP4

Cable
UL-CSA-S03VV2-F4x0.75 black n. UL2517, CSA C22.2/210.2 and n. VDE 0281 part 12 n. HAR 21.12 S1

Pin assignment
1-GY, 2-BU, 3-BN, 4-BK

Technical Information	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V
Maximum Switching Amperage	10A	10A
B10d	6 Million	6 Million
Mechanical Service Life	3 x 10^6	3 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP67	IP67
Utilization Category	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	240VAC	240VAC
Approvals		

Special features/variants

- Front mounting
- Actuator can be turned in steps of 90°

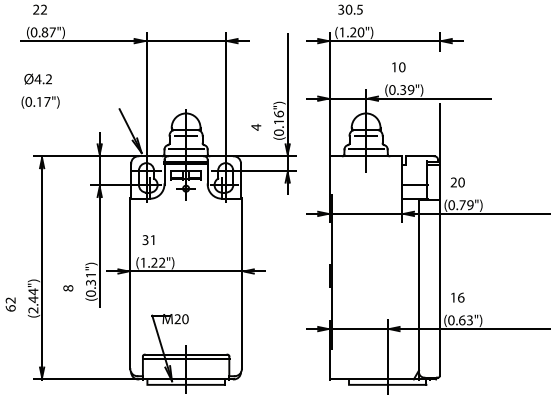
Drawing dimensions in mm

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I88 Series





Recommended use

Due to it's compact size and wide range of actuators and contacts the I88 series is our most popular line of limit switches. Suitable for a huge range of applications, including safety and position monitoring, these switches offer an IP65 protection rating.

Product advantages

- Standard switch conforming to DIN EN 50047
- Standard actuator conforming to DIN EN 50047, Type A, B, C, E
- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, self-extinguishing (UL-94-V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013

Options

- Available with M12 connector
- AS interface variants available
- Cable entry M16 x 1.5

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- Two M4 screws (distance between centers 22 mm), adjustment with slots
- Two M5 screws for safety applications without additional fixing element (Fig. 1)
- Additionally secured by guide plate for lateral approach forces
- Front mounting (depending on type)

Installation advantages

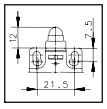


Fig. 1

- Snap-on cover can be released with screwdriver
- Cover opening range 135° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Easy to install cover lock (close and press)
- Cover can be additionally secured with screw

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Conventional thermal current (up to) [1]	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) [1]		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced (UL 94-V0)
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) [1]		10 x 10^6 switching cycles
B10d (up to) [1]		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		1 x M20 x 1,5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

1 Depending on the switch system.

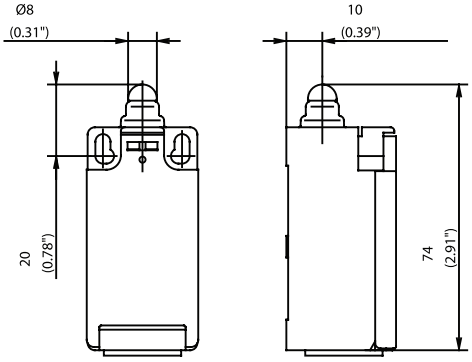
Drawing dimensions in mm

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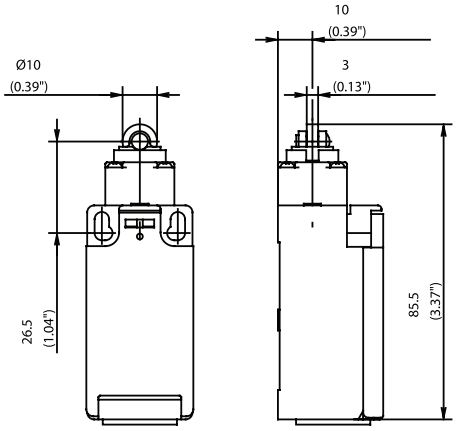
I88 Series

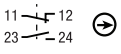
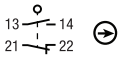
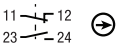
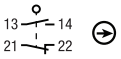
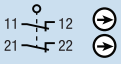
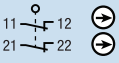
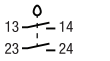
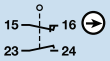


W (Form B)



RIWK (Form C)



Switching Operation	W (Form B) Slow Action	W (Form B) Snap Action	RIWK (Form C) Slow Action	RIWK (Form C) Snap Action
1 NC /1 NO Contacts	**608.6103.008** I88-U1Z W 	**608.6153.012** I88-SU1Z W 	**608.6117.017** I88-U1Z RIWK 	**608.6167.018** I88-SU1Z RIWK 
2 NC Contacts	**608.6803.013** I88-A2Z W 	– -	**608.6817.087** I88-A2Z RIWK 	– -
2 NO Contacts	**608.6803.014** I88-E2 W 	– -	**608.6817.071** I88-E2 RIWK 	– -
1 NC / 1 NO Contacts Overlapping	**608.6303.011** I88-UV1Z W 	– -	– -	– -

Technical Information	W (Form B) Slow Action	W (Form B) Snap Action	RIWK (Form C) Slow Action	RIWK (Form C) Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC	250VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)
- Available with black enclosure
- With latching function

Special features/variants (on request)
- Available with steel roller or black enclosure
- With black enclosure
- With latching function

Drawing dimensions in mm

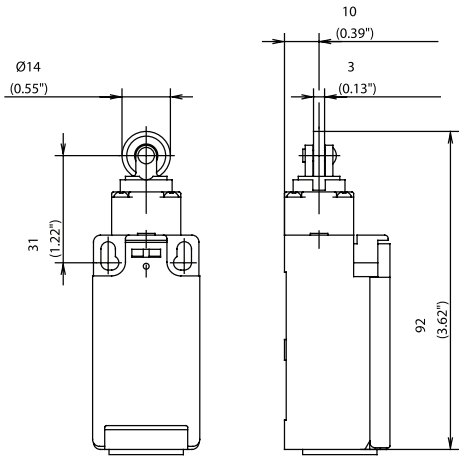
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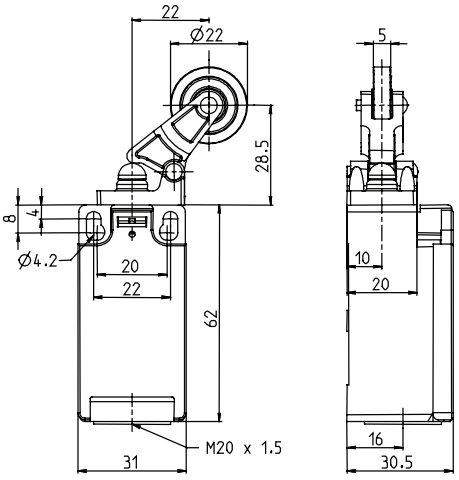
I88 Series

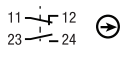
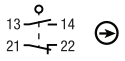
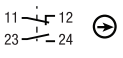
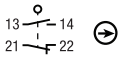
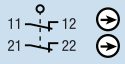
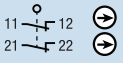


RIWL



KNW RO22



Switching Operation	RIWL Slow Action	RIWL Snap Action	KNW RO22 Slow Action	KNW RO22 Snap Action
1 NC / 1 NO Contacts	**608.6117.050** I88-U1Z RIWL 	**608.6167.051** I88-SU1Z RIWL 	**618.6127.112** I88-U1Z KNW RO22 	**608.6177.053** I88-SU1Z KNW RO22 
2 NC Contacts	**608.6817.072** I88-A2Z RIWL 	– -	**618.6827.246** I88-A2Z KNW RO22 	
2 NO Contacts	**608.6817.069** I88-E2 RIWL 		– -	– -
1 NC / 1 NO Contacts Overlapping	– -	– -	– -	– -
Replacement actuator:	**391.8161.673**		**391.8250.682**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC	250VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Available with black enclosure
- With latching function
- With steel roller

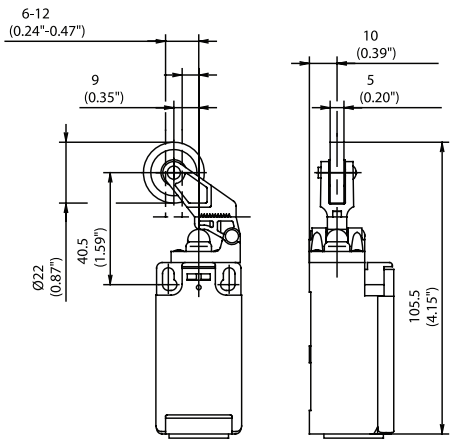
Drawing dimensions in mm

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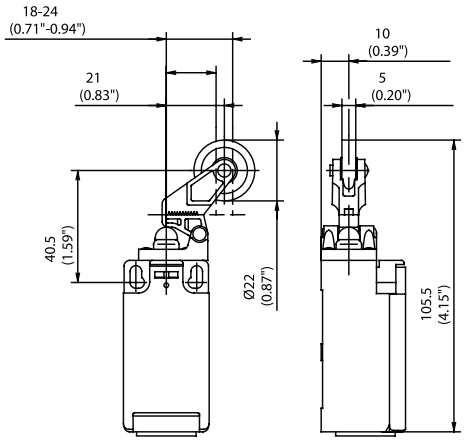
I88 Series

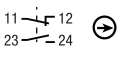
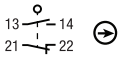
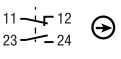
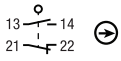
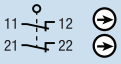
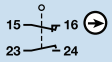


DGHW RO22



DGKW RO22



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.6121.029** I88-U1Z DGHW RO22 	**608.6171.030** I88-SU1Z DGHW RO22 	**608.6127.025** I88-U1Z DGKW RO22 	**608.6177.026** I88-SU1Z DGKW RO22 
2 NC Contacts	**608.6821.120** I88-A2Z DGHW RO22 	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	**618.6321.244** I88-UV1Z DGHW RO22 	–	–	–
Replacement actuator:	**391.8211.529**		**391.8271.528**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC	250VAC
Approvals	* Depending on switching system - see technical information for details			

Special features/variants (on request)
- Available with black enclosure
- Available with different mounting directions
- With different roller diameters

Special features/variants (on request)
- With latching function
- With different roller diameters
- With 2NC/1NO or 2NO/1NC contacts

Drawing dimensions in mm

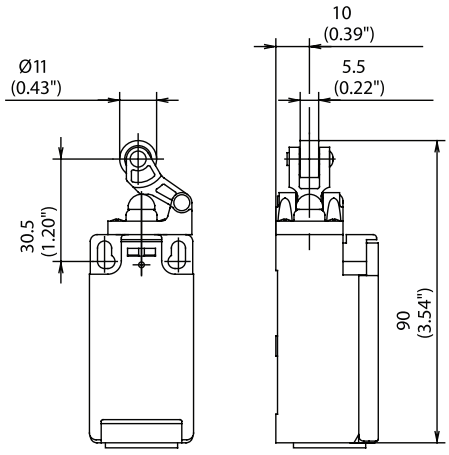
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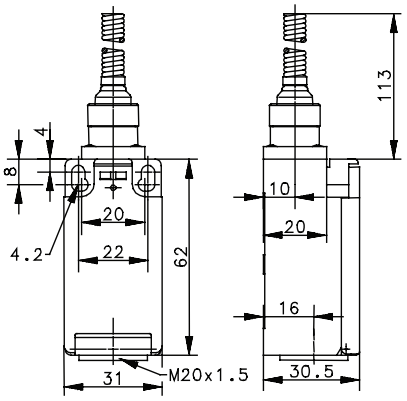
I88 Series

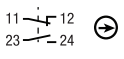
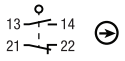
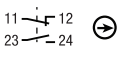
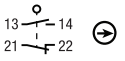
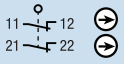
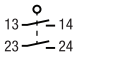
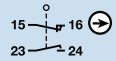


HW RO11 (Form E)



FF



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.6121.021** I88-U1Z HW RO11 	**608.6171.022** I88-SU1Z HW RO11 	**618.6140.217** I88-U1 FF 	**608.6190.078** I88-SU1 FF 
2 NC Contacts	**608.6821.099** I88-A2Z HW RO11 	– -	– -	– -
2 NO Contacts	**608.6821.068** I88-E2 HW RO11 	– -	– -	– -
1 NC / 1 NO Contacts Overlapping	**608.6321.100** I88-UV1Z HW RO11 	– -	– -	– -
Replacement actuator:	**391.8191.547**		**391.8401.031**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC	250VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)
- Available with black enclosure
- With steel roller
- Different roller diameters

Special features/variants (on request)
- Available with black enclosure
- Various spring lengths
- Different spring type or spring rod

Drawing dimensions in mm

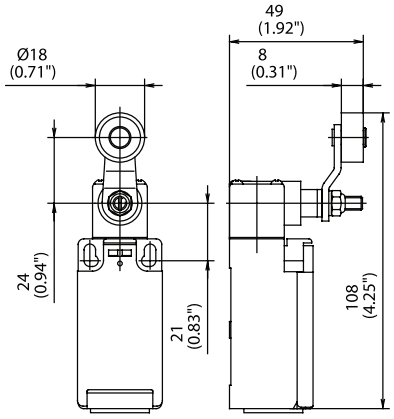
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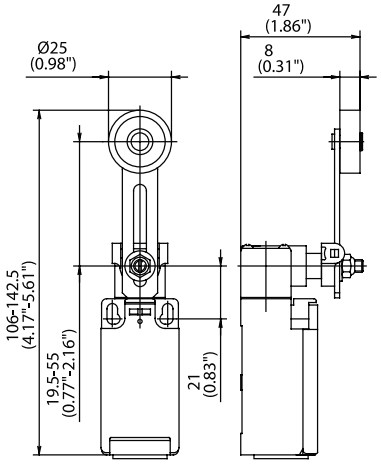
I88 Series



AH (Form A)



AV



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.6135.033** I88-U1Z AH 11–12, 23–24	**608.6185.034** I88-SU1Z AH 13–14, 21–22	**608.6136.037** I88-U1 AV 11–12, 23–24	**608.6186.038** I88-SU1 AV 13–14, 21–22
2 NC Contacts	**608.6835.059** I88-A2Z AH 11–12, 21–22	–	**608.6836.131** I88-A2 AV 11–12, 21–22	–
2 NO Contacts	**608.6835.116** I88-E2 AH 13–14, 23–24	–	–	–
1 NC / 1 NO Contacts Overlapping	**618.6335.628** I88-UV1Z AH 15–16, 23–24	–	–	–
Replacement actuator:	**391.8351.166**		**391.8360.984**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC	250VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Available with black enclosure
- Available with different actuating directions
- With steel or different diameter roller
- Bent or straight lever in different lengths

Special features/variants (on request)

- Available with black enclosure
- Available with different actuating directions
- With steel or different diameter roller
- Bent or straight lever in different lengths

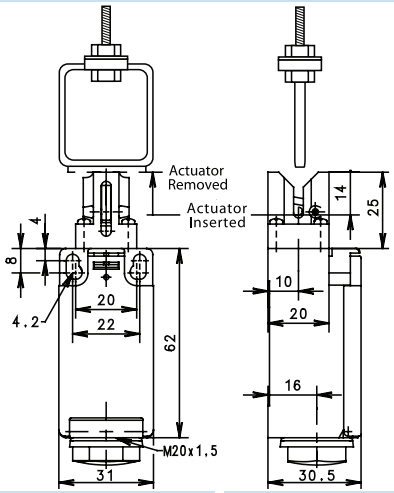
Drawing dimensions in mm

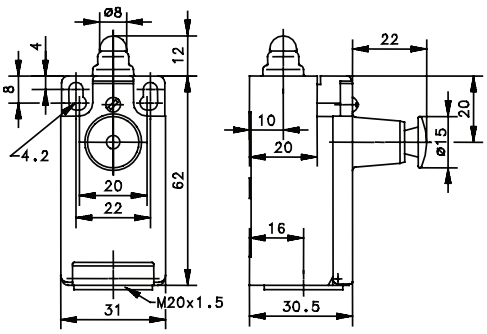
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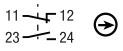
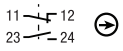
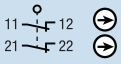
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I88 Series







Switching Operation	KS Slow Action	KS Snap Action	W RAST Slow Action	W RAST Snap Action
1 NC / 1 NO Contacts	**611.6819.140** I88-U1Z KS 	–	**618.6103.005** I88-U1Z W RAST 	
2 NC Contacts	–	–	**618.6803.155** I88-A2Z W RAST 	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:			**391.8401.031**	

Technical Information	KS Slow Action	KS Snap Action	W RAST Slow Action	W RAST Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC	250VAC
Approvals				

* Depending on switching system - see technical information for details

Drawing dimensions in mm

Altech Corp.® by BERNSTEIN

SGS Switches

The SGS is a latching safety switch with remote release ability. Once switched, the SGS remains in this position until it is manually reset at the plunger or via an external button. A built-in solenoid actuator controls the release action. In its rugged plastic housing, it represents an economically priced alternative to the BERNSTEIN GC Series with remote release.

The SGS can be used wherever an intentional (manual or electrical) reset function is required:

- In lift construction
- In door and gate systems
- In wind power stations or
- Wherever safety is of prime importance

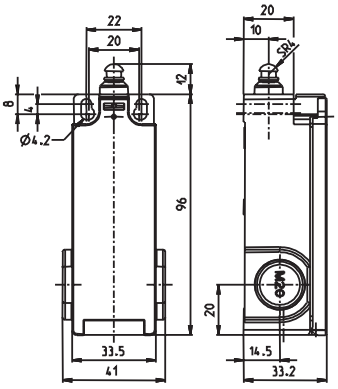
By correspondingly checking the NC contacts with positive opening action, an evaluator circuit is able to disconnect the power supply to a drive controller and shut down the machine.

SGS applications include

- Lift pre-switching (speed limiter)
- Monitoring of emergency release function
- Machine construction applications where specific reset of the switch is required
- Use in areas difficult to access
- Remote monitoring and reset over large distances

Features:

- Plunger groove for manual reset
- 2 versions: 230 V AC and 24 V DC
- Reset via built-in solenoid actuator
- 3 cable outlets M20 x 1.5
- Switching functions: 2 NC contacts
- Other actuators from the standard range on request



New switch series can be mounted in inaccessible areas and reset remotely!



Product selection

Supply voltage reset 24 Volt				
Switching operation	**Actuating force 3 N**		**Actuating force 6 N**	
1 NO / 1 NC	-	-	-	-
2 NC	**601.0853.002**	SGS-SA2Z W F3 24 V	**601.0853.001**	SGS-SA2Z W F6 24 V

Supply voltage reset 230 Volt				
Switching operation	**Actuating force 3 N**		**Actuating force 6 N**	
1 NO / 1 NC	-	-	**601.0153.027**	SGS-SU1Z W F6 230 V
2 NC	**601.0853.004**	SGS-SA2Z W F3 230 V	**601.0853.003**	SGS-SA2Z W F6 230 V

Technical data

Electrical data		
Protection class		II, Insulated
Switching elements		
Rated insulation voltage	U_i	250 V AC
Thermal current	I_{the}	10 A
Utilization category		AC-15, U_e /I_e 240 V / 3 A DC-13, U_e /I_e 250 V / 0.27 A
Minimum switching voltage		24 V
Minimum switching current		5 mA
Positive opening	p	conforming IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 4 A gL/gG
Electromagnet		Without free-wheeling diode
Thermal class		B (130 °C)
Rated operating voltage	U_e	24 V DC / 230 V AC (depending on type)
Rated operating current	I_e	2.3 A / 0.23 A AC
Duty factor	ED	3 %
Minimum ON time	T_i	0.2 s
Maximum ON time	T_e	0.5 s
Minimum OFF time	T_p	17 s
Mechanical data		
Enclosure		Glass fibre-reinforced thermoplastic, self-extinguishing
Cover		Glass fibre-reinforced thermoplastic, self-extinguishing
Actuation		Plunger (thermoplastic)
Approach speed	V_{max}	0.5 $^m/_s$
Ambient temperature		-25 °C bis +50 °C
Contact type		2 NC contacts (Zb) / NC contacts, 1NO contacts (Zb)
Switching principle		Snap action system, bistable
Mechanical service life		5 x 10^4 switching cycles
B10d		0,1 Mio.
Bolt		2 x M4 / 2 x M5 for safety applications
Type of connection Switching element		Screw connections
Conductor cross sections		Single-wire 0.5 ... 1.5 mm^2
Type of connection Electromagnet		2 x butt connector similar to DIN 46341 (crushing zone 0,5 – 1,5 mm^2)
Cable entry		3 x M20x1,5
Installation position		Any
Contact opening		4 x >2 mm
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 DIN EN 81-1		

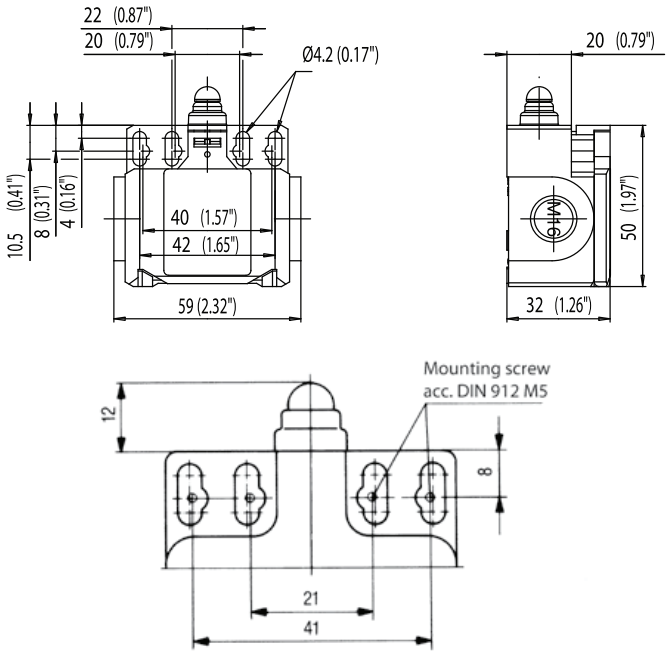
Drawing dimensions in mm

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Bi2 Series





Recommended use

Multiple slotted mounting holes allow this series to be used as a replacement in a variety of applications. Theses switches can be adjusted vertically when mounted with M4 bolts. M5 bolts can be used for fixed mounting for Safety applications. Thanks to its two cable entries, this switch is ideal for use in series-connections.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, self-extinguishing (UL-94 V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry 2x M16 x 1.5
- Connection designation conforming to DIN EN 50013

Options

- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- Two M4 adjustment slots (distance between centers 22 mm)
- Two M4 adjustment slots (distance between centers 42 mm)
- Two M5 holes (distance between centers 21 mm) for safety applications
- Two M5 holes (distance between centers 41 mm) for safety applications without additional securing element

Installation advantages

- Cover opening range 135° (cover can also be detached from hinge)
- Screw connections with self-lifting clamping plates
- Easy-action cover lock (close and press)
- Cover additionally secured with screw
- 2 cable entries for through-wiring

Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current [1]	I_{the}	10 A
Rated operating voltage	U_e max.	240 V AC
Utilization category		AC15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) [1]		10 x 10^6 switching cycles
B10d (up to) [1]		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		2 x M16 x 1,5
Protection class		IP65 conforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table in Electrical Data

Drawing dimensions in mm

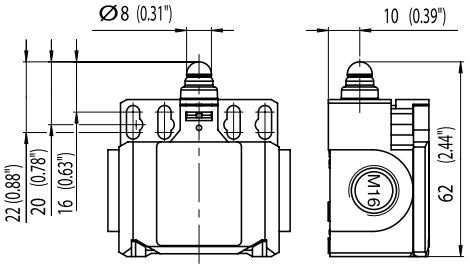
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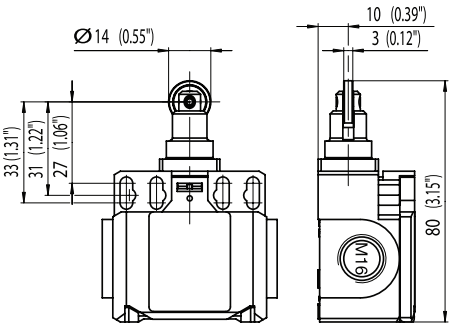
Bi2 Series



W



RIW



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.5103.100** BI2-U1Z W 11–12 / 23–24	**608.5153.107** BI2-SU1Z W 13–14 / 21–22	**608.5117.101** BI2-U1Z RIW 11–12 / 23–24	**608.5167.108** BI2-SU1Z RIW 13–14 / 21–22
2 NC Contacts	**608.5803.116** BI2-A2Z W 11–12 / 21–22	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	**608.5303.115** BI2-UV1Z W 15–16 / 23–24	–	–	–

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)
- Steel Roller Available

Drawing dimensions in mm

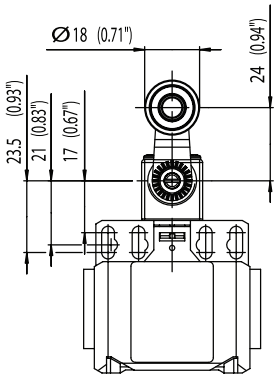
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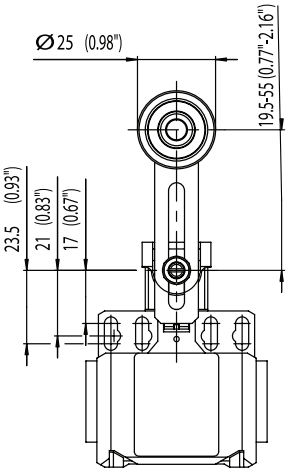
Bi2 Series

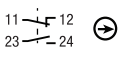
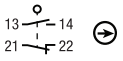
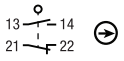


AH



AV



Switching Operation	AH Slow Action	AH Snap Action	AV Slow Action	AV Snap Action
1 NC / 1 NO Contacts	**608.5135.104** BI2-U1Z AH 	**608.5185.111** BI2-SU1Z AH 	-	**608.5186.112** BI2-SU1 AV 
2 NC Contacts	-	-	-	-
2 NO Contacts	-	-	-	-
1 NC / 1 NO Contacts Overlapping	-	-	-	-
Replacement actuator:	**391.8351.166**		**391.8360.984**	

Technical Information	AH Slow Action	AH Snap Action	AV Slow Action	AV Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Available with different actuator directions
- With steel roller and different roller diameters
- Different lever lengths; straight or bent

Drawing dimensions in mm

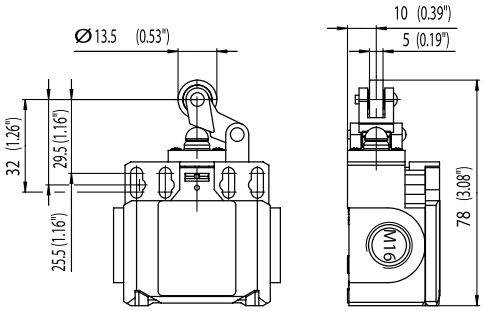
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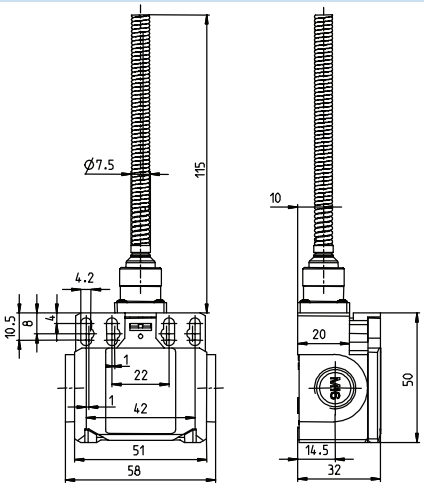
Bi2 Series

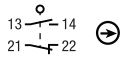
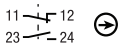
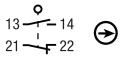


HW RO13.5



FF



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	-	**608.5171.109** BI2-SU1Z HW RO13.5 	**618.5140.104** BI2-U1 FF 	**608.5190.114** BI2-SU1 FF 
2 NC Contacts	-	-	-	-
2 NO Contacts	-	-	-	-
1 NC / 1 NO Contacts Overlapping	-	-	-	-
Replacement actuator:	**391.1890.681**			

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

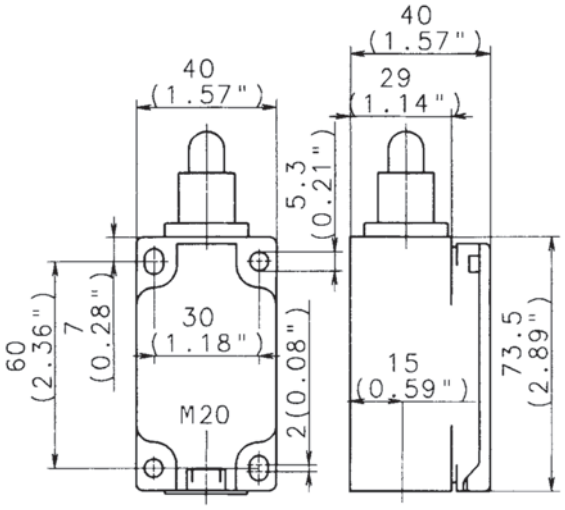
- Available with different spring lengths
- Spring rod
- Various spring versions

Drawing dimensions in mm

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ENK Series





Recommended use

Thanks to its standard size design and its metal actuators, the ENK limit switch is particularly suitable for applications requiring a sturdy switch made of plastic.

Product advantages

- Standard switch conforming to DIN EN 50041
- Standard actuator conforming to DIN EN 50041, Type A, B, C, D
- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, (UL-94-V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads

Options

- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 3 NC, overlapping contacts
- Latching function on request
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- 2 adjustment slots for M5 screws
- 2 holes for M5 mounting screws in safety applications

Installation advantages

- Snap-on cover can be released with screwdriver
- Cover opening range 150° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Easy to install cover lock (close and press)

Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current (up to) [1]	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) [1]		10 x 10^6 switching cycles
B10d (up to) [1]		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		1 x M20 x 1.5 ≈ 0.15 kg
Protection class		IP65 conforming tdEN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system.

Drawing dimensions in mm

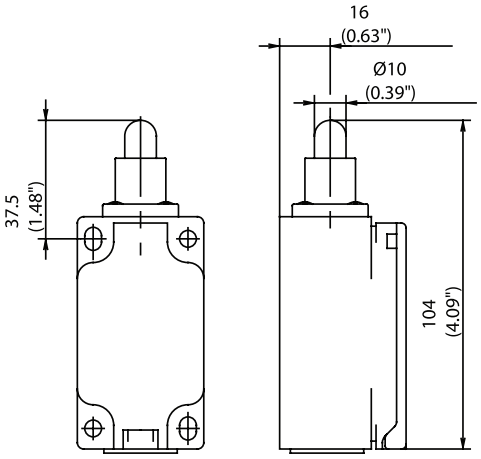
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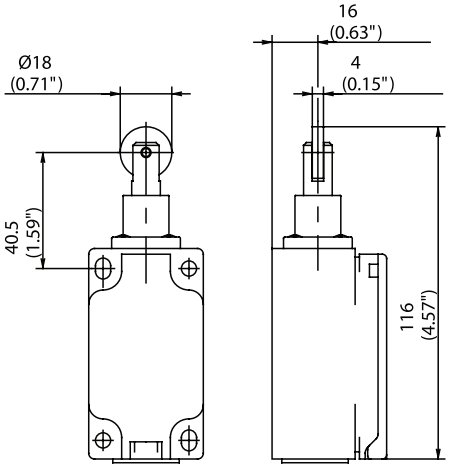
ENK Series



IW (Form B)



RIW (Form C)



Switching Operation	IW (Form B) Slow Action	IW (Form B) Snap Action	RIW (Form C) Slow Action	RIW (Form C) Snap Action
1 NC / 1 NO Contacts	**608.1102.001** ENK-U1Z IW 11 12 / 23 24	**608.1152.007** ENK-SU1Z IW 13 14 / 21 22	**608.1117.002** ENK-U1Z RIW 11 12 / 23 24	**608.1167.008** ENK-SU1Z RIW 13 14 / 21 22
2 NC Contacts	–	–	**608.1817.281** ENK-A2Z RIW 11 12 / 21 22	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	**608.1317.307** ENK-UV1Z RIW 15 16 / 23 24	–
Replacement actuator:	**391.8020.660**		**391.8170.661**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)
- Available with black enclosure and following contacts: 3 NC contacts

Special features/variants (on request)
- Available for high temperature range and following contacts: 3 NC contacts

Drawing dimensions in mm

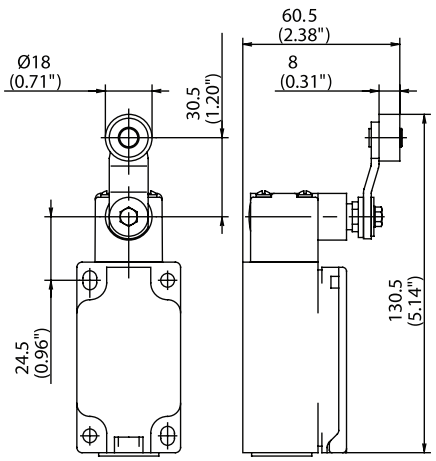
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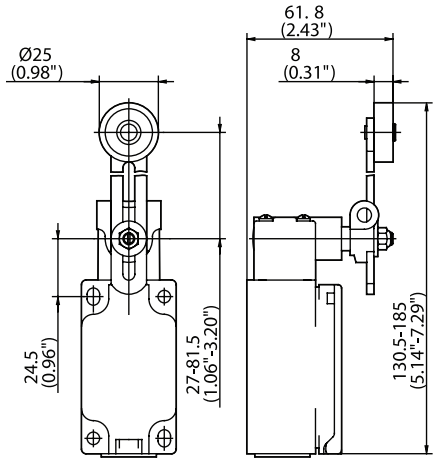
ENK Series



AHS-V (Form A)



AV



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.1135.003** ENK-U1Z AHS-V 11 12 / 23 24	**608.1185.009** ENK-SU1Z AHS-V 13 14 / 21 22	**608.1136.012** ENK-U1 AV 11 12 / 23 24	**608.1186.018** ENK-SU1 AV 13 14 / 21 22
2 NC Contacts	**608.1835.323** ENK-A2Z AHS-V 11 12 / 21 22	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	**608.1335.006** ENK-UV1Z AHS-V 15 16 / 23 24	–	–	–
Replacement actuator:	**391.8350.737**		**391.8360.738**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details			

Special features/variants (on request)
- Available with black enclosure
- With 50 mm diameter rubber roller
- 3 NC contacts possible

Special features/variants (on request)
- Available with different lever lengths
- With 50 mm diameter rubber roller

Drawing dimensions in mm

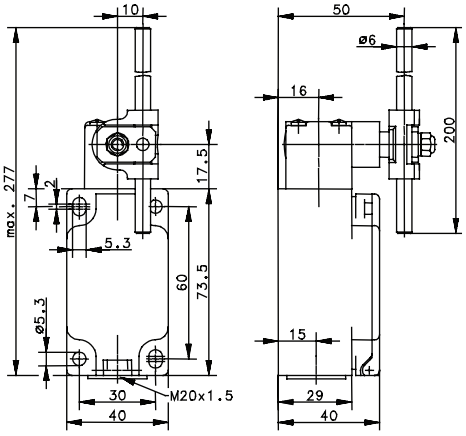
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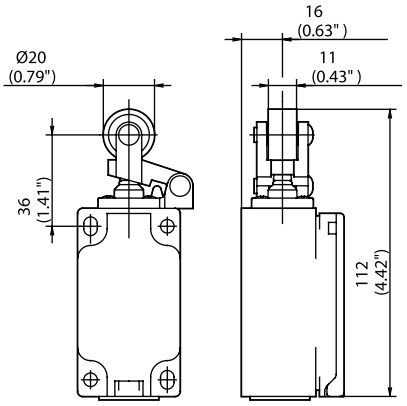
ENK Series

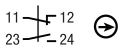
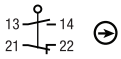
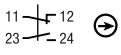
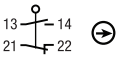


AD (Form D)



HW RO20



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.1137.011** ENK-U1 AD 	**608.1187.017** ENK-SU1 AD 	**608.1121.095** ENK-U1Z HW RO20 	**608.1171.096** ENK-SU1Z HW RO20 
2 NC Contacts	– –	– –	– –	– –
2 NO Contacts	– –	– –	– –	– –
1 NC / 1 NO Contacts Overlapping	– –	– –	– –	– –
Replacement actuator:	**391.8370.739**		**391.8200.906**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details			

Special features/variants (on request)

- Available with various actuator directions and actuator lengths

Special features/variants (on request)

- Available with black enclosure and various roller diameters

Drawing dimensions in mm

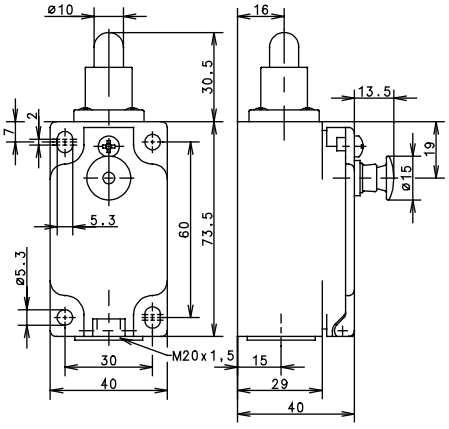
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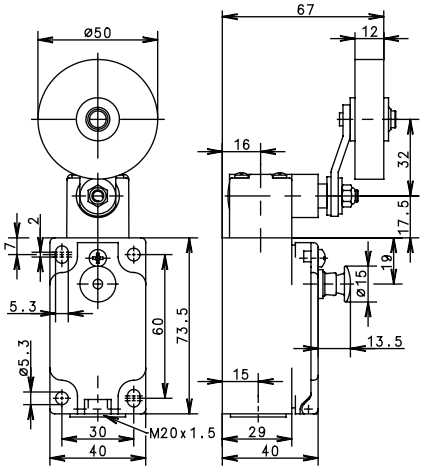
ENK Series



iW RAST - LATCHING



AHS-GU RAST RO050 - LATCHING



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**618.1102.137** ENK-U1Z IW RAST 11 12 / 23 24	–	**618.1135.251** ENK-U1Z AHSGU RAST RO50 11 12 / 23 24	–
2 NC Contacts	–	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.8020.660**			

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details			

Drawing dimensions in mm

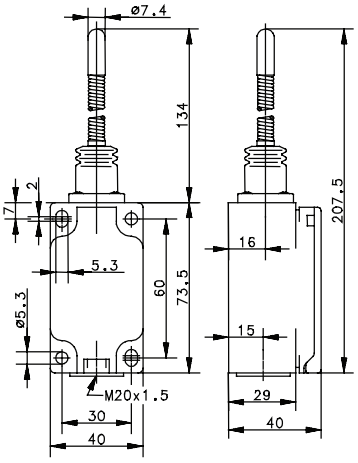
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ENK Series



FF



Switching Operation	Slow Action	Snap Action
1 NC / 1 NO Contacts		**608.1190.045** ENK-SU1 FF 13 14 21 22
2 NC Contacts	– -	– -
2 NO Contacts	– -	– -
1 NC / 1 NO Contacts Overlapping	– -	– -

Replacement actuator: **391.8400.662**

Technical Information	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V
Max. Switching Amps (up to)*	10A	10A
B10d (up to)*	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details	

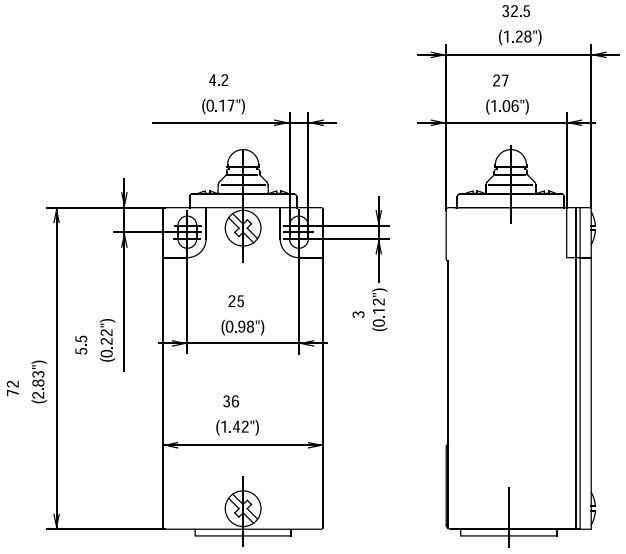
Drawing dimensions in mm

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GC Series





Recommended use

Thanks to its compact design, this metal-enclosed switch is ideally suited for safety and position monitoring applications.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminum pressure die-casting
- Cover: Sheet aluminum
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads
- Graduated adjustment of AH lever
- Selectable direction-dependent contact-making of AH actuator (basic setting: contact-making both sides)

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC/2 NO, 2 NC, overlapping contacts
- All NC contacts marked with ⊖ symbol in the circuit diagram are positively opening
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- 2 adjustment slots for M4 screws (for safety applications with blind hole for ø 4.0 mm fitted pin in enclosure base or enclosure with holes for M5)

Installation advantages

- Screw connections with clamping plates
- Captive cover screws
- Easy-to-change switching system thanks to snap-in retainer
- Finely adjustable switching point with adjusting screw

Technical data

Electrical data		
Rated insulation voltage (up to) [1]	U_i max.	400 V AC
Conventional thermal current (up to [1]	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) [1]		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminum pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) [1]		10 x 10^6 switching cycles
B10d (up to) [1]		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		1 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system.

Drawing dimensions in mm

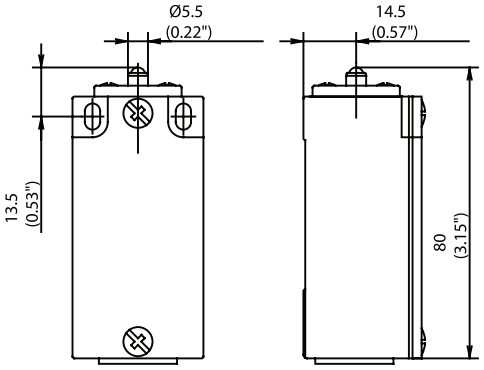
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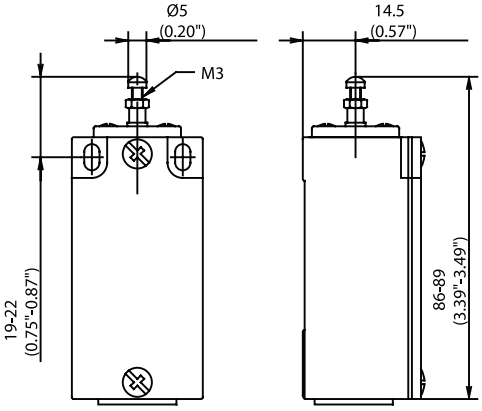
GC Series



IW



STIW



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**602.1102.001** GC-U1Z IW 11 12 / 23 24	**602.1352.620** GC-SU1Z IW 13 14 / 21 22	**602.1105.015** GC-U1Z STIW 11 12 / 23 24	**602.1155.017** GC-SU1Z STIW 13 14 / 21 22
2 NC Contacts	**602.1802.189** GC-A2Z IW 11 12 / 21 22	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	**602.1305.016** GC-UV1Z STIW 15 16 / 23 24	–
Replacement actuator:	**391.2030.546**		**391.2050.523**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details			

Special features/variants (on request)

Special features/variants (on request)

- Actuator length adjustable with adjusting screw

Drawing dimensions in mm

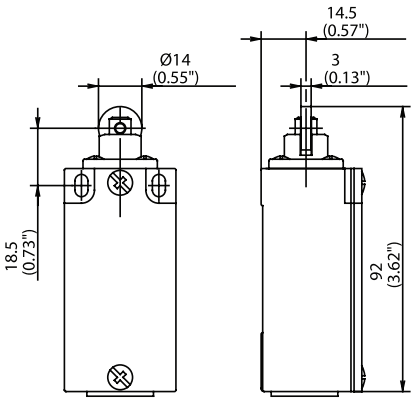
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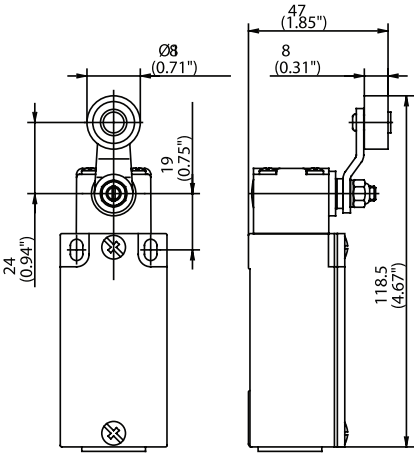
GC Series

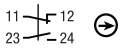
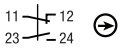
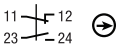
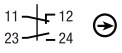
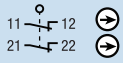
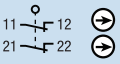
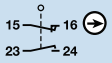
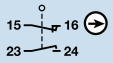


RIW



AH



Switching Operation	RIW Slow Action	RIW Snap Action	AH Slow Action	AH Snap Action
1 NC / 1 NO Contacts	**602.1117.029** GC-U1Z RIW 	**602.1367.626** GC-SU1Z RIW 	**602.1135.102** GC-U1Z AH 	**602.1385.634** GC-SU1Z AH 
2 NC Contacts	**602.1817.172** GC-A2Z RIW 	– -	**612.1835.833** GC-A2Z AHS 	– -
2 NO Contacts	**602.1817.154** GC-E2 RIW 	– -	**602.1835.160** GC-E2 AH 	– -
1 NC / 1 NO Contacts Overlapping	**602.1317.030** GC-UV1Z RIW 	– -	**602.1335.133** GC-UV1Z AH 	– -
Replacement actuator:	**391.2170.518**		**391.2350.722**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details			

Special features/variants (on request)
- Available for high temperature range and following contacts:
  2 NC /1 NO contact (larger enclosure)
  2 NC /2 NO contact (larger enclosure)

Special features/variants (on request)
- Available with different roller diameters, bent or straight lever and with different lever lengths

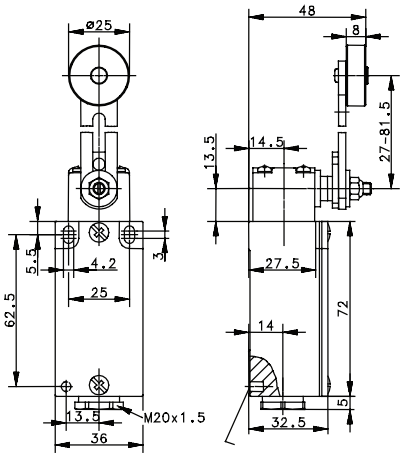
Drawing dimensions in mm

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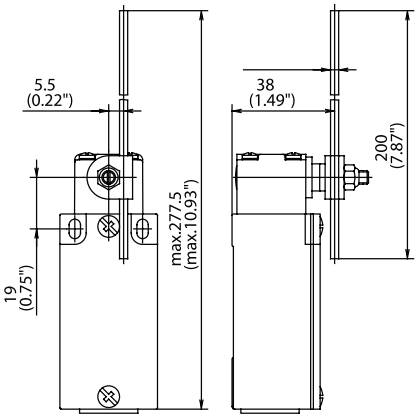
GC Series

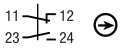
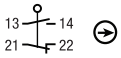
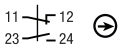
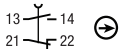


AV



AD



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**602.1136.104** GC-U1 AV 	**602.1186.118** GC-SU1 AV 	**602.1137.103** GC-U1 AD 	**602.1187.125** GC-SU1 AD 
2 NC Contacts	–	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.2360.723**		**391.2370.724**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details			

Special features/variants (on request)

- Different roller diameters and lever lengths
- With roller over switch and with 2 NC /2 NO contact

Special features/variants (on request)

- Available different actuator lengths and actuator directions
- With 2 NC /1 NO with overlap contacts (larger enclosure)

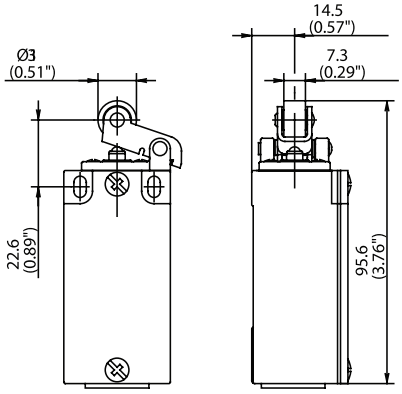
Drawing dimensions in mm

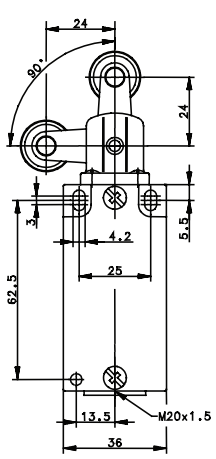
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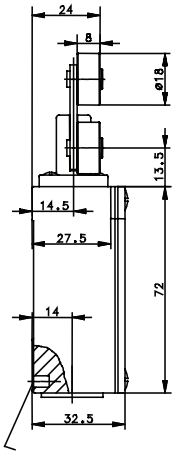
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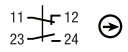
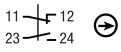
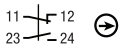
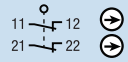
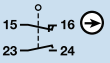
GC Series









Switching Operation	HIW Slow Action	HIW Snap Action	DR Slow Action	DR Snap Action
1 NC / 1 NO Contacts	**602.1120.057** GC-U1Z HIW 	**602.1370.629** GC-SU1Z HIW 	– -	**602.1191.099** GC-SU1Z DR 
2 NC Contacts	**602.1820.175** GC-A2Z HIW 	– -	– -	– -
2 NO Contacts	**602.1820.157** GC-E2 HIW 	– -	– -	– -
1 NC / 1 NO Contacts Overlapping	**602.1320.058** GC-UV1Z HIW 	– -	– -	– -
Replacement actuator:	**391.2200.552**		**391.2410.593**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Available with different actuator directions, steel roller and additional contacts:
  2 NC /1 NO overlaping contact (larger enclosure)
  2 NC /2 NO contact (larger enclosure)

Drawing dimensions in mm

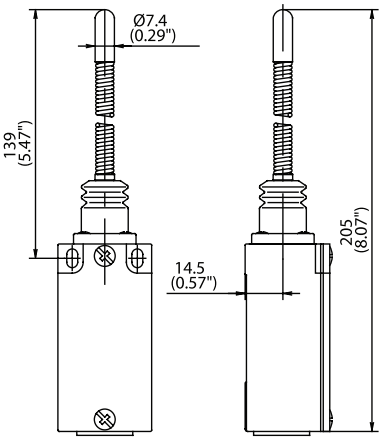
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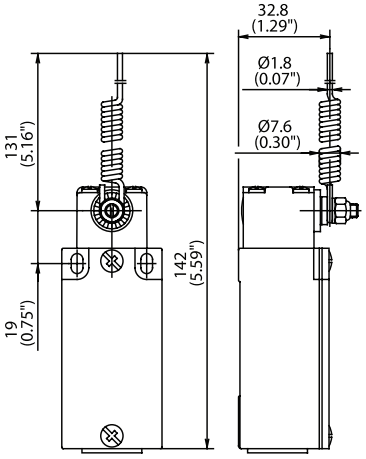
GC Series

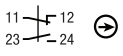
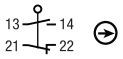
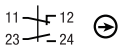
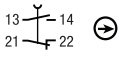


FF



AF



Switching Operation	FF Slow Action	FF Snap Action	AF Slow Action	AF Snap Action
1 NC / 1 NO Contacts	**602.1140.476** GC-U1 FF 	**602.1190.100** GC-SU1 FF 	**602.1139.106** GC-U1 AF 	**602.1189.128** GC-SU1 AF 
2 NC Contacts	–	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.2400.510**		**391.2390.725**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)
- Different spring lengths
- Different spring versions or spring rod

Special features/variants (on request)
- Available with various actuator lengths and actuator directions

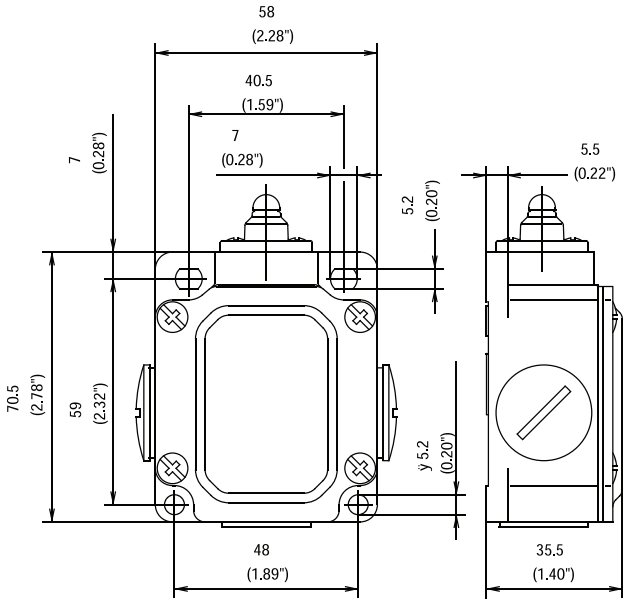
Drawing dimensions in mm

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SN2 Series





Recommended use

With its three cable entries and large connection area, the SN2 limit switch is an ideal solution for series-wiring or branch circuits. The rugged metal body is designed to provide safety or position monitoring in harsh environments.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminum pressure die-casting
- Cover: Sheet aluminum
- Actuator can be repositioned by 4 x 90°
- Cable entry 3x M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads
- Graduated adjustment of AH lever
- Selectable direction-dependent contact-making of AH actuator (basic setting: contact-making both sides)

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

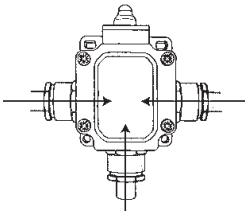
- Slow-action and snap-action contacts
- Versions: 1 NC / 1NO, 2 NC
- All NC contacts with ⊕ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- 2 adjustment slots for M5 screws
- 2 addition holes for M5 mounting screws in safety applications

Installation advantages

- 3 cable entries for through-wiring
- Large internal connection space
- Screw connections with clamping plates
- Easy-to-change switching system thanks to snap-in retainer
- Finely adjustable switching point with adjusting screw



Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, A300, U_e/I_e 240 V/3 A
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminum pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life		10 x 10^6 switching cycles
B10d (up to) [1]		20 Mill.
Switching frequency		max. 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		3 x M20 x 1.5
Protection class		IP65 conforming to EN 60529, DIN VDE 0470 T1
Standards		
conforming to EN 60947-1; EN 60947-5-1		

① Depending on switching system. See Table in Technical Section.

Dimensions shown in mm.

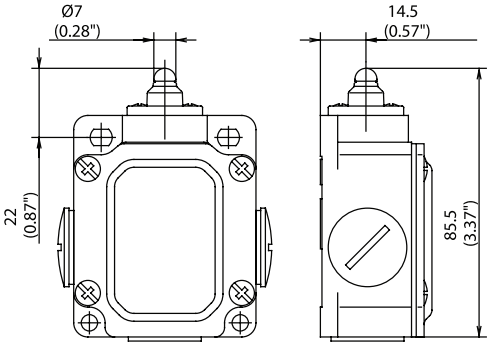
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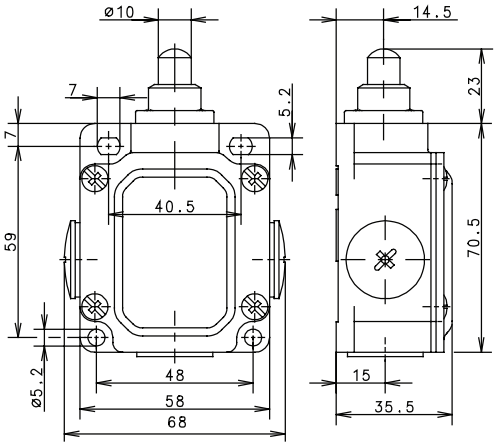
SN2 Series

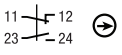
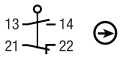
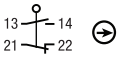


W



LIW



Switching Operation	W Slow Action	W Snap Action	LIW Slow Action	LIW Snap Action
1 NC / 1 NO Contacts	**603.3103.023** SN2-U1Z W 	**603.3353.016** SN2-SU1Z W 		**603.3194.022** SN2-SU1 LIW 
2 NC Contacts	–	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.3030.537**		**391.2440.536**	

Technical Information	W Slow Action	W Snap Action	LIW Slow Action	LIW Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details			

Special features/variants (on request)

- Telescopic plunger, very long actuation travel of 9 mm

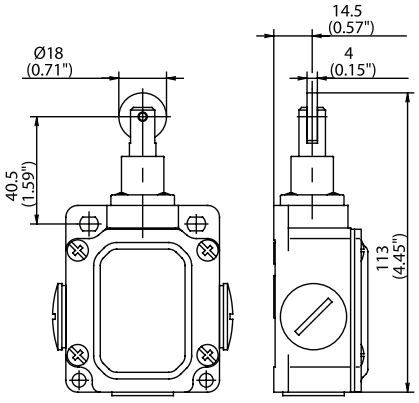
Drawing dimensions in mm

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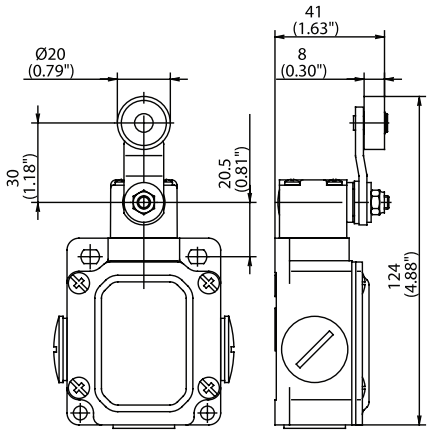
SN2 Series

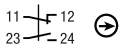
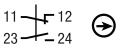
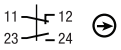
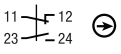
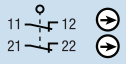


RIW



AHS



Switching Operation	RIW Slow Action	RIW Snap Action	AHS Slow Action	AHS Snap Action
1 NC / 1 NO Contacts	**603.3117.025** SN2-U1Z RIW 	**603.3367.017** SN2-SU1Z RIW 	**603.3135.002** SN2-U1Z AHS 	**603.3385.018** SN2-SU1Z AHS 
2 NC Contacts	**603.3818.038** SN2-A2Z RIW 	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.8170.587**		**391.3351.913**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3×10^6	10×10^6	10×10^6	10×10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)
- Available with different actuating directions
- With latching function

Special features/variants (on request)
- Available with different actuating directions

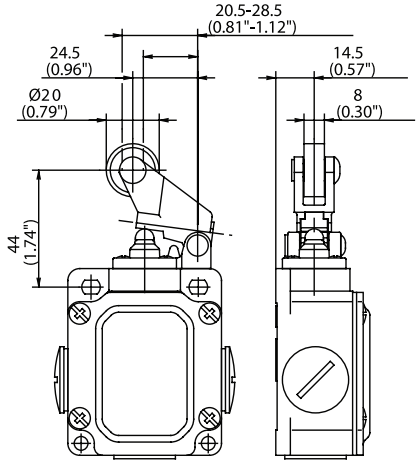
Drawing dimensions in mm

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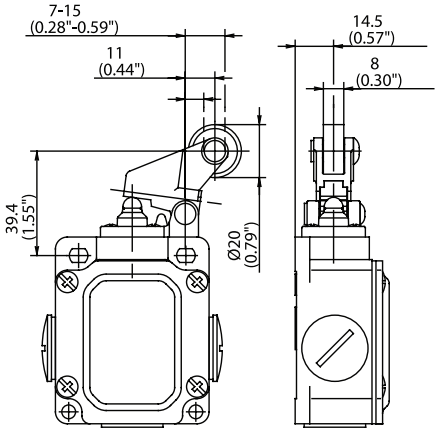
SN2 Series



DGHW



DGKW



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**603.3121.005** SN2-U1Z DGHW 11 12 / 23 24	**603.3371.004** SN2-SU1Z DGHW 13 14 / 21 22	**603.3127.010** SN2-U1Z DGKW 11 12 / 23 24	**603.3377.011** SN2-SU1Z DGKW 13 14 / 21 22
2 NC Contacts	–	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.8211.656**		**391.8271.655**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details			

Special features/variants (on request)

- Telescopic plunger, very long actuation travel of 9 mm

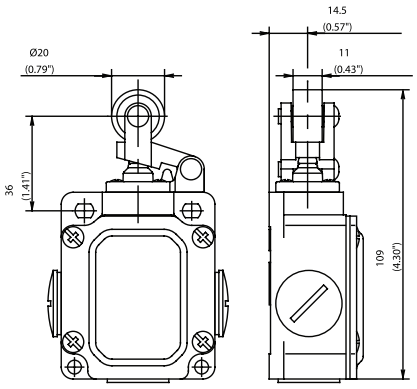
Drawing dimensions in mm

Altech Corp.® by BERNSTEIN

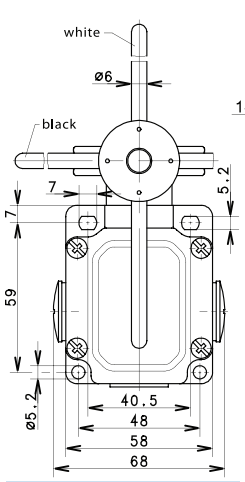
SN2 Series

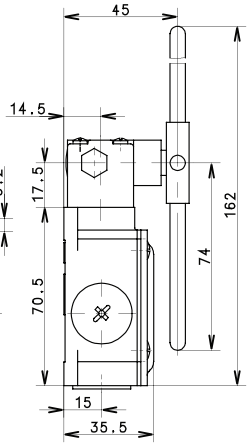


HW



AD4K





Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**603.3121.007** SN2-U1Z HW 11 12 23 24	**603.3371.006** SN2-SU1Z HW 11 12 23 24		**613.3887.022** SN2-SA2Z AD4K Functional description of turnstile black 18° white 13 14 21 22 Switch-on point at 18° white 82° black 13 14 21 22 Switch-off point at 82°
2 NC Contacts	–	–	–	
2 NO Contacts	–	–	–	
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.3210.553**			

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Available with different actuating directions

Drawing dimensions in mm

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Altech Carries a Full Line of Liquid Tight Strain Reliefs



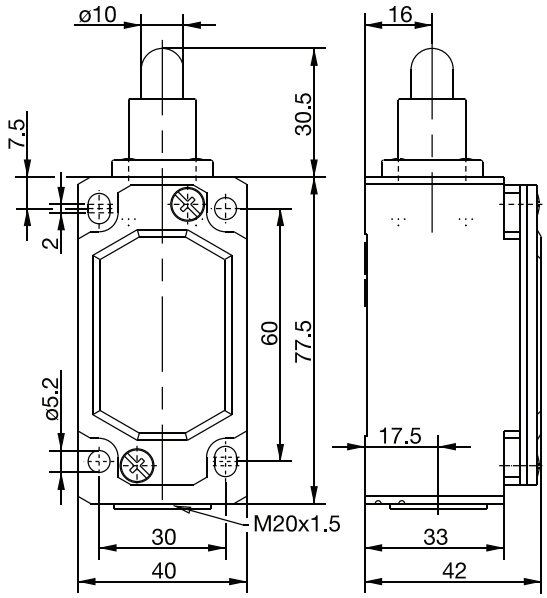
- Standard Straight-Through
- Industrial Straight-Through
- Industrial Flat Cable
- Industrial Multi-Conductor
- Atex
- EMI/RFI
- Pull/Bend Protection
- Once according to DIN
- Locknuts
- Reducers, Enlargers and Thread Adapters
- Hole Plugs
- Seal Rings
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ENM2 Series





Recommended use

With it's standard enclosure size, the ENM2 limit switch is a perfect series for use in industrial and safety applications, where a rugged and durable switch is required.

Product advantages

- Standard switch conforming to DIN EN 50041
- Standard actuator conforming to DIN EN 50041, Type A, B, C, D
- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminum pressure die-casting
- Cover: Sheet aluminum
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC /1NO, 2 NC, overlapping contacts
- All NC contacts with ⊕ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- Two M5 adjustment screws with slots
- Two M5 screws for safety applications without additional securing element

Installation advantages

- Screw connections with self-lifting clamping plates
- Easy-to-change switching system thanks to snap-in retainer (depending on type)
- Finely adjustable switching point with adjusting screw
- Captive cover screws
- Enlarged connection space
- Earthing surface on same level as switching system

Technical data

Electrical data		
Rated insulation voltage (up to) [1]	U_i max.	400 V AC
Conventional thermal current (up to) [1]	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) [1]		A300, AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminum pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) [1]		10 x 10^6 switching cycles
B10d (up to) [1]		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		1 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

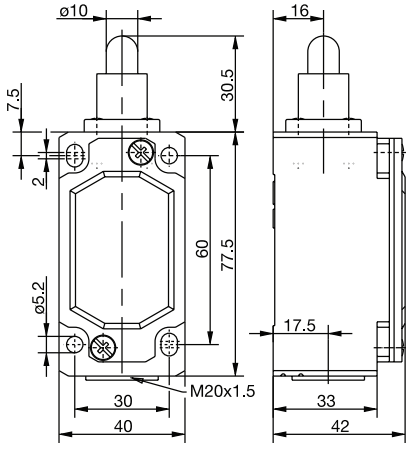
Drawing dimensions in mm

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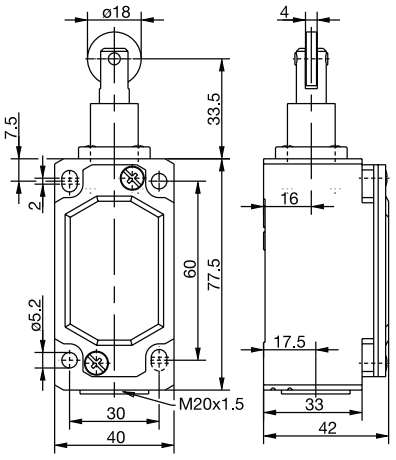
ENM2 Series



IW (Form B)



RIW (Form C)



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.7102.001** ENM2-U1Z IW 11 12 / 23 24	**608.7352.002** ENM2-SU1Z IW 13 14 / 21 22	**608.7117.004** ENM2-U1Z RIW 11 12 / 23 24	**608.7367.005** ENM2-SU1Z RIW 13 14 / 21 22
2 NC Contacts	**608.7802.003** ENM2-A2Z IW 11 12 / 21 22	–	**608.7817.006** ENM2-A2Z RIW 11 12 / 21 22	**608.7867.051** ENM2-SA2Z RIW 11 12 / 21 22
2 NO Contacts	**608.7802.021** ENM2-E2 IW 13 14 / 23 24	–	–	–
1 NC / 1 NO Contacts Overlapping	**608.7302.027** ENM2-UV1Z IW 15 16 / 23 24	–	–	–
Replacement actuator:	**391.8020.584**		**391.8170.587**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Also available with following contacts:
  2 NC /1 NO with overlap
  1 NC /2 NO with overlap

Special features/variants (on request)

- Available with different directions
- High temperature range
- Different roller diameters and contact types

Drawing dimensions in mm

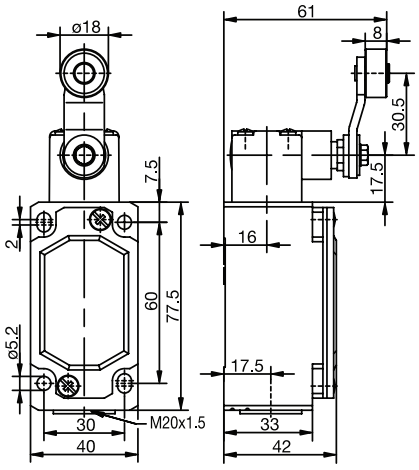
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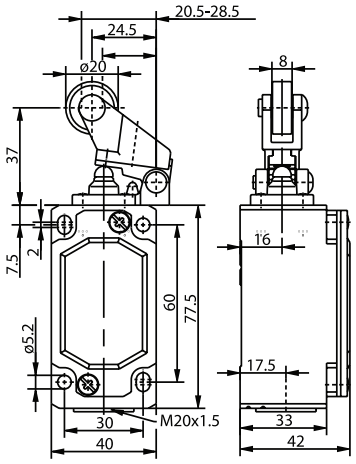
ENM2 Series

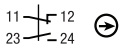
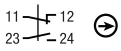
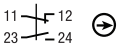
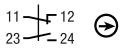
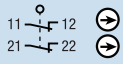
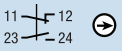


AHS-V (Form A)



DGHW RO20



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.7135.013** ENM2-U1Z AHS-V 	**608.7385.014** ENM2-SU1Z AHS-V 	**608.7121.007** ENM2-U1Z DGHW RO20 	**608.7371.008** ENM2-SU1Z DGHW RO20 
2 NC Contacts	**608.7835.015** ENM2-A2Z AHS-V 	– -	**608.7821.009** ENM2-A2Z DGHW RO20 	– -
2 NO Contacts	– -	– -	– -	– -
1 NC / 1 NO Contacts Overlapping	– -	– -	– -	– -
Replacement actuator:	**391.8350.729**		**391.8211.656**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)
- Available with different directions

Special features/variants (on request)
- Available with different directions

Drawing dimensions in mm

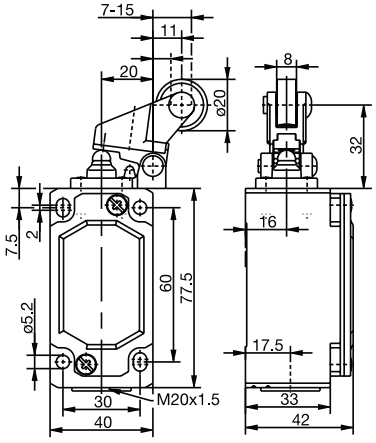
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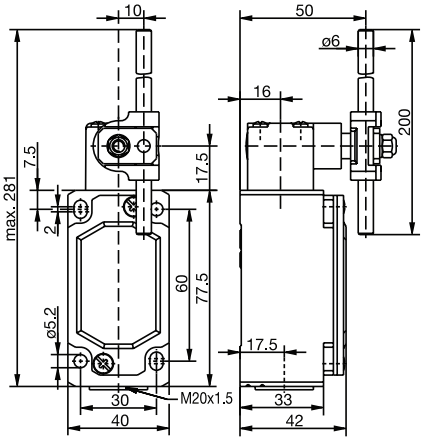
ENM2 Series

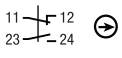
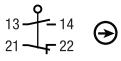
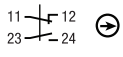
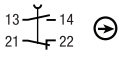


DGKW RO20



AD (Form D)



Switching Operation	Slow Action	Snap Action	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.7127.010** ENM2-U1Z DGKW RO20 	**608.7377.011** ENM2-SU1Z DGKW RO20 	**608.7137.018** ENM2-U1 AD 	**608.7387.019** ENM2-SU1 AD 
2 NC Contacts	–	–	–	–
2 NO Contacts	–	–	–	–
1 NC / 1 NO Contacts Overlapping	–	–	–	–
Replacement actuator:	**391.8271.655**		**391.8370.731**	

Technical Information	Slow Action	Snap Action	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Available with different actuating directions

Special features/variants (on request)

- Available with various actuator lengths and actuator directions

Drawing dimensions in mm

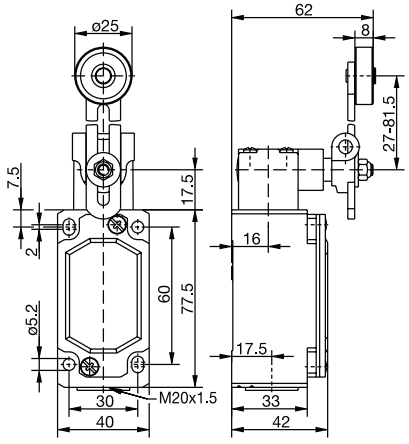
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ENM2 Series

AV





Switching Operation	Slow Action	Snap Action
1 NC / 1 NO Contacts	**608.7136.016** ENM2-U1 AV 11 12 23 24	**608.7386.017** ENM2-SU1 AV 11 12 23 24
2 NC Contacts	– -	– -
2 NO Contacts	**618.7836.060** ENM2-E2 AV 13 14 23 24	– -
1 NC / 1 NO Contacts Overlapping	– -	– -
Replacement actuator:	**391.8360.730**	

Technical Information	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V
Max. Switching Amps (up to)*	10A	10A
B10d (up to)*	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC
Approvals		

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Available with various actuator lengths and actuator directions
- Various roller diameters

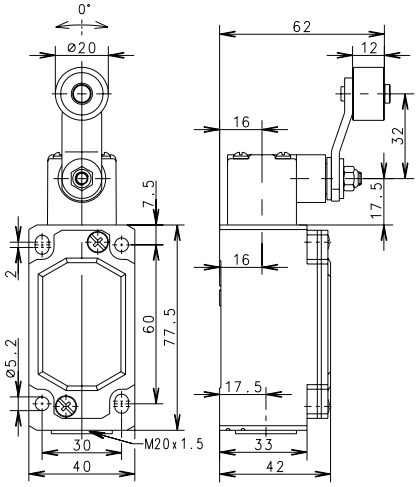
Drawing dimensions in mm

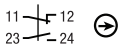
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ENM2 - Safety Limit Switch



AHZ



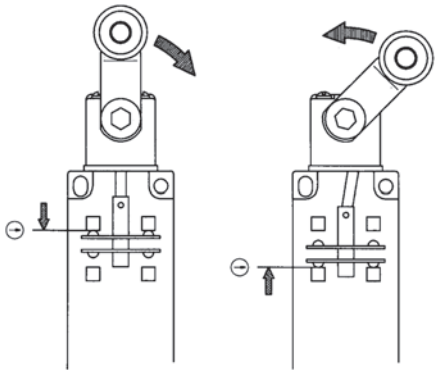
Switching Operation	Slow Action	Snap Action
1 NC/1 NO Contacts	**608.7135.030** ENM2-U1Z AHZ 	–
2 NC Contacts	–	–
2 NO Contacts	–	–
1 NC / 1NO Contacts Overlapping	–	–

Replacement actuator:

Technical Information	Slow Action	
Maximum Switching Voltage	240V	
Max. Switching Amps (up to)*	10A	
B10d (up to)*	20 Million	
Mechanical Service Life (up to)*	10 x 10^6	
Switching Frequency	≤ 100/min	
Operating Temperature	–30 °C to +80 °C	
Protection Rating	IP65	
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	
Rate Insulation Voltage	400VAC	
Approvals		

Special features

- Positively opening action, forward and return activation
- For special safety applications, the positive opening action of the normally-closed contacts takes place both in forward (moving in one direction) as well as in return (moving back to home position) direction
- For personal protection applications movement of the roller must be contained in a guide block in both directions



Note – if substituting actuators AH, AHS, AHS-V, AHZ, AF, AD, AV, DGH, DGK
– the positive conditions of the activation may change.

After the adjustment, the user must make sure that the part reaches the necessary safety levels.

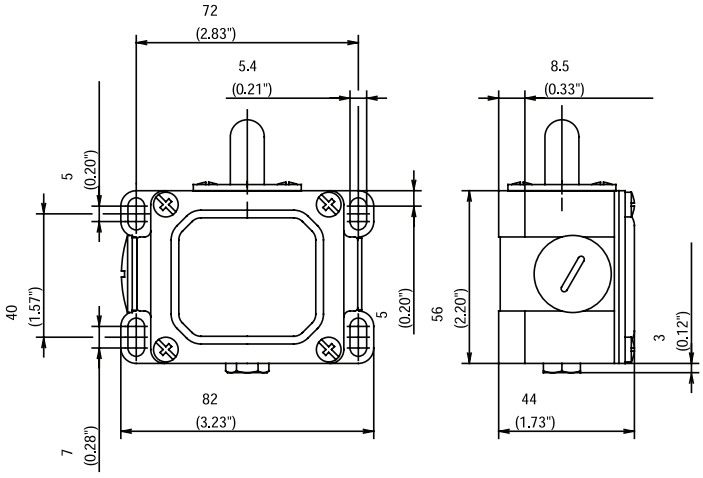
Drawing dimensions in mm

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D Series





Recommended use

Heavy duty switch body for designed for harsh operating conditions with very sturdy actuators and switching systems.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminum pressure die-casting
- Cover: Sheet aluminum
- Actuator can be repositioned by 4 x 90° (depending on type)
- Cable entries 2 x M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Sturdy contacts
- Hard wearing guide bushes

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC / 1NO, 2 NC, 2 NO, 3 NC, 3 NO, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Latching function on request

Mounting

- 4 slots for M5 screws

Installation advantages

- 2 cable entries for through-wiring
- Large internal connection space
- Captive cover screws

Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current (up to) [1]	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminum pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life		10 x 10^6 switching cycles
B10d		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		2 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table in the Technical Section

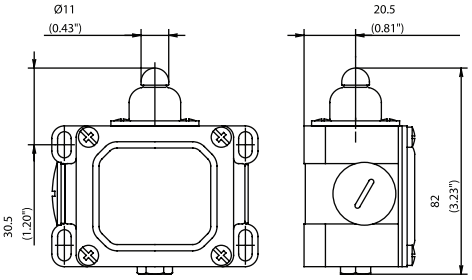
Drawing dimensions in mm

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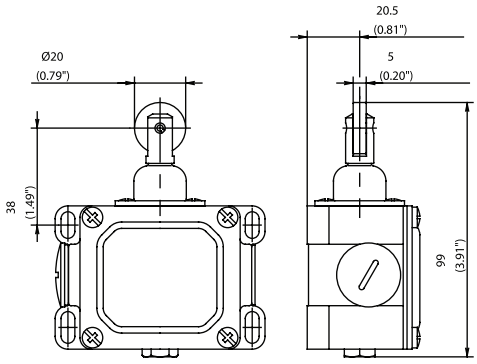
D Series



W



RW



Switching Operation	W Slow Action	W Snap Action	RW Slow Action	RW Snap Action
1 NC / 1 NO Contacts	**604.1103.002** D-U1 W	**604.1153.156** D-SU1 W	**604.1118.229** D-U1Z RW	**604.1168.162** D-SU1 RW
2 NC Contacts	**604.1803.090** D-A2 W	– -	**604.1818.741** D-A2Z RW	– -
2 NO Contacts	**604.1803.046** D-E2 W	– -	**604.1818.052** D-E2 RW	– -
1 NC / 1 NO Contacts Overlapping	**604.1303.134** D-UV1Z W	– -	**604.1318.140** D-UV1Z RW	– -

Replacement actuator:

Technical Information	W Slow Action	W Snap Action	RW Slow Action	RW Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)
- Also available with following contacts:
  3 NC contacts (larger enclosure)
  3 NO contacts (larger enclosure)
  2 NC / 2 NO contact (larger enclosure)

Special features/variants (on request)
- Also available with following contacts:
  3 NC contacts (larger enclosure)
  3 NO contacts (larger enclosure)
  2 NC / 2 NO contact (larger enclosure)

Drawing dimensions in mm

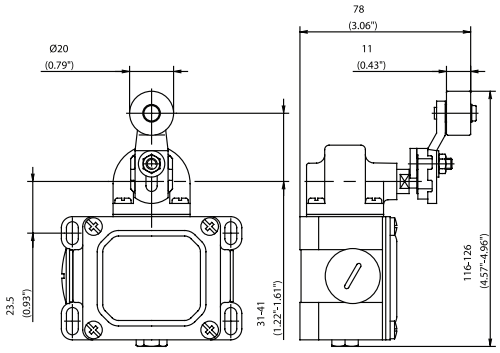
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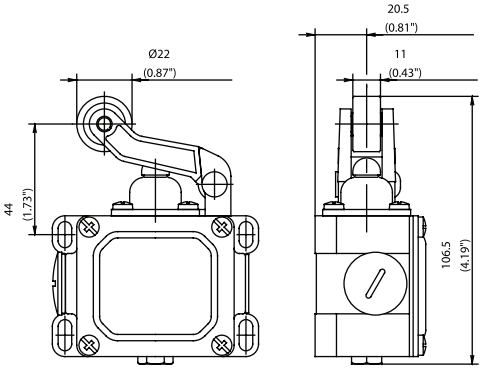
D Series

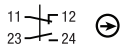
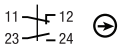
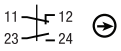
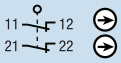
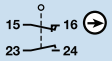


AH



HW



Switching Operation	AH Slow Action	AH Snap Action	HW Slow Action	HW Snap Action
1 NC / 1 NO Contacts	**604.1135.019** D-U1 AH 	**604.1185.173** D-SU1 AH 	**604.1121.010** D-U1 HW	**604.1171.164** D-SU1 HW 
2 NC Contacts	**604.1835.107** D-A2 AH 	– -	– -	– -
2 NO Contacts	**614.1835.709** D-E2 AH 	– -	– -	– -
1 NC / 1 NO Contacts Overlapping	– -	– -	**604.1321.142** D-UV1Z HW 	– -
Replacement actuator:	**391.4350.924**		**391.4211.065**	

Technical Information	AH Slow Action	AH Snap Action	HW Slow Action	HW Snap Action
Maximum Switching Voltage	240V	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	3 x 10^6	10 x 10^6	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC	400VAC	400VAC
Approvals				

* Depending on switching system - see technical information for details

Special features/variants (on request)

- Available steel and different diameter rollers, different lever lengths and additional contacts:
  3 NC overlaping contact (larger enclosure)
  2 NC /2 NO contact (larger enclosure)

- Available steel with higher temperature range, and additional contacts:
  3 NC overlaping contact (larger enclosure)
  2 NC /2 NO contact (larger enclosure)

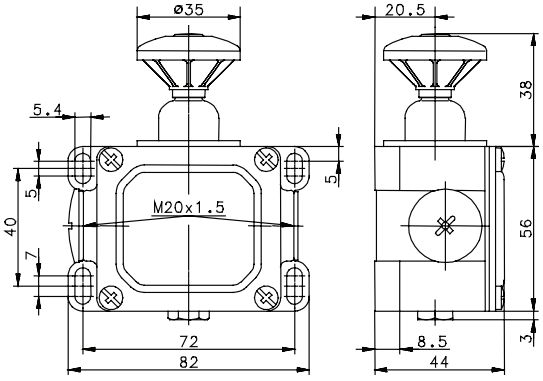
Drawing dimensions in mm

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D Series

PW





Switching Operation	Slow Action	Snap Action
1 NC / 1 NO Contacts	**604.1113.006** D-U1 PW 11 12 23 24	–
2 NC Contacts	**604.1813.835** D-A2Z PW 11 12 21 22	–
2 NO Contacts	**604.1813.050** D-E2 PW 13 14 23 24	–
1 NC / 1 NO Contacts Overlapping	–	–

Replacement actuator:

Technical Information	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V
Max. Switching Amps (up to)*	10A	10A
B10d (up to)*	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6
Switching Frequency	≤ 100/min	≤ 100/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	400VAC	400VAC
Approvals	* Depending on switching system - see technical information for details	

Special features/variants (on request)

- Also available with following contacts:
  3 NC contacts (larger enclosure)
  3 NO contacts (larger enclosure)
  2 NC / 2 NO contact (larger enclosure)

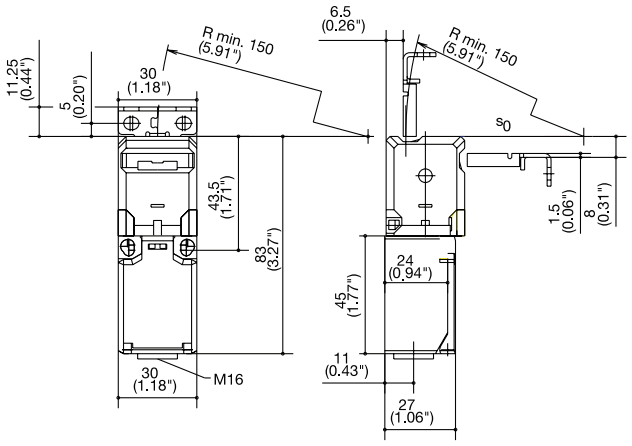
Drawing dimensions in mm

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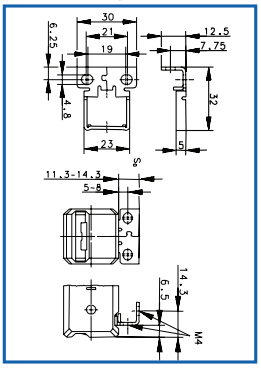
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SKT Series - Small Plastic Body

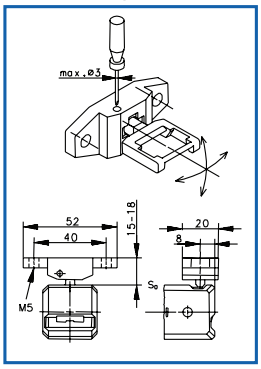




M3 KEY



MRU KEY



Safety switches with separate actuators provide a fail safe switch function, indicating the position of guarding access points. For use on hard guarding gates, panels and doors. The switches are typically mounted on the fixed frame of the machine. The key mounts on the door. When the door is closed the key is inserted into the switch, closing the Normally Closed Safety contacts.

BERNSTEIN AG offers various versions of these Type 2 switches. The differences and advantages of the individual switch groups are outlined in the following.

The SKT is the smallest safety switch with separate actuator. It is particularly suited for applications that require an extremely slim and short switch design. Its rotary head, two actuator openings and various switching functions underscore its versatility in extremely confined spaces.

Added to this, the SKT features other options to meet many applications requirements.

- **Integrated eject function (FE):**

  The actuator requires a holding force to maintain insertion into the switch and is ejected if the door is not locked securely. This prevents the machine from starting up if the door is not locked firmly into place.

- **Actuating force up to 11.2 lbs. (50 N):**

  The standard actuating force is 2.2 lbs. (10 N). Depending on the switch, an actuating force of 11.2 lbs (50 N) can also be selected. In many applications, doors need to be tightly secured to prevent them being opened unintentionally. This is achieved by means of bolts, fasteners or other latching mechanisms. The SKI safety switch should be selected for applications that require increased actuating force.

- **Hinged Actuator (MRU):**

  The MRU actuator is ideally suited for applications where the installation conditions severely restrict the actuating travel or radius. It has an adjustable actuating radius in the horizontal and vertical plane.

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	240 V AC
Conventional thermal current	I_{the}	10 A
Utilization category		AC-15, U_e/I_e 240 V / 3 A; DC-13, U_e/I_e 250 V / 0.27 A
Mechanical data		
Switching frequency		≤ 30/min
Mechanical service life Standard Mechanical service life increased actuator holding force		1 x 10^6 switching cycles 1 x 10^5 switching cycles
B10d (up to) [1]		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C to +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		M16 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system - see technical information for details.

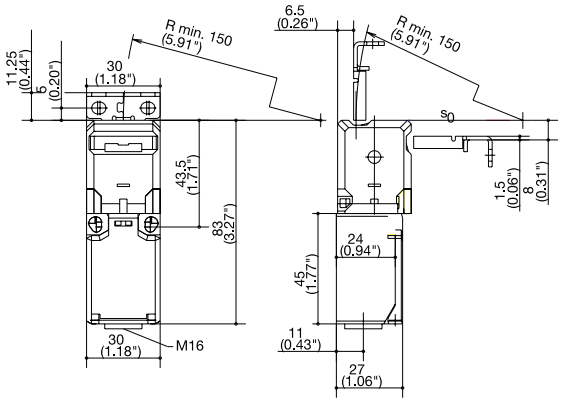
Drawing dimensions in mm

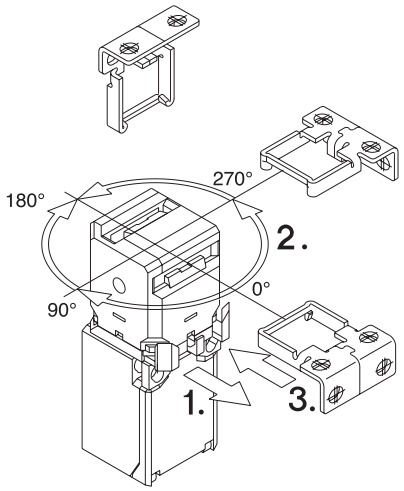
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SKT Series

SKT



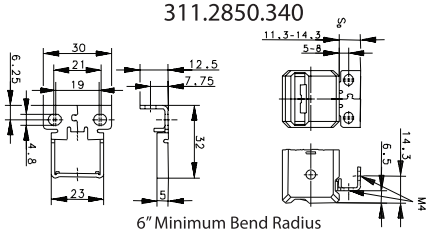




Switching Operation	Slow Action	Snap Action
1 NC / 1 NO Contacts	**601.6419.059** SKT-U1Z M3 11 12 23 24	–
1 NC Contacts		–
2 NC Contacts	**601.6469.066** SKT-A2Z M3 11 12 21 22	–
1 NC / 1 NO Contacts Overlapping	–	–

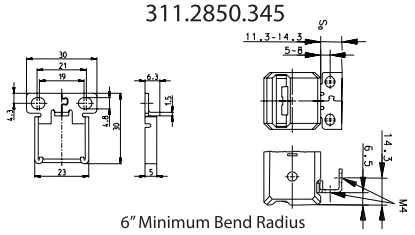
Replacement actuator keys:

M3 ACTUATOR KEY
311.2850.340



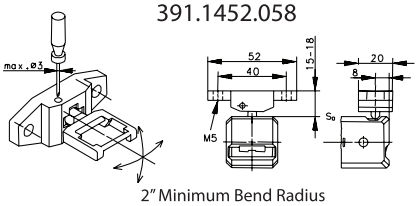
6" Minimum Bend Radius

M2 ACTUATOR KEY
311.2850.345



6" Minimum Bend Radius

MRU ACTUATOR KEY
391.1452.058



2" Minimum Bend Radius

Technical Information	Slow Action	Snap Action
Maximum Switching Voltage	240V	240V
Max. Switching Amps (up to)*	10A	10A
B10d (up to)*	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC

Approvals

* Depending on switching system - see technical information for details

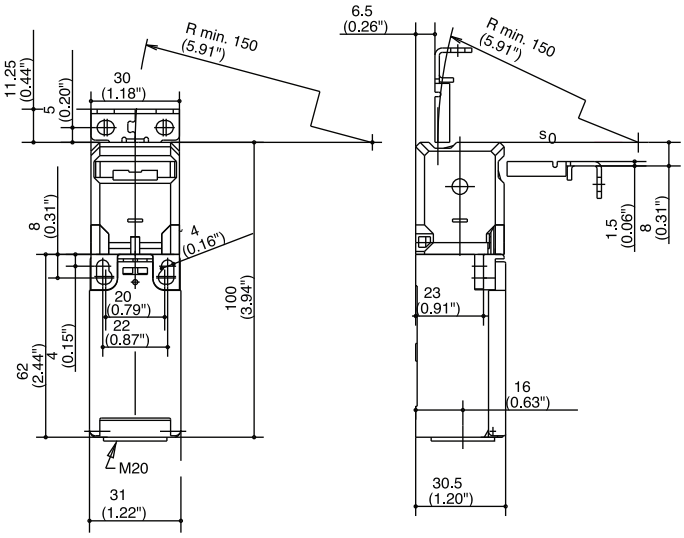
Drawing dimensions in mm

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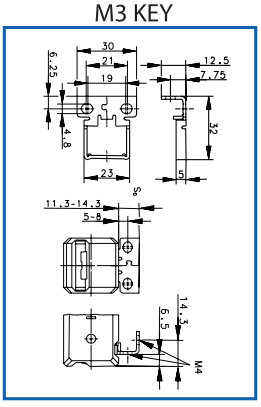
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SKI Series - Small Plastic Body

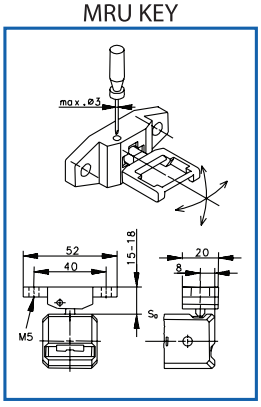




M3 KEY



MRU KEY



The SKI is a slimline safety switch with separate actuator. It is based on the popular BERNSTEIN I88 family. Its dimensions, not including the actuating head, correspond to EN 50047.

The actuating head is rotary mounted and has two actuator openings. The SKI safety switches are designed for installation in confined areas, but still offer durability and dependability. Compared to the SKT, it offers more connection space for the wiring and variants with up to three switching contacts are available.

Other advantages of this series include:

- **Integrated eject function (FE):**

  The actuator requires a holding force to maintain insertion into the switch and is ejected if the door is not locked securely. This prevents the machine from starting up if the door is not locked firmly into place.

- **Actuating force up to 11.2 lbs. (50 N):**

  The standard actuating force is 2.2 lbs. (10 N). Depending on the switch, an actuating force of 11.2 lbs (50 N) can also be selected. In many applications, doors need to be tightly secured to prevent them being opened unintentionally. This is achieved by means of bolts, fasteners or other latching mechanisms. The SKI safety switch should be selected for applications that require increased actuating force.

- **Hinged Actuator (MRU):**

  The MRU actuator is ideally suited for applications where the installation conditions severely restrict the actuating travel or radius. It has an adjustable actuating radius in the horizontal and vertical plane.

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current (up to) [1]	I_{the}	10 A
Utilization category (up to) [1]		AC-15, U_e /I_e 240 V / 3 A
Mechanical data		
Switching frequency		≤ 30/min.
Mechanical service life Standard Mechanical service life increased actuator holding force		1 x 10^6 switching cycles 1 x 10^5 switching cycles
B10d (up to) [1]		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C to +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		1 x M20 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

1 Depending on switching system - see technical information ofr details.

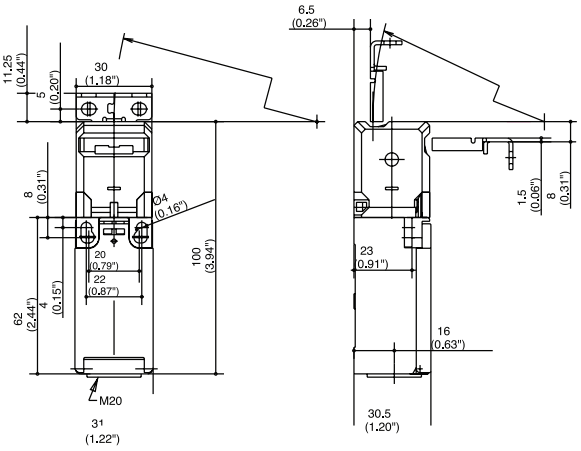
Drawing dimensions in mm

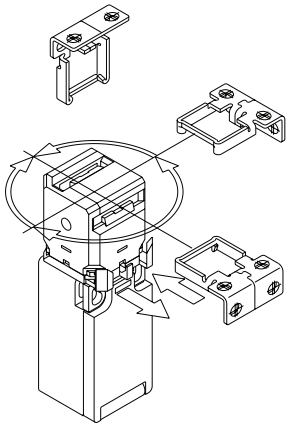
Altech Corp.® by BERNSTEIN

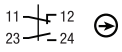
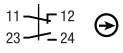
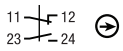
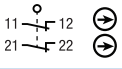
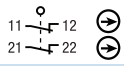
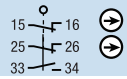
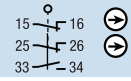
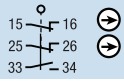
SKI Series

SKI







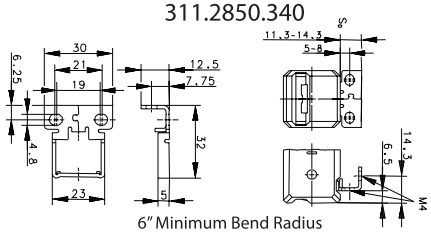
Switching Operation	Slow Action	High Activation Force	Radius Activation
1 NC / 1 NO Contacts	**601.6819.052** SKI-U1Z M3 	**601.6819.139** SKI-U1Z FI50 M3 	**601.6819.123** SKI-U1Z MRU 
1 NC Contacts	– -	– -	– -
2 NC Contacts	**601.6869.056** SKI-A2Z M3 	– -	**601.6869.122** SKI-A2Z MRU 
2 NC / 1 NO Contacts Overlapping	**601.6869.058** SKI-UV15Z M3 	**601.6869.145** SKI-UV15Z FI50 M3 	**601.6869.131** SKI-UV15Z MRU 

Technical Information	Slow Action	High Activation Force	Radius Activation
Maximum Switching Voltage	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^5	10 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min	≤ 30/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC
Approvals			

* Depending on switching system - see technical information for details

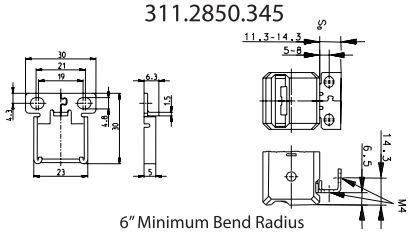
Replacement actuator keys:

M3 ACTUATOR KEY
311.2850.340



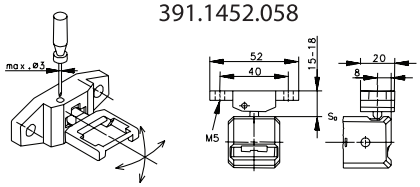
6" Minimum Bend Radius

M2 ACTUATOR KEY
311.2850.345



6" Minimum Bend Radius

MRU ACTUATOR KEY
391.1452.058



2" Minimum Bend Radius

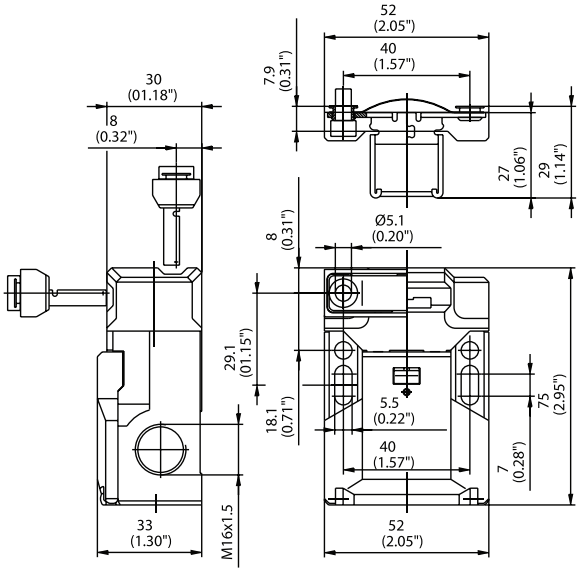
Drawing dimensions in mm

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SKC Series - Plastic Body Industrial Format





The SKC safety switch is based on a common industrial footprint. It is 15mm shorter than the SK series. This makes it a good choice for confined installation conditions.

The SKC offers the same advantages as the SK:
An industrial standard size with emphasis on safety and personal protection, variable actuator head with two actuator openings.

Other advantages include:

- **Different actuating forces:**

  To meet your application needs, in addition to the standard 2.2 lbs. (10N), actuating forces of 1.1 lbs. (5N), 4.5 lbs (20N), 6.7 lbs (30N) or 11.2 lbs. (50N) are also available.

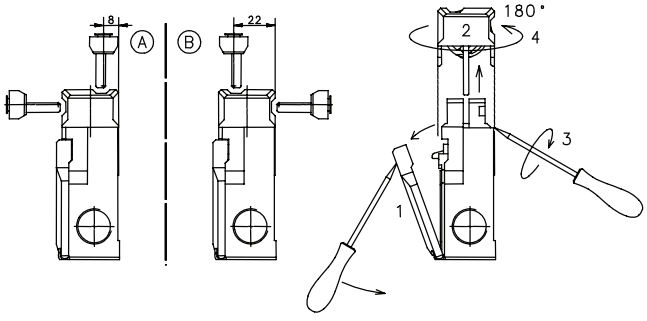
  Actuating forces from 6.7 lbs. (30N) to 22.5 lbs. (100N) can be reached using an additional externally mounted bracket which as a spring loaded retaining system.

- **Anti-tamper facility:**

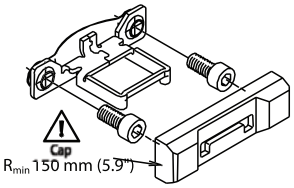
  The actuation system requires a multiple stepped initiation process which cannot be reset if tampered with.

- **Outstanding handling:**

  With the two slots you can easily adjust the SKC safety switch and lock it in position by means of the two holes accessible from the top or the two holes accessible from the front. The switch can be wired from three different sides. A transparent cover prevents foreign particles from entering the contact space while connecting the power supply cable.

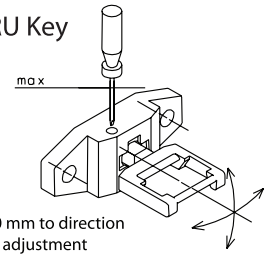


M4 Key

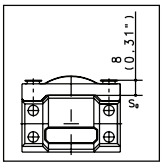


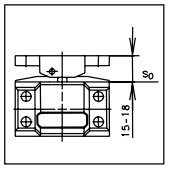
Actuator: Metal

MRU Key



50 mm to direction of adjustment





Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	5 A
Utilization category		AC-15, U_e /I_e 240 V / 1.5 A
Mechanical data		
Switching frequency		≤ 30/min.
Mechanical service life		1 x 10^6 switching cycles
B10d (up to) [1]		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C ... +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		3 x M16 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

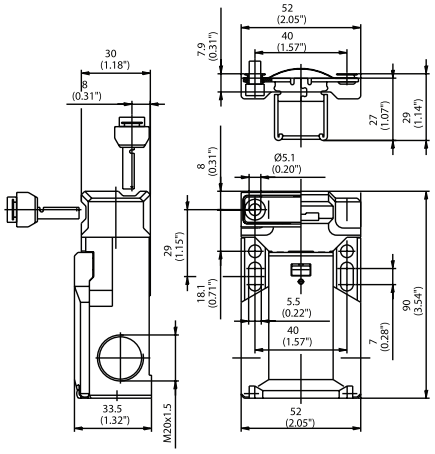
Drawing dimensions in mm

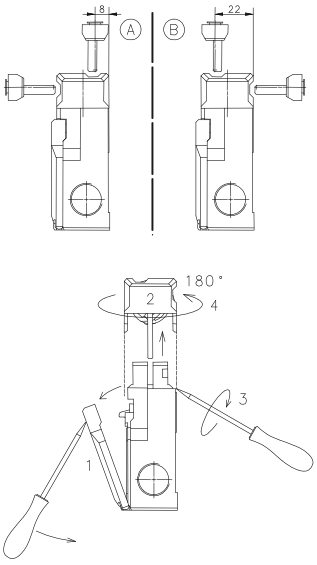
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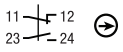
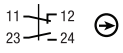
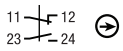
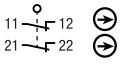
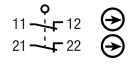
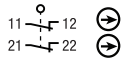
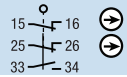
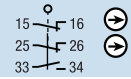
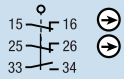
SKC Series



SKC

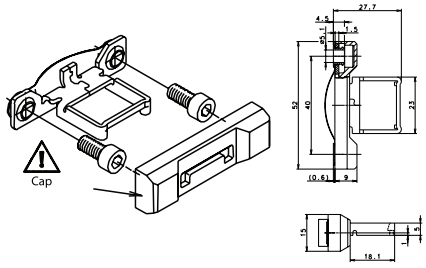




Switching Operation	Slow Action	High Activation Force	Radius Activation
1 NC / 1 NO Contacts	**601.6119.016** SK-U1Z M 	**611.6119.109** SK-U1Z F30 M 	**601.6119.084** SK-U1Z MRU 
1 NC Contacts	–	–	–
2 NC Contacts	**601.6169.036** SK-A2Z M 	**601.6169.053** SK-A2Z F30 M 	**601.6169.085** SK-A2Z MRU 
2 NC / 1 NO Contacts Overlapping	**601.6169.026** SK-UV15Z M 	**601.6169.061** SK-UV15Z F30 M 	**601.6169.086** SK-UV15Z MRU 

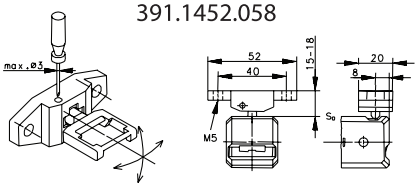
Replacement actuator keys:

M4 ACTUATOR KEY
391.1452.161



6" Minimum Bend Radius

MRU ACTUATOR KEY
391.1452.058



2" Minimum Bend Radius

Technical Information	Slow Action	High Activation Force	Radius Activation
Maximum Switching Voltage	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^5	10 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min	≤ 30/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC
Approvals			

* Depending on switching system - see technical information for details

Special features/variants (on request)
- 100 N actuating force on request

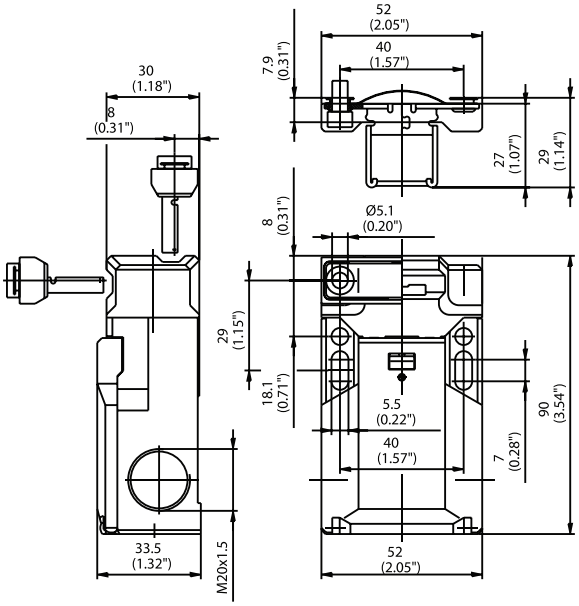
Drawing dimensions in mm

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SK Series - Plastic Body Industrial Format





The SK safety switch is based on a common industrial footprint. Offering design safety features conforming to VDE 0660 T200, EC 60947-5-1 and the test regulations GS-ET 15, the SK is well suited for personal protection applications. Its versatility

The SKC offers the same advantages as the SKC:
An industrial standard size with emphasis on safety and personal protection, variable actuator head with two actuator openings.

Other advantages include:

- **Different actuating forces:**

  To meet your application needs, in addition to the standard 2.2 lbs. (10N), actuating forces of 1.1 lbs. (5N), 4.5 lbs (20N), 6.7 lbs (30N) or 11.2 lbs. (50N) are also available.

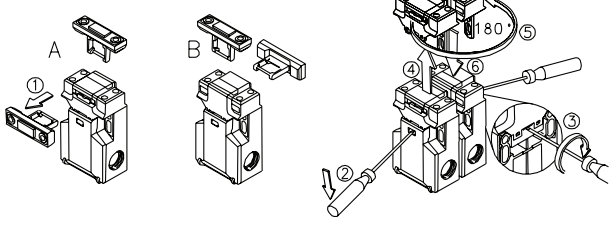
  Actuating forces from 6.7 lbs. (30N) to 22.5 lbs. (100N) can be reached using an additional externally mounted bracket which as a spring loaded retaining system.

- **Anti-tamper facility:**

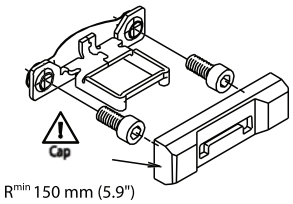
  The actuation system requires a multiple stepped initiation process which cannot be reset if tampered with.

- **Outstanding handling:**

  With the two slots you can easily adjust the SKC safety switch and lock it in position by means of the two holes accessible from the top or the two holes accessible from the front. The switch can be wired from three different sides. A transparent cover prevents foreign particles from entering the contact space while connecting the power supply cable.

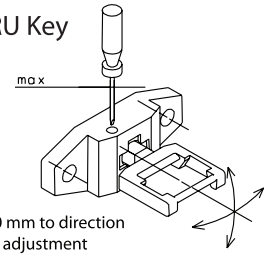


M4 Key

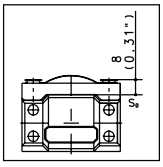


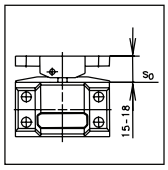
R^{min} 150 mm (5.9")

MRU Key



50 mm to direction of adjustment





Technical data

Electrical data		
Rated insulation voltage (up to) [1]	U_i max.	400 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current (up to) [1]	I_{the}	10 A
Utilization category		AC-15, U_e /I_e 240 V / 1.5 A
Mechanical data		
Switching frequency		≤ 30/min
Mechanical service life		1 x 10^6 switching cycles
B10d (bis zu) [1]		2 Mill.
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C ... +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		3 x M20 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

1 Depending on switching system - see technical information for details.

Drawing dimensions in mm

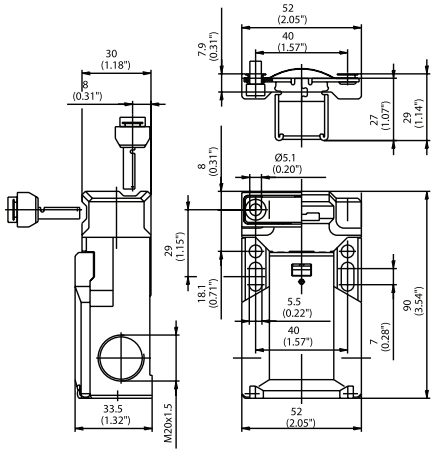
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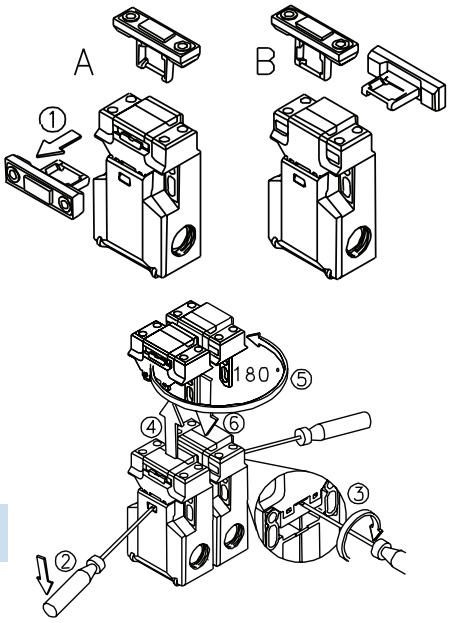
Altech Corp.® by BERNSTEIN

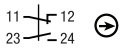
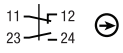
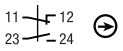
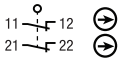
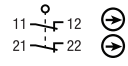
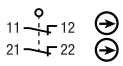
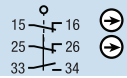
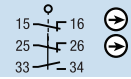
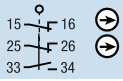
SK Series



SK

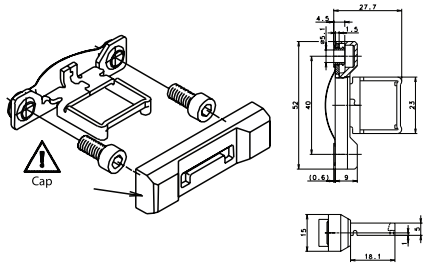




Switching Operation	Slow Action	High Activation Force	Radius Activation
1 NC / 1 NO Contacts	**601.6119.016** SK-U1Z M 	**611.6119.109** SK-U1Z F30 M 	**601.6119.084** SK-U1Z MRU 
1 NC Contacts	–	–	–
2 NC Contacts	**601.6169.036** SK-A2Z M 	**601.6169.053** SK-A2Z F30 M 	**601.6169.085** SK-A2Z MRU 
2 NC / 1 NO Contacts Overlapping	**601.6169.026** SK-UV15Z M 	**601.6169.061** SK-UV15Z F30 M 	**601.6169.086** SK-UV15Z MRU 

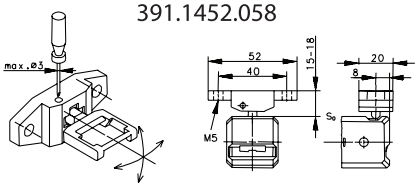
Replacement actuator keys:

M4 ACTUATOR KEY
391.1452.161



6" Minimum Bend Radius

MRU ACTUATOR KEY
391.1452.058



2" Minimum Bend Radius

Technical Information	Slow Action	High Activation Force	Radius Activation
Maximum Switching Voltage	240V	240V	240V
Max. Switching Amps (up to)*	10A	10A	10A
B10d (up to)*	20 Million	20 Million	20 Million
Mechanical Service Life (up to)*	10 x 10^6	10 x 10^5	10 x 10^6
Switching Frequency	≤ 30/min	≤ 30/min	≤ 30/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65	IP65
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A	AC-15, Ue/Ue 240V 3A
Rate Insulation Voltage	250VAC	250VAC	250VAC
Approvals	* Depending on switching system - see technical information for details		

Special features/variants (on request)
- 100 N actuating force on request

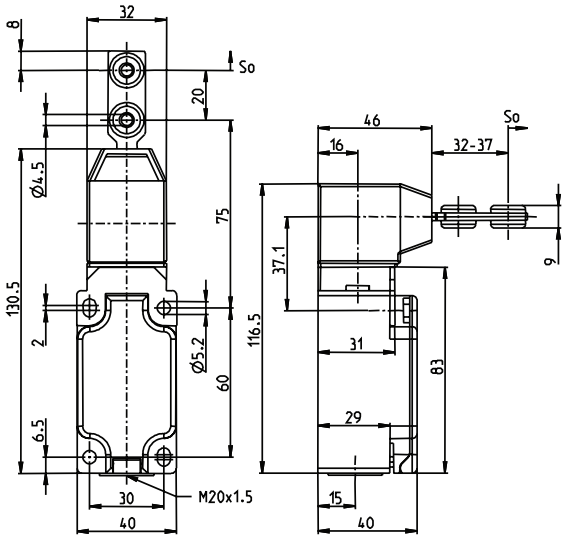
Drawing dimensions in mm

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Altech Corp.® by BERNSTEIN

ENK Series - Plastic Body Industrial Format





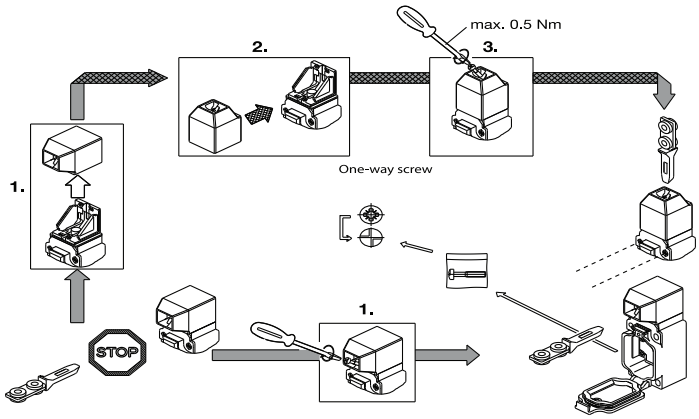
These keyed operated safety interlock switches from the from the popular ENK series correspond to Type 2.

This means that you can use Type 1 and Type 2 position switches corresponding from one series of switches for all your applications.

This results in many advantages:

- **Standardization:**
  Switches of one family have the same mounting dimensions and the same electrical properties.
- **Reduced costs:**
  The ENK series are used in large quantities. This not only reflects the quality of the products but also means lower prices compared to special designs used in small quantities.

Variable VTU head



Repositioning the actuator head either in horizontal or vertical direction results in 8 approach actuator directions.

Technical data		
Electrical data		
Rated insulation voltage	U_i	400 V AC
Conventional thermal current (up to) [1]	I_{the}	10 A
Rated operating voltage	U_e	240 V
Utilization category (up to) [1]		AC-15, U_e /I_e 240 V / 3 A
Forced disconnection	p	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure		Thermoplastic, glass fibre-reinforced
Cover		Thermoplastic, glass fibre-reinforced
Actuation		Separate actuator, (St/PA), Actuator (PA6 GV/Zn-GD)
Ambient temperature		-30°C to +80°C
Mechanical service life		1 x 10^6 switching cycles
B10d		2 mill.
Switching frequency		max. 30/min.
Mounting		4 x M5
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm
Cable entry		1 x M20 x 1.5
Weight		≈ 0.23 kg
Installation position		Any
Protection class		IP65 conforming to EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

1 Depending on switching system -see technical information for details

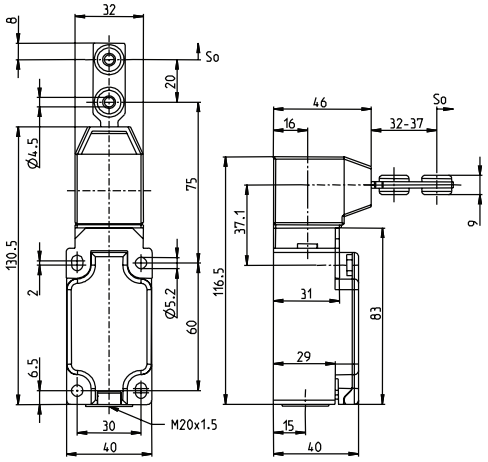
Drawing dimensions in mm

Altech Corp.® by BERNSTEIN

ENK Series



ENK

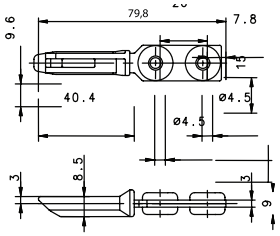


Switching Operation	Slow Action	High Activation Force	Radius Activation
1 NC / 1 NO Contacts	**601.6619.132** ENK-U1Z VTU 11 12 23 24	– -	– -
1 NC Contacts	– -	– -	– -
2 NC Contacts	**601.6669.133** ENK-A2Z VTU 11 12 21 22	– -	– -
2 NC / 1 NO Contacts Overlapping	**601.6669.154** ENK-UV15Z VTU 15 16 25 26 33 34	– -	– -

Technical Information	Slow Action	High Activation Force	Radius Activation
Maximum Switching Voltage	240V		
Max. Switching Amps (up to)*	10A		
B10d (up to)*	20 Million		
Mechanical Service Life (up to)*	10 x 10^6		
Switching Frequency	≤ 30/min		
Operating Temperature	–30 °C to +80 °C		
Protection Rating	IP65		
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A		
Rate Insulation Voltage	250VAC		
Approvals	* Depending on switching system - see technical information for details		

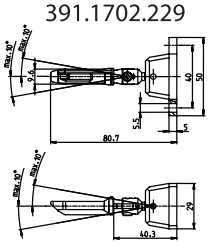
Replacement actuator keys:

A1 ACTUATOR KEY
391.1702.228



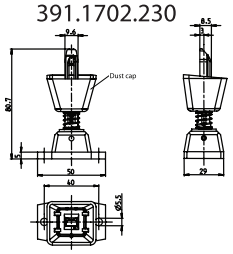
15.7" Minimum Bend Radius

A2 ACTUATOR KEY
391.1702.229



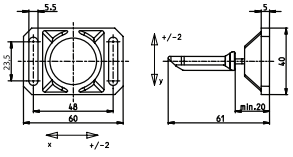
5.9" Minimum Bend Radius

A3 ACTUATOR KEY
391.1702.230



15.7" Minimum Bend Radius

A4 ACTUATOR KEY
391.1702.231



13.8" Minimum Bend Radius

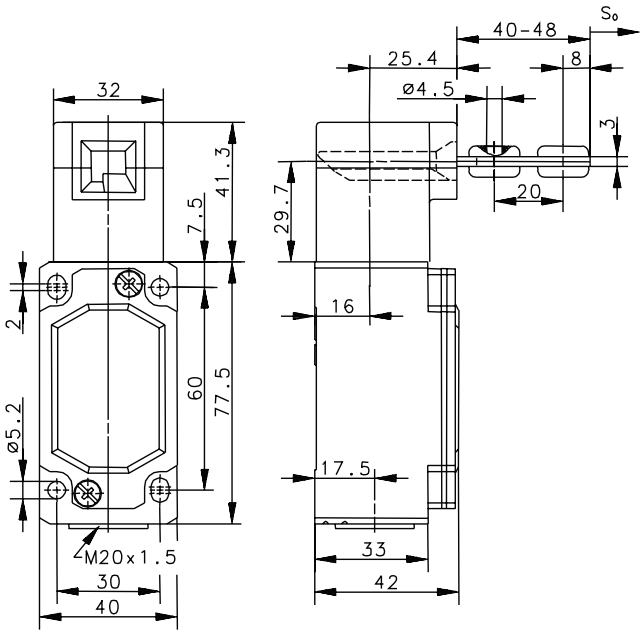
Drawing dimensions in mm

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ENM Series - Metal Body & Head Industrial Format





These keyed operated safety interlock switches from the from the popular ENM series correspond to Type 2.

This means that you can use Type 1 and Type 2 position switches corresponding from one series of switches for your all applications.

This results in many advantages:

- **Standardization:**
  Switches of one family have the same mounting dimensions and the same electrical properties.

- **Reduced costs:**
  The ENK series are used in large quantities. This not only reflects the quality of the products but also means lower prices compared to special designs used in small quantities.

Technical data		
Electrical data		
Rated operating voltage	U_e	240 V AC
Conventional thermal current (up to) [1]	I_{the}	10 A
Rated insulation voltage	U_i	400 V AC
Utilization category (up to) [1]		AC-15, U_e/I_e 240 V / 3 A
Forced disconnection	p	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		
Mechanical data		
Enclosure		Aluminum pressure die-casting
Cover		Sheet aluminum
Actuation		Separate actuator,(St / PA)
Ambient temperature		-30°C to +80°C
Mechanical service life		[6] switching cycles
B10d		
Switching frequency		≤ 50/min.
Mounting		4 x M5
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm
Cable entry		1 x M20 x 1.5
Weight		≈ 0.33 kg
Installation position		
Protection class		IP65 conforming to EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

1 Depending on switching system

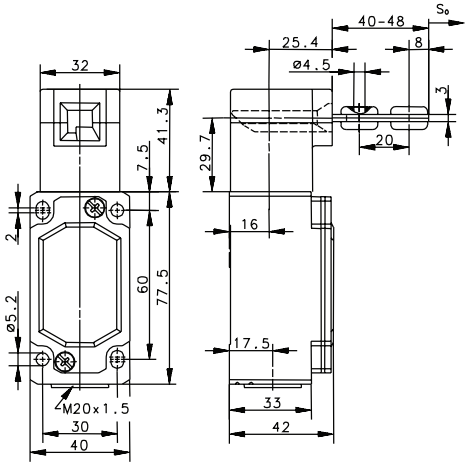
Drawing dimensions in mm

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ENM2 Series



ENM2 VTW

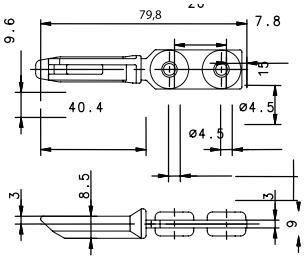


Switching Operation	Slow Action	High Activation Force	Radius Activation
1 NC / 1 NO Contacts	**601.6219.100** ENM2-U1Z VTW 11 12 23 24	– -	– -
1 NC Contacts	– -	– -	– -
2 NC Contacts	**601.6269.105** ENM2-A2Z VTW 11 12 21 22	– -	– -
2 NC / 1 NO Contacts Overlapping	**601.6269.104** ENM2-UV15Z VTW 15 16 25 26 33 34	– -	– -

Technical Information	Slow Action	High Activation Force	Radius Activation
Maximum Switching Voltage	240V		
Max. Switching Amps (up to)*	10A		
B10d (up to)*	20 Million		
Mechanical Service Life (up to)*	10 x 10^6		
Switching Frequency	≤ 30/min		
Operating Temperature	–30 °C to +80 °C		
Protection Rating	IP65		
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A		
Rate Insulation Voltage	400VAC		
Approvals	* Depending on switching system - see technical information for details		

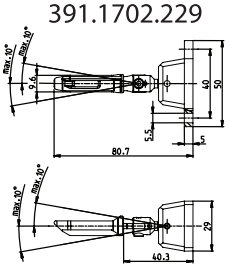
Replacement actuator keys:

A1 ACTUATOR KEY
391.1702.228



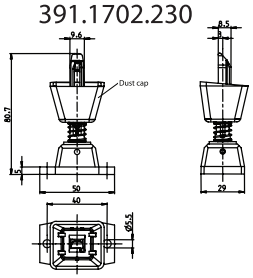
15.7″ Minimum Bend Radius

A2 ACTUATOR KEY
391.1702.229



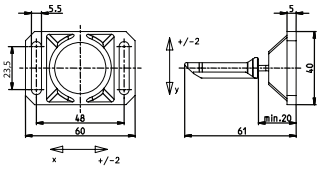
5.9″ Minimum Bend Radius

A3 ACTUATOR KEY
391.1702.230



15.7″ Minimum Bend Radius

A4 ACTUATOR KEY
391.1702.231



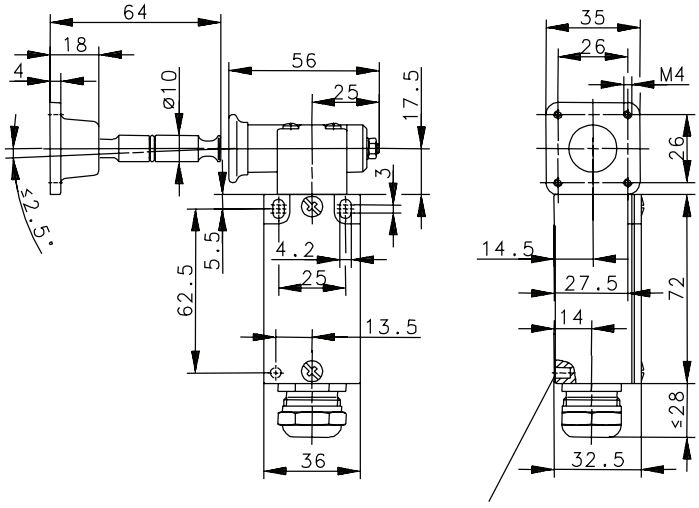
13.8″ Minimum Bend Radius

Drawing dimensions in mm

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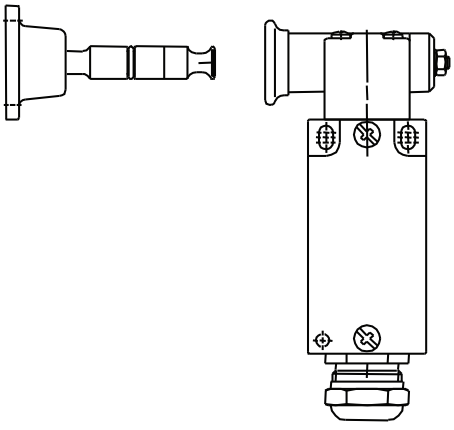
GC Series - Metal Body with Cylindrical Actuator





Blind hole for fitted pin
Ø4 ; 5.5 deep

Metal Cylindrical Pivoting Actuator provides greater radius access and less problems with misalignment. Features all metal body, head and actuator.



Technical data		
Electrical data		
Rated insulation voltage	U_i	400 V AC
Conventional thermal current (up to) [1]	I_{the}	10 A
Rated operating voltage	U_e	240 V
Utilization category (up to) [1]		AC-15, U_e /I_e 240 V / 3 A
Forced disconnection	p	conforming to IEC/EN 60947-5-1 Addendum K
Short-circuit protection (up to) [1]		Fuse 10 A gL/gG
Protection class		
Mechanical data		
Enclosure		Aluminum pressure die-casting
Cover		Sheet aluminum
Actuation		Separate actuator
Ambient temperature		-30°C to +80°C
Mechanical service life		1 x 10^6 switching cycles
B10d		2 mill.
Switching frequency		≤ 10/min.
Mounting		2 x M4
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm ded wire with ferrule 0.5 - 1.5 mm
Cable entry		1 x M20 x 1.5
Weight		≈ 0.32 kg
Installation position		Any
Protection class		IP65 conforming to EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

1 Depending on switching system

Drawing dimensions in mm

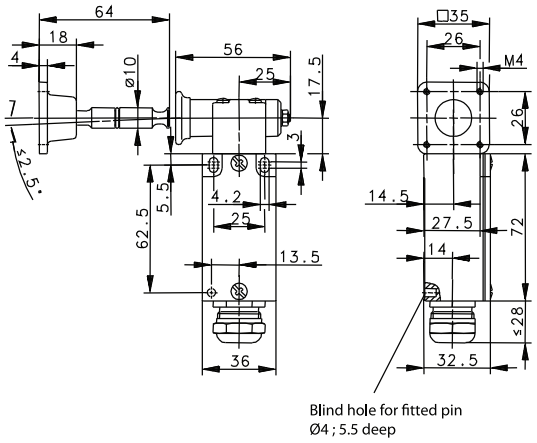
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GC-VT Series

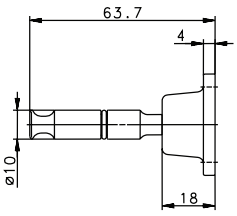
GC-VT

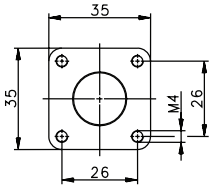




Replacement actuator keys:

VT ACTUATOR KEY
391.2001.275





Switching Operation	Slow Action	High Activation Force	Radius Activation
1 NC / 1 NO Contacts	**612.1100.555** GC-U1Z VT 90 GR 11 12 23 24	–	–
1 NC Contacts	–	–	–
2 NC Contacts	**611.6769.064** GC-AZZ VT 90 GR 11 12 21 22		–
2 NC / 1 NO Contacts Overlapping	–	–	–

Technical Information	Slow Action	High Activation Force	Radius Activation
Maximum Switching Voltage	240V		
Max. Switching Amps (up to)*	10A		
B10d (up to)*	20 Million		
Mechanical Service Life (up to)*	10 x 10^6		
Switching Frequency	≤ 30/min		
Operating Temperature	–30 °C to +80 °C		
Protection Rating	IP65		
Utilization Category (up to)*	AC-15, Ue/Ue 240V 3A		
Rate Insulation Voltage	400VAC		
Approvals	* Depending on switching system - see technical information for details		

Drawing dimensions in mm

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SLK - SLM Series





Machines that continue running after being switched off are often part of automated production processes. Safety guards prevent operator access and must therefore be kept closed until the hazards posed by machine movement have ceased.

Solenoid Locking Safety Switches are designed to lock the actuating key in the switch, ensuring that safety gates, safety doors and other protective guards remain closed for as long as a hazardous situation exists.

In production processes safety position switches have three main tasks:

- Enabling the machine/process when the safety guard is closed and interlocked
- Disabling the machine/process when the safety guard is opened
- Position monitoring of the safety guard and interlock

The SLK/SLM safety position switches with separate actuators and locking solenoid conforming to EN 1088, EN ISO 12100-1, 12100-2 and since 12/29/2009 to the compulsory Machinery Directive 2006/42/EC.

System description

SLK/SLM safety position switches with locking function are available with spring force locking (normally locked) or magnetic force locking (normally unlocked).

Normally Locked (Spring Force Locked)

With the Normally Locked Versions (F) the actuator key is locked in the switch as soon as it is inserted and requires voltage to be applied to the solenoid in order to remove the key from the switch.

These versions are usually available with a manual override that allow the key to be removed in the event of a power failure.

Normally Unlocked (Magnetic Force Locked)

The Normally Unlocked Version (M) allows the actuator key to be freely inserted and removed, until voltage is applied to the solenoid at which point the key will be locked in the switch.

In the event of a power failure the actuating key can be removed.

Solenoid Operating Voltage

The power used to control the locking (or unlocking) solenoid is supplied to the switch with separate circuit.

Switches with solenoid operating voltages of 24VAC/DC or 110/230VAC are available.

Typical Control Circuits

These switches are typically used in conjunction with a time delay circuit or zero speed monitor to control the voltage to the locking (or unlocking) solenoid.

Safety Contacts

Two independent safety contact blocks are offered. One monitors the position of the key; while the other monitors the locking function.

The contacts in these blocks can be used separately or in series to create the best possible safety circuit for the application.

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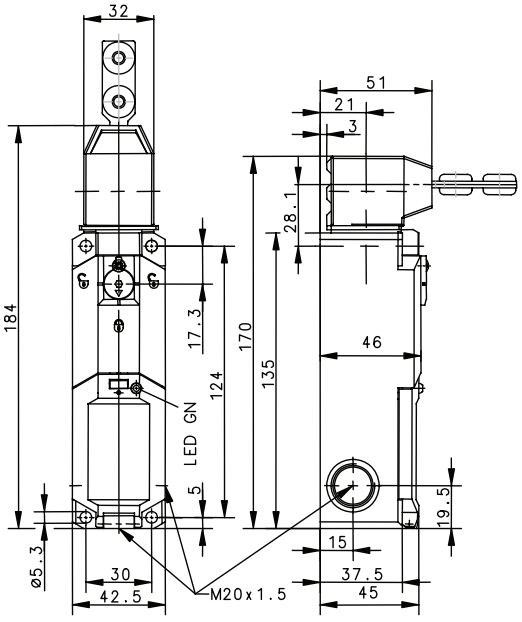
SLK Series - Plastic Body

Product advantages

- Two independent safety circuits ensure reliable integration
  - With two contacts, circuit 1 monitors the actuator
  - With two contacts, circuit 2 monitors the locking function

  The contact configuration is variable and may deviate from the selection table if required.
- Two different operating voltages for universal integration::
  - 24 V AC / DC
  - 110 V / 230 V AC
- Rotary actuating head (4x 90°) as well as horizontal and vertical actuation ensure complete flexibility in use
- Compact design with short overall size of only 170 mm
- Innovative installation with spring-loaded terminals
- Function conforming to GS ET 19, EN 60 204-1, EN 60 947-1 and EN 60 947-5-1





The actuator is not included and must be ordered separately.

Safe operation

The stainless steel actuator ensures safe and reliable operation. It's keyed operation reduces tampering and bypassing the system. The radius actuator is ideal for monitoring smaller safety hinged gates. It can be preset horizontally or vertically and is also made from stainless steel.



Innovative installation

The SLK is electrically connected safely and reliably by means of spring loaded terminals. Connection wires can be terminated without the need for tools.

High Protection Rating

The SLK series has a Protection Rating of IP67, making it suitable for tough environments.

Multiple Cable Entry Knockouts

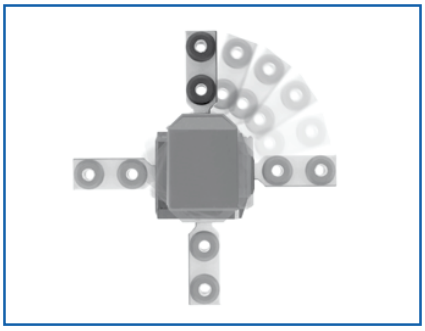
This series features three M20 cable entry knockouts, which facilitate single, series or branch wiring.

Vertical Housing

The vertically designed housing is ideal for use with extruded rail hard guarding.

Flexible in use

The SLK safety switch can be actuated in horizontal and vertical direction. Prior to installation it is preset by simply repositioning the head section. This flexibility in installation is achieved by positioning the actuator head in steps of 4 x 90°.



IMPORTANT: The actuator for the SLK must be ordered separately. You will find a corresponding overview at the end.

Drawing dimensions in mm

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SLK Series

Product selection

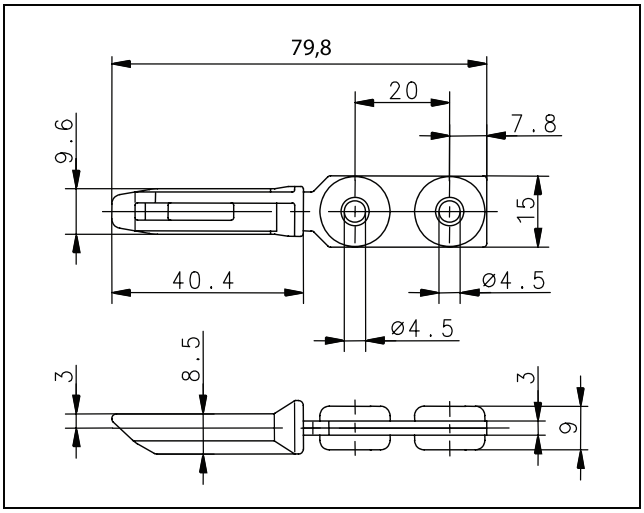
Article number	Designation	Locking action	Contacts Actuator	Contacts Interlock	Supply voltage	Additional function
601.8119.045	SLK-F-UC-55-R1-A0-L0-0	Normally Locked*	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Auxiliary release
601.8119.066	SLK-F-UC-55-R1-A0-L1-0	Normally Locked*	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Auxiliary release, LED
601.8169.054	SLK-F-UC-22-R1-A0-L0-0	Normally Locked*	2 NC	2 NC	24 Volt AC / DC	Auxiliary release
601.8169.050	SLK-F-UC-25-R1-A0-L0-0	Normally Locked*	2 NC	1NC / 1NO	24 Volt AC / DC	Auxiliary release
601.8169.068	SLK-F-UC-25-R1-A0-L1-0	Normally Locked*	2 NC	1NC / 1NO	24 Volt AC / DC	Auxiliary release, LED
601.8119.061	SLK-F-UC-55-R2-A0-L0-0	Normally Locked*	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Emergency release
601.8169.055	SLK-F-NC-22-R1-A0-L0-0	Normally Locked*	2 NC	2 NC	110 / 230 AC	Auxiliary release
601.8119.046	SLK-F-NC-55-R1-A0-L0-0	Normally Locked*	1NC / 1NO	1NC / 1NO	110 / 230 AC	Auxiliary release
601.8119.067	SLK-F-NC-55-R1-A0-L1-0	Normally Locked*	1NC / 1NO	1NC / 1NO	110 / 230 AC	Auxiliary release, LED
601.8169.051	SLK-F-NC-25-R1-A0-L0-0	Normally Locked*	2 NC	1NC / 1NO	110 / 230 AC	Auxiliary release
601.8169.069	SLK-F-NC-25-R1-A0-L1-0	Normally Locked*	2 NC	1NC / 1NO	110 / 230 AC	Auxiliary release, LED
601.8119.047	SLK-M-UC-55-R0-A0-L0-0	Normally Unlocked**	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	
601.8169.052	SLK-M-UC-25-R0-A0-L0-0	Normally Unlocked**	2 NC	1NC / 1NO	24 Volt AC / DC	
601.8169.056	SLK-M-UC-22-R0-A0-L0-0	Normally Unlocked**	2 NC	2 NC	24 Volt AC / DC	
601.8119.048	SLK-M-NC-55-R0-A0-L0-0	Normally Unlocked**	1NC / 1NO	1NC / 1NO	110 / 230 AC	
601.8169.053	SLK-M-NC-25-R0-A0-L0-0	Normally Unlocked**	2 NC	1NC / 1NO	110 / 230 AC	
601.8169.057	SLK-M-NC-22-R0-A0-L0-0	Normally Unlocked**	2 NC	2 NC	110 / 230 AC	

*** Energize Solenoid to Unlock** **** Energize Solenoid to Lock**

Technical data		Spring 24 Volt AC / DC	Spring 110 / 230 AC	Magnet 24 Volt AC / DC	Magnet 110 / 230 AC
Electrical data					
Rated insulation voltage	U_i	250 V	250 V	250 V	250 V
Utilization category		AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A
Conventional thermal current	I_{the}	5 A	5 A	5 A	5 A
Short-circuit protection		4 A gL	4 A gL	4 A gL	4 A gL
Protection class		II, Insulated	II, Insulated	II, Insulated	II, Insulated
Electromagnet					
Duty factor		100 % ED (an E1; E2)	100 % ED (an E1; E2)	100 % ED (an E1; E2)	100 % ED (an E1; E2)
Thermal class		F (155 °C)	F (155 °C)	F (155 °C)	F (155 °C)
Switch-on power		12 VA (0.2 s)	65 VA (0.1 s)	12 VA (0.2 s)	12 VA (0.2 s)
Continuous power		4.4 VA	8 VA	4.4 VA	4.4 VA
Mechanical data					
Enclosure		Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)
Cover		Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)
Actuator		Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD
Ambient temperature		-25 °C to +70 °C	-25 °C to +70 °C	-25 °C to +70 °C	-25 °C to +70 °C
Switching function		2 NC contacts, 2 NO contacts	2 NC contacts, 2 NO contacts	4 NC contacts	2 NC contacts, 2 NO contacts
Switching principle		4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts
Mechanical service life		1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)
B10d		2 mill.	2 mill.	2 mill.	2 mill.
Minimum actuating radius	R_{min}	See data sheet, actuator	See data sheet, actuator	See data sheet, actuator	See data sheet, actuator
Approach speed	V_{max}	0.5 $^m/_s$	0.5 $^m/_s$	0.5 $^m/_s$	0.5 $^m/_s$
Mounting		4 x M5	4 x M5	4 x M5	4 x M5
Cross sections		0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2
Type of connection		Cage clamp terminal	Cage clamp terminal	Cage clamp terminal	Cage clamp terminal
Cable entry		3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5
Weight		≈ 0.34 kg	≈ 0.30 kg	≈ 0.30 kg	≈ 0.35 kg
Protection class		IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529
Installation position		Any	Any	Any	Any
Locking principle		Spring force	Spring force	Magnetic force	Magnetic force
Latching force	FZh	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19

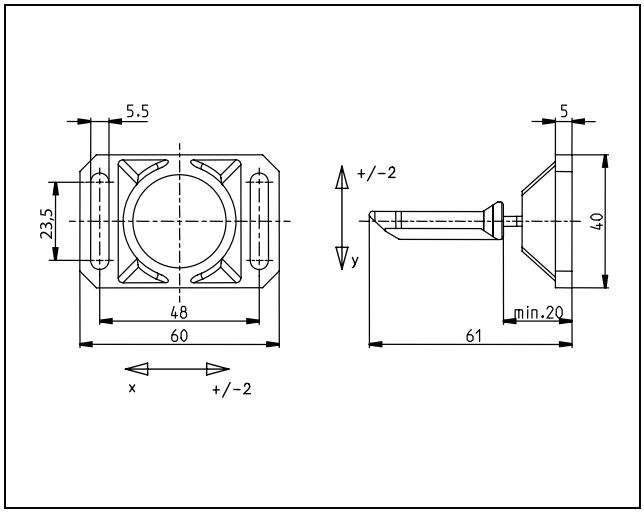
For Use With SLK, SLM, ENK-VTU, ENM2-VTW Switches

Article number	Designation
391.1702.228	Actuator A1



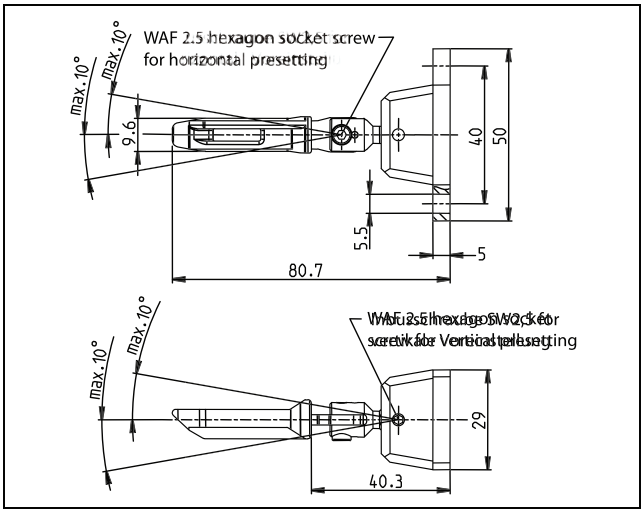
Mechanical data		
Actuator		Steel/PA
Minimum actuating radius	R_{min}	400 mm

Article number	Designation
391.1702.231	Actuator A4



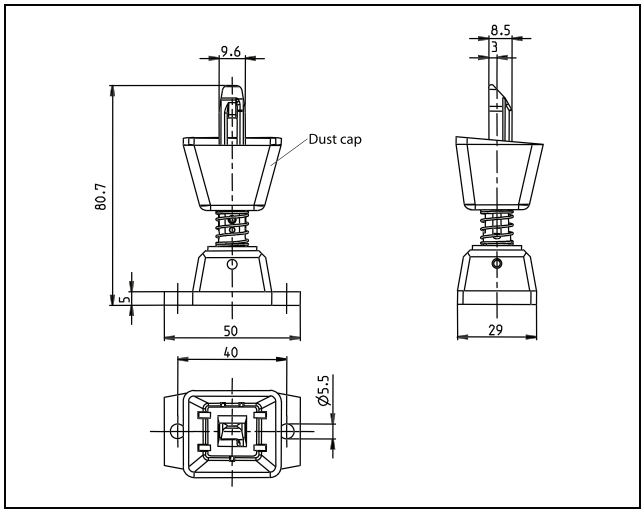
Mechanical data		
Actuator		Steel/PA
Enclosure		GD-Zn
Minimum actuating radius	R_{min}	350 mm
Repositioning of spring-mounted actuator by 4 x 90° in mounted state.		

Article number	Designation
391.1702.229	Actuator A2



Mechanical data		
Enclosure / Actuator		Steel/PA
Minimum actuating radius	R_{min}	150 mm
Repositioning of spring-mounted actuator by 4 x 90° in not mounted state.		
WAF 2.5 Allen key, supplied		

Article number	Designation
391.1702.230	Actuator A3



Mechanical data		
Enclosure / Actuator		Steel/PA
Dust cap		Elastomer CR
Minimum actuating radius	R_{min}	400 mm
Repositioning of spring-mounted actuator by 4 x 90° in not mounted state.		

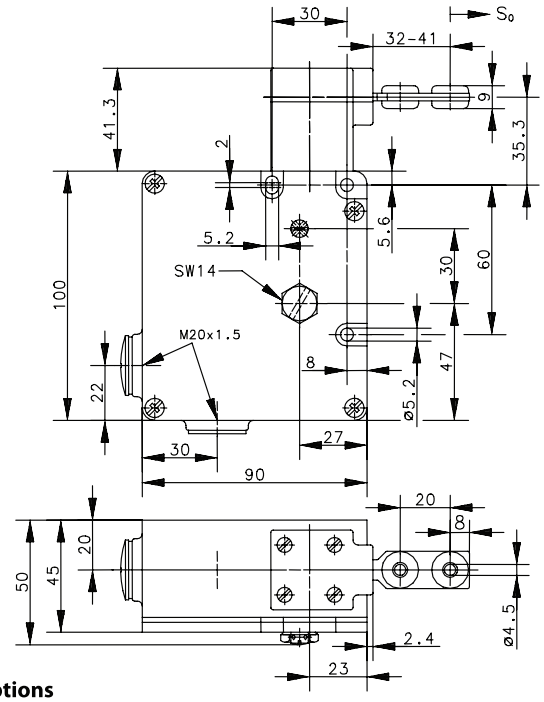
Drawing dimensions in mm

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SLM Series - Metal Body



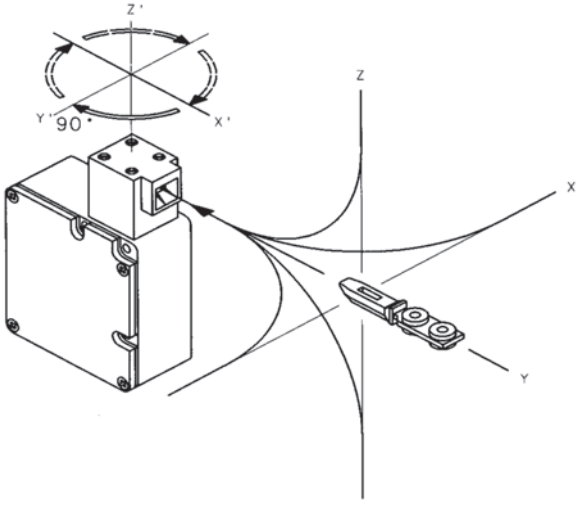


Product advantages

- Highly resistant in harsh industrial environments, with compact enclosure for space-saving installation
- Triple-keyed actuator with high anti-tamper security
- Approach direction of actuator easily changed in 90° steps (repositioning only possible with actuator inserted)
- Internally encapsulated construction; rated IP67
- Separate connection compartment for safe wiring at contact strip
- Two independent safety circuits ensure reliable integration
  - With two contacts, circuit 1 monitors the actuator
  - With two contacts, circuit 2 monitors the interlock
  - The contact configuration is variable and may deviate from the selection table if required
- Integrated protective circuit avoids polarity reversal and voltage spikes
- Function conforming to VDE 0660 Part 200, EN 60 947-5-1 and GS ET 19
- The SLM safety switches are supplied as standard with actuator A1

Options

- Individual contact configuration
- Radius actuator for actuating radii of less than 400 mm
- Auxiliary release
- Two independent safety circuits ensure reliable integration
- Solutions to customer specifications



Drawing dimensions in mm

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SLM Series - Metal Body

Product selection

Article number	Designation	Locking action	Contacts Actuator	Contacts Interlock	Supply voltage	Additional function
601.7119.020	SLM-FVTW 24DC-55-AR	Spring	1NC / 1NO	1NC / 1NO	24 Volt DC	Auxiliary release
601.7169.067	SLM-FVTW 24DC-22-AR	Spring	2 NC	2 NC	24 Volt DC	Auxiliary release
601.7119.047	SLM-FVTW 24DC-55-KR	Spring	1NC / 1NO	1NC / 1NO	24 Volt DC	With key release
601.7169.023	SLM-FVTW 24AC-22-AR	Spring	2 NC	2 NC	24 Volt AC	Auxiliary release
601.7119.032	SLM-FVTW 120AC-55-AR	Spring	1NC / 1NO	1NC / 1NO	120 Volt AC	Auxiliary release
601.7119.022	SLM-FVTW 230AC-55-AR	Spring	1NC / 1NO	1NC / 1NO	230 Volt AC	Auxiliary release
601.7169.066	SLM-MVTW 24DC-22	Magnet	2 NC	2 NC	24 Volt DC	
601.7119.023	SLM-MVTW 24DC-55	Magnet	1NC / 1NO	1NC / 1NO	24 Volt DC	
601.7119.024	SLM-MVTW 230AC-55	Magnet	1NC / 1NO	1NC / 1NO	230 Volt AC	

*** Energize Solenoid to Unlock** **** Energize Solenoid to Lock**

Technical data	Spring 24 Volt DC	Spring 120 Volt AC	Spring 230 Volt AC	Magnet 24 Volt DC	Magnet 230 Volt AC
Electrical data					
Rated insulation voltage U_i	250 V	250 V	250 V	250 V	250 V
Utilization category	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A
Conventional thermal current I_{the}	5 A	5 A	5 A	5 A	5 A
Short-circuit protection	10 A gL/gG	10 A gL/gG	10 A gL/gG	10 A gL/gG	10 A gL/gG
Protection class	I	I	I	I	I
Electromagnet					
Duty factor	100 % ED	100 % ED	100 % ED	100 % ED	100 % ED
Thermal class	B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)
Continuous power	5.2 W	5.2 W	5.2 W	5.2 W	5.2 W
Operating voltage	24 V DC	120 V AC	230 V AC	24 V DC	230 V AC
Mechanical data					
Enclosure	Al die-cast	Al die-cast	Al die-cast	Al die-cast	Al die-cast
Cover	Sheet aluminum	Sheet aluminum	Sheet aluminum	Sheet aluminum	Sheet aluminum
Actuator	ZN die-cast	Al die-cast	Al die-cast	Al die-cast	Al die-cast
Ambient temperature	-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C
Switching principle	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts
Mechanical service life	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d	2 mill.	2 mill.	2 mill.	2 mill.	2 mill.
Minimum actuating radius R_{min}	400 mm	400 mm	400 mm	400 mm	400 mm
Approach speed V_{max}	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$
Mounting	3 x M5	3 x M5	3 x M5	3 x M5	3 x M5
Cross sections	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2
Type of connection	Screws	Screws	Screws	Screws	Screws
Cable entry	2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5
Weight	≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg
Protection class	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC 529	IP67 conforming to IEC 529	IP67 conforming to IEC 529	IP67 conforming to IEC 529
Installation position	Any	Any	Any	Any	Any
Locking principle	Spring force	Spring force	Spring force latching	Spring force latching	Spring force latching
Latching force	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19

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SHS3 Series



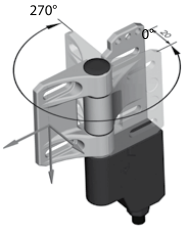
- **Easy to install and tamper-resistant -** the switch mechanism is safely integrated in the hinge
- **No actuator** - no alignment necessary since the actuator is an integral part of the switch
- **No mechanical deterioration** - due to the actuator free switching
- **Reliably operating** - there is no alignment issues between the switch and actuator
- **Tamper-resistant** - the hinged switch can not be defeated with an extra actuator

New Design With Fine Adjustment

The new SHS3 series offers the next generation of hinged safety switch development. It is now unnecessary to replace switches when misalignment of safety doors or gates may occur due to mechcaical stress created by accidents or instability. The SHS3 features a fine adjustment system that allows the trip point to be fine tuned to correct for changes to the door or gate, even after the switching point has been set.

Reusable

The SHS3 can be reused even when the entire system needs to be converted: With the aid of a change kit, the user can redefine the switching point without effecting the protection rating of IP67.



Safe:

With suitable system layout, the switch can be used up to performance level PLe. Following variants are available:

- 2 positive opening safety contacts
- 2 positive opening safety contacts with additional normally-open signaling contact
- With integrated AS interface Safety at Work.

Greater Application Range

The SHS3 has a swivel range from 0° to 270°. The switching point is also freely selectable. The SHS3 hinge switch has virtually no limits in terms of its installation flexibility. Not only does the SHS3 enable front and interior installation, right-hinged or left-hinged mounting or freely selectable direction of electric connection, but thanks to the switching point which can be set in an angle range of 270°, this hinge switch can also be installed in places that were previously not possible.

Flexible:

- Freely and repeatedly adjustable switching point
- Switching point freely adjustable by user over a range of 270°
- Uncomplicated re-adjustment even of set switching point by ±1.5° thanks to integrated fine adjustment system
- Slots for mounting on sections and welded structures
- In addition to the plug connection version, an SHS3 with fixed cable connection at the back is also available
- Right and left hinged systems possible for optimum cable routing
- Mounting between sections while maintaining the required finger guard gap

Fast:

To connect the SHS3 even more efficiently, the two contacts are designed as normally-closed contacts with Ultra-Lock technology, thus enabling connection with an M12 cable.

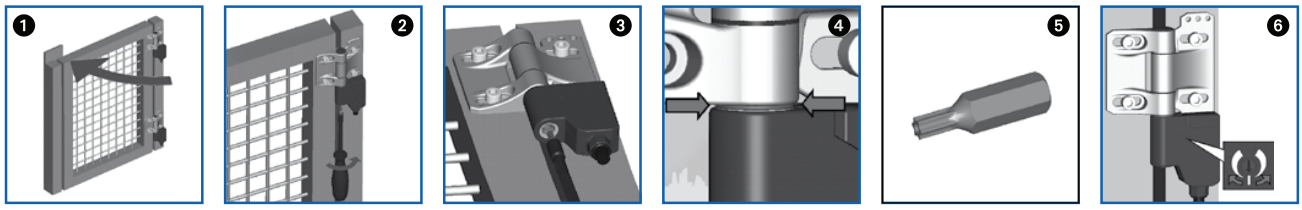
Reliable:

- The protection rating is IP67
- The load-bearing hinge is made from stainless steel while the switching system is housed in a high quality plastic enclosure

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SHS3 Series



On delivery, the SHS3 hinge switch allows for all possible settings. With your specific application you define and lock the safe status of the hinged safety equipment (the closed position) (Fig. 1).

The adjusting screw located in axial direction in the switching system is then tightened with the special bit supplied with the hinge switch. The arrangement of the adjusting screw makes it possible to adjust the switching point in all installation positions (Fig. 2+3)

After establishing a form-fit connection, a green ring in the gap between the stainless steel hinge and switch enclosure indicates that the switching point has been set correctly at a min. torque of 2 Nm/+10% (Fig. 4).

A red ring at this point additionally indicates wear, e.g. caused by abrasive substances. With the same special bit you can not only freely adjust the switching point to suit your application but you can also change the mounting arrangement of your safety equipment from right-hinged to left-hinged (Fig. 5).

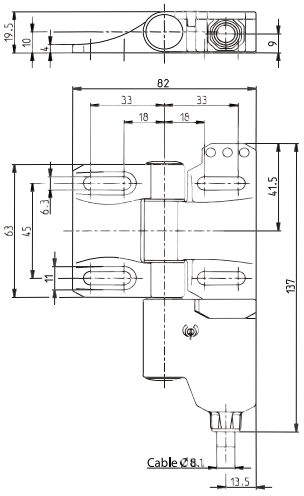
Fine adjustment

The set switching point can be subsequently varied by up to ±1.5% by turning the adjusting screw in the corresponding direction (Fig. 6).

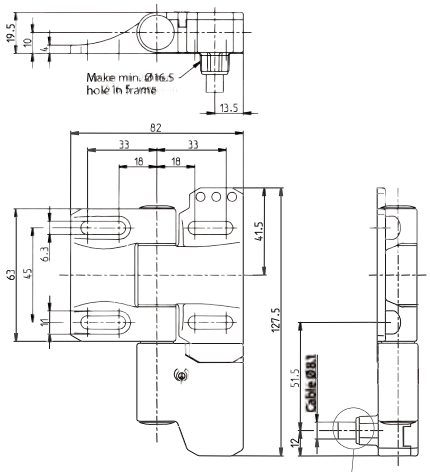
In many cases this fine adjustment makes it unnecessary to replace the switch or readjust the switching point due to mechanical deformation of the safety guard. The switching angle should generally be selected as small as possible.

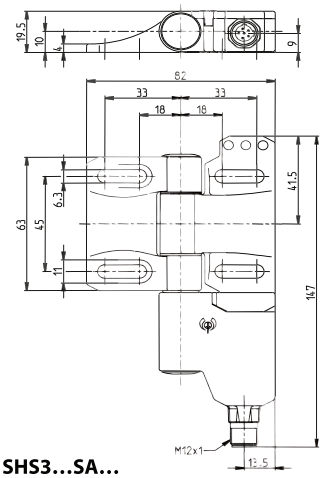
Dimensioned drawings

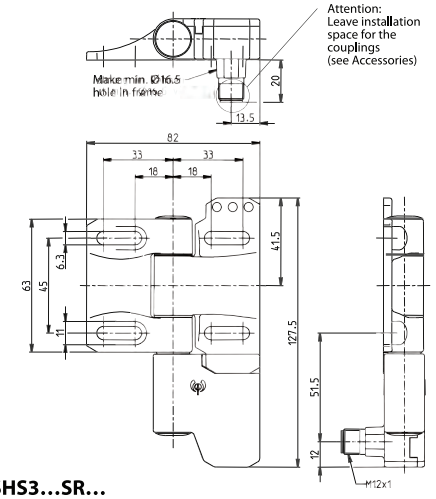
SHS3…KA…



SHS3…KR…



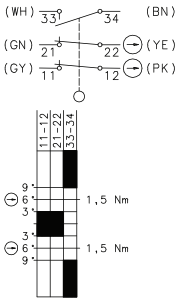




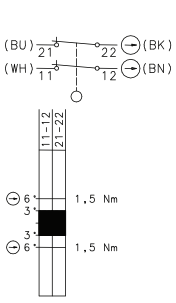
SHS3…SA… **SHS3…SR…**

Contact Information

U15Z
2 NC contacts,
2 NO contacts (Zb)



A2Z
2 NC contacts (Zb)



Setting point freely selectable in range from 0°... 270° and 0°…180°

Tolerances:

Switching angle (opening) ± 1.5°
Positive opening torque 10 %
Positive opening angle ± 1.5°

Drawing dimensions in mm

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SHS3 Series

Product selection for die-cast zinc version

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction radial	Type of connection and direction axial	Required cable coupling / type	Mounting
601.9490.050	SHS3Z-U15Z-KA5 R	2NC/1NO	230 V	AC/DC		Cable		Right
601.9490.051	SHS3Z-U15Z-KA5 L	2NC/1NO	230 V	AC/DC		Cable		Left
601.9490.052	SHS3Z-U15Z-KR5 R	2NC/1NO	230 V	AC/DC	Cable			Right
601.9490.053	SHS3Z-U15Z-KR5 L	2NC/1NO	230 V	AC/DC	Cable			Left
601.9490.054	SHS3Z-U15Z-SA R	2NC/1NO	230 V	AC/DC		M12	D	Right
601.9490.055	SHS3Z-U15Z-SA L	2NC/1NO	230 V	AC/DC		M12	D	Left
601.9490.056	SHS3Z-U15Z-SR R	2NC/1NO	230 V	AC/DC	M12		D	Right
601.9490.063	SHS3Z-U15Z-SR L	2NC/1NO	230 V	AC/DC	M12		D	Left
601.9490.057	SHS3Z-U1Z-SA R	1NC/1NO	230 V	AC/DC		M12	E	Right
601.9490.058	SHS3Z-U1Z-SA L	1NC/1NO	230 V	AC/DC		M12	E	Left
601.9490.059	SHS3Z-U1Z-SR R	1NC/1NO	230 V	AC/DC	M12		E	Right
601.9490.060	SHS3Z-A2Z-SA R	2NC	230 V	AC/DC		M12	E	Right
601.9490.061	SHS3Z-A2Z-SA L	2NC	230 V	AC/DC		M12	E	Left
601.9490.062	SHS3Z-A2Z-SR R	2NC	230 V	AC/DC	M12		E	Right
601.9490.049	SHS3Z-HINGE							

Product selection for stainless steel version

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction radial	Type of connection and direction axial	Required cable coupling / type	Mounting
601.9390.023	SHS3-U15Z-KA 5 L	2NC/1NO	230 V	AC/DC		Cable		Left
601.9390.022	SHS3-U15Z-KA 5 R	2NC/1NO	230 V	AC/DC		Cable		Right
601.9390.025	SHS3-U15Z-KR 5 L	2NC/1NO	230 V	AC/DC	Cable			Left
601.9390.024	SHS3-U15Z-KR 5 R	2NC/1NO	230 V	AC/DC	Cable			Right
601.9390.035	SHS3-U15Z-SA L	2NC/1NO	230 V	AC/DC		M12	D	Left
601.9390.034	SHS3-U15Z-SA R	2NC/1NO	230 V	AC/DC		M12	D	Right
601.9390.037	SHS3-U15Z-SR L	2NC/1NO	230 V	AC/DC	M12		D	Left
601.9390.036	SHS3-U15Z-SR R	2NC/1NO	230 V	AC/DC	M12		D	Right
601.9390.040	SHS3-A2Z-SA-R	2NC	230 V	AC/DC		M12	E	Right
601.9390.041	SHS3-A2Z-SA-L	2NC	230 V	AC/DC		M12	E	Left
601.9390.044	SHS3-A2Z-SR-R	2NC	230 V	AC/DC	M12		E	Right
601.9390.042	SHS3-U1Z-SA-R	1NC/1NO	230 V	AC/DC		M12	E	Right
601.9390.043	SHS3-U1Z-SA-L	1NC/1NO	230 V	AC/DC		M12	E	Left
601.9390.045	SHS3-U1Z-SR-R	1NC/1NO	230 V	AC/DC	M12		E	Right
601.9390.038	SHS3-HINGE (blank hinge)							Both sides

Product selection for stainless steel version in IP 69K

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction radial	Type of connection and direction axial	Required cable coupling / type	Mounting
6019390064	SHS3-U15Z-KA5-R-IPX	2NC/1NO	230 V	AC/DC		Cable		Right
6019390065	SHS3-U15Z-KA5-L-IPX	2NC/1NO	230 V	AC/DC		Cable		Left
6019390066	SHS3-U15Z-KA5-R-IPX	2NC/1NO	230 V	AC/DC	Cable			Right
6019390067	SHS3-U15Z-KA5-L-IPX	2NC/1NO	230 V	AC/DC	Cable			Left
6019390068	SHS3-7-KA5-IPX/7-KA5-IPX	2 x 1NC/1NO	230 V	AC/DC		Cable		Both sides

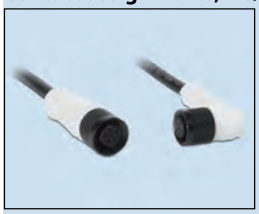
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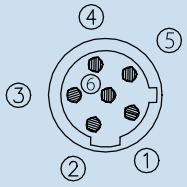
SHS3 Series

SHS3 Cable Type D

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
325.1006.291	AN-KAB.SHS3 2M STRAIGHT	2 m	Straight	6	M12 BG version
325.1006.292	AN-KAB.SHS3 5M STRAIGHT	5 m	Straight	6	M12 BG version
325.1006.293	AN-KAB.SHS3 10M STRAIGHT	10 m	Straight	6	M12 BG version
325.1006.294	AN-KAB.SHS3 2M ELBOW	2 m	Elbow	6	M12 BG version
325.1006.295	AN-KAB.SHS3 5M ELBOW	5 m	Elbow	6	M12 BG version
325.1006.296	AN-KAB.SHS3 10M ELBOW	10 m	Elbow	6	M12 BG version

Contact assignments, AC/DC versions





1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Grey
6 = Pink

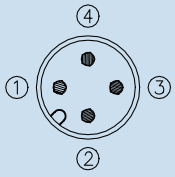
Core insulation/sheathing material:	PVC (∅ 5.6 mm)
Molding/contact carrier material:	PUR Elastollan R3000
Max. rated voltage:	250 V AC
Max. current carrying capacity:	2.5 A (at 70 °C)
Min./max. temperature range:	–5 °C to +105 °C (moved)
	–40 °C to +105 °C (moved firmly)
Cable configuration mm²:	LiYwUL2517 6 x 0.34
Protection class when assembled:	IP68

SHS3 Cable Type E

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
325.1004.310	AN-KAB.SHS3 4P 2M STRAIGHT	2 m	Straight	4	M12 BG version
325.1004.311	AN-KAB.SHS3 4P 5M STRAIGHT	5 m	Straight	4	M12 BG version
325.1004.312	AN-KAB.SHS3 4P 10M STRAIGHT	10 m	Straight	4	M12 BG version
325.1004.313	AN-KAB.SHS3 4P 2M ELBOW	2 m	Elbow	4	M12 BG version
325.1004.314	AN-KAB.SHS3 4P 5M ELBOW	5 m	Elbow	4	M12 BG version
325.1004.315	AN-KAB.SHS3 4P 10M ELBOW	10 m	Elbow	4	M12 BG version
325.1004.316	AN-KAB.SHS3 4P U.L. 2M STRAIGHT	2 m	Straight	4	Ultra Lock BG version
325.1004.317	AN-KAB.SHS3 4P U.L. 5M STRAIGHT	5 m	Straight	4	Ultra Lock BG version
325.1004.318	AN-KAB.SHS3 4P U.L. 10M STRAIGHT	10 m	Straight	4	Ultra Lock BG version
325.1004.319	AN-KAB.SHS3 4P U.L. 2M ELBOW	2 m	Elbow	4	Ultra Lock BG version
325.1004.320	AN-KAB.SHS3 4P U.L. 5M ELBOW	5 m	Elbow	4	Ultra Lock BG version
325.1004.321	AN-KAB.SHS3 4P U.L. 10M ELBOW	10 m	Elbow	4	Ultra Lock BG version

Contact assignments, AC/DC versions





1 = White
2 = Brown
3 = Blue
4 = Black

Core insulation/sheathing material:	Heat resistant PVC UL 1731 / UL 2517 black
Molding/contact carrier material:	APEX 7500-85 / R3000 Elastollan R3000 neutral
Max. rated voltage:	250 V
Max. current carrying capacity:	4 A
Min./max. temperature range:	At rest –25 °C to +105 °C
	Moved –5 °C to +105 °C
Protection class when assembled:	IP68

Change kit for re-adjusting switching point



Article number	Designation
399.1990.161	SHS3 change kit
Containing:	
2 replacement caps	
1 special bit	
1 plastic ring	

Installation tool



Article number	Designation
1910000005	Bit holder 1/4" flexible stem

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SHS3 Series



Cable axial
Installation position
on the left side



Connector axial
Installation position
on the right side



Cable radial
Installation position on
the right side



Connector radial
Installation position
on the right side

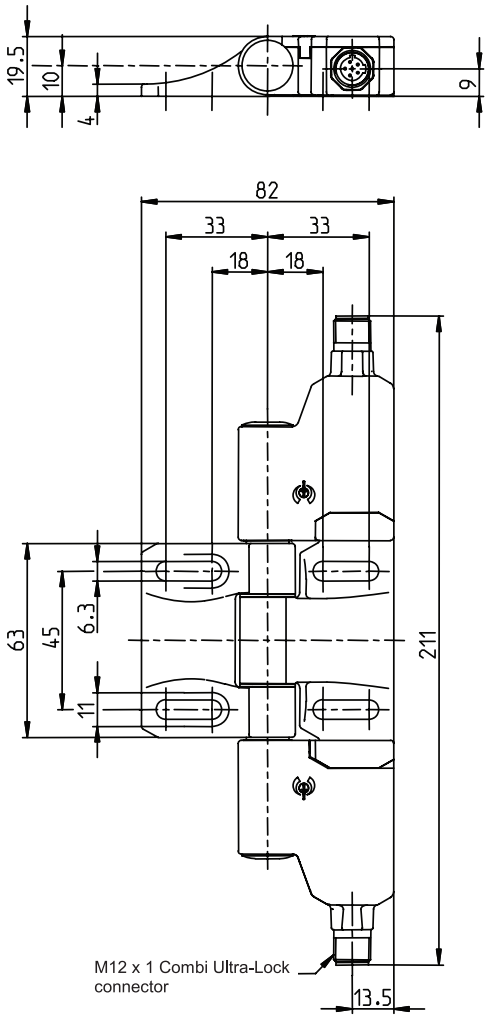
Technical data SHS3

Electrical data		
Rated insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	230 V AC; 24 V DC
Conventional thermal current	I_{the}	5 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 230 V / 3 A; DC-13 U_e /I_e 24 V/1A
Short-circuit protection		4 A gL/gG
Protection class		II, Insulated
Mechanical data		
Switch		PBT / Hinge G-X22 Cr Ni 17
Ambient temperature		–25°C to + 70°C (Connection cable installed)
Mechanical service life		10^6 switching cycles
Switching frequency max.		max. 300 switching cycles/hour
Mounting		4 x M6 Screws DIN EN ISO 7984
B10d		2 mill.
Type of connection		Fixed connection cable, 6 x 0.75 mm^2, minimum bending radius = 60 mm
Weight		approx. 0.7 kg (cable variant)
Installation position		Any
Protection class		IP 67 conforming to IEC/EN 60529
Switching angle		± 3° from setting point
Positive opening angle		± 6° + 2
Positive opening torque		1.5 Nm
Mechanical load		F_{R1} = max. 1200 N, F_{R2} = max. 500 N, F_A = max. 1200 N
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

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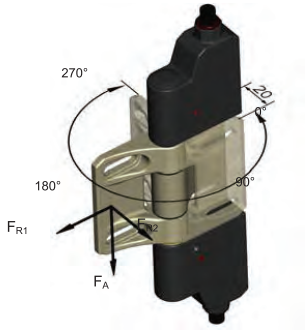
SHS3 Double Series





Double hinge

Thanks to its two switching elements on one hinge, the BG (occupational health and safety)-approved variant of the SHS3 provides two independently adjustable switching points. This arrangement not only makes it possible to monitor the opening of a safety guard but also the direction of opening of swing doors.



swivel range: 0° to 270°

Product selection for stainless steel version

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction radial	axial	Required cable coupling / type	Mounting
601.9390.046	SHS3-2-SA/2-SA	2 x 2NC	230 V	AC/DC		M12	2 x E	Both sides
601.9390.047	SHS3-5-SA/5-SA	2 x 1NC/1NO	230 V	AC/DC		M12	2 x E	Both sides
601.9390.048	SHS3-7-KA5/7-KA5	2 x 1NC/1NO	230 V	AC/DC		Cable		Both sides
601.9390.039	SHS3-7-SA/7-SA	2 x 2NC/1NO	230 V	AC/DC		M12	2 x D	Both sides
601.9390.068	SHS3-7-KA-IPX/7-KA5-IPX*	2 x 2NC/1NO	230 V	AC/DC		M12	2 x D	Both sides
601.9390.038	SHS3-HINGE (blank hinge)							Both sides

*IP69-K

Drawing dimensions in mm

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SHS Series



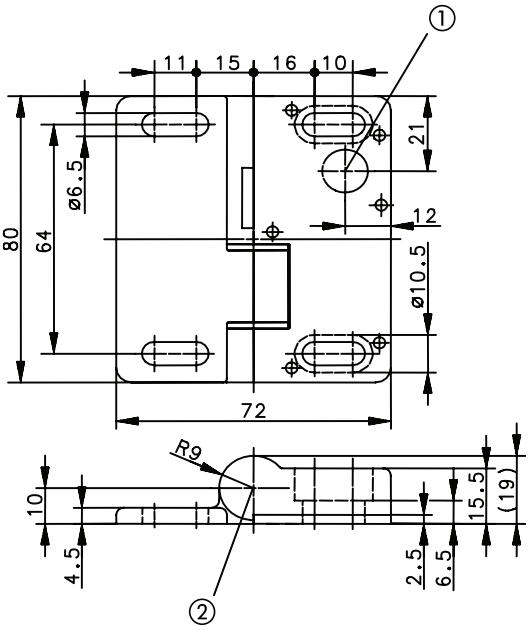


Illustration showing fixed pin and shearing bolt sheared off

① Position of connection variant 2, 5 and 6.

② Position of connection variant 1, 3 and 4.

Protective hoods and safety guards on machines such as gates in safety gate systems are often pivot mounted with hinges.

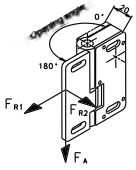
BERNSTEIN presented the world's first first safety hinge switch in 2002, offering the innovative SHS series, which combines a hinge and safety switch in one functional unit.

The design of the SHS safety hinge switch has been updated to work cohesively with aluminum extruded rail systems. Its shallow depth, even when fully opened, makes it ideally suited for use in tight installation conditions on machines. Safety doors and gates are often subject to high mechanical stresses, which can cause them sag, leading alignment issues with standard keyed switches. With the SHS switches the safety guards are monitored directly from the hinge.

The concealed components of the safety switch provides a high degree of protection against tampering. In addition, units with a back connection allow the cable to be completely hidden in the door frame preventing unauthorized access. The SHS hinge switch provides maximum anti-tamper protection as, once set, the switching point can no longer be changed.

Safe:

- 2 SHS hinge switches, each equipped with a positively opening safety contact, allows you to configure a system up to performance level PLe



Flexible:

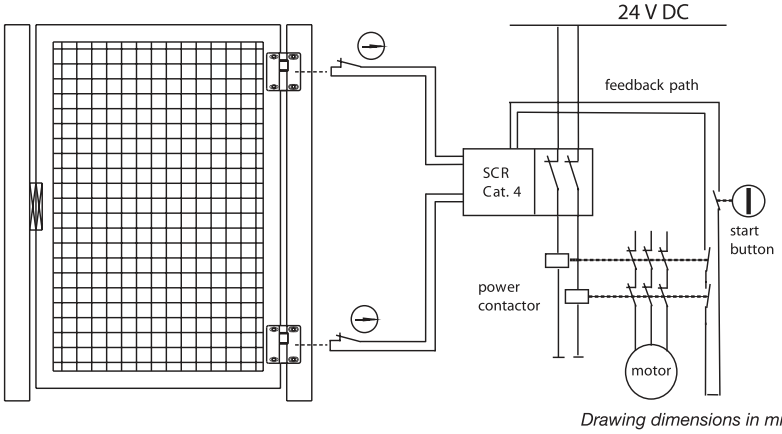
- The angle range extends from 0 to 225°
- A safety device ensures positive activation after the switch has been set
- In addition to the plug connection version, an SHS with fixed cable connection from the back or pivot point is also available

Fast:

- Plug connector and fixed cable connections are available for axial and radial (rear) connection
- An AC/DC version (up to 250 V) or a DC version (up to 60 V) is available, depending on the configuration of the safety circuit

Reliable:

- A pressure die-cast zinc enclosure allows versatile use of the SHS switch in varied applications
- When used as a load bearing hinge, the SHS takes up loads of up to 750 N in axial direction and 1000 N in radial direction after the switching point has been finally set
- The protection rating is IP67



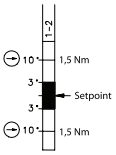
Drawing dimensions in mm

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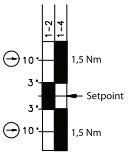
SHS Series

Switching diagram

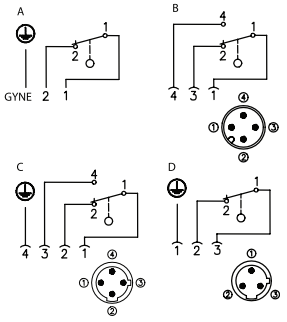
1 NC contact (Type B)



1 Changeover contact (Type C)



Connection drawing

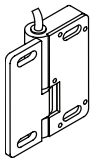


Setting point freely selectable in range from 0°... 225°

Tolerances:
Switching angle (opening) +2.0°/-1.5°
Positive opening torque 10 %
Positive opening angle +0.5°/-3°

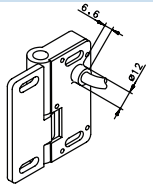
Switching angle hysteresis (closing of normally-closed contact -1.0°) from typical hinge switch-off point

Connection variant 1



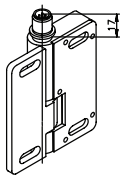
Cable, PVC

Connection variant 2



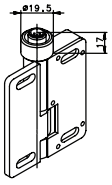
Cable, PVC

Connection variant 3



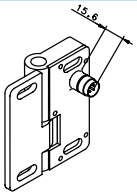
Connector M12 x 1, metal thread

Connection variant 4



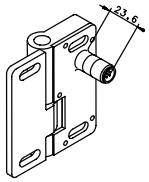
Connector M12 x 1, metal thread

Connection variant 5



Connector M12 x 1

Connection variant 6



Connector M12 x 1

Product selection

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction radial	axial	Required cable coupling/type	Remarks
601.9261.011	SHS-A1Z-KA 5	1NC	230 V	AC/DC		Cable		BG approval
601.9261.014	SHS-A1Z-KR 5	1NC	230 V	AC/DC	Cable			BG approval
601.9261.017	SHS-A1Z-SA-BG	1NC	230 V	AC/DC		M12	A	BG approval
6019261018	SHS-A1Z-SR-BG	1NC	230 V	AC/DC	M12		A	BG approval
601.9261.009	SHS-A1Z-SA	1 Changeover contact	230 V	AC/DC		M12	C	
601.9261.010	SHS-A1Z-SR	1 Changeover contact	60 V	DC	M12		B	
601.9261.015	SHS-A1Z-SA	1 Changeover contact	60 V	DC		M12	B	
601.9261.016	SHS-A1Z-SR	1 Changeover contact	230 V	AC/DC	M12		C	
6019291013	SHS-0Z							Blank hinge

Technical data

Electrical data		
Rated insulation voltage	U_i	250 V
Rated surge voltage strength	U_{imp}	2.5 kV
Thermal current	I_{the}	3 A
Rated operating voltage	U_e	230 V AC; 60 V DC
Utilization category		AC-15, 230 V AC/1.5 A;
Positive opening	p	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 4 A gL/gG
Mechanical data		
Switch	GD-Zn	
Ambient temperature	-25°C to +70°C (Connection cable installed)	
Mechanical service life	10^6 switching cycles	
B10d	2 mill.	
Switching frequency	max. 1200 switching cycles/hour	
Mounting	4x M6 screws DIN 7984 or DIN 6912	
Type of connection	Fixed connection cable, 3 x 0.5 mm^2 x 5 m (AWG20), minimum bending radius = 25 mm	
Weight	approx. 0.7 kg (cable variant) approx. 0.4 kg (connector and blank hinge variant)	
Installation position	Any	
Protection class	IP67 as per IEC/EN 60529	
Switching angle	± 3° from setting point	
Positive opening angle	± 10° from setting point	
Positive opening torque	1.5 Nm	
Mechanical load	F_{R1}= max. 1000 N, F_{R2}= max. 500 N, F_A = max. 750 N	
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Drawing dimensions in mm

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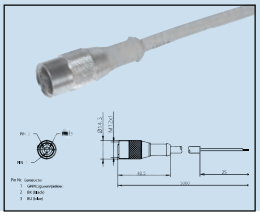
SHS Series

SHS Cable Type A

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
325.1103.234	AN-KAB.SHS 5M AC GERADE	5 m	Straight	3	AC/ DC BG version
325.1103.236	AN-KAB.SHS 5M AC WINKEL	5 m	Elbow	3	AC/ DC BG version

Contact assignments, AC/DC versions

1 = Green/yellow
2 = Black
3 = Blue



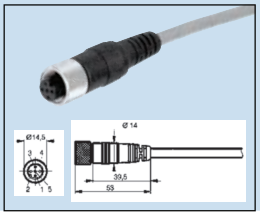
Core insulation/sheathing material:	PVC (UL)/PVC (UL)
Molding/contact carrier material:	PUR (UL)/PUR (UL)
Max. rated voltage:	300 V AC
Max. current carrying capacity:	3 A
Min./max. temperature range:	–25 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	3 x 0.5
Protection class when assembled:	IP67

SHS Cable Type B

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
325.1003.221	AN-KAB.SHS 2M DC STRAIGHT	2 m	Straight	3	DC approval
325.1003.222	AN-KAB.SHS 5M DC STRAIGHT	5 m	Straight	3	DC approval
325.1003.223	AN-KAB.SHS 10M DC STRAIGHT	10 m	Straight	3	DC approval
325.1003.224	AN-KAB.SHS 2M DC ELBOW	2 m	Elbow	3	DC approval
325.1003.225	AN-KAB.SHS 5M DC ELBOW	5 m	Elbow	3	DC approval
325.1003.226	AN-KAB.SHS 10M DC ELBOW	10 m	Elbow	3	DC approval

Contact assignments, DC versions

1 = Brown
2 = –
3 = Blue
4 = Black



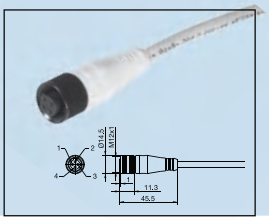
Core insulation/sheathing material:	PVC/PVC
Molding/contact carrier material:	PUR/PUR
Max. rated voltage:	60 V AC/75 V DC
Max. current carrying capacity:	1.5 A
Min./max. temperature range:	–25 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	3 x 0.34
Protection class when assembled:	IP67

SHS Cable Type C

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
325.1004.219	AN-KAB.SHS 5M AC STRAIGHT E	5 m	Straight	4	AC/DC-approval
325.1004.220	AN-KAB.SHS 5M AC ELBOW E	5 m	Elbow	4	AC/DC-approval

Contact assignments, AC/DC versions

1 = Brown
2 = Black
3 = Blue
4 = Green/yellow



Core insulation/sheathing material:	PVC/PVC
Molding/contact carrier material:	PUR/Nylon 6.6
Max. rated voltage:	300 V AC
Max. current carrying capacity:	4.0 A
Min./max. temperature range:	–5 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	4 x 0.34
Protection class when assembled:	IP68

Drawing dimensions in mm

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To complement the extensive range of mechanical safety switches offered by BERNSTEIN, a new series of non-contact safety switches is now available. These safety sensors ensure that safety doors and protective guards remain closed when danger is present.

The non-contact safety technology offers the following advantages:

- Wear-free actuating
- Very easy to clean
- No actuator, therefore:
  - No mechanical damage possible
  - No hazards or restrictions caused by protruding actuator
- Switching function not affected by contaminants

BERNSTEIN offers two different technologies in the field of non-contact safety technology:

- Safety sensors on magnetic basis, MAK series
- Safety sensors on RFID basis, CSMS series

Safety sensors CSMS

The CSMS can be directly connected to contactors or to an evaluation unit (dependent on the respective model). The RRS version integrates an evaluation of a return circuit and start button with direct connection to contactors. With the CSMS, PL e and SIL 3 is achieved.
This is the case with only one CSMS and also with series circuits with up to 32 sensors the case.



Product features

- Performance Level e
- Up to 32 series circuits without leaving the PL e
- Power supply 24 V DC
- High coding level corresponding to the draft DIN EN ISO 14119
- No need of any additional external monitoring (dep. on the type)
- Connection of return circuit and start button possible (dep. on the type)
- Output current up to 250 mA per safety output
- Large diagnostic possibility
- 3 LEDs for status information of the CSMS
- Switching distance: 13 mm
- Dimensions: 110 mm x 30 mm x 15 mm
- IP 67

Safety sensors MAK

To achieve a PL or SIL value with the MAK safety sensors, it is necessary to connect them to a safety evaluation unit. The magnetic safety sensors are dual channel versions. The evaluation unit (BERNSTEIN designation: MÜZ) monitors the correct switching of the two MAK channels and a defined time window in which the two channels must switch.

With the combination of MAK and MÜZ, a PL d and a SIL 3 can be reached. Besides the 3 different types of magnetic safety switches, BERNSTEIN also offers two different evaluation units.



Product features

- Performance Level d
- Redundancy with NO and NC contacts
- Switching distance: 6 mm
- IP 67

Comparison CSMS – MAK

Product characteristics	CSMS	MAK
Operating principle	electro-magnetic, RFID	magnetic, Reed
Safety parameters	PL e, SIL3	PL d, SIL 3
Safety outputs	electrical outputs	mechanical contacts
Can be switched in series	yes, when a constant safety level is guaranteed	yes, with falling safety level
Evaluation unit required	no	yes
Actuator coding	high	low
Diagnostic interface	via LED and electronically	no
Mechanical sensitivity	low	very high
Approach possibility of the actuator	4	1
Safety outputs	2	1
Return circuit evaluation	yes	partially (depending on the evaluation unit)
Start button monitoring	yes	partially (depending on the evaluation unit)

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CSMS - Non-Contact RFID Safety System

The CSMS non-contact electronical safety switch systems ensures that safety doors and protective guards remain closed.

In addition to high switching tolerances and fast reaction times, the contactless, coded communication between the sensor and the actuator also offers a high level of safety and protection against tampering.

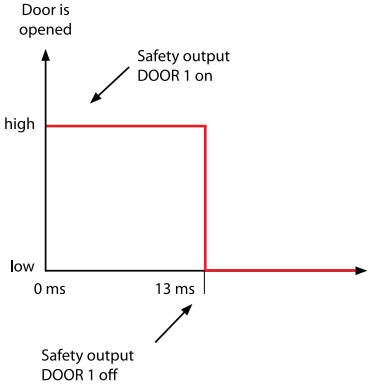


The use of non-contact safety switches for monitoring movable safety doors, guards and gates offers the following advantages:

- **Simple adjustment**
- **No broken actuators**
- **High degree of tolerance to vibrations**
- **No wear**
- **Exceptionally easy cleaning**
- **Unique or Multiple Coding –** with unique coding pairs only one mated actuator with can be used with each switch; multiple coding pairs allow a common actuators to be used for multiple switches
- **Safety series connection** with max. 32 CSMS up to **PL e / SIL 3 (category 4)**
- **Reduction in cost –** no additional external monitoring is needed
- **Flexible application –** a manual and automatic start is possible with the same CSMS
- **Meets the latest requirements –** the CSMS fulfils the requirements of **ISO 14119** (the successor to EN 1088) regarding individual coding **(high-level coding)**
- **Economic system installation** due to the **simple** and **fast installation** with M12 plug technology
- **Time saving –** laborious troubleshooting as a result of wiring errors is now a thing of the past
- **Time saving –** the system status is displayed on the **diagnosis interface**

Advantages of fast shutdown:

Thanks to the fast shutdown, it is possible to significantly reduce the area of the dangerous movement which is to be protected.
This results in savings in both protective guards and hoods, as well as in space.



Description Breakdown:

CSMS-SET-RRS-H-ST

ST M12 connector
KA Cable

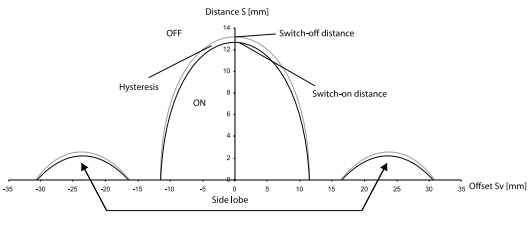
H High-level coding (unicode)
L Low-level coding (multicode)

RRS Serial connection, with evaluation of a return circuit
R Serial connection, without evaluation of a return circuit
A Stand-Alone application, without evaluation of a return circuit

SET Set, comprising the master and slave
M Master
S Slave

CSMS Contactless Safety Monitoring Sensor

Sensing distance

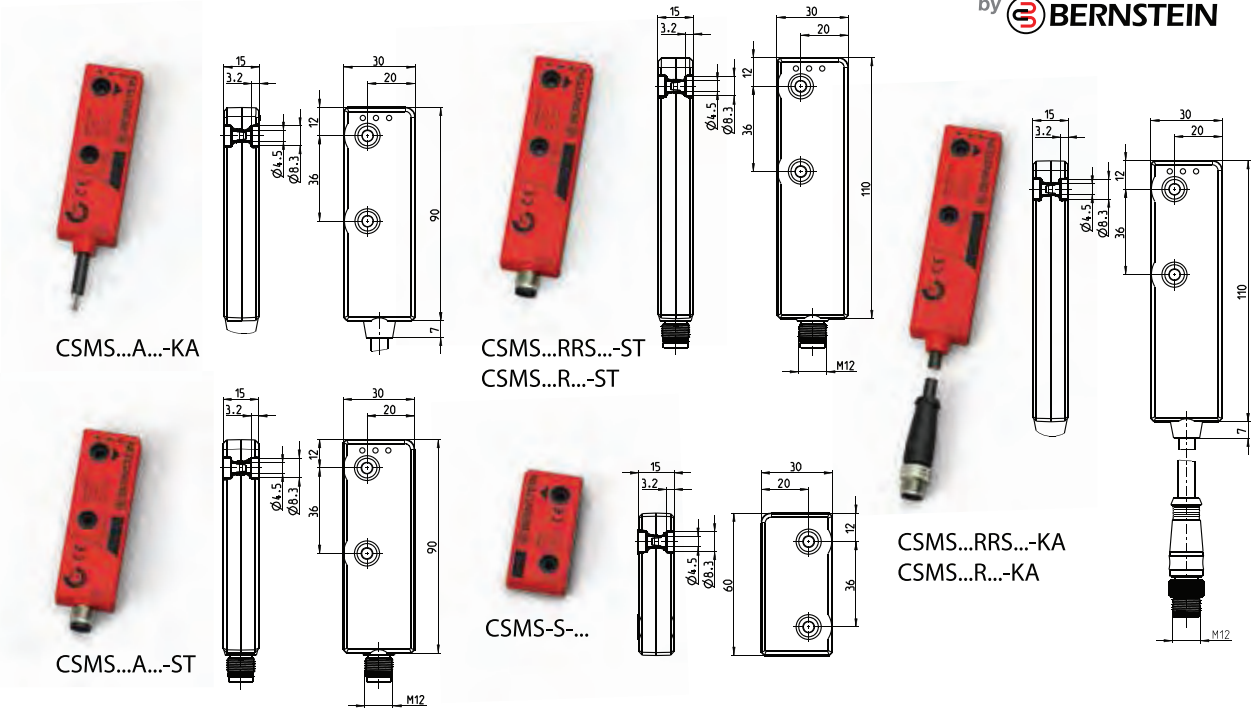


Rated sensing distance S_n	13 mm
Assured sensing distance – (On) S_{ao}	min. 10 mm
Assured sensing distance – (Off) S_{ar}	19 mm
Hysteresis H	0,5 mm

Please note: Metal may also affect the sensing distance.

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Technical data

- Rated operating voltage 24 V, polarity reversal protection
- Open-circuit current ≤ 55 mA
- Repeatability 0,1 x S (within the limits Smin and Smax)
- Switching frequencies ≤ 1Hz
- Switch-off delay time 13 ms + 200 µs x down stream CSMS unit in serial connection
- Output current Safety contacts = 2x 250mA
- Enclosure Macromelt, red / PA 6, black
- Mounting through 2 holes Ø 4,5 (for M4 screws)
- Ambient temperature –25 °C to +70 °C
- Protection class IP 67
- Sensing distance S $_n$ 13 mm

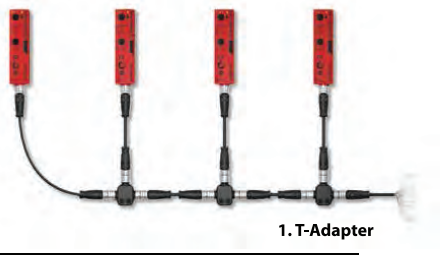
Readiness delay t_v

- **CSMS...RRS with automatic start**
  1,8 s + 33 ms x following CSMS unit
- **CSMS...RRS with Start button**
  50 ms + 50 ms x following CSMS unit
- **CSMS...R**
  320 ms + 50 ms x following CSMS unit

Accessories CSMS

T-Adapters

Versions	Start function	1. T-Adapter	Following T-Adapter
Version RRS	Manual start Automatic start	Grey Black	Black Black
Version R		Grey	Black


1. T-Adapter

Cables

Article number	Designation	Description	
607.5989.038	CON-CAB.CSMS 0,5M G/G	Length: 0,5 m	Connection cable M12 / 8-pin male / female
607.5989.039	CON-CAB.CSMS 1M G/G	Length: 1 m	
607.5989.040	CON-CAB.CSMS 2M G/G	Length: 2 m	
607.5989.041	CON-CAB.CSMS 5M G/G	Length: 5 m	
607.5989.042	CON-CAB.CSMS 10M G/G	Length: 10 m	
607.5989.043	CON-CAB.CSMS 20M G/G	Length: 20 m	
607.5989.053	CON-CAB.CSMS 0,3 M G	Length: 0,3 m	Connection cable M12 / 8-pin female / open
607.5989.054	CON-CAB.CSMS 2 M G	Length: 2 m	
607.5989.036	T-Adapter AS	T-Adapter (black) for series circuits (see the table above)	
607.5989.037	T-Adapter MS	T-Adapter (grey) for series circuits (see the table above)	
607.3900.070	SPACER short		
607.5989.044	SPACER long		
607.5989.031	CSMS DIAGNOSE STANDARD 8	Diagnosis for 8 CSMS, 8 PNP outputs	
607.5989.032	CSMS DIAGNOSE STANDARD 16	Diagnosis for 16 CSMS, 16 PNP outputs	
607.5989.033	CSMS DIAGNOSE PROFIBUS	Diagnosis for up to 32 CSMS with Profibus Gateway	
607.5989.055	CSMS BASIS CONNECT. DEVICE	Connection device for easy and fast installation of the CSMS system	
607.5989.056	CSMS SLAVE TEACHADAPTER	Tool for teaching in a replacement actuator	

Drawing dimensions in mm

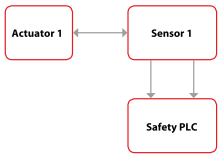
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CSMS - A for direct connection to a control unit

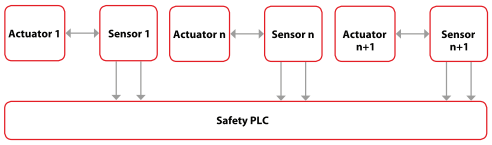
Advantages

- Up to **PL e / SIL 3**
- Multi-coding
- Compact construction
- Connection to an external safety evaluation unit like the SCR-ON

Individual application



Series application



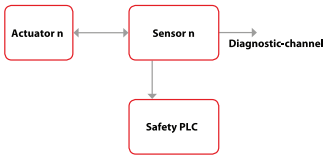
Unique Code	Multicode	M12 connector	2 m cable	Article number	Designation	Description
	x	x		**607.5988.072**	CSMS-SET-A-L-ST	Switch & Actuator with 2M Cable
	x		x	**607.5988.073**	CSMS-SET-A-L-KA	Switch & Actuator with M12 Connector
	x		x	**607.5985.070**	CSMS-M-A-L-KA	Switch Only with 2M Cable
	x	x		**607.5986.071**	CSMS-M-A-L-ST	Switch Only with M12 Connector
	Replacement actuator Multicode			**607.5980.065**	CSMS-S-L	Multicode Actuator Only

CSMS - R for direct connection to a control unit, with diagnostic channel

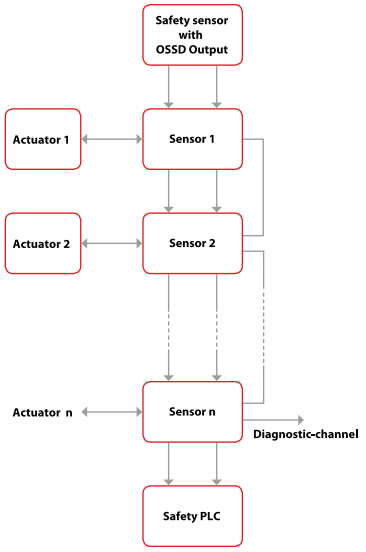
Advantages

- Safe serial connection with max. 32 CSMS up to **PL e**
- Connection to an external safety evaluation unit like the SCR ON
- Single or multiple coding
- Optional: Connection of a safety sensor (for ex. safety light curtain) with OSSD output to the first CSMS

Individual application



Series application



Unique Code	Multi Code	M12 connector	2 m cable with M12 connector	Article number	Designation	Description
x			x	**607.5988.059**	CSMS-SET-R-H-KA	Switch & Actuator+2M Cable/Connector
x		x		**607.5988.060**	CSMS-SET-R-H-ST	Switch & Actuator with M12 Connector
	x	x		**607.5988.067**	CSMS-SET-R-L-ST	Switch & Actuator+2M Cable/Connector
	x		x	**607.5988.069**	CSMS-SET-R-L-KA	Switch & Actuator with M12 Connector
x			x	**607.5985.049**	CSMS-M-R-H-KA	Switch Only + 2M Cable / Connector
x		x		**607.5986.051**	CSMS-M-R-H-ST	Switch Only with M12 Connector
	x		x	**607.5985.063**	CSMS-M-R-L-KA	Switch Only + 2M Cable / Connector
	x	x		**607.5986.064**	CSMS-M-R-L-ST	Switch Only with M12 Connector
	Replacement actuator Multicode			**607.5980.065**	CSMS-S-L	Multi code Actuator Only
	Replacement actuator Unicode			**607.5980.052**	CSMS-S-H*	Single code Actuator Only

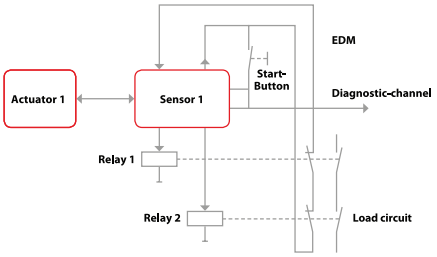
*Must be taught in with 6075989056 (CSMS SLAVE TEACHADAPTER) for the master.

CSMS - RRS with external monitoring circuit

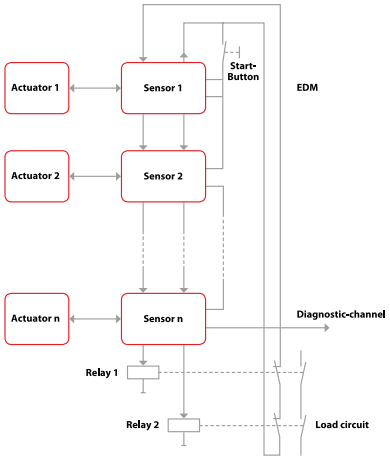
Advantages

- Individual CSMS or safe serial connection with max. 32 CSMS up to **PL e**
- Manual or automatic start
- No external safety evaluation unit required
- Unique or multi-coding
- Integrated evaluation of a return circuit and start button with direct connection to contactors

Individual application



Series application



Unique Code	Multi Code	M12 connector	2 m cable with M12 connector	Article number	Designation	Description
x			x	**607.5988.057**	CSMS-SET-RRS-H-KA	Switch & Actuator+2M Cable/Connector
x		x		**607.5988.058**	CSMS-SET-RRS-H-ST	Switch & Actuator with M12 Connector
	x	x		**607.5988.066**	CSMS-SET-RRS-L-ST	Switch & Actuator+2M Cable/Connector
	x		x	**607.5988.068**	CSMS-SET-RRS-L-KA	Switch & Actuator with M12 Connector
x			x	**607.5985.048**	CSMS-M-RRS-H-KA	Switch Only + 2M Cable / Connector
x		x		**607.5986.050**	CSMS-M-RRS-H-ST	Switch Only with M12 Connector
	x		x	**607.5985.061**	CSMS-M-RRS-L-KA	Switch Only + 2M Cable / Connector
	x	x		**607.5986.062**	CSMS-M-RRS-L-ST	Switch Only with M12 Connector
	Replacement actuator Multicode			**607.5980.065**	CSMS-S-L	Multi code Actuator Only
	Replacement actuator Unicode			**607.5980.052**	CSMS-S-H*	Single code Actuator Only

*Must be taught in with 6075989056 (CSMS SLAVE TEACHADAPTER) for the master.

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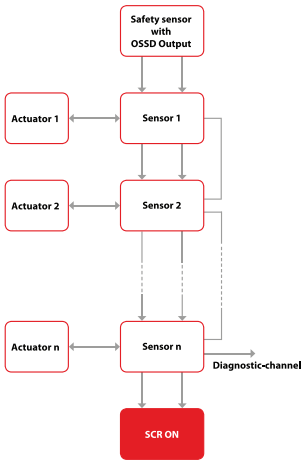
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SCR ON

For processing signals from the BERNSTEIN CSMS-R and CSMS-A, the safety relay series SCR ON can be used.

Features

- Monitoring of sensors with PNP output
- **PL e** according to **ISO 13849**
- Monitored start / automatic start
- Three enabling current paths (NO)
- Evaluation of a return circuit





Article number	Designation
6075111020	SCR ON4-W22-3.6-S

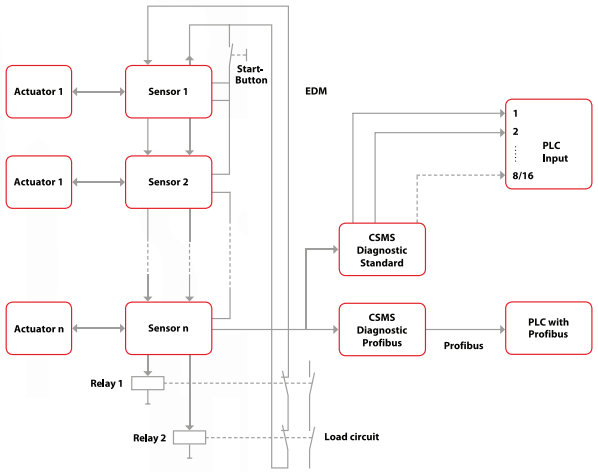
CSMS diagnosis

The CSMS product family offers one of the **largest diagnostic options** on the market. Opened protective gates and guards as well as failures can be rapidly and precisely identified. With the optional diagnostic devices monitor, the status of each CSMS switch can be read from the security network.

Features

- Status display of each CSMS in the security chain
- Electronical outputs or bus interface





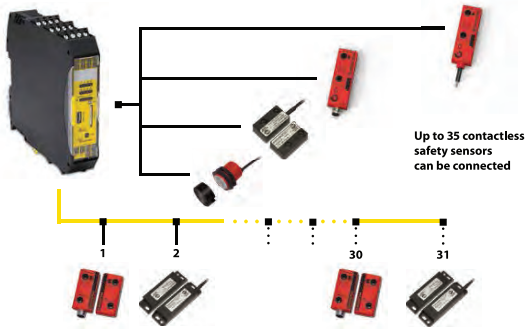
Article number	Designation	Description
6075989031	CSMS DIAGNOSE STANDARD 8	Diagnosis for 8 CSMS
6075989032	CSMS DIAGNOSE STANDARD 16	Diagnosis for 16 CSMS
6075989033	CSMS DIAGNOSE PROFIBUS	Profibus Gateway

Safety basis monitor

The Safety Basis Monitor is a graphically programmable safe "miniature control unit", which supports up to 35 inputs.

Features

- Evaluation of a return circuit
- Manual / automatic start
- Up to **PL e / SIL 3**
- Two safe electronic outputs
- Time delay for safe outputs
- Graphically programmable



Article number	Designation
6073100084	ASI BASISMONITOR EXP. FUNCTION
6073800079	ASI PROG. SOFTWARE
6073100078	USB-CA. F. ASI BASISMONITOR

MAK - Non-Contact Magnetic Safety System

Magnetic controllers for safety functions

BERNSTEIN offers magnetic controllers for safety functions that fulfill performance level PLd according to EN 13849-1 and SIL 3 according to EN 61508 or EN 62061.

A safety system consists of the safety magnetic controllers and a coded transducer unit.

The anti-tamper security of the transducer unit is achieved by variable coding of the actuator magnets and magnetic switches.



Depending on the type of device, one or two coded transducer units (magnetic switch with corresponding magnet) of type:

- MAK-4236
- MAK-5236
- MAK-5336

can be connected to and monitored by the safety magnetic controllers.

The safety magnetic controller processes the NC or NO contact signals coming from the coded magnetic switches. Thereby, it is possible to detect the opening of the safety guard (door, hatch, protective hood etc.) and to turn off the safety output. Thanks to the redundant evaluation, the magnetic controller is switched to the “safe state” should a fault or manipulation occur, or if the time difference is exceeded between the NC contact signal and the NO contact signal. An LED indicates that the safety magnetic controller is in the “safe state”.

To ensure fault detection of the switch-off device, the MÜZ-102 offers the possibility to connect a return circuit. The system additionally features a NC contact for signaling purposes.

- Redundancy by NO and NC contacts
- Manipulation safety by coding
- Monitoring of the return circuit (depending on device type)



MAK-4236-x with magnet TK-42-CD



MAK-5236-x with magnet TK-52-CD / 2



MAK-5336-x with magnet TK-43-CD

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MUZ - Non-Contact Magnetic Switch Controllers



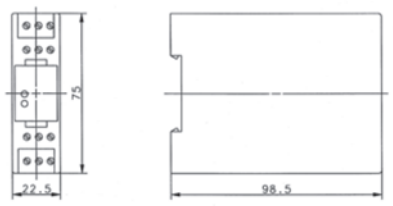
- EN ISO 13849-1 Performance Level PL d
- EN 61508 and EN 62061 SIL 3
- EN 60947-5-3 Single fault security S
- TÜV certified

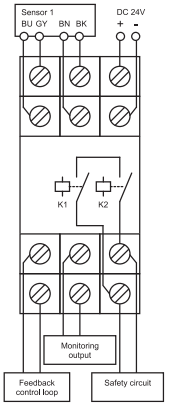
Coded transducer units for magnetic switches

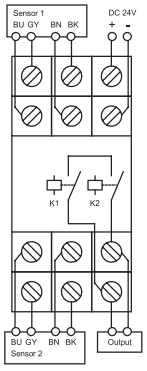
Type designation		MÜZ-102/D24-FL-DA	MÜZ-202/D24-FL
Article number		**639.2701.306**	**639.2702.307**
Max. number of connect-able transducer units		1	2
Safety output, NO contact		☒	☒
Feedback circuit		☒	–
Data output (NC contact)		☒	–
Technical data			
Operating voltage		24 V DC	24 V DC
Operating current		60 mA	60 mA
Switching capacity, safety output			
Switching voltage	max	AC 250 V	AC 250 V
Switching current	max	8 A	8 A
Switching power	max	1700 VA	1700 VA
LED: Hazard status/switching status		☒/–	☒/–
LED: Supply voltage/ON		☒	–
Relay: Positive-action/standard		☒/–	☒/–
Ambient conditions			
Temperature range	min/max	0 °C/+55 °C	0 °C/+55 °C
		32 °F/+131 °F	32 °F/+131 °F
Protection class (to IEC 529, EN 60529)		IP20	IP20
Enclosure material		PC	PC
Mounting system (DIN 50022)		TS 35	TS 35
Type of connection: Terminal block		max. 2.5 mm²	max. 2.5 mm²

Type designation
Article number
Cable length
Type designation
Article number
Cable length
Type designation
Article number
Cable length
Type designation
Article number
Cable length

Ambient conditions	
Temperature range	min/max
Protection class (to IEC 529, EN 60529)	
Enclosure material	
Sensing distance	S on min
	S on max
Actuating magnet	
Type designation	
Article number	
Use: safety magnetic controller	
Article number	







All dimensions in mm

Other types available on request.

Drawing dimensions in mm

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MAK - Non-Contact Magnetic Switches



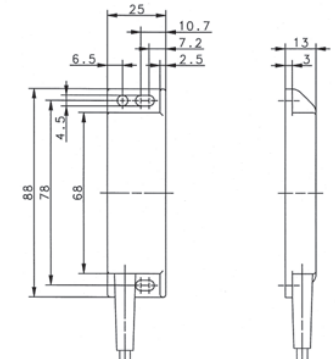


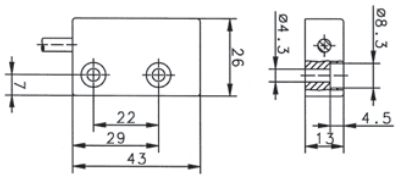


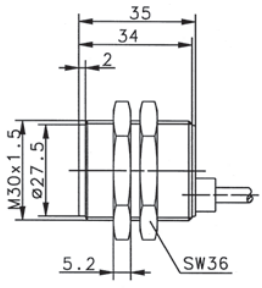
Switch					
Standard Version	New UL Version	Standard Version	New UL Version	Standard Version	New UL Version
MAK-4236-3	MAK-4236-BCD-3	MAK-5236-3	MAK-5236-BCD-3	MAK-5336-3	MAK-5336-BCD-3
649.0642.315	**649.0642.315**	**649.0652.316**	**649.0652.327**	**649.0653.317**	**649.0653.323**
3 m PVC cable	3 m PVC cable	3 m PVC cable	3 m PVC cable	3 m PVC cable	3 m PVC cable
MAK-4236-6	MAK-4236-BCD-6	MAK-5236-6	MAK-5236-BCD-6	MAK-5336-6	MAK-5336-BCD-6
649.0642.302	**649.0642.319**	**649.0652.307**	**649.0652.328**	**649.0653.311**	**649.0653.324**
6 m PVC cable	6 m PVC cable	6 m PVC cable	6 m PVC cable	6 m PVC cable	6 m PVC cable
MAK-4236-9	MAK-4236-BCD-9	MAK-5236-9	MAK-5236-BCD-9	MAK-5336-9	MAK-5336-BCD-9
649.0642.303	**649.0642.320**	**649.0652.308**	**649.0652.329**	**649.0653.312**	**649.0653.325**
9 m PVC cable	9 m PVC cable	9 m PVC cable	9 m PVC cable	9 m PVC cable	9 m PVC cable
MAK-4236-STK	MAK-4236-BCD-M8	MAK-5236-STK	MAK-5236-BCD-M8	MAK-5336-STK	MAK-5336-BCD-M12
649.0642.305	**649.0642.321**	**649.0652.309**	**649.0652.322**	**649.0653.313**	**649.0653.326**
4-pin connector	4-pin connector	4-pin connector	4-pin connector	4-pin connector	4-pin connector

Actuator and Safety Controller Sold Seperately

–5 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C	–5 °C/+70 °C
+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F
IP67	IP67	IP67	IP67	IP67	IP67
PA 6.6	PA 6.6	PBT	PBT	PA 6.6	PA 6.6
4 mm	4 mm	3 mm	3 mm	3 mm	3 mm
14 mm	14 mm	14 mm	14 mm	14 mm	14 mm
Actuator					
TK-42-CD	TK-42-CD	TK-52-CD/2	TK-52-CD/2	TK-43-CD	TK-43-CD
640.2042.310	**640.2042.310**	**640.2052.311**	**640.2052.311**	**640.2043.312**	**640.2043.312**
Safety Controllers					
639.2701.306	**639.2701.306**	**639.2701.306**	**639.2701.306**	**639.2701.306**	**639.2701.306**
639.2702.307	**639.2702.307**	**639.2702.307**	**639.2702.307**	**639.2702.307**	**639.2702.307**





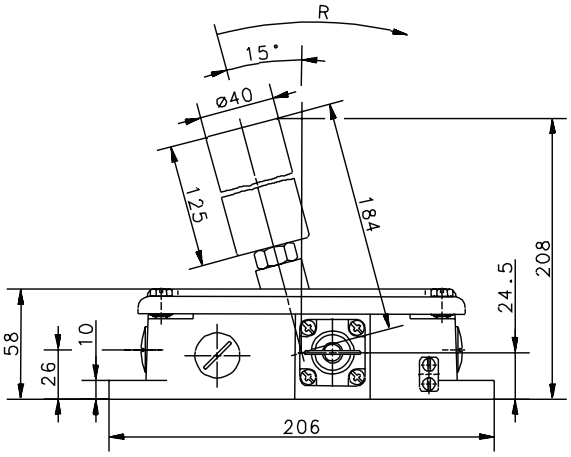


Drawing dimensions in mm

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Conveyor Belt Alignment Monitoring



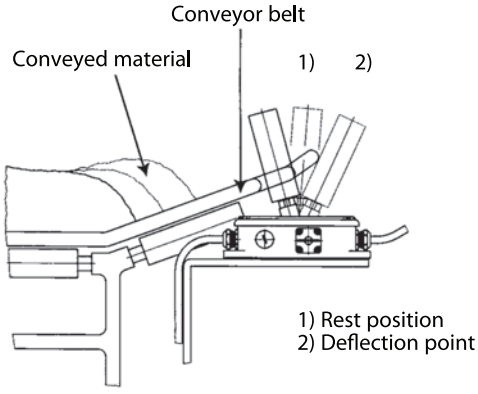


Metal-enclosed belt alignment switches for monitoring conveyor belts

In conveyor belt applications, the safety switch prevents conveyor belts from being damaged or being destroyed as the result of the belt running off track. When the roller lever is deflected by a conveyor belt running off track the safety contacts in the switch engage, thus shutting down the conveyor belt.

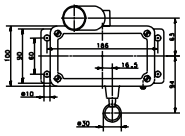
Only after eliminating the cause of the malfunction can the system be restarted by means of the pull release (key ring).

The roller lever is mounted in ball bearings. The cast iron enclosure has three M20 x 1.5 cable entries ready for through-wiring. The belt alignment switch is equipped with 2 normally-open contacts and 2 positive opening NC contacts p . Thanks to its sturdy design, the device guarantees continuous trouble-free operation even under extreme operating conditions.



Product selection

Part number	Designation
601.5736.003	Si2-U2Z AW R-Rast



Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V
Rated operating voltage	U_e max.	240 V AC
Conventional thermal current	I_{the}	10 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 240 V / 3 A
Positive opening action	p	as per IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure		Cast iron
Cover		Cast iron
Actuation		Roller lever
Ambient temperature		-30°C to +80°C
Contact type		2 NC / 2 NO contact (Zb)
Resetting the lock		Pulling the keyring (< 50 N)
Mechanical service life		2 x 10^6 switching cycles
Switching frequency max.		≤ 10 / min.
Mounting		4 x M8
B10d		4 mill.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Cable entry		3 x M20 x 1.5
Weight		≈ 4.1 kg
Installation position		Any
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Drawing dimensions in mm

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SRM and SR

SRM



SR



General information on safety cable pull switches

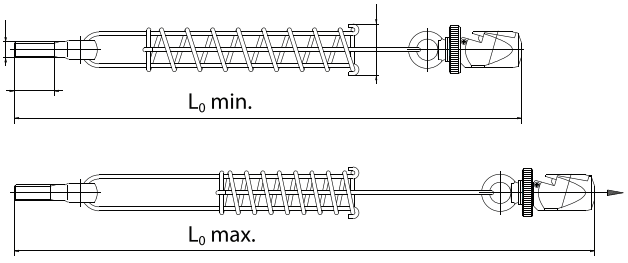
The SR and SRM safety cable pull switches are designed and approved in accordance with the standards IEC 947-5-5, DIN EN 60947-5-5 and ISO 13850, which state that on actuation or in the event of cable breakage, the emergency stop switching device locks automatically and can only be reset to its initial setting by means of the resetting device on the switch.

In order for the overall system to conform to the standards EN 60947-5-5 and EN 13850 governing the emergency stop function of cable pull switches, it is necessary to integrate a spring in the system. The reasoning behind this requirement is that a person who triggers the emergency stop functions does not need to consider the activation direction. With the spring it is possible to pull the cable in the direction of the cable pull switch, thus activating the emergency stop function.

Safety cable pull switches may only be used in control power circuits. Safety cable pull switches are used on accessible sides of conveyor systems or machines. In contrast to Emergency Stop switching devices (e.g. mushroom pushbuttons) installed at intervals, where the emergency stop signal can only be generated at the device itself, with the safety cable pull switch it is possible to generate the signal at any point in a section. Depending on the type of switching device, a span of up to 75 m can be achieved with a pull cable connected to the pulling element.

The maximum possible span length of a pull cable switch is always dependent on the temperature fluctuations to which the system is exposed. It is possible that the pull cable switch may trip due to the fact that, because of it's temperature coefficient, the length of the steel cable can change in response to changes in temperature. Ultimately, this change in length is dependent on the length of the cable, the difference in the temperature change and the type of springs used in the pull cable switch. Overview 1 shows which cable lengths are possible as a function of change in temperature.

Pull cable counter-spring
With overstretch safeguard based on compression spring principle



Application		
Type	SR...100/SR...175/SRM...175	SR...300/SRM...300
Spring Art. No.	**391.1042.153**	**391.1042.154**
$L_{0\,min.}$	383	483
$L_{max.}$	487	653

SRM and SR Series

Advantages of SRM/SR safety cable pull switches:

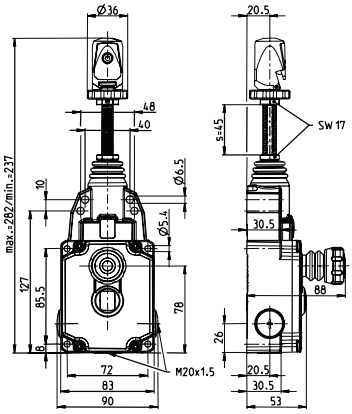
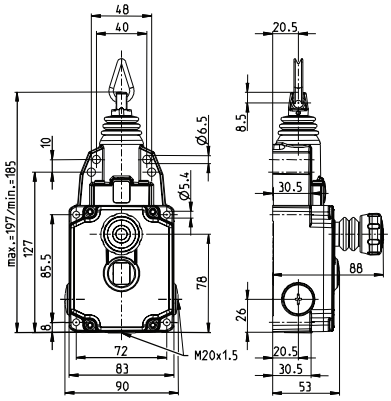
- The SR (plastic enclosure) and SRM (metal enclosure) safety cable pull switches are available with the Quickfix quick-connect system, which eliminates the need for cable eye stiffeners, cable clamps and turnbuckles that are otherwise required for mounting the cable. Added to this, the time required to install the cable is drastically reduced. Versions with a conventional eye are, of course, also available.
- All variants of the SRM and especially of the SR are equipped with an integrated emergency stop impact button that can be actuated by pressing in hazardous situations. In the same way as pulling the pull cable, the safety contacts are opened and the switch is locked.
- The type SRM...E-... safety cable pull switches are optionally available with a remote indicator for monitoring the cable tension. This option has an integrated sensor unit that monitors situations in which the cable tension may overshoot or undershoot the permissible value or triggering of the safety cable pull switch is imminent. This electronic output signals in advance that maintenance/adjustment is required otherwise the machine will shut down. This output can also be used for event signaling purposes or optionally available indicator lamps can be connected. This connection configuration con forms to "preventative maintenance" requirements.
- During installation/adjustment of the cable span, the correct tension of the cable can be checked through the integrated inspection window. To ensure optimum cable tension as part of the adjustment procedure, the tips of the indicator arrows should be aligned with the marking.
- A second inspection window integrated in the SRM version makes it possible to check the status of the locking function and of the contacts. Yellow in the inspection window indicates that the safety cable pull switch is locked. Green in the inspection window indicates that the cable pull switch is ready for operation and the cable assembly is monitored.

Overview 1

| | Span L max. in meters [m] | | |

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SRM Safety Rope Pull Switches

Max. span length	Quick Fix Cable Mounting		Cable Ring Cable Mounting	
				
	2 NC/2 NO	**3 NC/1 NO**	**2 NC/2 NO**	**3 NC/1 NO**
123 Ft. (37.5 Meters)	**601.2929.085** SRM-U1Z/U1Z-QF-175	**601.2999.094** SRM-A2Z/U1Z-QF-175	**601.2921.089** SRM-U1Z/U1Z-LU-175	**601.2991.098** SRM-A2Z/U1Z-LU-175
246 Ft. (75 Meters)	**601.2929.087** SRM-U1Z/U1Z-QF-300	**601.2999.096** SRM-A2Z/U1Z-QF-300	**601.2921.091** SRM-U1Z/U1Z-LU-300	**601.2991.100** SRM-A2Z/U1Z-LU-300
123 Ft. (37.5 Meters) with remote monitoring	**601.2929.086** SRM-U1Z/U1Z-QF-175-E	**601.2999.095** SRM-A2Z/U1Z-QF-175-E	**601.2921.090** SRM-U1Z/U1Z-LU-175-E	**601.2991.099** SRM-A2Z/U1Z-LU-175-E
246 Ft. (75 Meters) with remote monitoring	**601.2929.088** SRM-U1Z/U1Z-QF-300-E	**601.2999.097** SRM-A2Z/U1Z-QF-300-E	**601.2921.092** SRM-U1Z/U1Z-LU-300-E	**601.2991.101** SRM-A2Z/U1Z-LU-300-E

Technical Information

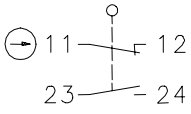
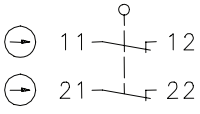
Maximum Switching Voltage	240V	240V
Maximum Switching Amperage	10A	10A
B10d	0.2 Million	0.2 Million
Mechanical Service Life	1 x 10^5	1 x 10^5
Switching Frequency	≤ 20/min	≤ 20/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP67	IP67
Utilization Category	AC-15, Ue/Ie 240V 3A; 120V/6A DC-13Ue/Ue 250V/0.27A; 125V/0.55A	AC-15, Ue/Ie 240V 3A; 120V/6A DC-13Ue/Ue 250V/0.27A; 125V/0.55A
Rate Insulation Voltage	250VAC	250VAC
Approvals		

Drawing dimensions in mm

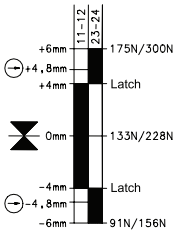
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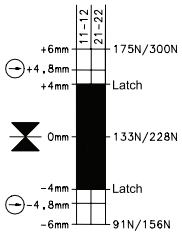
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	10 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 240 V / 3 A; 120 V/6 A DC-13 U_e /I_e 250 V/0.27 A; 125 V/0.55 A
Short-circuit protection		6 A gL/gG
Protection class		I
Mechanical data		
Enclosure	Aluminum pressure die-casting	
Ambient temperature	-30°C to +80°C	
Mechanical service life	1 x 10^5	
Switching frequency max.	≤ 20 / min.	
Mounting	4 x M6 or 4 x M5	
B10d	0.2 mill.	
Type of connection	Screw connections	
Conductor cross sections	Single-wire 0.5 - 1.5 mm^2	
Cable entry	3 x M20 x 1.5	
Protection class	IP67 conforming to IEC/EN 60529	
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 VDE 0660 T210, DIN EN 60947-5-5, IEC 60947-5-5 ISO 13850		

Contact type	**1 NC / 1 NO (Zb)**	**2 NC (Zb)**
Action contacts	**U1Z**	**A2Z**
Circuit symbol	**Slow-action contacts** 	**Slow-action contacts** 
Switching Diagram		

On
OFF





The pulling force data depend on the type of switch used. (SRM...175/SRM...300)
Tolerances: Switching point +/- 0.5 mm, actuating force +/- 15 %

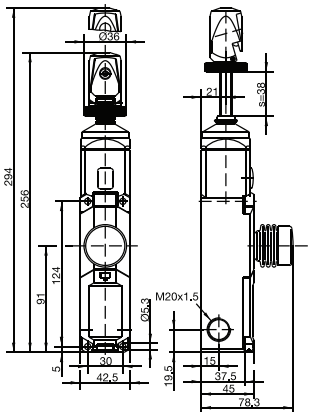
Drawing dimensions in mm

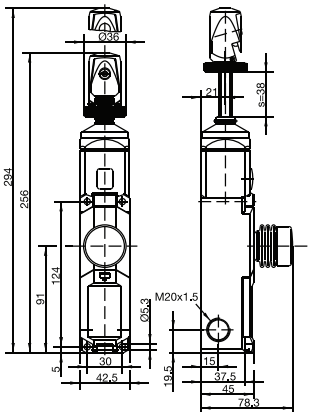
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SR Series - Safety Rope Pull Switches







Max. span length	Quick Fix with E-Stop & Reset		Quick Fix with Reset Only	
	2 NC / 2 NO	4 NO	2 NC / 2 NO	4 NC
82 Ft. (25 Meters)	**601.1629.067** SR-U2Z-NA-QF-100-L0-0-0 Replaces **601.1629.031** SR-U2Z-NA-QF 100	**601.1691.077** SR-A4Z-NA-QF-100-L0-0-0 Replaces **601.1691.052** SR-A4Z-NA-QF 100	**601.1629.070** SR-U2Z-0-QF-100-L0-0-0 Replaces **601.1629.032** SR-U2Z-QF 100	**601.1691.080** SR-A4Z-0-QF-100-L0-0-0 Replaces **601.1691.049** SR-A4Z-QF 100
123 Ft. (37.5 Meters)	**601.1629.068** SR-U2Z-NA-QF-175-L0-0-0 Replaces **601.1629.027** SR-U2Z-NA-QF 175	**601.1691.078** SR-A4Z-NA-QF -175-L0-0-0 Replaces **601.1691.053** SR-A4Z-NA-QF 175	**601.1629.071** SR-U2Z-0-QF-175-L0-0-0 Replaces **601.1629.024** SR-U2Z-QF 175	**601.1691.081** SR-A4Z-0-QF-175-L0-0-0 Replaces **601.1691.050** SR-A4Z-QF 175
246 Ft. (75 Meters)	**601.1629.069** SR-U2Z-NA-QF-300-L0-0-0 Replaces **601.1629.019** SR-U2Z-NA-QF 300	**601.1691.079** SR-A4Z-NA-QF-300-L0-0-0 Replaces **601.1691.054** SR-A4Z-NA-QF 300	**601.1629.072** SR-U2Z--0-QF-300-L0-0-0 Replaces **601.1629.028** SR-U2Z-QF 300	**601.1691.082** SR-A4Z-0-QF-300-L0-0-0 Replaces **601.1691.051** SR-A4Z-QF 300
Approvals	c SP us BG		c SP us BG	

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	10 A
Utilization category	U_e / I_e	AC-15, U_e / I_e 240 V / 3 A
Short-circuit protection		6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure	PA 6 GV (UL94-V0)	
Ambient temperature	-25°C to +70°C	
Mechanical service life	100,000 Cycles	
Switching frequency max.	≤ 20 / min.	
Mounting	4 x M5	
B10d	10,000	
Type of connection	Cage clamp terminal	
Conductor cross sections	≤ 1.5 - 2 mm²	
Cable entry	3 x M20 x 1.5	
Protection class	IP67 conforming to IEC/EN 60529	
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 VDE 0660 T210, DIN EN 60947-5-5, IEC 60947-5-5 ISO 13850		

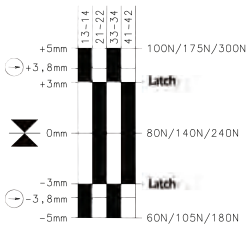
Drawing dimensions in mm

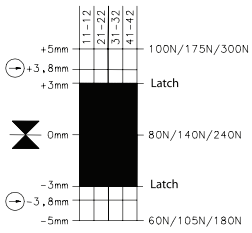
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SR Series - Safety Rope Pull Switches

Max. span length	Cable Ring with Reset Only	
	2 NC / 2 NO	**4 NC**
	601.1621.064 SR-U2Z-0-LU-100-L0-0-0	**601.1691.074** SR-A4Z-0-LU-100-L0-0-0
82 Ft. (25 Meters)	Replaces **601.1621.030** SR-U2Z 100	Replaces **601.1691.033** SR-A4Z 100
	601.1621.065 SR-U2Z-0-LU-175-L0-0-0	**601.1691.075** SR-A4Z-0-LU-175-L0-0-0
123 Ft. (37.5 Meters)	Replaces **601.1621.026** SR-U2Z 175	Replaces **601.1691.047** SR-A4Z 175
	601.1621.066 SR-U2Z-0-LU-300-L0-0-0	**601.1691.076** SR-A4Z-0-LU-300-L0-0-0
246 Ft. (75 Meters)	Replaces **601.1620.020** SR-U2Z 300	Replaces **601.1691.048** SR-A4Z 300
Approvals		

Contact type	**2 NC / 2 NO (Zb)**	**4 NC**
Action contacts	**U2Z**	**A4Z**
Circuit symbol	**Slow-action contacts**	**Slow-action contacts**
Switching Diagram		





Drawing dimensions in mm

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SiRK, Si1 and Si2 Series



SiRK



Si2



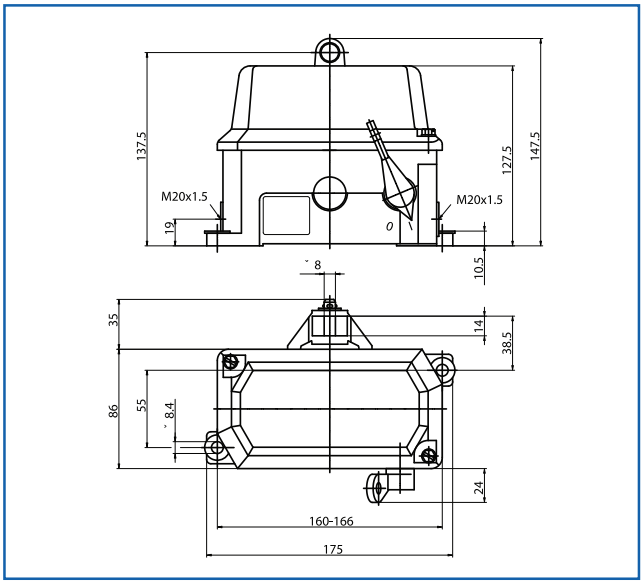
Si1

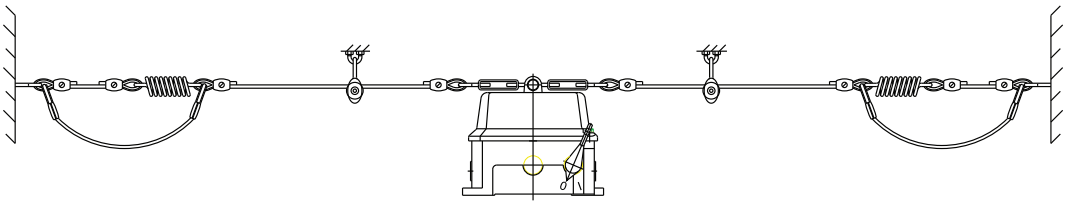
BERNSTEIN double-spanned cable pull switches (SiRK, Si1 and Si2) are also used in emergency stop applications. When the cable is pulled the switching lever is deflected in the corresponding direction and the system shut down.

The switches are available in two metal versions, the Si1 and Si2, as well as an insulation-enclosed version, the SiRK.

These types of cable pull switch are ideally suited for applications with high temperature fluctuations and long cable spans. With their sturdy enclosure, the Si1 and Si2 are the perfect switches for harsh environments.

Two cables spanned in opposite directions are attached to the switching device. The counter-springs are secured to the wall at the ends of the cables. Provided the change in temperature is the same at all points along the cable, the springs will effectively compensate for the change in cable length.





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SiRK, Si1 and Si2

Product selection

Designation	Max. span length
SI1-U2Z AK R-RAST	2 x 50 m
SI1-U1Z/U1Z AK R-RAST	2 x 50 m
SI2-U2Z AK R-RAST	2 x 50 m
SIRK-U2Z R	2 x 75 m

Technical data

Technical data		SiRK	Si1	Si2
Electrical data				
Rated insulation voltage	U_i	250 V AC	250 V AC	400 V AC
Rated operating voltage	U_e	240 V	250 V	240 V
Conventional thermal current	I_{the}	10 A	10 A	10 A
Utilization category		AC 15, A 300 240 V /3 A, 120 V /6 A DC 13, Q300 250 V/0.27 A, 125 V/0.55 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Positive opening action	p	as per IEC/EN 60947-5-1, Addendum K	as per IEC/EN 60947-5-1, Addendum K	as per IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 6 A gL/gG	Fuse 6 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	I	I
Mechanical data				
Enclosure		ABS	Aluminum sand casting	Cast iron
Cover		ABS	Aluminum sand casting	Cast iron
Actuation		Lever, plastic (glass fibre-reinforced)	Lever (GRP)	Lever (GRP)
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Contact type		2 NC / 2 NO contact (Zb)	2 NC / 2 NO contact (Zb)	2 NC / 2 NO contact (Zb)
Mechanical service life (up to)[1]		1 x 10^5 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
Switching frequency max.		Max. 30/min.	≤ 10 / min.	≤ 10 / min.
Mounting		2 x M8	4 x M8	4 x M8
B10d (up to)[1]		0,2 mill.	2 mill.	2 mill.
Type of connection		8 Screw connections (M3, 5)	8 Screw connections (M3, 5)	8 Screw connections (M3, 5)
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Cable entry		2 x M20 x 1.5	1 x M20 x 1.5	3 x M20 x 1.5
Weight		≈ 0.8 kg	≈ 1.62 kg	≈ 4.21 kg
Installation position		Any	Any	Any
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529
Standards				
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1				

1 Depending on switching system.

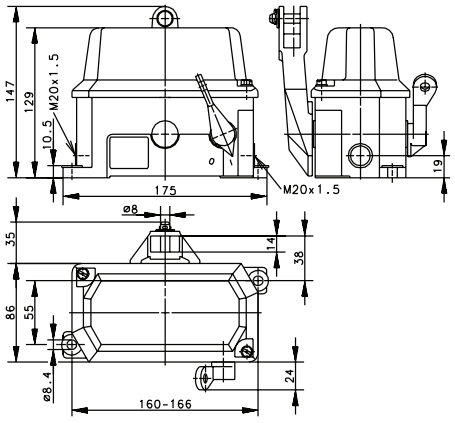
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SiRK and Si1 Series

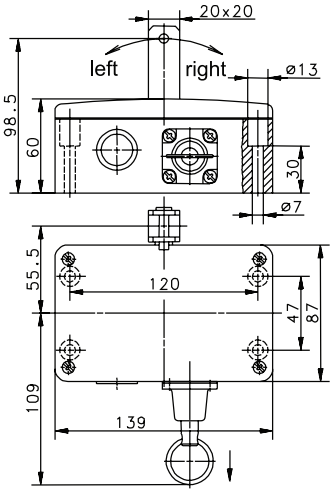




SIRK



SI1



		SIRK	SI1
Variant 1	**Article No.** **Designation** Max. span	**601.5625.001** SIRK-U2Z R 2 x 75 m	**601.4735.001** SI1-U2Z AK R-RAST 2 x 50 m
Variant 2	**Article No.** **Designation** Max. span		**601.4735.025** SI1-U1Z/U1Z AK R-RAST 2 x 50 m
Variant 3	**Article No.** **Designation** Max. span		

Technical Information

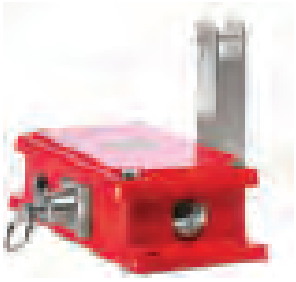
	SIRK	SI1
Maximum Switching Voltage	240V	240V
Maximum Switching Amperage	10A	10A
B10d	0.2 Million	2 Million
Mechanical Service Life	1 x 10^5	1 x 10^5
Switching Frequency	≤ 30/min	≤ 10/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category	AC 15, A 300 240 V /3 A, 120 V /6 A DC 13, Q300 250 V/0.27 A, 125 V/0.55 A	AC-15, U /I_e 240 V / 3 A
Rate Insulation Voltage	250VAC	250VAC
Approvals		

Drawing dimensions in mm

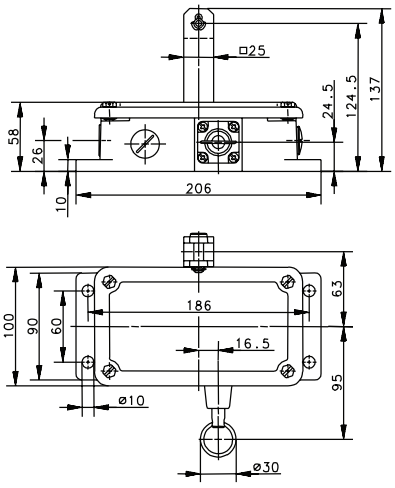
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SI2 Series



SIRK



Variant 1	**Article No.** **Designation** Max. span	**601.5735.002** SI2-U2Z AK R-RAST 2 x 50 m
Variant 2	**Article No.** **Designation** Max. span	
Variant 3	**Article No.** **Designation** Max. span	

Technical Information

Maximum Switching Voltage	240V
Maximum Switching Amperage	10A
B10d	2 Million
Mechanical Service Life	1 x 10^6
Switching Frequency	≤ 10/min
Operating Temperature	–30 °C to +80 °C
Protection Rating	IP65
Utilization Category	AC-15, 240 V/3 A
Rate Insulation Voltage	400VAC
Approvals	C SP US

Drawing dimensions in mm

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With and Without Latching Function



SEK



SEM2



SIEM2



SD



SID



SID



SIN

Because of their specifications and the safety standards for application (see Cable Safety Pull Switches SRM/SR), these cable pull switches are used generally as safety command devices; switching control signals instead of the power directly.

These switches are available with metal and plastic bodies. They are operated manually by the attached cable.

Thanks to their pretension, these switches, which feature a switching contact with overlap, execute a switching function when the cable is pulled or in the event of cable breakage.

Switches with tension monitor require per-tension to the cable for the normally closed contact to close.

The field of application for these cable pull switches includes

- Opening and closing of (overhead) doors
- Starting machines
- Issuing commands in production processes

The basic design of the standard cable pull switches is similar to that of position switches.

The specified cable length refers to the maximum length at minimum temperature variation. The maximum cable length may decrease under different environmental conditions.

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Technical Data

Technical data		SEK	SiEK	SEM2	SiEM2
Electrical data					
Rated insulation voltage	U_i	400 V AC	400 V AC	400 V AC	400 V AC
Rated operating voltage	U_e	240 V	240 V	240 V	240 V
Conventional thermal current	I_{the}	10 A	10 A	10 A	10 A
Utilization category	U_e / I_e	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Mechanical data					
Switching frequency max.		≤ 50/min.	max. 100/min.	max. 50/min.	max. 50/min.
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		on request	on request	on request	on request
Short-circuit protection		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	II, Insulated	I	I
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Protection class		IP65 conforming to IEC/EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529; DIN VDE 0470 T1
Type of connection		4 Screw connections (M3, 5)	4 Screw connections (M3, 5)	4 Screw connections (M3, 5)	Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced	Thermoplastic, glass fibre-reinforced	Aluminum pressure die-casting	Aluminum pressure die-casting
Cable entry		1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1					

Technical data		SD	SiD	SIN
Electrical data				
Rated insulation voltage	U_i	400 V AC	400 V AC	400 V AC
Rated operating voltage	U_e	240 V	240 V	240 V
Conventional thermal current	I_{the}	16 A	16 A	10 A
Utilization category	U_e / I_e	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Mechanical data				
Switching frequency max.		≤ 20/min.	max. 20/min.	≤ 20/min.
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		on request	on request	on request
Short-circuit protection		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		I	I	I
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529
Type of connection		Screw connections	Screw connections	Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Aluminum pressure die-casting	Aluminum pressure die-casting	Aluminum pressure die-casting
Cable entry		2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5
Standards				
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1				

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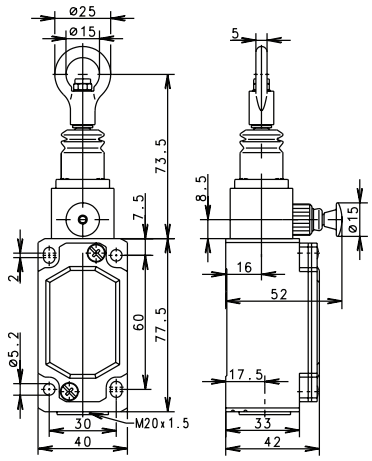
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SIEM and SID Latching with Reset Button

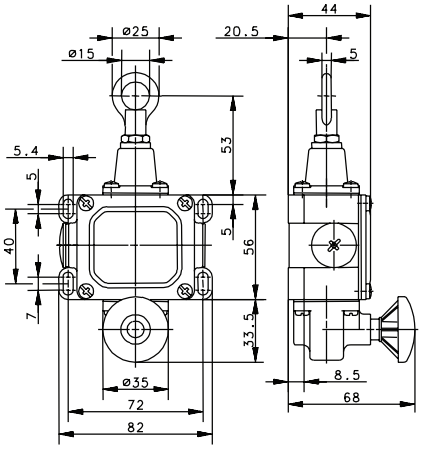


Pull Cable to change contact state, push button to reset

SIEM2 RAST



SID RAST



		SIEM2 RAST	SID RAST
Variant 1	**Article No.** **Designation** Max. span Type	**601.2831.023** SIEM2-UV1Z P-RAST 19.6 Ft. (6 Meters) Metal Body with Tension Monitor 13 14 25 26	**601.1411.868** SD-U1 P-RAST 26.2 Ft. (8 Meters) Metal Body without Tension Monitor 13 14 21 22
Variant 2	**Article No.** **Designation** Max. span Type		**611.1431.060** SID-UV1Z P-RAST 49.2 Ft. (15 Meters) Metal Body with Tension Monitor 13 14 25 26
Variant 3	**Article No.** **Designation** Max. span Type		**601.1431.869** SID-UV1Z P-RAST 39.4 Ft. (12 Meters) Metal Body with Tension Monitor 13 14 25 26

Technical Information

	SIEM2 RAST	SID RAST
Maximum Switching Voltage	240V	240V
Maximum Switching Amperage	10A	16A
B10d	On Request	On Request
Mechanical Service Life	1 x 10^6	1 x 10^6
Switching Frequency	≤ 50/min	≤ 20/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category	AC-15, U_e /I_e 240 V / 3 A	AC-15, U /I_e 240 V / 3 A
Rate Insulation Voltage	400VAC	400VAC
Approvals	c SP us	c SP us

Drawing dimensions in mm

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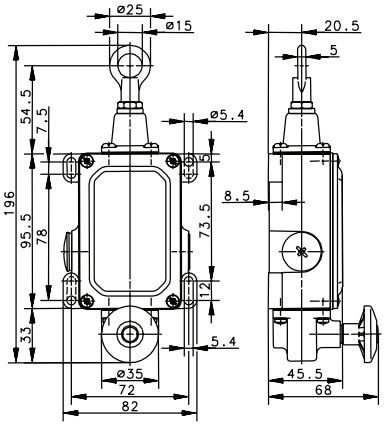
SID and SIN Latching with Reset Button



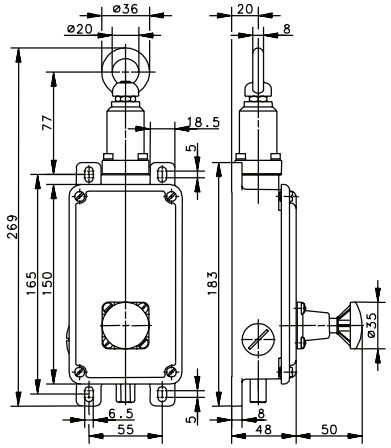


Pull Cable to change contact state, push button to reset

SID RAST



SIN RAST



		SID RAST	SIN RAST
Variant 1	**Article No.** **Designation** Max. span Type	**611.2431.050** SID-UV1Z P-RAST 144.8 Ft. (35 Meters) Metal Body with Tension Monitor	**601.3531.367** SIN-UV1Z P-RAST 196.8 Ft. (60 Meters) Metal Body with Tension Monitor
Variant 2	**Article No.** **Designation** Max. span Type	**601.2441.907** SID-UV2Z P-RAST 59 Ft. (18 Meters) Metal Body with Tension Monitor	
Variant 3	**Article No.** **Designation** Max. span Type		

Technical Information

	SID RAST	SIN RAST
Maximum Switching Voltage	240V	240V
Maximum Switching Amperage	16A	10A
B10d	On Request	On Request
Mechanical Service Life	1 x 10^6	1 x 10^6
Switching Frequency	≤ 20/min	≤ 20/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category	AC-15, U_e /I_e 240 V / 3 A	AC-15, U /I_e 240 V / 3 A
Rate Insulation Voltage	400VAC	400VAC
Approvals		

Drawing dimensions in mm

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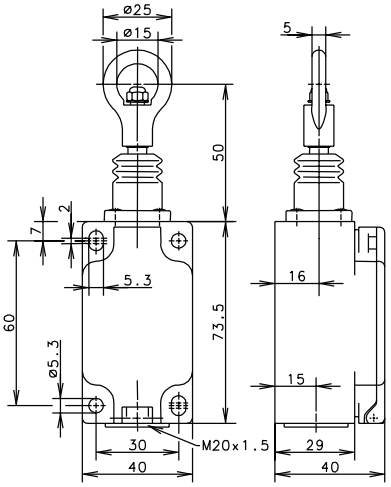
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SEK, SIEK, SEM2 and SIEM2 Series

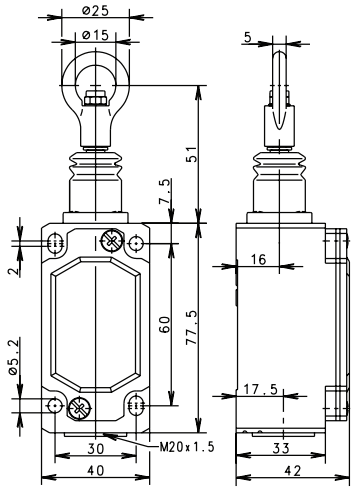


Pull Cable to change contact state, release cable to reset

SEK / SIEK



SEM / SIEM2



		SEK / SIEK	SEM / SIEM2
Variant 1	**Article No.** **Designation** Max. span Type	**601.1811.133** SEK-U1Z 19.6 Ft. (6 Meters) Plastic Body without Tension Monitor	**601.2811.029** SEM2-U1Z 19.6 Ft. (6 Meters) Metal Body without Tension Monitor
Variant 2	**Article No.** **Designation** Max. span Type	**601.1831.134** SIEK-UV1Z 13 Ft. (4 Meters) Plastic Body with Tension Monitor	**601.2831.022** SIEM2-UV1Z 19.6 Ft. (6 Meters) Metal Body with Tension Monitor
Variant 3	**Article No.** **Designation** Max. span Type		

Technical Information

Maximum Switching Voltage	240V	240V
Maximum Switching Amperage	10A	16A
B10d	On Request	On Request
Mechanical Service Life	1 x 10^6	1 x 10^6
Switching Frequency	≤ 50/min	≤ 20/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category	AC-15, U_e /I_e 240 V / 3 A	AC-15, U /I_e 240 V / 3 A
Rate Insulation Voltage	400VAC	400VAC
Approvals		

Drawing dimensions in mm

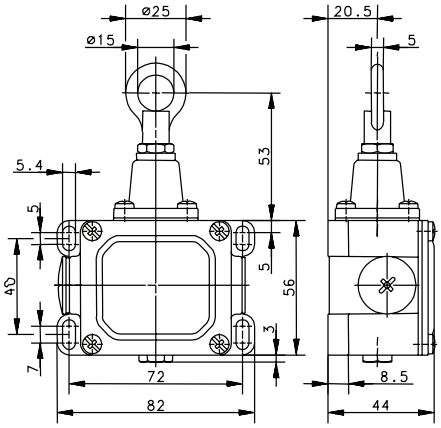
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SD and SID Series

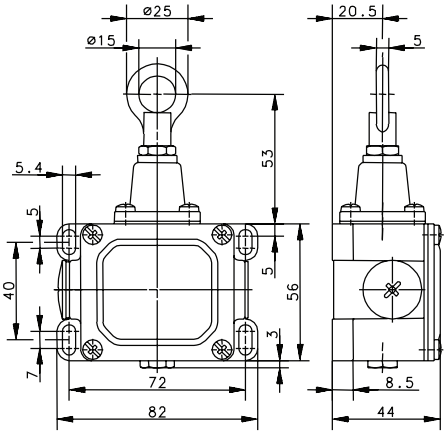


Pull Cable to change contact state, release cable to reset

SD



SID



		SD	SID
Variant 1	**Article No.** **Designation** Max. span Type	**601.1411.856** SD-U1 26.2 Ft. (8 Meters) Metal Body without Tension Monitor	**601.1431.857** SID-UV1Z 13.1 Ft. (4 Meters) Metal Body with Tension Monitor
Variant 2	**Article No.** **Designation** Max. span Type	**611.1411.029** SD-U1 19.7 Ft. (6 Meters) Metal Body without Tension Monitor	**611.1431.022** SID-UV1Z 26.2 Ft. (8 Meters) Metal Body with Tension Monitor
Variant 3	**Article No.** **Designation** Max. span Type	**611.1411.161** SD-U1 19.7 Ft. (6 Meters) Metal Body without Tension Monitor	**611.1431.069** SID-UV1Z 39.4 Ft. (12 Meters) Metal Body with Tension Monitor

Technical Information

Maximum Switching Voltage	240V	240V
Maximum Switching Amperage	16A	16A
B10d	On Request	On Request
Mechanical Service Life	1 x 10^6	1 x 10^6
Switching Frequency	≤ 20/min	max. 20/min
Operating Temperature	–30 °C to +80 °C	–30 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category	AC-15, U_e /I_e 240 V / 3 A	AC-15, U /I_e 240 V / 3 A
Rate Insulation Voltage	400VAC	400VAC
Approvals		

Drawing dimensions in mm

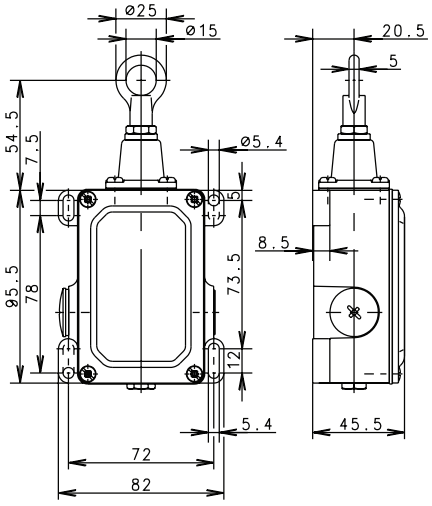
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SID Series

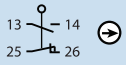


Pull Cable to change contact state, release cable to reset

SID



Variant 1	**Article No.** **Designation** Max. span Type	**601.2431.877** SID-UV1 26.2 Ft. (8 Meters) Metal Body with Tension Monitor
Variant 2	**Article No.** **Designation** Max. span Type	
Variant 3	**Article No.** **Designation** Max. span Type	



Technical Information

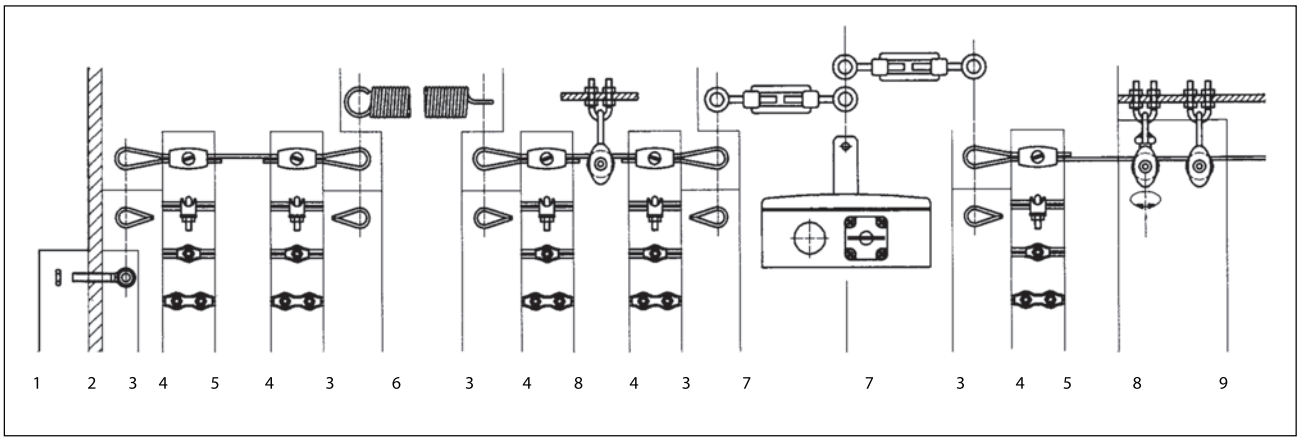
Maximum Switching Voltage	240V
Maximum Switching Amperage	16A
B10d	On Request
Mechanical Service Life	1 x 10^6
Switching Frequency	≤ 50/min
Operating Temperature	–30 °C to +80 °C
Protection Rating	IP65
Utilization Category	AC-15, U_e /I_e 240 V / 3 A
Rate Insulation Voltage	400VAC
Approvals	

Drawing dimensions in mm

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Cable Clamps. Eye-bolts & Hardware



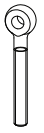
1 Nut



Size		Strength class	Art. No.
M 6	DIN 439T2	A2-70	**260.0439.090**
M 8	DIN 439T2	04	**260.0439.187**
M 10	DIN 934	8	**260.0934.092**

Coating: Thick-layer passivated (M 8/M 10), Ros-compliant

2 Eye bolt



Size	Strength class	Art. No.
M 10 x 50	4.6	**260.0444.076**
M 6 x 50	4.6	**260.0444.185**
M 8 x 50	4.6	**260.0444.186**

Coating: Thick-layer passivated, RoHs-compliant

3 Cable eye stiffener

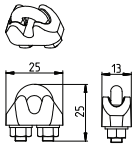


Size		Art. No.
D 2.5	to DIN 65457	**269.6899.013**
D 3	to DIN 65457	**269.6899.014**
D 4	to DIN 65457	**269.6899.015**
D 5	to DIN 6899B	**269.6899.001**

Material: Steel strip

Coating: Blue passivated, RoHs-compliant

4 Cable grip

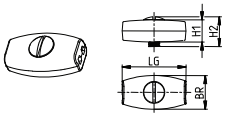


Size	Art. No.
D5	**269.0741.002**

Material: GTW/steel

Coating: Yellow chromed, RoHs-compliant

4 Cable grip, oval

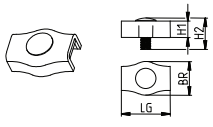


Size	LG	BR	H1	H2	Art. No.
2	28 mm	15 mm	11 mm	13 mm	**269.0000.004**
3	28 mm	15 mm	12 mm	13 mm	**269.0000.005**
4	34 mm	20 mm	14 mm	18 mm	**269.0000.006**

Material: Refined zinc cast alloy

Coating: Blue passivated, RoHs-compliant

4 Cable grip, simplex



Size	LG	BR	H1	H2	Art. No.
2	15 mm	12 mm	5 mm	11 mm	**269.0000.007**
3	17 mm	14 mm	6 mm	14 mm	**269.0000.008**
4	20 mm	17 mm	7 mm	16 mm	**269.0000.009**

Material: Steel strip

Coating: Blue passivated, RoHs-compliant

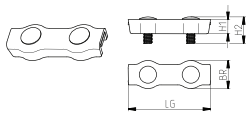
Drawing dimensions in mm

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Cable Clamps, Cable, Springs, Turnbuckles & Pulleys

4 Cable grip, duplex



Size	LG	BR	H1	H2	Art. No.
2	35 mm	12 mm	5 mm	11 mm	**269.0000.010**
3	35 mm	14 mm	6 mm	14 mm	**269.0000.011**
4	40 mm	17 mm	7 mm	16 mm	**269.0000.012**

Material: Steel strip
Coating: Blue passivated, RoHs-compliant

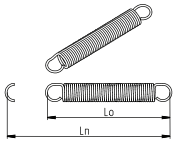
5 Cable



Cable Ø / Sheath Ø	Design	Minimum breaking strength		Art. No.
D 1,8/D 5	Similar to DIN 3055	275 kp		**369.9100.008**
D 2/D 2.5	to DIN 3055	239 kp		**369.9100.024**
D 3/D 4	to DIN 3055	538 kp	Ideal for Quickfix (QF)	**369.9100.025**
D 4/D 5	to DIN 3055	957 kp		**369.9100.026**

Material: Fiber-core galvanized, strength 1770 N/mm²
Coating: Blue passivated, RoHs-compliant

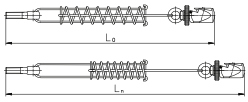
6 Compression spring, eye shape to DIN 1479



Fo	Fn	R	Lo	Ln	Art. No.
18 N	296 N	1.269 N/mm	188 mm	408 mm	**365.2100.331**
24 N	354 N	2.466N/mm	180 mm	314 mm	**365.2100.332**
13.3 N	153 N	0.694 N/mm	185 mm	387 mm	**365.2100.211**
35.2 N	450 N	3.490 N/mm	201 mm	319 mm	**365.2100.198**

Material: Wire to DIN 2076 - 1.4310

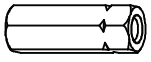
7 Pull cable spring



Fn	R	Lo	Ln	Art. No.
218 N	2.1 N/mm	383 mm	487 mm	**391.1042.153**
335 N	1.9 N/mm	483 mm	653 mm	**391.1042.154**

Material: Wire to DIN 2076 – 1.4310, cable grip – zinc pressure die-cast alloy, eye bolt to DIN 444 – 4.6
Coating: Thick-layer passivated (except spring), RoHs-compliant

7 Turnbuckle sleeve



Size	Art. No.
M 6	**2601479188**
M 8	**2601479189**

Material: Steel, min. tensile strength 330 N/mm²
Coating: Blue passivated, RoHs-compliant

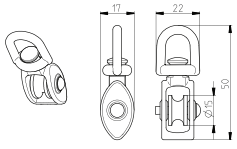
7 Turnbuckle similar to DIN 1480 with two eyes



Open	Art. No.
M 5 x 50	**260.1480.016**
M 6 x 60	**260.1480.017**

Material: Steel, forged
Coating: Blue passivated, RoHs-compliant

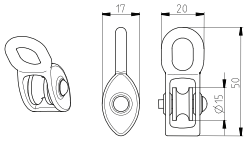
8 Pulley block, swivel version



Art. No.
2690000023

Material: Zinc pressure die-cast alloy (pulley polyamide)
Coating: Blue passivated, RoHs-compliant

8 Pulley block, fixed version



Art. No.
260.0000.022

Material: Zinc pressure die-cast alloy (pulley polyamide)
Coating: Blue passivated, RoHs-compliant

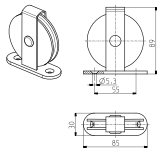
9 Mounting bracket for pulley to DIN 1142



Art. No.
3911751437

Material: Steel
Coating: Blue passivated, RoHs-compliant

Deflection pulley ø 75 mm for cable diameter up to 8 mm



Art. No.
269.0000.051

Material: Steel/polyamide
Coating: Blue passivated, RoHs-compliant

Drawing dimensions in mm

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General Information



BERNSTEIN – For over 50 years we have developed and produced foot switches

Tailored to your applications –
the modular foot switch concept from BERNSTEIN.

BERNSTEIN, a leader in the field of industrial foot switches, incorporates more than 50 years of experience into the development and production of it's products. The wide range of models reflects the expertise of the company offering foot switch solutions for many different applications.

- Uncovered
- Covered
- Standard
- Slow or Snap Action
- Two Stage Operation
- Latching Function
- Analog Output
- Anti-Trip
- Protective Covers
- Enabling Function
- Latching Safety
- Build in E-Stop
- Internal Contactor
- Build in Foot Rest
- ASi Interface
- ATEX Rated
- Mini Pedal
- Medical

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Overview



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Technical data

Electrical data		
Rated insulation voltage	U_i	400 V AC
		250 V AC (in type designation "ZS", "EX")
Rated impulse strength	U_{imp}	4 kV *
		2,5 kV (in type designation "C", "ZS", "EX") *
Conventional thermal current	I_{the}	10 A
		5 A (in type designation "ZS", "EX")
Utilization category		AC-15, U_e / I_e 240 V / 3 A
		AC-15, U_e / I_e 240 V / 1,5 A (in type designation "ZS")
Positive opening		according to IEC/EN 60947-5-1, Addendum K (when reaching the pedal stop)
Over-voltage category (switch-in contact with enabling function)		III (according to IEC 60664-1)
Protection class		I

* does not apply to "MI" and "MI RG" in article designation

Mechanical data	
Enclosure	Cast aluminum (powder-coated)
Cover, Protective shroud UN	Cast aluminum (powder-coated)
Foot pedal	Thermoplastic
Ambient temperature (with no icing / no condensation)	-30°C to +80°C (-20°C to +65°C in type designation "EX")
Storage temperature	-30°C bis +80°C (-20°C to +65°C in type designation "EX")
Mechanical service life	> 1 x 10^6 switching cycles when using switches with potentiometer 5 x 10^4
Switching frequency	50 min^{-1} when using switches with potentiometer 20 min^{-1}
Type of connection	Screw connections (M3,5)
Conductor cross sections	Single-wire 0,5 – 1,5 mm^2 or stranded wire with ferrule 0,5 – 1,5 mm^2
Cable entry	M20 x 1,5
Weight with cover	F1 ≈ 0,6 kg, F2 ≈ 1,7 kg, F3 ≈ 3,0 kg
Weight with protective shroud UN	F1 ≈ 1,5 kg, F2 ≈ 2,6 kg, F3 ≈ 5,4 kg
Protection class	Protection class depends on type. Standard is IP 65.

Standard values for safety technology	
B10d	20 x 10^6
	6 x 10^6 Restrictions in article designation "C" *
	2 x 10^6 Restrictions in article designation "D" *
	4 x 10^6 Restrictions in article designation "EX" *
	1 x 10^5 Restrictions in article designation "ZS" *

* Once a restriction exists, the lowest value needs to be applied.

This technical data is generic to our standard foot switch range, please refer to individual technical data sheets for exact product information as the technical data above may vary.

Standards
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1
VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

Approvals*
CCSAUS A300, Q300 (same polarity)
$_cUL_{US}$ B300 (in type designation "ZS")
DGUV (Only switches that have an appropriate label.)

* Approvals depend on type.
More information can be found in the data sheet.

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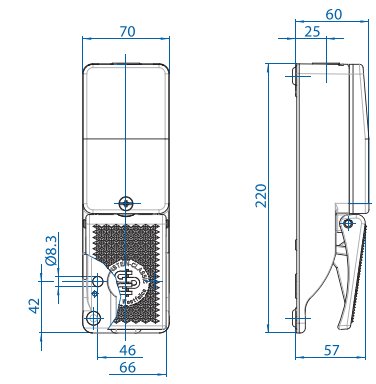
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Single Pedal Without Cover

STANDARD



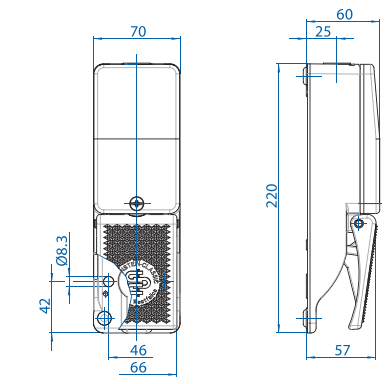
Standard OFF-ON Operation - Push pedal to change contact state. Release pedal to return to original state.



STANDARD with IP67 & IP68 PROTECTION



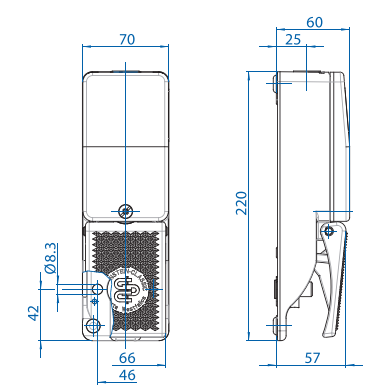
Standard OFF-ON Operation - Push pedal to change contact state. Release pedal to return to original state. With IP67 & IP68 Protection Rating (Temporary Submersion).



TWO STAGE OPERATION



Two Stage Operation- Press Pedal to change the state of the first set of contacts. Continue to press further to change the second set of contacts.



Single pedal foot switch F1

Article number	Designation	Switching contacts
Snap-action contact:		
		Pedal 1
606.1300.011	F1-SU1Z	1NC / 1NO
606.1400.061	F1-SU2Z	2NC / 2NO
Slow-action contact:		
		Pedal 1
616.1100.005	F1-U1Z	1NC / 1NO
606.1200.003	F1-U2Z	2NC / 2NO

Single pedal foot switch F1

Article number	Cable Entry	Designation	Switching contacts
Slow-action contact (IP 67):			
			Pedal 1
616.1100.469	1 x M20	F1-U1Z	1NC / 1NO
616.1100.469	3 x M20	F1-U1Z	1NC / 1NO
Slow-action contact (IP 68):			
			Pedal 1
616.1100.251	1 x M20	F1-U1Z	1NC / 1NO

Single pedal foot switch F1

Article number	Designation	Switching contacts	Pressure point
Slow-action contact:			
			Pedal 1
606.1200.007	F1-U2ZD	2NC / 2NO	200 N

Drawing dimensions in mm

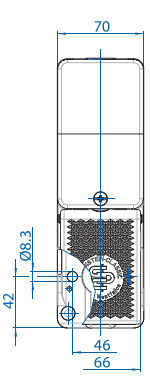
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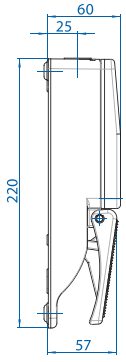
Single Pedal Without Cover

LATCHING



Latching Operation -
Push pedal to change contact state. When you release the pedal , the contacts remain in that state. Push again to return to original state.





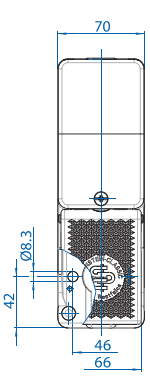
Single pedal foot switch F1

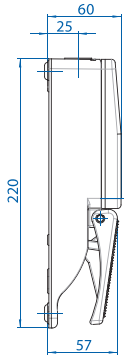
Article number	Designation	Switching contacts
		Pedal 1
616.1000.676	F1-A2Y	2NC
606.1100.001	F1-U1Y	1NC / 1NO

ANALOG OUTPUT



Analog Output Operation -
As the pedal is depress, voltage or amperage (depending on model) is increase. Features an additional programmable NP NO signaling contact that activates at a preset level.





Single pedal foot switch F1

Article number	Designation	Output Range
616.1500.723	F1-AU0-5	0 - 5 V
616.1500.724	F1-AU0-10	0 - 5 V
616.1500.725	F1-AI0-20	0 - 20 mA
616.1500.726	F1-AI4-20	4 - 20 mA

Drawing dimensions in mm

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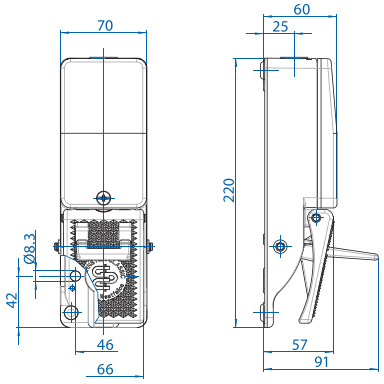
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Single Pedal With Kick Protection

STANDARD with Anti Trip



Standard OFF-ON Operation - Push forward in the Anti Trip Pedal Lock to release. Push down pedal to change contact state. Release pedal to return to original state.



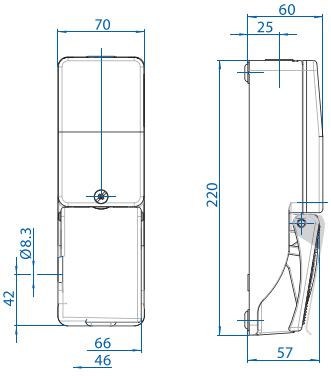
Single pedal foot switch F1

Article number	Designation	Switching contacts
616.1100.554	F1-U1Z AT	1NC / 1NO

STANDARD with Protective Hinged Cover



Standard OFF-ON Operation - Lift protective hinged cover up to activate pedal. Push pedal down to change contact state. Release pedal to return to original state. With IP67 Protection Rating (Temporary Submersion).



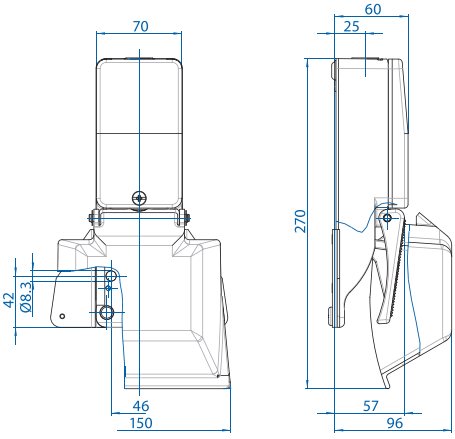
Single pedal foot switch F1

Article number	Designation	Switching contacts
606.1400.572	F1-SU2Z PS	2NC / 2NO

STANDARD with Protective Shroud



Standard OFF-ON Operation - Lift protective hinged Shroud up to activate pedal. Push pedal down to change contact state. Release pedal to return to original state.



Single pedal foot switch F1

Article number	Designation	Switching contacts
616.1600.071	F1-U1Z UK	1NC / 1NO

Drawing dimensions in mm

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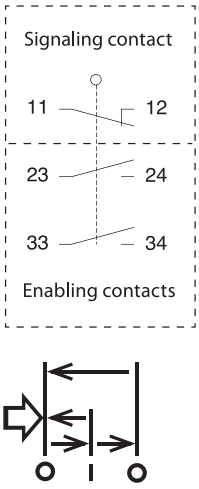
Enabling Foot Switch without Cover

The enable foot switch provides two enabling contacts and one signaling contact and is available with or without latch. If the pedal is pressed up to pressure point, the two enable contacts are closed. If the pedal is released, the enable contacts are open again. If the pedal is pressed past the pressure point, to the bottom position, the positive opening action enabling contacts are opened. When the pedal is released from the bottom position, the enabling contacts remain open through the center position to the top. For the application of an enable device, the rules for DIN EN ISO 12100 and DIN EN 60204-1 apply.

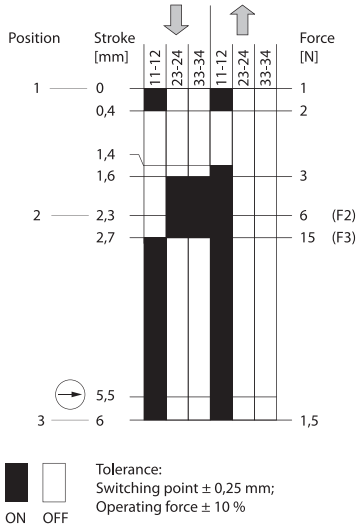
The programmable signaling contact can be used to indicate a fixed position, with a PNP output. By combining both outputs you can determine if the actuation position was made with the top position- the OFF position of the enable contacts (the actuator is not pressed) - or the bottom position - the OFF position of the operating contacts (the actuator is fully pressed).



Circuit symbol

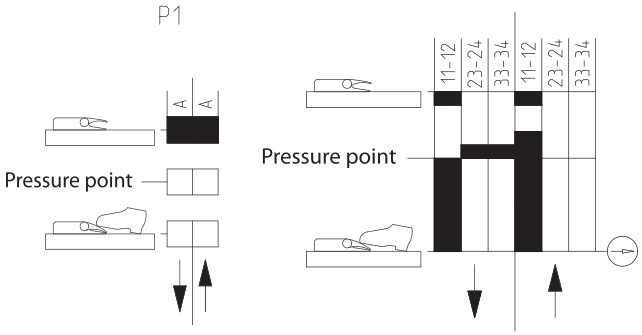


Switching diagram



The indicated travels and forces refer to the switch-in contact of the foot switch with latching function.

Switching diagram with PNP sensor



Example of a switching diagrams with static position monitoring in position 1

Single pedal enable foot switch F1

Article number	Designation	Switching contacts	Pressure point	Special feature
606.1500.559	F1-ZSD	1NC / 2NO	200 N	Pressure point D
606.1500.567	F1-ZSDR	1NC / 2NO	200 N	Pressure point D, Latching R
606.1500.569	F1-ZSP1D	1NC / 2NO	200 N	Additional board 1*, Pressure point D
606.1500.570	F1-ZSP3D	1NC / 2NO	200 N	Additional board 3**, Pressure point D

* Additional board PNP for determination of switching position 1
** Additional board PNP for determination of switching position 3

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Single Pedal With Cover

STANDARD



Standard OFF-ON Operation - Push pedal to change contact state. Release pedal to return to original state.

TWO STAGE OPERATION

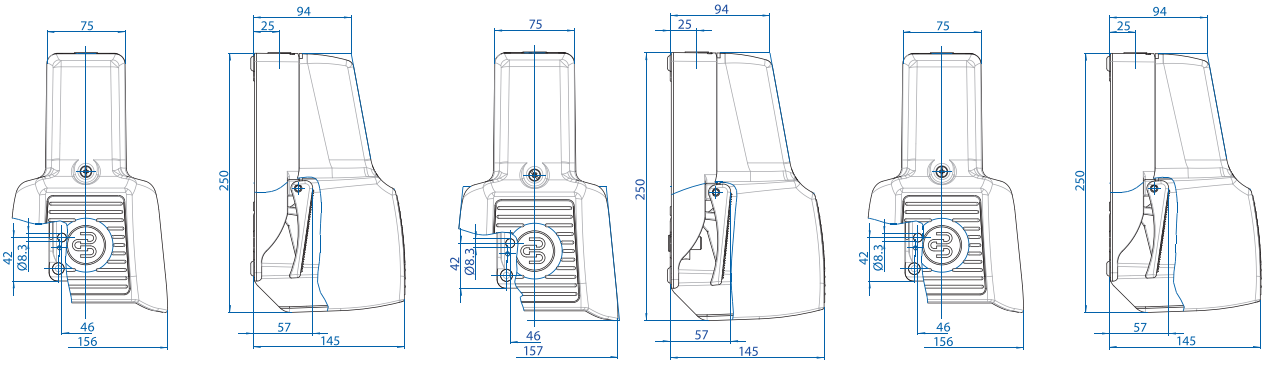


Two Stage Operation- Press Pedal to change the state of the first set of contacts. Continue to press further to change the second set of contacts.

LATCHING



Latching Operation - Push pedal to change contact state. When you release the pedal , the contacts remain in that state. Push again to return to original state.



Single pedal foot switch F1

Article number	Cable entry	Designation	Switching contacts
Snap-action contact:			
			Pedal 1
606.1800.012	1 x M20	F1-SU1Z UN	1NC / 1NO
606.1900.062	1 x M20	F1-SU2Z UN	2NC / 2NO
Slow-action contact (IP65 Protection Rating):			
			Pedal 1
606.1600.006	1 x M20	F1-U1Z UN	1NC / 1NO
606.1700.004	1 x M20	F1-U2Z UN	2NC / 2NO
Slow-action contact (IP67 Protection Rating):			
			Pedal 1
606.1600.538	1 x M20	F1-U1Z UN	1NC / 1NO
606.1600.345	3 x M20	F1-U1Z UN	1NC / 1NO

Single pedal foot switch F1

Article number	Designation	Switching contacts	Pressure point
Snap-action contact:			
		Pedal 1	Pedal 1
616.1800.073	F1-SU1ZD UN	1NC / 1NO	200 N
606.1900.433	F1-SU2ZD UN	2NC / 2NO	200 N
Slow-action contact:			
			Pedal 1
606.1600.010	F1-U1ZD UN	1NC / 1NO	200 N
606.1700.008	F1-U2ZD UN	2NC / 2NO	200 N

Single pedal foot switch F1

Article number	Designation	Switching contacts
Snap-action contact:		Pedal 1
616.1800.247	F1-SU1Y UN	1NC / 1NO
Slow-action contact:		
616.1600.295	F1-U1Y UN	1NC / 1NO

Drawing dimensions in mm

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Single Pedal With Cover

WITH E-STOP BUTTON



Standard OFF-ON Operation - Push pedal to change contact state. Release pedal to return to original state. With 2NC contact Emergency Stop

INTERNAL CONTACTOR

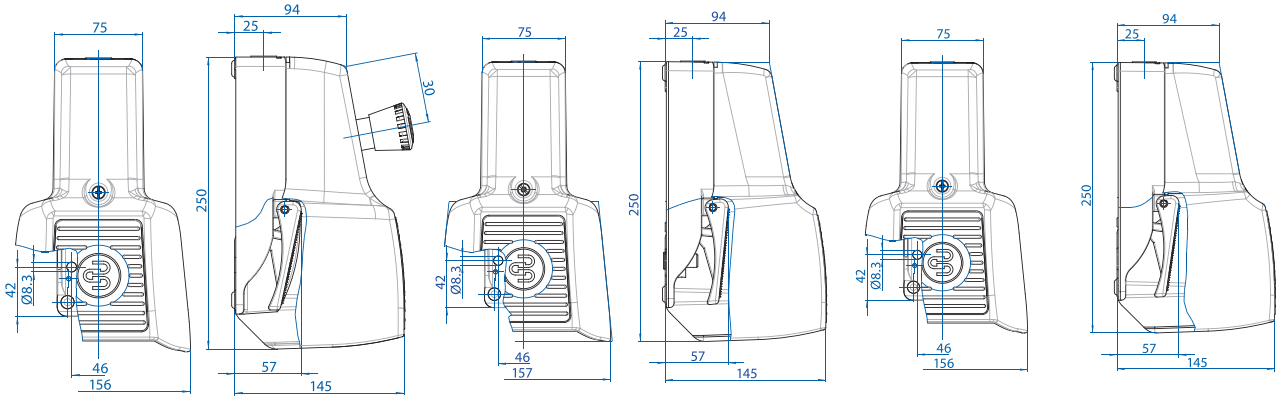


Standard and Latching style with built in contactor can switch up to 16AMPS@400VAC for AC1 applications, with additional 3NO/1NC Contacts

ANALOG OUTPUT



Analog Output Operation - As the pedal is depress, voltage or amperage (depending on model) is increase. Features an additional programmable PNP NO signaling contact that activates at a preset level.



Single pedal foot switch F1

Article number	Designation	Switching contacts
606.1600.435	F1-U1Z NA2 UN	1NC / 1NO

Single pedal foot switch F1

Article number	Designation	Switching contacts
Standard		
606.1800.436	F1-SU1Z LS22 UN	1NC / 1NO
Latching		
606.1800.439	F1-SU1Y LS22 UN	1NC / 1NO

Single pedal foot switch F1

Article number	Designation	Output Range
616.1000.727	F1-AU0-5	0 - 5 V
616.1000.728	F1-AU0-10	0 - 5 V
616.1000.729	F1-AI0-20	0 - 20 mA
616.1000.730	F1-AI4-20	4 - 20 mA

Drawing dimensions in mm

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Single Pedal With Cover

STANDARD with Anti Trip



Standard OFF-ON Operation - Push forward in the Anti Trip Pedal Lock to release. Push down pedal to change contact state. Release pedal to return to original state.

STANDARD with FST Footrest

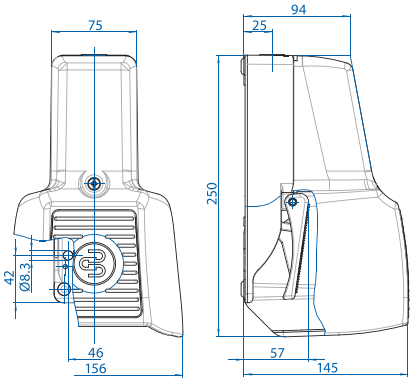


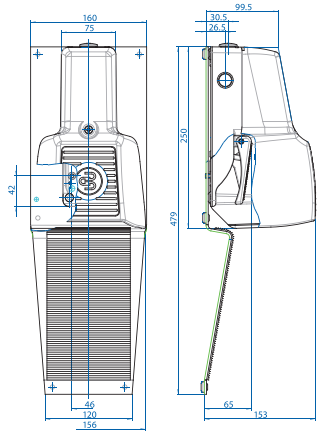
Standard OFF-ON Operation - Push pedal to change contact state. Release pedal to return to original state. With anti-fatigue footrest.

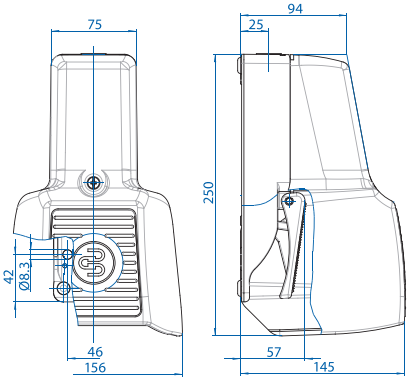
ASI Interface



Foot Switches with built in ASI Bus System interface via an M12 plug connection. Available in Standard or Enabling Switch versions







Single pedal foot switch F1

Article number	Designation	Switching contacts
616.1800.482	F1-SU1Z AT UN	1NC / 1NO
616.1600.400	F1-U1Z AT UN	1NC / 1NO
616.1700.483	F1-U2Z AT UN	2NC / 2NO
616.1700.660	F1-U2ZD AT UN	2NC / 2NO

Single pedal foot switch F1

Article number	Designation	Switching contacts
616.1700.091	F1-U2Z UN FST	2NC / 2NO

Standard with ASI Interface

Article number	Designation
607.3700.076	ASI F1 UN

Enabling Switch with ASI Interface

Article number	Designation
607.3700.085	F1-ASI-ZSD UN
607.3700.086	F1-ASI-ZSDR UN (Latching)

Drawing dimensions in mm

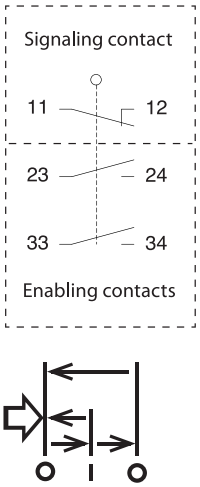
Enabling Foot Switch with Cover

The enable foot switch provides two enabling contacts and one signaling contact and is available with or without latch. If the pedal is pressed up to pressure point, the two enable contacts are closed. If the pedal is released, the enable contacts are open again. If the pedal is pressed past the pressure point, to the bottom position, the positive opening action enabling contacts are opened. When the pedal is released from the bottom position, the enabling contacts remain open through the center position to the top. For the application of an enable device, the rules for DIN EN ISO 12100 and DIN EN 60204-1 apply.

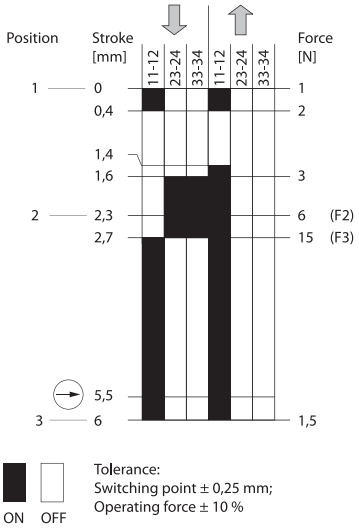
The programmable signaling contact can be used to indicate a fixed position, with a PNP output. By combining both outputs you can determine if the actuation position was made with the top position- the OFF position of the enable contacts (the actuator is not pressed) - or the bottom position - the OFF position of the operating contacts (the actuator is fully pressed).



Circuit symbol

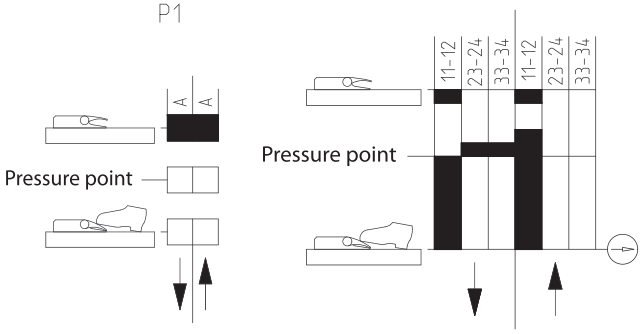


Switching diagram



The indicated travels and forces refer to the switch-in contact of the foot switch with latching function.

Switching diagram with PNP sensor



Example of a switching diagrams with static position monitoring in position 1

Single pedal foot switch with enabling function F1

Article number	Designation	Switching contacts	Pressure point	Special feature
606.1000.558	F1-ZSD UN	1NC / 2NO	200 N	Pressure point D, Prot. shroud UN
606.1000.560	F1-ZSDR UN	1NC / 2NO	200 N	Pressure point D, Latching R, Prot. shroud UN
606.1000.564	F1-ZSP1D UN	1NC / 2NO	200 N	Additional board 1*, Pressure point D, Prot. shroud UN
607.3700.085	F1-ASI-ZSD UN		200 N	ASI-ZS, Pressure point D, Prot. shroud UN
607.3700.086	F1-ASI-ZSDR UN		200 N	ASI-ZS, Pressure point D, Latching R, Prot. shroud UN

* Additional board PNP for determination of switching position 1

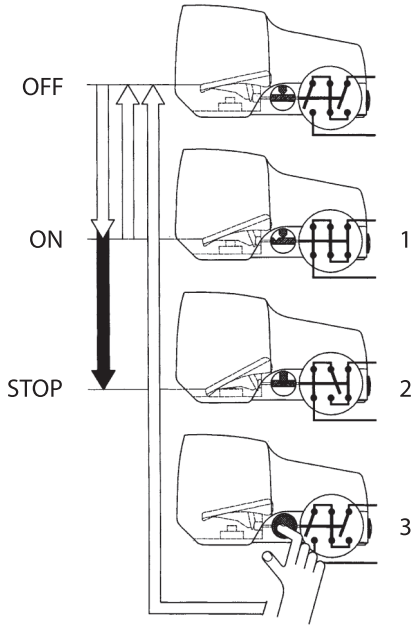
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Foot Switches with Safety Lock Plus Manual Release



- **Pedal pressed up to pressure point:**
  The make contact is closed and the work process is started.
- **Pedal pressed beyond resistance of the pressure point in an emergency situation:**
  The make contact is interrupted and locked, the work process is interrupted. In this phase the lock remains in the Off position even when the pedal is not pressed. This reliably prevents uncontrolled restart of the machine or moving parts.
- **Release:**
  Only after the hazardous situation has been remedied does manual release (pushbutton on the side of the enclosure) release the contacts again and the work process can be restarted by pressing the pedal as far as the pressure point.



Safety function on foot switches with mechanical lock (SiPf)

Single pedal foot switch F1

Article number	Designation	Switching contacts	Pressure point	Special feature
616.1000.560	F1-SU1ZUV1ZDR UN	2NC / 2NO	200 N	Pressure point D, Latching, Prot. shroud UN
616.1000.203	F1-SU1Z/UV1ZD UN	1NC / 2NO	200 N	Pressure point D, Latching, Prot. shroud UN
616.1000.626	F1-SU1ZCA2ZDR UN	3NC / 1NO	200 N	Pressure point D, Latching, Prot. shroud UN
616.1000.443	F1-UV1Z/UV1ZD	2NC / 2NO	200 N	Pressure point D, Latching
616.1000.532	F1-UV1Z/UV1ZD UN	2NC / 2NO	200 N	Pressure point D, Latching, Protective unlatch button, Prot. shroud UN

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Double Pedal without Cover

STANDARD

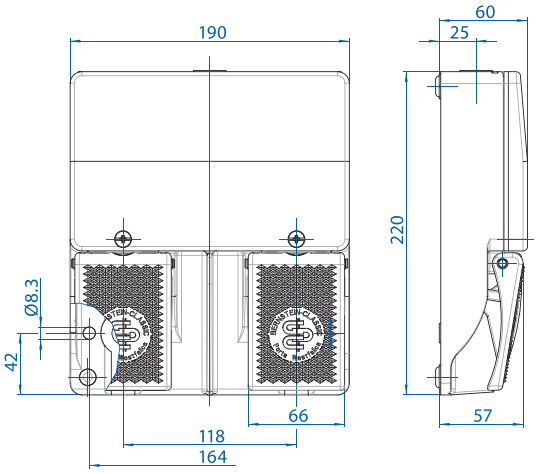


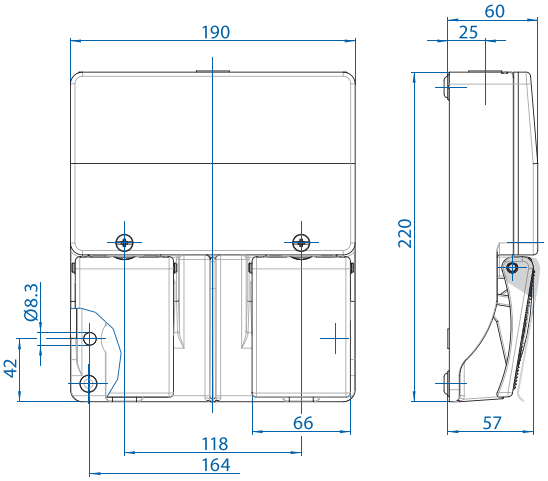
Standard OFF-ON Operation-
Push pedal to change contact state. Release pedal to return to original state.

STANDARD with
Protective Hinged Cover



Standard OFF-ON Operation-
Lift protective hinged cover up to activate pedal. Push pedal down to change contact state. Release pedal to return to original state. With IP67 Protection Rating (Temporary Submersion).





Two pedal foot switch F2

Article number	Designation	Switching contacts	
Snap-action contact:			
		Pedal 1 (left)	Pedal 2 (right)
606.2330.021	F2-SU1Z/SU1Z	1NC / 1NO	1NC / 1NO
606.2440.065	F2-SU2Z/SU2Z	2NC / 2NO	2NC / 2NO
Slow-action contact:			
		Pedal 1 (left)	Pedal 2 (right)
606.2110.013	F2-U1Z/U1Z	1NC / 1NO	1NC / 1NO
606.2220.015	F2-U2Z/U2Z	2NC / 2NO	2NC / 2NO

Two pedal foot switch F2

Article number	Designation	Switching contacts	
		Pedal 1 (left)	Pedal 2 (right)
606.2440.573	F2-SU2ZPS/SU2ZPS	2NC / 2NO	2NC / 2NO

Drawing dimensions in mm

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Double Pedal with Cover

STANDARD

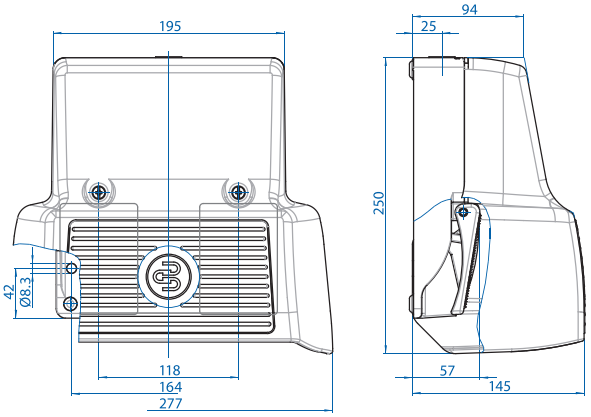


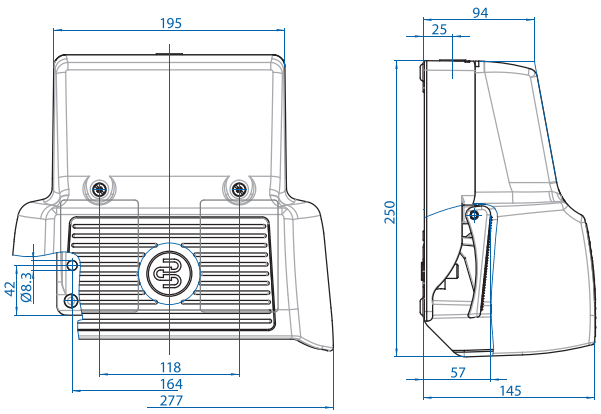
Standard OFF-ON Operation-
Push pedal to change contact state. Release pedal to return to original state.

TWO STAGE OPERATION



Two Stage Operation-
Press Pedal to change the state of the first set of contacts. Continue to press further to change the second set of contacts.





Two pedal foot switch F2

Article number	Designation	Switching contacts		Special feature
Snap-action contact:				
		Pedal 1 (left)	Pedal 2 (right)	
606.2830.022	F2-SU1Z/SU1Z UN	1NC / 1NO	1NC / 1NO	Prot. shroud UN
606.2940.066	F2-SU2Z/SU2Z UN	2NC / 2NO	2NC / 2NO	Prot. shroud UN
Slow-action contact:				
		Pedal 1 (left)	Pedal 2 (right)	
606.2610.014	F2-U1Z/U1Z UN	1NC / 1NO	1NC / 1NO	Prot. shroud UN
606.2720.016	F2-U2Z/U2Z UN	2NC / 2NO	2NC / 2NO	Prot. shroud UN

Two pedal foot switch F2

Article number	Designation	Switching contacts		Two Stage Operation
Snap-action contact:				
		Pedal 1 (left)	Pedal 2 (right)	
616.2000.418	F2-SU1Z/SU2ZD UN	1NC / 1NO	2NC / 2NO	(Pedal 2)
606.2830.417	F2-SU1ZD/SU1ZD UN	1NC / 1NO	1NC / 1NO	(Pedal1+Pedal 2)
616.2000.503	F2-SU4ZD/SU4ZD UN	4NC / 4NO	4NC / 4NO	(Pedal 1+Pedal 2)
Slow-action contact:				
616.2610.253	F2-U1ZD/U1Z UN	1NC / 1NO	1NC / 1NO	(Pedal 1)
606.2620.086	F2-U1Z/U2ZD UN	1NC / 1NO	2NC / 2NO	(Pedal 2)
606.2720.020	F2-U2ZD/U2ZD UN	2NC / 2NO	2NC / 2NO	(Pedal 1+Pedal 2)
606.2710.376	F2-U2ZD/U1Z UN	2NC / 2NO	1NC / 1NO	(Pedal 1)

Drawing dimensions in mm

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LATCHING

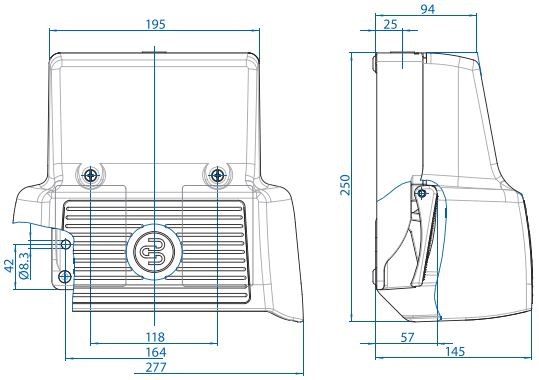


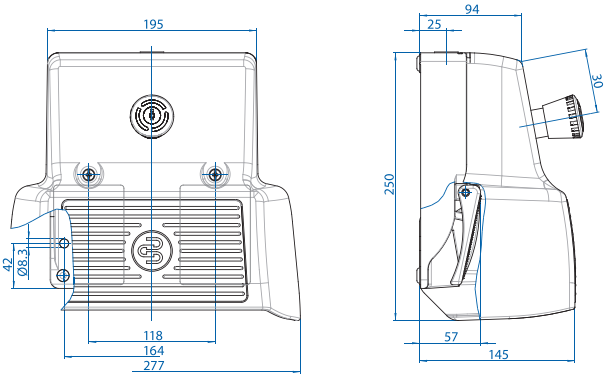
Latching Operation -
Push pedal to change contact state. When you release the pedal , the contacts remain in that state. Push again to return to original state.

WITH E-STOP BUTTON



Standard OFF-ON Operation -
Push pedal to change contact state. Release pedal to return to original state. With 2NC contact Emergency Stop





Two pedal foot switch F2

Article number	Designation	Switching contacts		Latching
		Pedal 1 (left)	Pedal 2 (right)	
616.2840.655	F2-SU1Y/SU2Z UN	1NC / 1NO	2NC / 2NO	(Pedal 1)
606.2610.018	F2-U1Y/U1Y UN	1NC / 1NO	1NC / 1NO	(Pedal 1+Pedal 2)
606.2610.047	F2-U1Y/U1Z UN	1NC / 1NO	1NC / 1NO	(Pedal 1)

Two pedal foot switch F2

Article number	Designation	Switching contacts	
		Pedal 1 (left)	Pedal 2 (right)
616.2720.700	F2-U2Z/U2Z NA2 UN	2NC / 2NO	2NC / 2NO

Drawing dimensions in mm

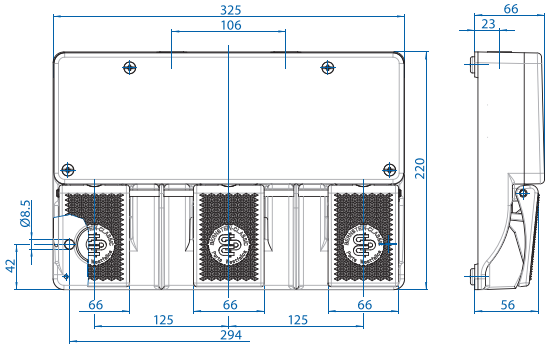
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Triple Pedal

STANDARD WITHOUT COVER



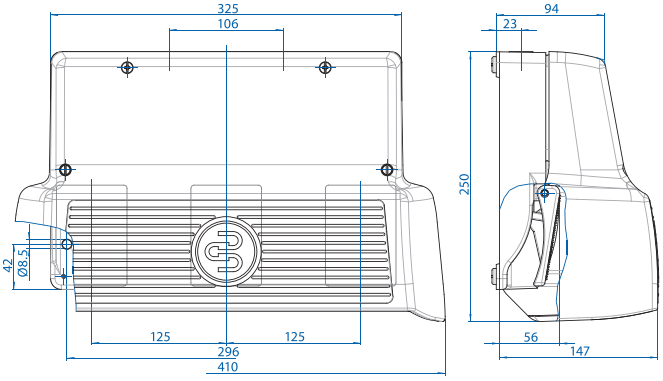
Standard OFF-ON Operation-
Push pedal to change contact state. Release pedal to return to original state.



STANDARD WITH COVER



Standard OFF-ON Operation-
Push pedal to change contact state. Release pedal to return to original state.



Three pedal foot switch F3

Article number	Designation	Switching contacts		
Snap-action contact:				
		Pedal 1 (left)	Pedal 2 (middle)	Pedal 3 (right)
616.3444.577	F3-SU2Z/SU2Z/SU2Z	2NC / 2NO	2NC / 2NO	2NC / 2NO
Slow-action contact:				
		Pedal 1 (left)	Pedal 2 (middle)	Pedal 3 (right)
606.3111.025	F3-U1Z/U1Z/U1Z	1NC / 1NO	1NC / 1NO	1NC / 1NO

Three pedal foot switch F3

Article number	Designation	Switching contacts		
Snap-action contact:				
		Pedal 1 (left)	Pedal 2 (middle)	Pedal 3 (right)
606.3833.045	F3-SU1Z/SU1Z/SU1Z UN	1NC / 1NO	1NC / 1NO	1NC / 1NO
Slow-action contact:				
		Pedal 1 (left)	Pedal 2 (middle)	Pedal 3 (right)
606.3611.026	F3-U1Z/U1Z/U1Z UN	1NC / 1NO	1NC / 1NO	1NC / 1NO

Drawing dimensions in mm

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Foot switches for potentially explosive atmospheres

BERNSTEIN offers you a wide range of single and double pedal foot switches designed to meet the exacting requirements of zone 1 and 2 potentially explosive atmospheres (other approvals on demand). The foot switches have factory fitted connection cables which are available in different lengths.





Ordering Instructions for foot switches in potentially explosive atmospheres:

Foot switches for potentially explosive atmospheres have "EX" in the article designation and can be delivered in one and two pedal versions.

Single pedal foot switch F1

Article number	Designation	Switching contacts	Special feature
609.6198.014	F1-SU1Z EX 5M	1NC / 1NO	5 m Connection cable
609.6198.015	F1-SU1Z EX 9M	1NC / 1NO	9 m Connection cable
609.6197.017	F1-SU1Z EX UN -2M-	1NC / 1NO	2 m Connection cable, Prot. shroud UN
609.6197.019	F1-SU1Z EX UN -5M-	1NC / 1NO	5 m Connection cable, Prot. shroud UN
609.6197.020	F1-SU1Z EX UN -9M-	1NC / 1NO	9 m Connection cable, Prot. shroud UN

Two pedal foot switch F2

Article number	Designation	Switching contacts		Special feature
		Pedal 1(left)	Pedal 2(right)	
609.6198.022	F2-SU1Z/SU1Z EX -2M-	1NC / 1NO	1NC / 1NO	2 m Connection cable
609.6198.024	F2-SU1Z/SU1Z EX -5M-	1NC / 1NO	1NC / 1NO	5 m Connection cable
609.6197.029	F2-SU1Z/SU1Z EX UN -5M-	1NC / 1NO	1NC / 1NO	5 m Connect. cable, Prot. shroud UN
609.6197.030	F2-SU1Z/SU1Z EX UN -9M-	1NC / 1NO	1NC / 1NO	9 m Connect. cable, Prot. shroud UN

Mobility Handles



The mobility handle option is a complementary accessory for the one (F1) and two (F2) pedal versions. Modification to the foot switch is not required and has retro fitting possibility.

Mobility handling for foot switches:	
Article number	**Designation**
399.6000.229	F1-TV
399.6000.230	F2-TV

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Medical Foot Switches

FBT Series



- Modular pedal or joy-pad attachments
- Bar as footrest or for changing position
- Adjustable foot heights ensure the ideal ergonomic position
- High mechanical durability
- 2-level switching possible
- Analogue or digital output signals

MF Series

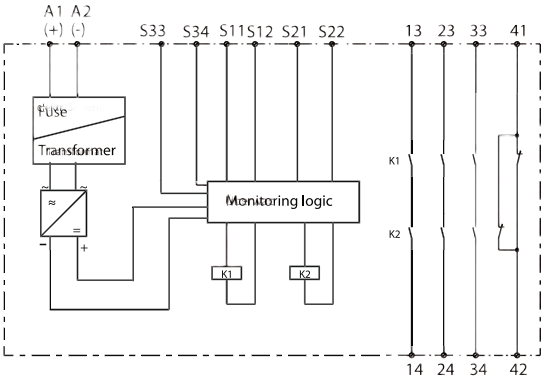


- Ergonomically optimized, elegant design
- Easy to clean
- Radial cable entry for effective cable protection
- Analogue or digital output signals
- Protected, internal cover seal
- Customized modular design

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SCR Series

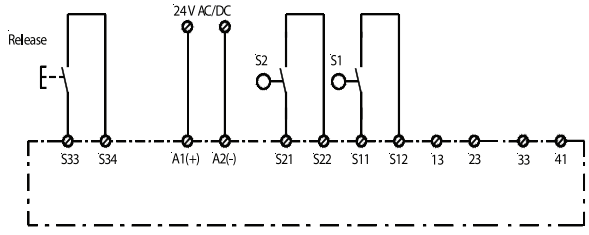




Whether it's safety switches or safety relays, BERNSTEIN has the complete range of products for your application. Our SCR safety relays are used to evaluate safety circuits, such as those generated by BERNSTEIN position switches, safety switches, safety latching devices, safety cable pull switches, safety sensors or two hand control modules.

With their compact standard mounting rail enclosure, BERNSTEIN SCR relays can be used in a wide variety of applications up to performance level PLe as defined by EN 13849. Conforming to this standard, the SCR relays monitor the correct position and reliable operation of safety sensors and or contacts in safety switches. This evaluation function is used to actuate power elements such as power contactors or frequency converters and stop machines in the case of emergency.

Two positive opening normally-closed contacts are required as the signaling contacts for safety monitoring circuits. Virtually all BERNSTEIN switches feature these contacts. They can be identified by the ⊕ symbol.



Schematic representation of safety relay system

The product range includes switching relays for evaluating:

- Safety gate monitors with and without monitored start pushbutton
- Expansion module as auxiliary switching circuit for safety relays
- Two-hand controllers
- Auxiliary controller for safety light curtains/barriers

SCR - Safety Relays

Product selection

Article number	Designation	Enable current paths (NO contact)	Signaling contact (NC contact)	Signaling contact (NC contact)	Monitored start	Start automatic/ pushbutton (manual)	Remarks
607.5111.009	SCR4-W22-3.5-D	e	3	1	No	Auto / pushbutton	-
607.5111.010	SCR4-W22-3.5-SD	e	3	1	Yes	Pushbutton	-
607.5111.012	SCR4-W22-4.6-DXT	e	4	0	-	-	Expansion module only used together with another SCR
607.5111.015	SCR2-W22-2.5	d	2	0	No	Auto / pushbutton	-
607.5111.016	SCR2-W22-2.5-S	d	2	0	No	Pushbutton	-
607.5111.018	SCR4-W22-2.6-D2H	e	2	1	-	-	SCT for two-hand controller
607.5111.020	SCR ON4-W22-3.6-S	e	3	0	Programmable	Pushbutton	Pushbutton SCR for safety light barrier

Technical data

Electrical data		
Supply voltage	U_e	24 V AC/DC (6075111020 24V DC)
Voltage range		0,90 ... 1,1 U_e
Frequency		50 ... 60 Hz
Power intake		24 V DC: 3 W, 24 V AC: 5 V A
Performance data		
Conductor cross section		2 x 1.5 mm^2 / 4 x 1.5 mm^2
Contact data		
Switching voltage		230 V AC, 24 V DC
Switching current		5 A
Max. switching power		1250 V A (ohmic load)
Mechanical service life		107 switching cycles
Environmental data		
Ambient temperature		-25 °C to +50 °C
Protection class, enclosure		IP40 DIN VDE 0470 Part 1
Protection class, terminals		IP20 DIN VDE 0470 Part 1
Mechanical data		
Enclosure material		Polyamide PA 6.6
Approvals		
TÜV		
UL		
C-UL		



IMPORTANT: The actuator for the SLK must be ordered separately. You will find a corresponding overview at the end.

ASi Safety Bus Interface Products

The resounding success of the AS interface (actuator-sensor interface) that operates in accordance with the master-slave principle is attributed to its complete ease of use, its ability to be specifically adapted to the simplest elements in machine and system construction as well as the host of unparalleled application advantages it offers. The AS interface has major advantages when control system must be design to conform to the Machinery Directive 2006/42/EC; effective 12/29/2009. Performance level PLe and SIL 3 are achieved effortlessly. It is not always possible to set up safety systems with safety switches connected in series while conforming to EN 13849-1. Such configurations present no problems for the AS interface which provides effective solutions up to the highest performance level.



The unshielded two-wire line that carries both data and power renders redundant parallel wiring between sensors and controller unnecessary, thus offering a considerably expanded range of functionality while reducing costs. With piercing technology corresponding field devices, i.e. up to 62 standard/31 safety devices or a mixed configuration, can be connected using the plug & play principle in any position on the yellow, two-core cable. The AS interface master, acting as an independent gateway to higher bus systems (e.g. Profibus), monitors the bus and cyclically polls the bus users.

As an open-ended standard, AS interface guarantees maximum compatibility while providing significant benefits in terms of overall cost considerations. These benefits are reflected in the substantial time and cost savings achieved for initial installation, retrofitting, converting and maintaining systems as well as significantly reducing hardware outlay.

The safety monitor makes the AS interface into a safety bus. It monitors communication between the slaves and the master. The safety monitor shuts down the up to 16 enable circuits as soon as it detects that a safety slave has switched or identifies a fault. A safety-oriented system can be built up by installing a safety monitor and corresponding slaves in an existing AS interface system.

The safety-oriented application is created using the ASIMON program and loaded into the monitor. Programming is carried out by means of simple drag and drop.

AS interface – from under one roof

All plastic-enclosed safety switches are available in the Safety at Work configuration and other products from the switch range are constantly being equipped with this functionality. With the SHS3, BERNSTEIN offers the first safety hinge switch with AS interface capabilities on the market. Integrated AS interfaces ensure BERNSTEIN components are designed with the smallest possible dimensions. For instance, the mini limit switch Ti2 is the only switch in its class on the market with AS interface capabilities. The safety switch with interlock (SLK) is also available equipped with an AS interface. In addition to switches, gateway masters and terminal boxes, the BERNSTEIN product range also includes power supply units, safety monitors, hand-held programming units as well as an extensive assortment of accessories. The entire comprehensive spectrum makes it possible to offer complete systems solutions.

Master with gateways to following bus systems are available:

- Profibus
- Profinet
- Ethernet
- Powerlink
- EtherCat
- CanOpen
- DeviceNet
- Modbus
- Allen-Bradley ControlLogix

Quick-Connect Technology



Direct connection of AS interface formed cable to BERNSTEIN AS interface switch.

The combination of the AS interface cable with ribbon cable terminals and M12 connecting lines guarantees enormous time-saving potentials in installation and connection.

This principle is supported by the direct connection technology of BERNSTEIN AS interface switches. These BERNSTEIN AS interface switches are connected directly to the AS interface cable by means of integrated ribbon cable terminals.

The use of the AS interface cable together with piercing technology ensures the ribbon cable terminal can be easily reposition-ed while retaining the cable's protection class.

Installation advantages

- Reduced installation time
- Easy installation thanks to piercing technology (in ribbon cables protected against polarity reversal)
- Safety circuits can be retrofitted and converted by simply plugging in individual slaves
- Changes to safety system can be quickly implemented by way of software
- Reduced cable requirements, consequently:
  - Small trailing cables
  - Small cable platforms
  - Easy to clean
  - Low fire load
- No terminal boxes
- No need to prepare enclosures, terminals and screw connections

Planning advantages

- Straightforward planning – intricate wiring documents are replaced by clearly arranged bus structure diagrams
  - Safety functions quickly created by drag and drop in ASIMON
  - Printout of safety configuration from programming tool

System advantages

- Uncomplicated interconnection of safety system in machines used in production lines
- Straight forward implementation of safety system cascading
- Faults in the safety system can be diagnosed with a laptop online
- Diagnostic facilities directly at the master and monitor for exact fault location
- System data/polling can be read out via higher-level bus system: Remote servicing
- Fewer I/Os at controller
- Takes up less space in control cabinet

Economic advantages

- Reduced costs through:
  - Faster installation
  - Fewer circuit diagrams need to be created
  - Faster assignment
  - Fast troubleshooting
  - Extensive diagnostic facilities

User advantages through reduced:

- Machine downtimes thanks to extensive diagnosis and fast troubleshooting
- Commissioning costs
- Maintenance and servicing expenditure

Further advantages

- Direct connection – no need for M12 connection cable and connection adapters
- Great degrees of freedom in terms of network typology
- Tough even in harsh working environments
- Modularity and perfect integration in higher-level bus systems – an AS interface master can be integrated as a normal slave in a higher-level bus system

Technical data (for all saves, except coupling box)

Electrical data					
Voltage range	U	26.6 ... 31.6 V; via AS interface with polarity reversal protection			
Power intake	I	< 30 mA			
AS interface specification		Profile S-0.B			
		IO-Code: IO-Code1:	0 x 0 0 x F	ID-Code: ID-Code2:	0 x B 0 x E
AS interface inputs		Contact 1:	Data bits D0/D1 = static 00 or dynamic code transfer		
		Contact 2:	Data bits D2/D3 = static 00 or dynamic code transfer		
Parameter bits		No function			
Mechanical data					
Display		LEDs for indicating status of ASI slave and bus			
Contact type		2 Öffner (Slow-action contact, Zb)			
Type of connection		Connector M12 male			
Plug assignment 1		1: AS-i +	2: free		
		3: AS-i –	4: free		
Installation position		Any			
Protection class		IP65 conforming to EN 60529; DIN VDE 0470 T1			
Performance Level					
PL	Conforming to 13849-1	Up to e			
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 EN 50295, EN ISO 13849-1					

Please refer to the corresponding standard product for further technical data.

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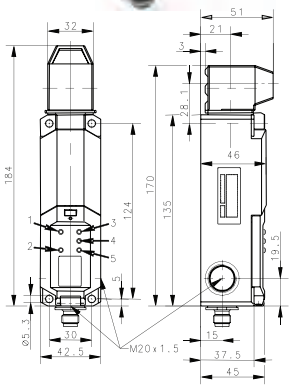
Intelligent Locking, Hinged and Rope Pull Switches



ASI SLK

With the ASI SLK BERNSTEIN offers a switch with interlock function and integrated Safety at Work interface.
You can choose the functional principle, i.e. spring and magnet latching device.
LED integrated in the switches indicate the bus status.
The inserted actuator and the status of the latching device are also indicated by LEDs.
The LEDs can also be optionally controlled via the PLC.

M12-connection	Direct connection
607.3200.058 ASI-SLK-F-R1 (Spring Latching / Normally Locked)	– -
607.3200.057 ASI-SLK-M-R0 (Magnetic Latching / Normally Unlocked)	– -

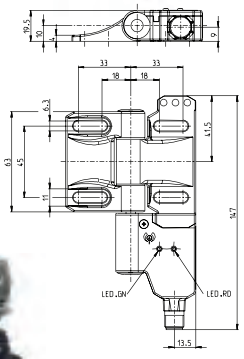


ASI SHS

With the SHS3 BERNSTEIN offers the only safety hinge switch with AS interface Safety at Work.
As on the standard hinge, after adjustment, the user can correct the switching point with the integrated fine adjustment system.
When converting a system you can redefine the switching point with the aid of a change kit.



M12-connection	Direct connection
607.3200.011 ASI SHS3 SA R	– -
607.3200.013 ASI SHS3 SR R	– -

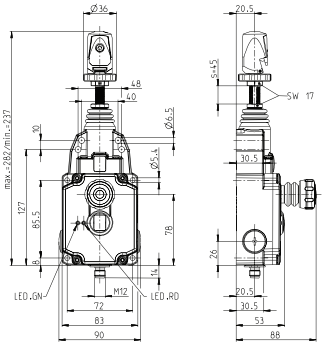


ASI SRM

Cable span lengths of up to 37.5 meters are possible with the SRM...175 (see information under Safety Cable Pull Switches).
As in the standard range, the Q variant features the quick-connect head that drastically reduces the cable installation time.



M12-connection	Direct connection
607.3200.007 ASI SR M-FF-175	– -
607.3200.008 ASI SR M-FF-300	– -
607.3200.009 ASI SR M-LU-175	



Drawing dimensions in mm

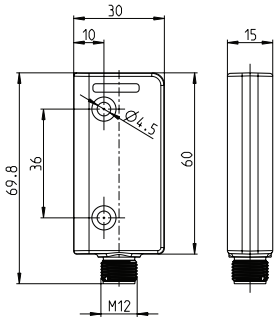
Altech Corp.® by BERNSTEIN

Intelligent Non-Contact and Keyed Safety Switches

CSMS

The BERNSTEIN CSMS is a non-contact safety sensor (transponder) with dynamically coded signal transmission for AS Interface – Safety at Work. With the unique allocation of the actuator to the safety switch, protection against tampering is already integrated in the CSMS, making it suitable for concealed installation in non-coded systems.





CSMS KIT	CSMS individual components
607.3200.062 ASI-CSMS-SET (kit contains: Read head and actuator)	**607.3200.060** ASI-CSMS-M-ST (Read head)
– -	**607.3200.061** ASI-CSMS-S (Actuator)

ASI SKT

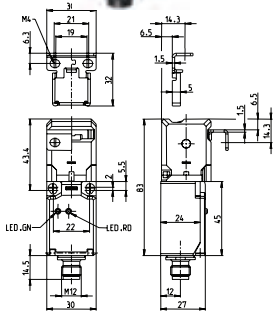
The ASI SKT with separate actuator for monitoring safety gates and guards is a Type 2 switch and is one of the smallest in its class.

The enclosure and cover are made from fiber glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.





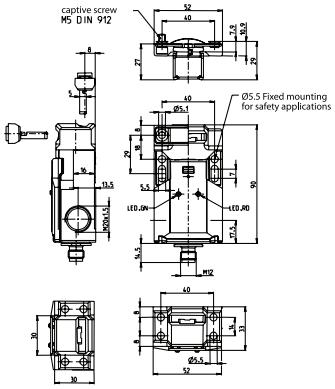
M12-connection	Direct connection
607.3200.006 ASI SKT	**607.3200.029** ASI SKT D
– -	– -

ASI SK

The ASI SK with separate actuator for monitoring safety gates and guards is a Type 2 switch.

The enclosure and cover are made from fiber glass-reinforced thermoplastic. LEDs that indicate the status of the ASI slave and bus are integrated in the cover. Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.





M12-connection	Direct connection
607.3205.028 ASI SK M	**607.3205.039** ASI SK M D
6073205050 ASI SK F30 M	– -

Drawing dimensions in mm

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Intelligent Keyed Safety and Limit Switches



ASI ENK

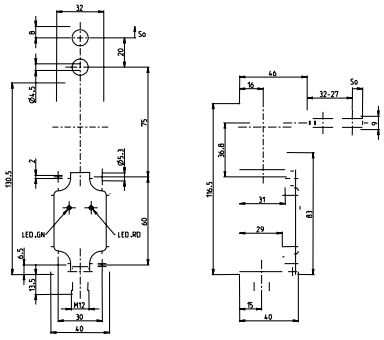
The ASI ENKK VTU with separate actuator is a very tough standard switch often used for monitoring safety gates and guards.

The enclosure and cover are made from fiber glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

M12-connection	Direct connection
607.3504.025 ASI ENK VTU	**607.3504.038** ASI ENK VTU D
– -	– -



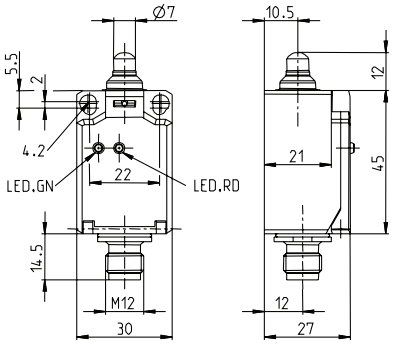


ASI Ti2

The Ti2 family with its extremely compact dimensions is the only ASI switch family in this class.

The captive snap-on cover contributes to the protection rating of IP65 in accordance with EN 60529, DIN VED 0470 T1.

M12-connection	Direct connection
607.3401.018 ASI Ti2 w	**607.3401.033** ASI TI2 W D
607.3402.019 ASI Ti2 Riw	**607.3402.034** ASI TI2 RIW D
607.3403.020 ASI Ti2 Hw	**607.3403.035** ASI TI2 HW D





ASI I88

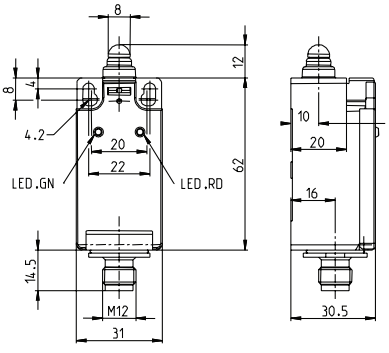
The ASI I88 conforming to EN 50047 is a standard switch used in a wide range of applications.

The enclosure and cover are made from fiber glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

M12-connection	Direct connection
607.3301.015 ASI I88 w	**607.3301.030** ASI I88 W D
607.3302.016 ASI I88 RiwK	**607.3302.031** ASI I88 RIWK D
607.3303.017 ASI I88 Hw	**607.3303.032** ASI I88 HW D



Drawing dimensions in mm

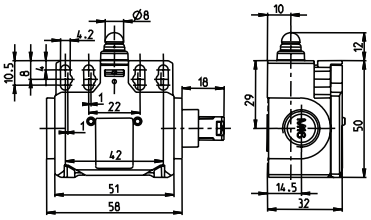
Intelligent Limit Switches and Connection Box

ASI BI2

The AS interface version of the ASI Bi2 switch is designed as a very compact unit with a low overall height and side connection.



M12-connection	Direct connection
607.3201.052 ASI BI2 w	**607.3201.051** ASI BI2 w D
– -	– -

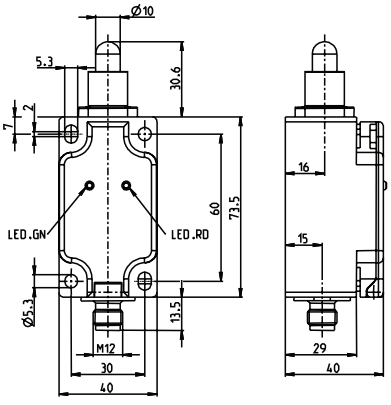


ASI ENK

The ASI ENK conforming to EN 50041 is an extremely sturdy standard switch used in a wide range of applications.
The enclosure and cover are made from fiber glass-reinforced thermoplastic.
LEDs that indicate the status of the ASI slave and bus are integrated in the cover.
Protection class IP65 in accordance with EN 60529, DIN VDE 0470 T1 is guaranteed.



M12-connection	Direct connection
607.3501.023 ASI ENK iw	**607.3501.036** ASI ENK IW D
607.3502.024 ASI ENK Riw	**607.3502.037** ASI ENK RIW D



ASI ANS

The standard connection box has an ASI address and integrates up to four non-safety sensors in the ASI system.
The connection box is equipped with LEDs that indicate the status of the connected user.

Connection box 6073201	
607.3100.027 ASI CONNECTION BOX 4 IN	– -
– -	– -



Drawing dimensions in mm

ASi Masters and Power Supply

ASI MST

The ASI Master is the "head" of the AS interface system.

It organizes communication on the bus and makes available all data to the higher-level system via the gateway.

The master shown here is equipped with a Profibus gateway.

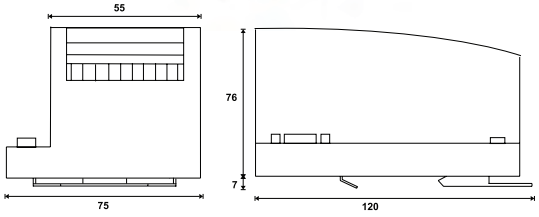
Gateways are available for following bus systems:

Profinet, Ethernet, Powerlink, EtherCat, CanOpen, Devicenet, Modbus, Allen-Bradley ControlLogix



Master

607.3100.001
ASI MST PROFIBUS



ASI SMO

The second generation safety monitor is an emergency stop switching device that features two integrated and a further 14 external enable circuits.

The second generation ASI safety monitor features a stainless steel enclosure and an LC display for showing slave addresses and error messages.

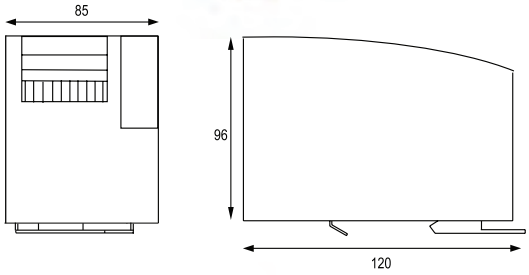
The safety monitor can be used in applications up to performance level e and SIL 3.

The safety application is created with the ASIMON program.



Safety monitor

607.3100.004
ASI SMON B+W



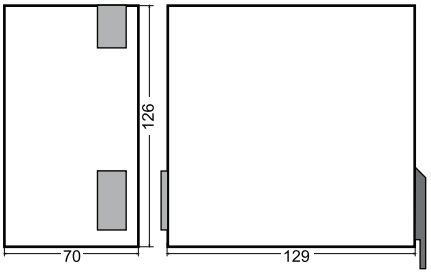
ASI NT

The primary clocked power supply unit for AS interface supplies a 4 amp current. Besides supplying power, the power supply unit is also responsible for data decoupling with respect to the feed source and balancing the two AXI output lines with respect to machine earth.



Power supply unit

607.3100.003
ASI NT 4A B+W



ASi Hand Held Addressing Device and Software

ASI HND

The ASI hand-held addressing device is a compact unit used for addressing ASI slaves (sensors, actuators and interface modules).

Electromechanical connection is made by the universal connection adapter.

ASI slaves can be addressed in accordance with ASI specifications 2.0, 2.1 and 3.0 with the ASI hand-held addressing device.

Hand-held addressing device

607.3100.005
ASI HND PRG



ASI PRO

The safety application of the safety monitor is created with the ASIMON software.

This program makes available a debug view for fast troubleshooting.

In addition, documentation of the safety application can be printed out.

It comes with a cable for connecting the safety monitor to a laptop.

Software

607.3800.021
ASI PROG SW + KBL

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ASi Cable and Connectors

607.3900.040
ASI CABLE EPDM YELLOW



607.3900.041
ASI CABLE EPDM BLACK



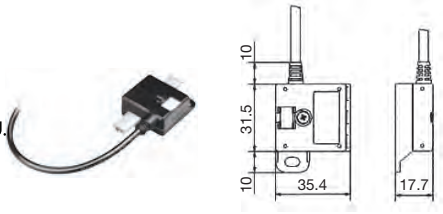
607.3900.042
ASI COUPLING MODULE
M12 SCREW



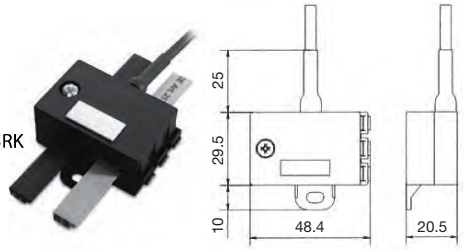
607.3900.043
ASI COUPLER
M. 0.3 RK U. M12 G



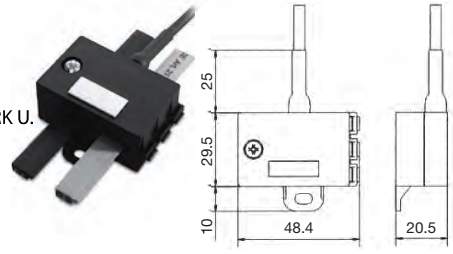
607.3900.044
ASI COUPLER M. 0.3 RK U.
M12 W



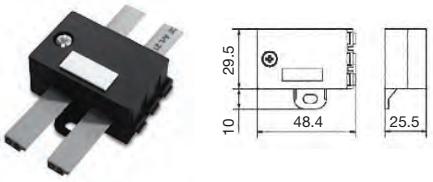
607.3900.045
ASI COUPLER 2F M.0.5RK
U.M12 G



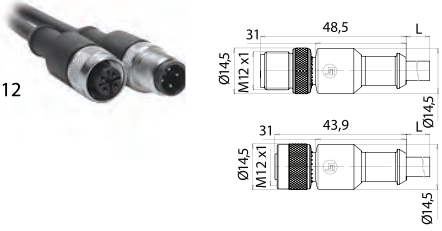
607.3900.046
ASI COUPLER 2F M.0.5RK U.
M12 W



607.3900.047
ASI CABLE LINK



607.3900.048
ASI CONNECTING LEAD M12
1M G/G



607.3900.049
ASI CONNECTING LEAD M12
1M G/W



Drawing dimensions in mm

Altech Corp.® by BERNSTEIN

Ex	II2G	Ex	ia	IIC	T6	TÜV	2008	ATEX	1234	-
Type approval to RAL 94/9/EC	Application	Explosion protection	Protection class	Device group	Temperature class	Inspection authority	Year	As per Directive 94/9/EC	Consecutive number	Additional conditions

Types of protection for gas-explosion hazardous areas

Symbol		Type of protection	Standard
	Ex „d"	Flameproof encapsulation Switching devices, motors, transformers etc. IEC60079-1	IEC60079-1
	Ex „p"	Pressurized encapsulation Control cabinets px = Use in Zone 1, 2 py = Use in Zone 1, 2 pz = Use in Zone 2	IEC60079-2
	Ex „q"	Powder-filled encapsulation Transformers, capacitors	IEC60079-5
	Ex „o"	Oil immersion encapsulation Transformers, load resistors	IEC60079-6
	Ex „e"	Increased safety Terminal boxes, control cabinets, enclosures for installing devices of other protection class	IEC60079-7
	Ex „i"	Intrinsically safe Terminal boxes, control cabinets, sensors, measurement and control equipment ia = Use in Zone 0, 1, 2 ib = Use in Zone 1, 2	IEC60079-11
		Intrinsically safe systems	IEC60079-25
	Ex „n"	Non sparking Systems that, due to their design, cannot spark	IEC60079-15
	Ex „m"	Encapsulation Command and signaling devices, sensors, display/indicator devices ma = Use in Zone 0,1,2 mb = Use in Zone 1,2	IEC60079-18
	Ex „op"	Optical radiation op is = Intrinsically safe optical radiation op pr = Protected optical radiation op sh = Shutdown optical radiation	IEC60079-28

IP Protection Classes

IP 1st digit	Contact	Foreign bodies	IP 2nd digit	Water
0	No protection	No protection	0	No protection
1	Large body parts	Solid object > 50 mm	1	Water dripping vertically
2	Finger	Solid object > 12.5 mm	2	Water dripping at angle up to 15°
3	Tool > 2.5 mm	Solid object > 2.5 mm	3	Water sprayed at an angle up to 60°
4	Tool > 1 mm	Solid object > 1 mm	4	Spayed water 360°
5	Complete protection	Dust accumulation	5	Hose water 360°
6	Complete protection	Dust infiltration	6	Strong hose water 360°
			7	Temporary submersion
			8	Submersion

Max. permissible surface temperature	Temperature classes for gases
450°	T1
300°	T2
200°	T3
135°	T4
100°	T5
85°	T6

Explosion groups for gases

Group	Typical gas	Ignition energy
I	Methane	280 µJ
IIA	Propane	> 180 µJ
IIB	Ethylene	60...180 µJ
IIC	Hydrogen	< 60 µJ

Device group I Mining

I M1	Safety provided by 2 safety measures, 2 faults
I M2	Shutdown on occurrence of explosive atmosphere

Device group II All potentially explosive atmospheres except mining

II 1	Zone 0	Zone 20	1 Zone 0 zone 20 Safety provided by 2 safety measures, 2 faults
II 2	Zone 1	Zone 21	2 Zone 1 Zone 21 Safety in the event of frequent equipment malfunctions, 1 fault
II 3	Zone 2	Zone 22	3 Zone 2 Zone 22 Safety in trouble-free operation

Zone categories, device group II

Hazard	Gas as per IEC	Dust as per IEC
Permanent or frequent	Zone 0	Zone 20
Occasional	Zone 1	Zone 21
Rare, temporary no longer than 30 min per year	Zone 2	Zone 22

Additional conditions

-	No restriction
X	Special conditions
U	Component certification Parts certification

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ATEX-Approved Product Range

- Ex e, Ex ia and Ex e\ia terminal boxes made from polyester and aluminum
- Ex d limit switches, cable pull switches and foot switches
- Ex mb/Ex tD magnetic switches







Terminal boxes and empty enclosures

Only materials that correspond to the temperature range T6 required for Ex enclosures are used in these enclosures and components.

The minimum type of protection rating of all enclosures and screw connections is IP64, other protection classes available on request.

The latching devices on the enclosures are optionally available as captive screw connections or quick-release fasteners.

Various CA versions are available with flange plates.

All built-in components must conform to the relevant approvals.

Momentary contact, cable pull and foot switches

An Ex d-certified switching element lies at the heart of these Ex-approved switches.

It is available in the several types of switch enclosures. The mechanical actuator and its installation are certified separately.

The approval of additional actuators and switch enclosures from other series is possible on request.

All switches and momentary contact switches feature one NO contact and one NC contact.

Magnetic switches

The magnetic switches are fitted at the factory with an up to 7 meter long connection cable.

The cable is permanently connected to the switch which is part of the approval.

All sensors are certified for a maximum ambient temperature of 80 °C.

ATEX - General Information

EX versions of the many of the standard BERNSTEIN switches with ATEX approval are also available for applications involving potentially gas and dust explosive atmospheres.

Approvals for gas "ii G" in accordance with DIN EN 60079-XX

Approvals for dust "ii D" in accordance with DIN EN 61241-XX

Make use of our Ex protection expertise for your applications.







What is ATEX?

ATEX = Atmosphère explosive.
The European Directive 94/4/EC governs the production and the circulation of devices and components for explosive atmospheres in the European Union. The IEC Standards harmonized throughout the EU stipulate that ATEX products approved by a certification authority can be used anywhere throughout the EU.

In most aspects the certification authorities of non-European countries such as North America, Russia etc. closely follow ATEX-relevant standards so that various approvals can be acquired worldwide based on an ATEX approval. Corresponding national approvals are available on request.

Where are devices with ATEX approval used?

The fields of application for Ex-protected switches include mixing and processing machines in bakeries (flour dust explosion), processing machines in the food industry where spices are mixed (spice dust explosion), sewer manholes, pump stations and sewage treatment plant (explosive gases "fermentation/digester gas"), waste disposal and recycling industry (various sources of dust and gas explosion), automotive industry and wherever paints and lacquers are used (painting booth) in addition to the classic explosion-hazard branches of industry such as the chemical, petrochemical, pharmaceutical industries as well as the coal, gas and oil-producing and processing industries. Mobile equipment and systems such as vacuum cleaners, stacker lift trucks, fans etc. that are used in the above fields of application must exhibit a corresponding ATEX approval. ATEX products are therefore a part of our everyday lives..

Who is responsible for what in Ex applications?

The device or component manufacturer must obtain a type approval certificate (ATEX approval) for these devices and components. The machine manufacturer can acquire his system approval based on these approvals and the declaration of conformity.

The manufacturer of a machine or system that is used in Ex applications must obtain a corresponding system approval for the machines it markets. The entire system must be taken into consideration both from a mechanical as well as from an electrical aspect.

In accordance with the ATEX Operator Directive 1999/92/EC (ATEX137), the operator of technical facilities shall be responsible for avoiding or restricting the formation of explosive atmospheres (primary explosion protection), avoiding effective ignition sources (secondary or design explosion protection) and restricting the effect of an explosion to a safe level (tertiary explosion protection).An explosion protection document describing the implemented measures and hazard assessments is to be compiled.

In addition to foot switches and cable pull switches, our current ATEX-certified product range also includes various standard limit switches, limit switches and miniature limit switches.

Customer-specific individual approvals or approvals for switches and components from the BERNSTEIN range not yet certified are available on request.

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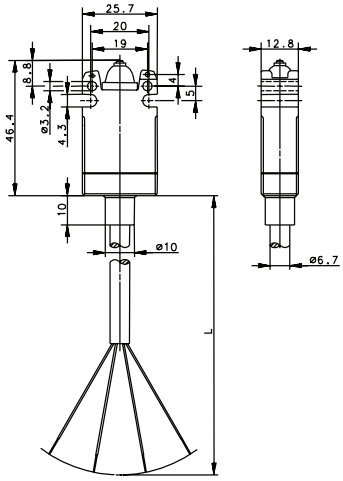
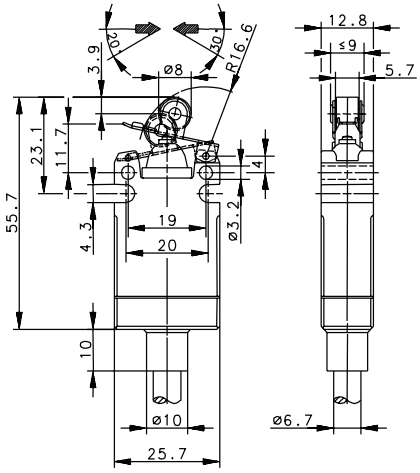
ATEX - Technical Information

Technical data	EEX	GC	ENM2	F
Electrical data				
Rated insulation voltage U_i max.	250 V	250 V	250 V	250 V
Rated operating voltage U_e max.	230 V AC	230 V AC	230 V AC	230 V AC
Conventional thermal current I_{the}	5 A	5 A	5 A	5 A
Utilization category: switching capacity	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Mechanical data				
Mechanical Switching frequency	max. 120/min.	max. 50/min.	max. 50/min.	max. 50/min.
Mechanical service life	2 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles
Contact type	1 NC /1 NO contact (Zb)	1 NC /1 NO contact (Zb)	1 NC /1 NO contact (Zb)	2 NC /2 NO contact (Zb)
B10d	4 mill.	4 mill.	4 mill.	4 mill.
Short-circuit protection	Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)
Protection class	II, Insulated	II, Insulated	II, Insulated	II, Insulated
Approval for Zone	II 2G (GAS)	II 2G (GAS)	II 2G (GAS)	II 2G (GAS)
Admissible ambient temperature	-20°C to +65°C	-20°C to +65°C	-20°C to +65°C	-20°C to +65°C
Protection class of built-in snap-action switch	IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529
Type of connection	Control line (with ferrules)	Control line (with ferrules)	Control line (with ferrules)	Control line (with ferrules)
Conductor cross sections	4 x 0,75 mm^2	4 x 0,75 mm^2	4 x 0,75 mm^2	4 x 0,75 mm^2
Enclosure	PEI	Aluminum pressure die-casting	Aluminum pressure die-casting	Aluminum pressure die-casting
Cable entry	Cast	1 x cable screw connection M20 x 1,5	1 x cable screw connection M20 x 1,5	1 x cable screw connection M20 x 1,5

Technical data	SN2	SI2 U2Z AW	SI2 U2Z AK	
Electrical data				
Rated insulation voltage U_i max.	400 V AC	400 V AC	400 V AC	
Rated operating voltage U_e max.	240 V	240 V	240 V	
Conventional thermal current I_{the}	10 A	10 A	10 A	
Utilization category: Switching capacity	AC 15, U_e /I_e 240 V / 3 A	AC 15, U_e /I_e 240 V / 3 A	AC 15, U_e /I_e 240 V / 3 A	
Mechanical data				
Mechanical Switching frequency	≤ 60/min.	≤ 10/min.	≤ 10/min.	
Mechanical service life	10 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles	
Actuation	Achshebel (Zn-Al), Rolle (Termoplast)	Roller lever (St)	Lever (St)	
Ambient temperature	-20°C to +80°C	-20°C to +60°C	-20°C to +60°C	
Contact type	1 NC /1 NO contact	2 NC /2 NO contact (Zb)	2 NC /2 NO contact (Zb)	
B10d	20 mill.	4 mill.	4 mill.	
Short-circuit protection	Fuse 2 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	
Protection class	I	I	I	
Approval for Zone	II 2D IP65 T85°C (STAUB)	II 3D IP65 T80°C (STAUB)	II 3D IP65 T80°C (STAUB)	
Surface temperature T	85°C	80°C	80°C	
Protection class of built-in snap-action switch	IP65 conforming to IEC/EN 60529	IP65 conforming to IEC/EN 60529	IP65 conforming to IEC/EN 60529	
Type of connection	Contact screws	Screw connections	Screw connections	
Conductor cross sections	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2	
Enclosure	AL-Aluminium pressure die-casting	Cast iron	Cast iron	
Cable entry	3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5	
Standards				
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 EN 60079-0, DIN EN 60079-0 EN 60079-1, DIN EN 60079-1 Directive 94/9 EG (ATEX 95)				

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EEX Series Limit Switches

	EEX W	EEX RH
		
6.5′ (2 meter) connection cable	**609.0153.002** EEX-SU1Z W -2M-	**609.0148.022** EEX-SU1Z RH -2M-
16.4′ (5 meter) connection cable	– -	**609.0148.024** EEX-SU1Z RH -5M-
29.5′ (9 meter) connection cable	**609.0153.005** EEX-SU1Z W -9M-	**609.0148.025** EEX-SU1Z RH -9M-
EX Certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

Technical Information

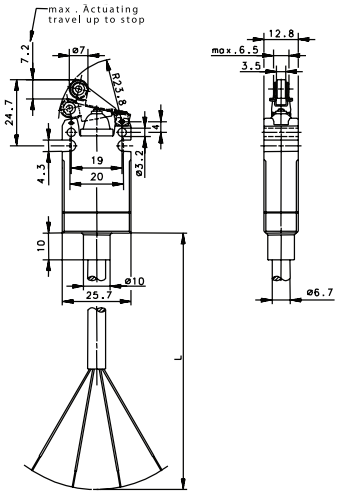
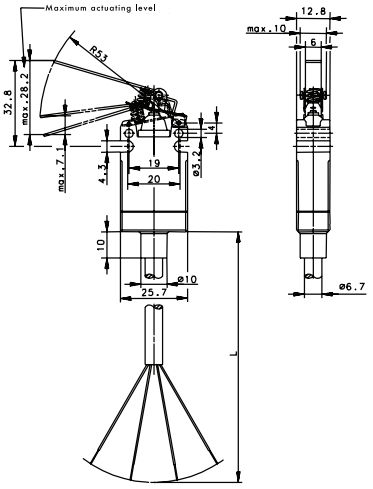
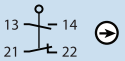
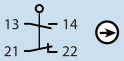
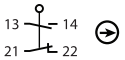
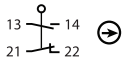
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2×10^6	2×10^6
Switching Frequency	≤ 120/min	≤ 120/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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EEX Series Limit Switches

	EEX RHL	EEX UH
		
6.5′ (2 meter) connection cable	**609.0149.027** EEX-SU1Z RHL -2M- 	**609.0146.012** EEX-SU1 UH -2M- 
16.4′ (5 meter) connection cable	**609.0149.029** EEX-SU1Z RHL -5M- 	**609.0146.014** EEX-SU1 UH -5M- 
29.5′ (9 meter) connection cable	–	–
EX Certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

Technical Information

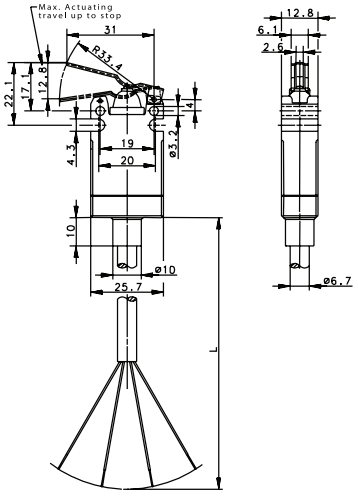
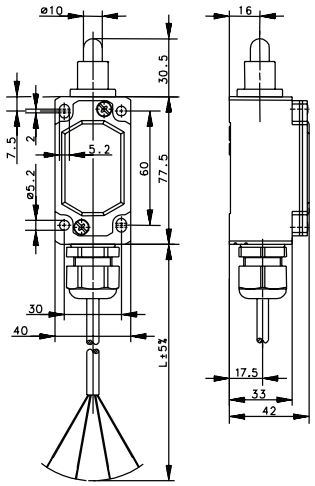
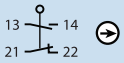
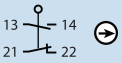
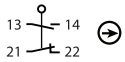
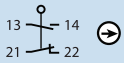
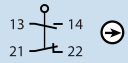
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2 x 10^6	2 x 10^6
Switching Frequency	≤ 120/min	≤ 120/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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EEX and ENM2 Series Limit Switches

	EEX FH	ENM2 IW
		
6.5′ (2 meter) connection cable	**609.0145.007** EEX-SU1Z FH -2M- 	**609.7152.052** ENM2-SU1Z EX IW -2M- 
16.4′ (5 meter) connection cable	-	**609.7152.054** ENM2-SU1Z EX IW -5M- 
29.5′ (9 meter) connection cable	**609.0145.010** EEX-SU1Z FH -9M- 	**609.7152.055** ENM2-SU1Z EX IW -9M- 
EX Certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

Technical Information

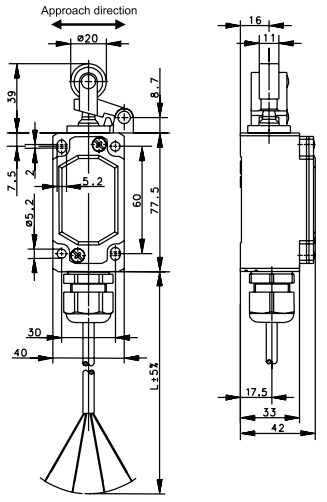
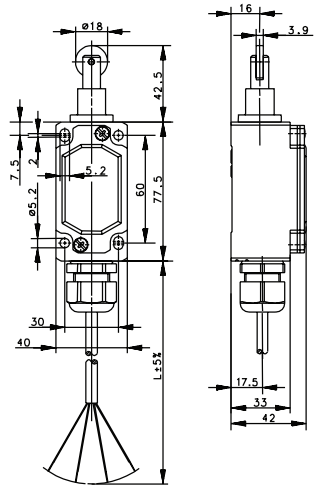
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2×10^6	2×10^6
Switching Frequency	≤ 120/min	≤ 50/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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ENM2 Series Limit Switches

	ENM2 HW	ENM2 RIW
		
6.5′ (2 meter) connection cable	**609.7171.072** ENM2-SU1Z EX HW -2M-	**609.7167.062** ENM2-SU1Z EX RIW -2M-
16.4′ (5 meter) connection cable	**609.7171.074** ENM2-SU1Z EX HW -5M-	**609.7167.064** ENM2-SU1Z EX RIW -5M-
29.5′ (9 meter) connection cable	**609.7171.075** ENM2-SU1Z EX HW -9M-	**609.7167.065** ENM2-SU1Z EX RIW -9M-
EX Certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

Technical Information

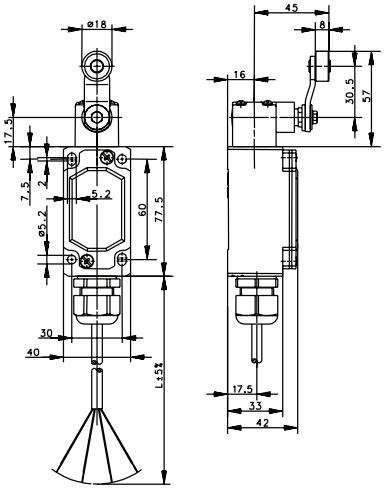
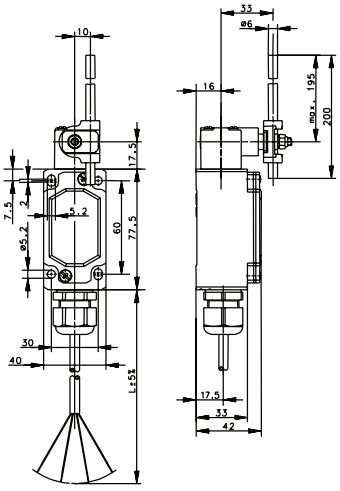
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2 x 10^6	2 x 10^6
Switching Frequency	≤ 50/min	≤ 50/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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ENM2 Series Limit Switches

	ENM2 AHT	ENM2 AD
		
6.5′ (2 meter) connection cable	**609.7185.082** ENM2-SU1Z EX AHT -2M- 13 14 21 22	**609.7187.092** ENM2-SU1 EX AD -2M- 13 14 21 22
16.4′ (5 meter) connection cable	**609.7185.084** ENM2-SU1Z EX AHT -5M- 13 14 21 22	**609.7187.094** ENM2-SU1 EX AD -5M- 13 14 21 22
29.5′ (9 meter) connection cable	**609.7185.085** ENM2-SU1Z EX AHT -9M- 13 14 21 22	**609.7187.095** ENM2-SU1 EX AD -9M- 13 14 21 22
EX Certification	Ex II 2 G EEx d IIC T6	Ex II 2 G EEx d IIC T6

Technical Information

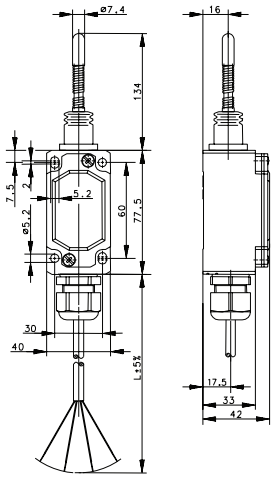
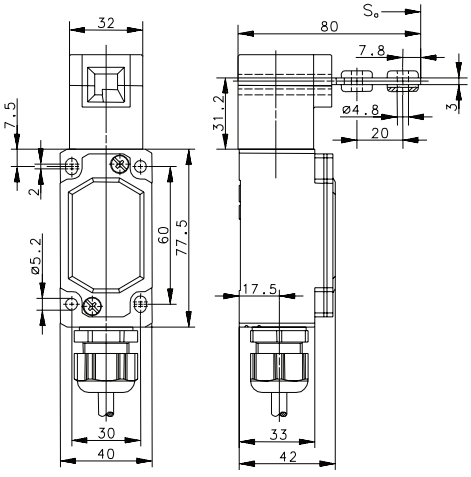
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2 x 10^6	2 x 10^6
Switching Frequency	≤ 50/min	≤ 50/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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ENM2 Series Limit Switches and Keyed Safety Switches

	ENM2 FF	ENM2 VTW
		
6.5' (2 meter) connection cable	**609.7190.097** ENM2-SU1 EX FF -2M- 	–
16.4' (5 meter) connection cable	**609.7190.099** ENM2-SU1 EX FF -5M- 	**619.7100.010** ENM2-SU1Z EX VTW -5M- 
29.5' (9 meter) connection cable	**609.7190.100** ENM2-SU1 EX FF -9M- 	–
EX Certification	Ⓔx II 2 G EEx d IIC T6	Ⓔx II 2 G EEx d IIC T6

Technical Information

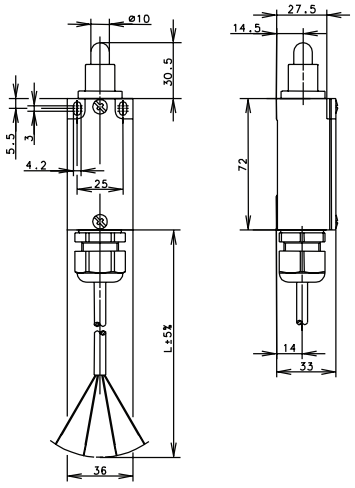
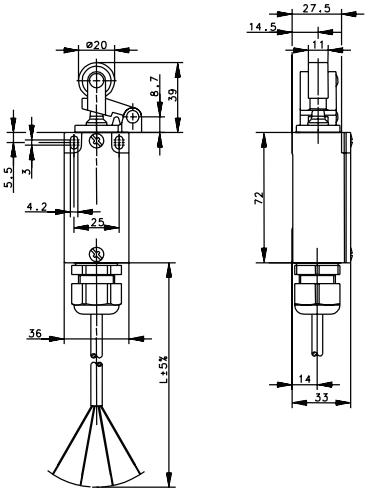
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2 x 10^6	2 x 10^6
Switching Frequency	≤ 50/min	≤ 50/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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GC Series Limit Switches

	GC IW	GC HW
		
6.5′ (2 meter) connection cable	**609.2152.002** GC-SU1Z EX IW -2M-	- -
16.4′ (5 meter) connection cable	**609.2152.004** GC-SU1Z EX IW -5M-	**609.2171.024** GC-SU1Z EX HW -5M-
29.5′ (9 meter) connection cable	**609.2152.005** GC-SU1Z EX IW -9M-	**609.2171.025** GC-SU1Z EX HW -9M-
EX Certification	Ex II 2 G EEx d IIC T6	Ex II 2 G EEx d IIC T6

Technical Information

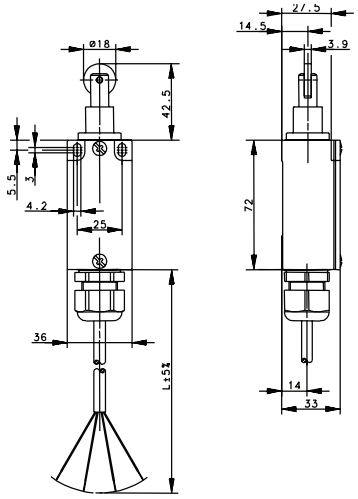
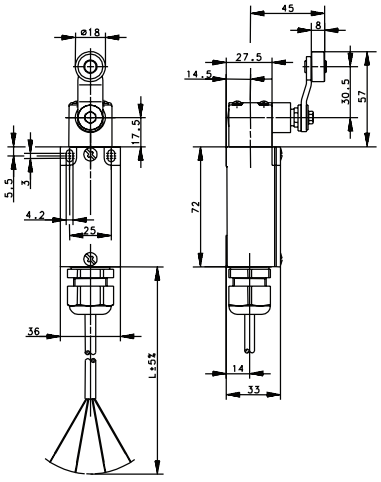
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2 x 10^6	2 x 10^6
Switching Frequency	≤ 50/min	≤ 50/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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GC Series Limit Switches

	GC RIW	GC AHT
		
6.5' (2 meter) connection cable	**609.2167.012** GC-SU1Z EX RIW -2M-	**609.2185.032** GC-SU1Z EX AHT -2M-
16.4' (5 meter) connection cable	-	**609.2185.034** GC-SU1Z EX AHT -5M-
29.5' (9 meter) connection cable	**609.2167.015** GC-SU1Z EX RIW -9M-	**609.2185.035** GC-SU1Z EX AHT -9M-
EX Certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

Technical Information

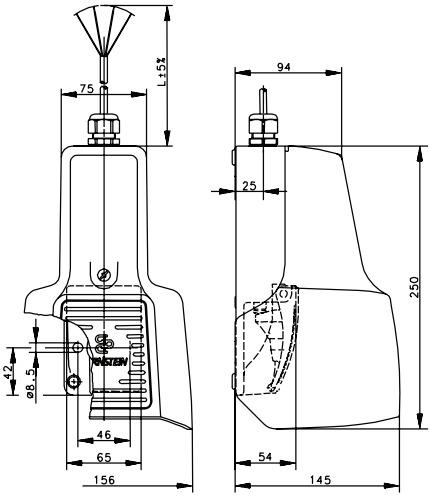
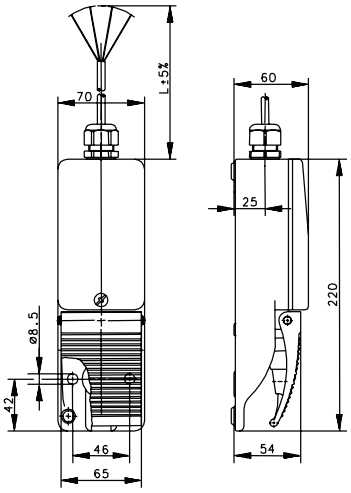
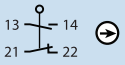
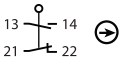
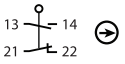
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2 x 10^6	2 x 10^6
Switching Frequency	≤ 50/min	≤ 50/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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F Series - Single Pedal Foot Switches

	F1 UN	GC HW
		
6.5′ (2 meter) connection cable	**609.6197.017** F1-SU1Z EX UN -2M- 	–
16.4′ (5 meter) connection cable	**609.6197.019** F1-SU1Z EX UN -5M- 	**609.6198.014** F1-SU1Z EX -5M- 
29.5′ (9 meter) connection cable	–	–
EX Certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

Technical Information

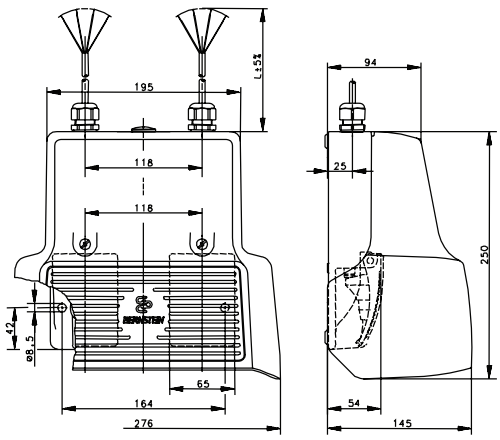
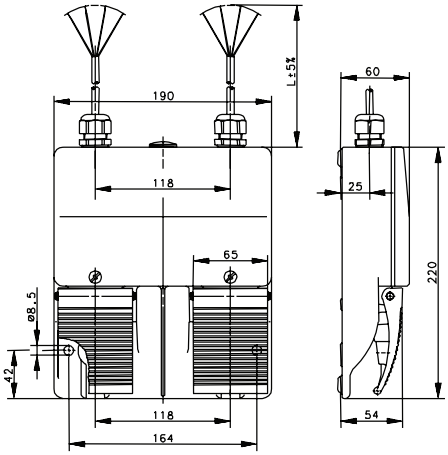
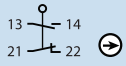
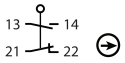
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2 x 10^6	2 x 10^6
Switching Frequency	≤ 50/min	≤ 50/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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F2 Series Double Pedal Foot Switches

	F2 UN	F2
		
6.5' (2 meter) connection cable	–	**609.6198.022** F2-SU1Z/SU1Z EX -2M- 
16.4' (5 meter) connection cable	**609.6197.029** F2-SU1Z/SU1Z EX UN -5M- 	–
29.5' (9 meter) connection cable	–	–
EX Certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

Technical Information

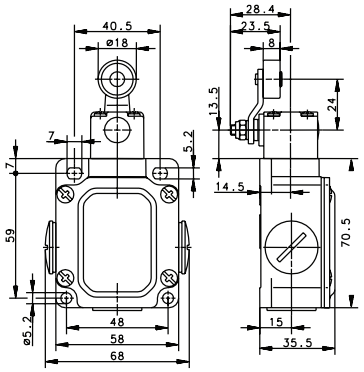
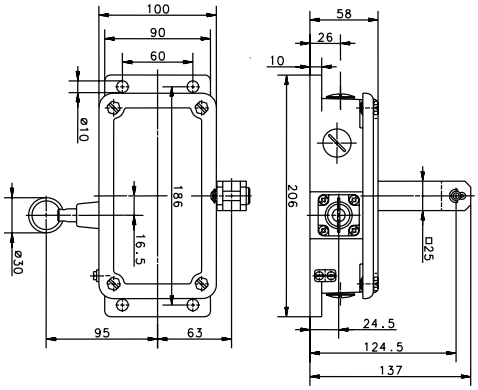
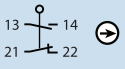
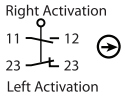
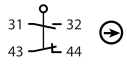
Maximum Switching Voltage	230V	230V
Maximum Switching Amperage	5A	5A
B10d	4 Million	4 Million
Mechanical Service Life	2×10^6	2×10^6
Switching Frequency	≤ 50/min	≤ 50/min
Operating Temperature	–20 °C to +65 °C	–20 °C to +65 °C
Protection Rating	IP66 / IP67	IP66 / IP67
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	250VAC	250VAC

Drawing dimensions in mm

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SN2 Series Limit Switch and Double Sided Cable Pull Switch

	SN2 Limit Switch without Cab;e	Series SI2 Double Sided Rope Pull
		
1 NC /1 NO contact	**619.3285.001** SN2-SU1Z AH EXD 180 Gr. 	–
	–	**609.1288.024** SI2-U2Z AK EXD Right Activation  Left Activation 
2 NC /2 NO contacts	–	–
EX Certification	II 2 D IP65 T 85 °C	II 3 D Ex tD A22 IP65 T 80°C

Technical Information

Maximum Switching Voltage	240V	240V
Maximum Switching Amperage	10A	10A
B10d	20 Million	4 Million
Mechanical Service Life	10 x 10^6	2 x 10^6
Switching Frequency	≤ 60/min	≤ 10/min
Operating Temperature	–20 °C to +80 °C	–20 °C to +80 °C
Protection Rating	IP65	IP65
Utilization Category	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Rate Insulation Voltage	400VAC	400VAC

Drawing dimensions in mm

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Technical Information



Part Number

Bernstein's actual part number is a 10 digit numeric code. As an example - 6086103008. This is the part number that we prefer to work with because it is unique to every switch version. To make the number easier to work with we add periods to break up the digits. As an example - 608.6103.008.

Description

Bernstein also assigns a description to every part. The description gives more information about the actual part. Letter and number codes are used to indicate the switch body, contact configuration, actuator type and any special features.

The description, however, is not unique. Bernstein may offer several different switch versions with the same description.

Here is a typical example of the description break down for a standard limit switch:

I88	A2Z[1]	AH	M12
Switch group	Switching system[2]	Actuator	Special features
• C2 • Ti2 • IF • I88 • Bi2 • ENK • GC • SN2 • ENM2 • D	• U1 • SU1 • A2 • SA2 • E2 • SE2		• M12 connection • Actuator turned 90°, 180°, 270° • Special switching forces • Special temperature ranges • Other special features on request

[1] The letter Z suffix to the designation of the switching function denotes the mechanical positive opening action of the normally-closed contacts. In technical data sheets, the positive opening point is identified by the international symbol ⊕.

[2] Please refer to the proceeding pages in the catalogue to establish which switching system can be used in the switch groups.

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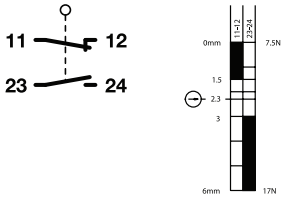
Switching function example

NC = Normally-closed contact
NO = Normally-open contact

PLEASE NOTE - Due to size limitations, the 3 contact versions are only available in larger switch body styles.

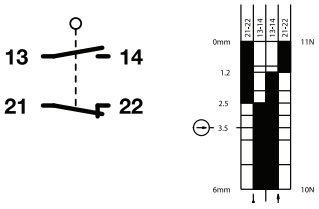
U1Z

Slow-action contact, 1 NC, 1 NO



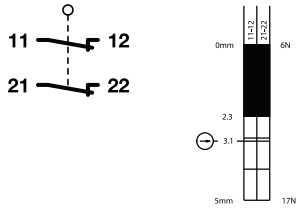
SU1Z

Snap-action contact, 1 NC, 1 NO



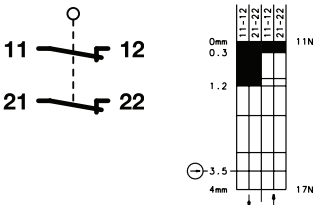
A2Z

Slow-action contact, 2 NC



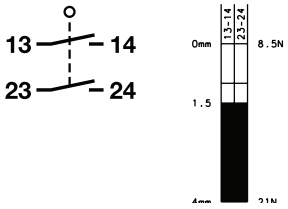
SA2Z

Snap-action contact, 2 NC



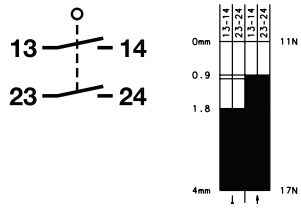
E2

Slow-action contact, 2 NO



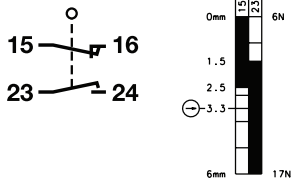
SE2

Slow-action contact, 2 NO



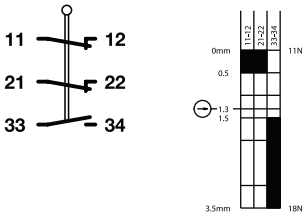
UV1Z

Slow-action contact,
with overlapping contacts,
1 NC, 1 NO



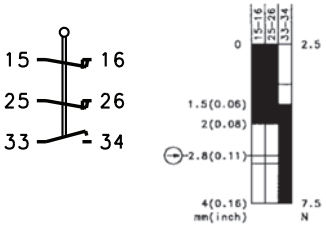
U15Z

Slow-action contact, 2 NC, 1 NO



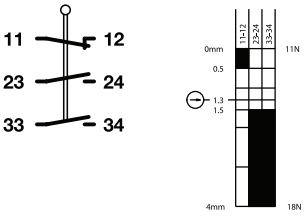
UV15Z

Slow-action contact,
with overlapping contacts,
2 NC, 1 NO



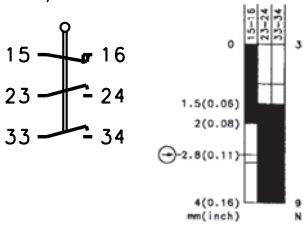
U16Z

Slow-action contact, 1 NC, 2 NO



UV16Z

Slow-action contact,
with overlapping contacts,
1 NC, 2 NO



The actuating forces and travel distances are subject to tolerances.
In Type 1 and Type 2 position switches, the tolerances are independent of the switching system and switching function.

Function	Tolerance
Switching travel	± 0.25 mm
Switching angle	± 3.5°
Switching force in N	± 10%
Actuating torque in	± 10%

Table 1

Switching systems

The switching element is the heart of all electromechanical switching devices and must be properly matched to the application. Essentially there are two basic types of switching systems that are different terms of their mechanical design and their range of application:

- Slow-action contacts
- Snap-action contacts

Slow-action contacts

- When activated, the normally-closed and normally-open contact functions correspond to the movement of the impact pin
- The approach speed controls the contact opening (closing) time
- Large distance/actuating travel between normally-closed and normally-open contact function
- The switching points are identical in forward and reverse travel

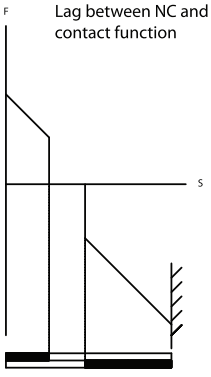


Fig. 1 shows the contact force during the switching cycle of a slow-action contact.

Overlap

- The switching principle of slap-action contacts makes overlapping of the NC/NO contact function possible. The term overlap refers to the area, in which both the normally-closed contact as well as the normally-open contact are closed in connection with a changeover switch with delay.

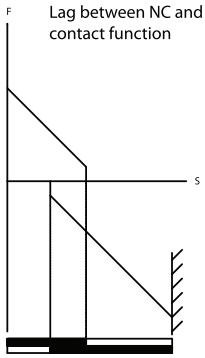


Fig. 2 shows the contact force during the switching cycle of a slow-action contact with overlap.

Snap-action contact

- When activated, the normally-closed contact function is immediately followed by the normally-open contact function
- In this configuration there is no overlap of the NC/NO contacts. The switch provides a distinct OR-function.
- The changeover accuracy is not dependent on the approach speed
- Offers effective suppression of DC arcing
- Reliable contact activation for extremely slow approach speeds
- The snap mechanism triggers the full opening width of the contact on reaching the changeover point
- Due to the change of force in the mechanical system, a different switching point occurs in forward and reverse travel. The lag is referred to as hysteresis.

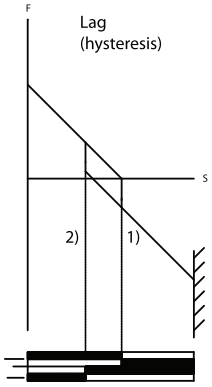


Fig. 3 shows the contact force during the switching cycle of a snap-action contact.

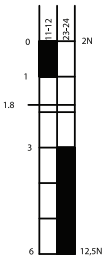
[1] Changeover point in forward travel
[2] Changeover point in reverse travel

Switching diagram

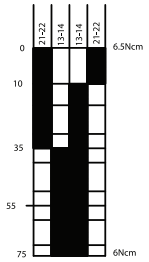
The switching diagram describes the function of the switching device in detail.

It combines the mechanical input variables that act on the contact system via the actuator with the electrical output variables. The user can determine the following information from the switching diagram:

- Mechanical input variables (force, travel, torque, angle)
- Electrical contact-making in forward and reverse travel
- Terminal designation
- Point at which positive opening is achieved
- Type of contact system



Slow-action contact



Snap-action contact

■ Contact closed
□ Contact open

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Contact designation

In accordance with DIN 50013 and DIN 50005 the terminal designations of the contact elements are always made up of two digits.

The contact rows are numbered consecutively with the first digit indicating the order of the actuation. Contacts of a switching element that belong together have the same allocating digit.

The second digit is the function digit that indicates the type of contact element.

1–2 Normally-closed contact
3–4 Normally-open contact
5–6 Normally-closed contact with delayed opening
7–8 Normally-open contact with delayed closing

Protection class

The protection class of an enclosed device indicates the degree of protection. The degree of protection includes the protection of persons against contact with parts under voltage and the protection of equipment against the infiltration of foreign bodies and water. BERNSTEIN standard enclosures mainly correspond to protection classes IP65 and IP67. Higher protection ratings are also available for individual customer solutions. In accordance with DIN EN 60521 (IEC 529), the numerals used in the protection rating denote the following:

1st digit Degree of protection against contact and infiltration of foreign bodies

2nd digit Degree of protection against infiltration of water

Example IP65:

6 =
- Complete protection against contact with components under voltage or with internal moving parts
- Protection against dust infiltration

5 =
- A water jet directed from all directions at the device must not have damaging effects
- Protection against water from a hose

Enclosures

Limit switches are supplied either in a molded enclosure or a metal enclosure. Which material is to be selected for a specific application depends on the ambient conditions, the location as well as several other factors.

Molded limit switches provide protective insulation and are resistant to many aggressive chemicals and liquids. The formation of condensation water in moist environments with extreme temperature fluctuations is significantly reduced with molded enclosures.

In insulation-enclosed switches the switching elements are integrated directly in the molded enclosure and are therefore not replaceable (complete switching devices).

Metal-enclosed limit switches are able to withstand high mechanical loads, they can also be used wherever hot metal chips and sparks occur and are resistant to many solvents and detergents. The switching elements in metal-enclosed switches are often integrated in the metal enclosure as modular built-in switches. The enclosure has a VDE-compliant connection for the PE conductor.

Safety switches

The range of applications for limit switches has changed over time. Limit switches were previously used primarily to detect product and end of travel positions, today they are increasingly assuming functions designed to protect persons and products in machine, equipment and plant construction.

The BERNSTEIN range of safety switches offers the right solution for the most diverse applications in many branches of industry. Particularly when it comes to safety, users appreciate the fact that they are able to source all required safety switches and receive professional advice from one place.

The main factors governing the selection of safety equipment include the ambient conditions, installation situation and risk analysis.



A switching device that can be used for safety functions is identified by the standardised symbol conforming to EN 65000-41 and EN 65000-42. The switches can, of course, also be used for pure position monitoring purposes.

Safety switches are divided into two categories, Type 1 and Type 2. The difference is in the actuating elements which are completely integrated in the enclosure in Type 1 and separated from the switching element in Type 2.



Type 1



Type 2

= Mechanical positive opening action

The term positive opening action refers to contact separation as the direct result of a defined movement of the switch actuator by means of non-spring parts. All parts involved in contact separation must be directly connected. The positive opening distance describes the minimum travel distance from the start of actuation of the operating element up to the point where positive opening action of the opening contacts is completed.

DIN EN 60947-5-1 defines two types of positive opening action contacts:

Type Za

- Positively opening contacts not galvanically isolated

Type Zb

- Positively opening contacts galvanically isolated

Galvanic isolation describes the isolation of electrically conducted parts by insulating material or by air gaps.

In switching devices with several contact elements, galvanically isolated contact elements make it possible to switch voltages with different potential (e.g. normally-closed contact in safety circuit, normally-open contact for indicator).

In accordance with the appropriate safety requirements, protective devices (guards) must be mounted on machines, devices and systems that perform hazardous movements. Safety switches in the form of electromechanical switching devices are used to create safe access to these guarded areas, since they offer the following advantages:

- High degree of safety
- Non-susceptibility to interference
- Safety status easily checked on site

Direct mechanical drives or coupling elements in the form of levers, rods, gearwheels etc. are necessary to ensure optimum operation of these safety components.

Switching devices that are used for safety functions must be identified with the symbol ⊖ internationally standardized in accordance with DIN EN 60947-5-1.
In defining the class of switching devices, this symbol denotes two important properties that must be met for personal protection applications:

- Mechanical positive opening action
- Disruptive breakdown voltage > 2.5 kV

Disruptive breakdown voltage

In accordance with DIN EN 60947-5-1, the open contacts must be able to maintain a minimum surge voltage of 2.5 kV without disruptive breakdown.

Limit Switch - Spindle-Mounted Lever

Switching devices with spindle-mounted lever enclosure

On delivery, contact-making takes place in both pivot directions corresponding to the switching diagrams.

Adaptation of basic actuator setting on spindle

The basic setting of the device can be varied in steps and fixed for exact positioning:

- AH, AHS, AHZ, AF, AD, AV:
  Adjustment in steps of 15° (Fig. 1)
- AHS-V:
  Adjustment in steps of 7.5° or 15° (only here p) by repositioning the intermediate piece (Fig. 2)
- Adaptation AV, AD:
  Adjustment in radial direction
- AH, AHS, AHS-V, AHZ, AV:
  The roller levers can be used in a different axial actuating plane by repositioning by 180° (Fig. 3 and 4)

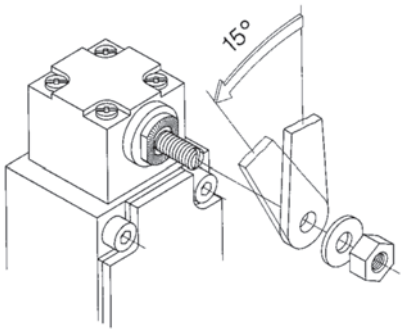


Fig.1

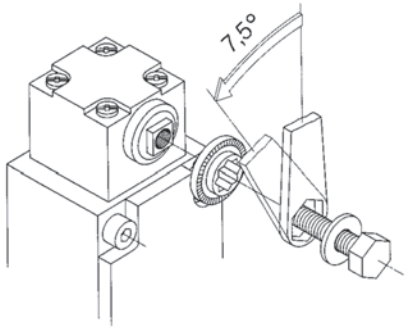
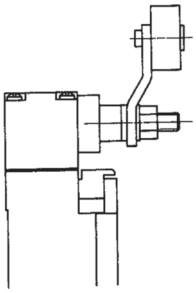
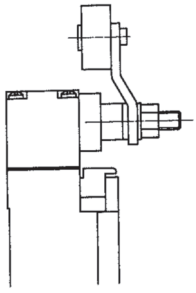


Fig. 2


Fig. 3

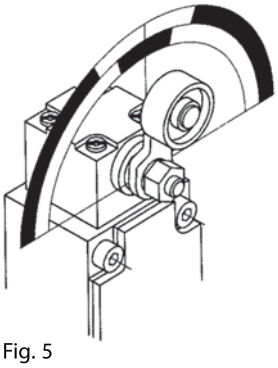

Fig. 4

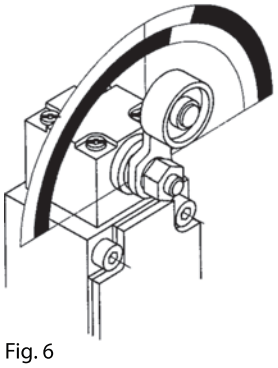
Adaptation of direction-independent switching function

With actuators AHS, AHS-V, AV, AD.

On delivery, contact-making takes place in both pivot directions corresponding to the switching diagrams. An idle function in the required pivot direction is achieved by simply repositioning the actuator cam (Fig. 5 and 6).

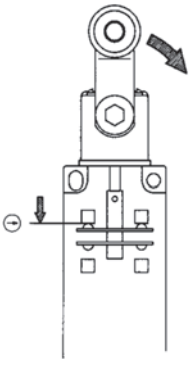
The idle function can be used in control systems that cannot process successive rebound pulses caused by oscillatory movement of extremely long AV/AD actuators.

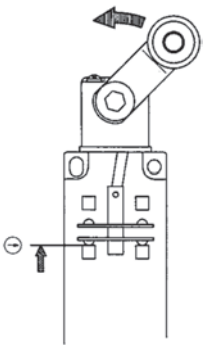

Fig. 5


Fig. 6

Positive opening action Forward and return AHZ

For special safety applications, the positive opening action of the normally-closed contacts takes place both in forward (moving in one direction) as well as in return (moving back to home position) direction. For personal protection applications movement of the roller must be restrained in a guide block in both directions (Fig. 7 and 8).


Fig. 7

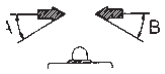
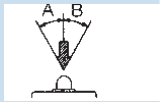
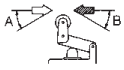
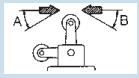
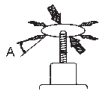
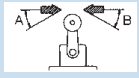
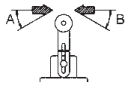
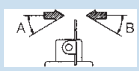
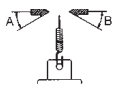

Fig. 8

Note on changing actuators AH, AHS, AHS-V, AHZ, AF, AD, AV, DGH, DGK

The guaranteed as-delivered properties change when the actuation directions are adjusted and when actuators are repositioned by 90°.

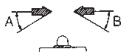
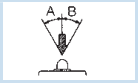
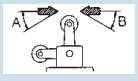
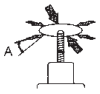
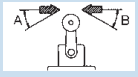
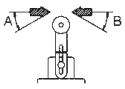
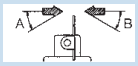
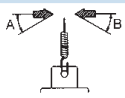
The user himself must ensure that the device achieves safe operation for its intended purpose.

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Actuator	Example	Designation	Gasket iw = internal w = external	Plastic series COMBI	TINY 2	I88	BIGGY 2	ENK	Metal series GC !	SN 2	ENM 2	D !
Plunger		–	iw	–	–	–	–	●	–	–	–	–
		–	w	–	●	●	●	–	–	–	–	–
		–	IP30	●	–	–	–	–	–	–	–	–
		–	IP43	–	–	–	–	–	–	–	–	▯
Ball		KU	iw	–	–	–	–	–	▯	▯	▯	–
Mushroom head		P	w	–	–	–	–	–	–	–	–	●
Telescopic plunger		L	iw	–	–	–	–	–	●	▯	▯	–
Adjustable plunger		ST	w	–	–	–	–	–	●	▯	▯	●
		ST	iw	–	–	–	–	–	●	▯	▯	–
		ST	IP30	●	–	–	–	–	–	–	–	–
Button		K	IP30	●	–	–	–	–	–	–	–	–
Roller		R	IP30	●	–	–	–	–	–	–	–	–
		R	iw	–	●	▯	●	●	●	●	●	–
			w	–	–	–	–	–	–	–	–	●
			IP43	–	–	–	–	–	–	–	–	▯
Roller, long		R ... L	iw	–	▯	●	▯	–	–	–	–	–
Roller, short		R ... K	iw	–	▯	●	▯	–	–	–	–	–
Lever		H	IP30	●	–	–	–	–	–	–	–	–
		H	w	–	●	●	●	●	–	–	–	–
		H, HT	iw	–	–	–	–	–	●	▯	▯	–
Lever, long		H/D-WI	w	–	–	–	–	–	●	●	▯	●
		HL	iw	–	–	–	–	–	●	▯	▯	–
		HL/D-H	w	–	–	–	–	–	●	▯	▯	●
		D – H	IP43	–	–	–	–	–	–	–	–	▯
Pivot joint, lever		DGH	w	–	▯	●	▯	▯	▯	●	●	–
Pivot joint, cranked lever		DGK	w	–	▯	●	▯	▯	▯	●	●	–
Cranked lever		KN	iw	–	–	–	–	–	●	▯	▯	–
		KN	w	–	▯	●	▯	–	●	▯	▯	▯
Cranked lever link		KG	iw	–	–	–	–	–	●	▯	▯	–
		KG	w	–	▯	●	▯	–	●	▯	▯	–
Double roller		DR	iw	–	–	–	–	–	●	▯	▯	–
Spring feeler		FF	iw	–	–	–	–	–	●	●	▯	–
		FF	w	–	●	▯	●	●	–	–	–	–
Spring feeler, long		FFL	w	–	–	–	–	–	●	▯	▯	–
Spindle-mounted lever		AH	iw	–	●	●	●	–	●	▯	▯	●
- With star clamping		AHS	iw	–	●	●	●	–	▯	●	▯	–
- With fine spindle		AHS-V	iw	–	–	–	–	●	▯	●	●	–
- For positive opening - in forward/return direction		AHZ	iw	–	–	–	–	–	▯	▯	●	–
- adjustable		AV	iw	–	●	●	●	●	●	▯	●	●
Spindle-mounted lever, wire		AD	iw	–	●	●	●	●	●	▯	●	▯
Spindle-mounted lever, spring		AF	iw	–	▯	●	▯	▯	●	●	▯	–

● Catalogue type (stock type or delivery time as per agreement) ▯ Technical possible from modular system (from system layout) – Not included in design

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Approach direction	Approach speed/approach angle							Remarks (Switching diagrams available upon request)
		m/s	0,1	0,5	1	2	5	
	Metal	A	20°	20°	10°	5°	–	• The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
		B	20°	20°	10°	5°	–	
	Plastic	A	20°	20°	10°	5°	–	
		B	20°	20°	10°	5°	–	
	Metal	A	30°	5°	–	–	–	• The values shown in the switching diagrams for switching travel/force refer **to plunger direction** • Plunger tip adjustable in ST version
		B	30°	5°	–	–	–	
	Plastic	A	30°	5°	–	–	–	
		B	30°	5°	–	–	–	
	Metal	A	30°	30°	20°	10°	5°	• The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
		B	30°	30°	20°	10°	5°	
	Plastic	A	30°	30°	20°	10°	5°	
		B	30°	30°	20°	10°	5°	
 H  HL	Metal	A	–	–	–	–	–	• The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
		B	20°	20°	10°	–	–	
	Plastic	A	–	–	–	–	–	
		B	40°	40°	30°	20°	10°	
	Metal	A	–	–	–	–	–	• The values shown in the switching diagrams for switching travel/force refer **to plunger direction** • Adjustable upper section of actuator with roller
		B	20°	20°	10°	–		
	Plastic	A	–	–	–	–	–	
		B	40°	40°	30°	20°	10°	
	Metal	A	–	–	–	–	–	• The values shown in the switching diagrams for switching travel/force refer to **90° to plunger direction** • Adjustable upper section of actuator with roller
		B	30°	30°	20°	10°	–	
	Plastic	A	–	–	–	–	–	
		B	40°	40°	40°	30°	20°	
	Metal	A	–	–	–	–	–	• The values shown in the switching diagrams for switching travel/force refer to **90° to plunger direction**
		B	30°	30°	20°	10°	–	
	Plastic	A	–	–	–	–	–	
		B	40°	40°	40°	30°	20°	
	Metal	A	–	–	–	–	–	• The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
		B	40°	40°	30°	20°	–	
	Plastic	A	–	–	–	–	–	
		B	40°	40°	40°	30°	20°	
	Metal	A	45°	45°	40°	30°	–	• The values shown in the switching diagrams for switching travel/force refer **to direction of rotation** • Switch position retained after actuation
		B	45°	45°	40°	30°	–	
	Plastic	A	–	–	–	–	–	
		B	–	–	–	–	–	
	Metal	A	60°	50°	45°	–	–	• The values shown in the switching diagrams for switching angle/actuation torque refer **to any approach direction** • Not suitable for personal protection
		B	–	–	–	–	–	
	Plastic	A	20°	20°	10°	5°	–	
		B	–	–	–	–	–	
	Metal	A	45°	45°	45°	40°	30°	• The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** • Graduated adjustment of roller lever on spindle with 180° repositioning
		B	45°	45°	45°	40°	30°	
	Plastic	A	45°	45°	45°	40°	30°	
		B	45°	45°	45°	40°	30°	
	Metal	A	45°	45°	45°	40°	30°	• The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** • Graduated adjustment of roller lever on spindle with 180° repositioning • Not suitable for personal protection
		B	45°	45°	45°	40°	30°	
	Plastic	A	45°	45°	45°	40°	30°	
		B	45°	45°	45°	40°	30°	
	Metal	A	45°	45°	40°	30°	20°	• The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** • Graduate adjustment of rod about pivot axis and in longitudinal direction
		B	45°	45°	40°	30°	20°	
	Plastic	A	45°	45°	40°	30°	20°	
		B	45°	45°	40°	30°	20°	
	Metal	A	45°	45°	40°	30°	20°	• The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** • Graduated adjustment of spring about pivot axis • Not suitable for personal protection
		B	45°	45°	40°	30°	20°	
	Plastic	A	45°	45°	40°	30°	20°	
		B	45°	45°	40°	30°	20°	

Switch Systems



Switch systems –
Economy meets safety

BERNSTEIN electromechanical switches offer a huge price/performance value and feature an impressive range of products suitable for many operating voltages. The range extends from limit switches, enclosed in insulating material or metal, through foot switches to safety switching devices. The AS-i compatible products save time and material in installation and provide cost advantages in operation. The comprehensive range of designs, sizes and switching functions makes BERNSTEIN an ideal choice for a large variety of of switching applications.

Sensor Systems



Sensor systems –
Compact intelligence

BERNSTEIN'S line of sensors offer extremely fast and precise operation without interference and mechanical wear. Suitable of a large variety of applications, their reliability and the compact dimensions offer a clear advantage in design and function. In addition to ultra sonic sensors and level switches, customers can choose from a wide range of inductive, capacitive, magnetic or optical sensors.

Enclosure Systems



Enclosure systems –
Function and design

With a long history of manufacturing enclosures, BERNSTEIN combines superior enclosure technology and state of the art manufacturing to provide an extensive range of aluminum and polyester control enclosures. BERNSTEIN enclosures conform to many of the standards used in medical technology and the food processing industries. ATEX rated products, for use in potentially explosive atmospheres are also available.

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649.0653.312	MAK-5336-9	95
649.0653.313	MAK-5336-STK	95
649.0653.317	MAK-5336-3	95
649.0653.323	MAK-5336-BCD-3	95
649.0653.324	MAK-5336-BCD-6	95
649.0653.325	MAK-5336-BCD-9	95
649.0653.326	MAK-5336-BCD-M12	95

TITLE - Title to the products of ALTECH shall remain with ALTECH until payment is made in full by Customer. Such reservation of title is for the purpose of securing the purchase price and shall not relieve Customer of the duty to inspect the products upon receipt, to notify ALTECH of any deficiencies or defects, and to exercise due care in the use, installation, operation, and maintenance of the products when on the premise of the Customer or under the control of the Customer. Notwithstanding any reservation of title by ALTECH, risk of loss shall pass to customer at any time of shipment.

SHIPMENT AND DELIVERY - All orders for destination in the mainland United States (less Hawaii, Alaska and non-continental United States possessions) will be shipped F.O.B. Flemington, N.J. All destination, shipping and other charges shall be paid by the Customer in accordance with ALTECH's then current shipping and billing practices.

Delivery dates given in the acceptance of any order are approximate. ALTECH shall not be liable for delays in delivery or in performance due to causes beyond its reasonable control including acts of God, acts of Customer, acts of civil or military authority, fires, strikes or other labor disturbances, war, riot or delays in transportation. In the event of such delay, the date of delivery or performance shall be extended for a period equal to the time lost by reason of the delay.

PRICE - PRICES in any ALTECH publication are subject to change without prior notification. Catalog prices are based on prices published in the current price list. All written quotations are valid for thirty (30) days from the date of quotation. Customer shall pay all sales, use, excise or similar taxes whenever ALTECH must itself pay and/or collect such tax from Customer arising out of the sale.

PAYMENT - Customer agrees to make payment within thirty (30) days of date of the invoice from ALTECH. Customer agrees to pay a late payment charge of one and one-half percent (1.5% per month, or the maximum late payment charge permitted by applicable law, whichever is less, on any unpaid amount for each calendar month (or fraction thereof) that such payment is in default. Orders amounting to less than $100.00 will be billed at $100.00 plus freight. Full carton purchases are required. In the event of referral to an attorney for collection, reasonable attorney's fees for collection of the overdue amount shall be paid by Customer. In the event payment is not received within 30 days from the date of invoice, any discount shall be cancelled and the full list price will be due.

LIMITED WARRANTY - ALTECH warrants to Customer that the equipment purchases shall be free from defects in material and workmanship under normal use and service for a period of one year from shipment.

Written notice as an explanation of the circumstances of any claim that the equipment has proved defective in material or workmanship shall be given promptly by the Customer to ALTECH.

ALTECH will not be liable for any misuse, improper operations, improper installation, improper maintenance, alteration, modification, accident or unusual degradation of the equipment or parts due to an unsuitable installation environment.

No representation of other affirmation of facts,
including but not limited to statements regarding capacity, suitability for use or performance of the equipment, shall be or be deemed to be a warranty or representation by ALTECH for any purpose, nor give rise to any liability or obligation of ALTECH whatsoever.

Customer's sole and exclusive remedy in the event of breach of warranty, as set forth herein, is expressly limited to (1) the correction of the defect by adjustment, repair, modification, or replacement, or (2) issuance of a credit or refund of the purchase price for the defective equipment at ALTECH's election and sole expense.

EXCEPT AS SPECIFICALLY PROVIDED IN THIS AGREEMENT, THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

THIS WARRANTY EXTENDS ONLY TO THE CUSTOMER FROM ALTECH OR ITS AUTHORIZED DISTRIBUTOR.

LIMITATION OF LIABILITY - IN NO EVENT, SHALL ALTECH BE LIABLE FOR LOSS OF PROFITS, INDIRECT, SPECIAL, CONSEQUENTIAL OR OTHER SIMILAR DAMAGES ARISING OUT OF ANY BREACH OF THIS AGREEMENT OR OBLIGATIONS UNDER THE AGREEMENT.

ALTECH SHALL NOT BE LIABLE FOR ANY DAMAGES CAUSED BY DELAY IN SHIPMENT, INSTALLATION OR FURNISHING OF EQUIPMENT OR SERVICES UNDER THIS AGREEMENT.

No action arising out of any claimed breach of this Agreement may be brought by either party more than two (2) years after the cause of action has accrued.

PATENT INDEMNITY - ALTECH shall defend or settle any suit or proceeding brought against Customer based on a claim that any equipment made to ALTECH design and furnished hereunder constitutes an infringement of any existing United States patent, provided (ALTECH) is notified promptly in writing and is given complete authorization and information required for the defense, and ALTECH shall pay all damages and costs awarded against Customer, but shall not be responsible for any costs, expense or compromise incurred or made by Customer without ALTECH's prior written consent. If any equipment is in ALTECH's opinion likely to or does become the subject of a claim for patent infringement, ALTECH may at its option and expense procure for Customer the right to continue using the device, modify it to become non-infringing, but in the event ALTECH is not reasonably able to modify, substitute, or otherwise procure for Customer the right to continue using it, ALTECH will remove such equipment and refund to Customer the amount paid in excess of a reasonable rental for past use.

ALTECH shall not be liable for any infringement or claim based upon use of the equipment in combination with other equipment not supplied by ALTECH or with modifications made by Customer.

The foregoing states the entire liability of ALTECH to Customer arising from patent infringement.

SELLER'S REMEDIES - Should Customer fail to make any payment within ten (10) days of its due date, or fail to perform any other of the Customer's obligation hereunder upon thirty (30) days written notice, or should Customer be or become insolvent or be a party to any bankruptcy receivership proceeding prior to full payment of all amounts payable hereunder, ALTECH may: (a) with or without demand or notice to customer declare the entire amount unpaid immediately due and payable; (b) enter upon the premises where the equipment may be found and remove it (Customer shall assemble the equipment and make it available to ALTECH at a place reasonably convenient to both parties and shall permit and assist ALTECH in effecting the retaking and removal of the equipment); and (c) sell any or all the equipment as permitted under applicable law, applying the proceeds of the sale to payment of the expenses of retaking, repairing and selling the equipment, reasonable attorney fees and to the satisfaction of all indebtedness then due and unpaid under this Agreement. Any surplus shall be paid to Customer and any deficiency shall be paid to ALTECH by Customer.

The remedies provided herein shall be cumulative and in addition to all other remedies provided by law or equity or under the Uniform Commercial Code.

GOVERNING LAW - This agreement will be governed by the Laws of the State of New Jersey.

GENERAL - This Agreement shall only become effective and binding when either (a) it has been accepted and executed by an authorized representative of ALTECH, or (b) the equipment has been shipped to Customer, with or without acceptance in writing hereon. Notice of acceptance is hereby waived by Customer. Customer hereby acknowledges receipt of a true and complete copy hereof.

No addition to or modification of any of the Terms and Conditions of Sale as they appear herein shall be binding upon ALTECH unless signed in writing by duly authorized representative of ALTECH in Flemington, N.J.

Typographical and clerical errors in quotations, orders and acknowledgments are subject to correction.

This Agreement is not assignable without the prior written consent of ALTECH. Any attempt to assign any of the rights, duties or obligations of this Agreement without such consent is void.

If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability, of the remaining provisions shall not in any way be affected or impaired thereby.

ALTECH is not responsible for failure to fulfill its obligation under this Agreement due to causes beyond its control, or except as agreed herein.

THE CUSTOMER ACKNOWLEDGES THAT HE HAS READ THE AGREEMENT, UNDERSTANDS IT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS. FURTHERMORE, THE CUSTOMER AGREES THAT IT IS THE COMPLETE AND EXCLUSIVE STATEMENT OF THE AGREEMENT BETWEEN THE PARTIES, WHICH SUPERSEDES ALL PROPOSALS OR PRIOR AGREEMENTS, ORAL OR WRITTEN, EXPRESSED OR IMPLIED, AND ALL OTHER COMMUNICATIONS BETWEEN THE PARTIES RELATING TO THE SUBJECT MATTER OF THIS AGREEMENT.

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Altech offers a NEW Terminal Block catalog with the most competitively priced blocks in the industry. We feature screw and spring clamp models for DIN rail and panel mount applications. This advanced line of wire termination products will increase your design options and help to get the job done more efficiently. Our line of blocks include feed-through (single, double or triple level), distribution, ground, fuse, disconnect, thermocouple, surge suppressor and indicator. A wide variety of accessories, tools and ferrules are available.

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Liquid Tight Strain Reliefs



This 64-page catalog introduces Altech's full line Liquid Tight Strain Reliefs (Cord Grips) which are used to seal cable entries, keep contaminant's from entering enclosures, provide strain relief and thus reduce stress on components and termination points inside enclosures. Available in standard, high-performance, and economy versions, functions include Straight-Through, Increased Strain Relief, Bend Protection, Pull/Bend Protection, Multi-conductor, Flat Cable and EMI/RFI. They can be used with almost any type of cable, cord or conductor - solid, stranded, flat, shielded, high temperature, etc.
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Industrial Enclosures



Altech's expanded line of TK Industrial Enclosures, with metric knockouts, is here. Now our entire line of industrial enclosures is in metric. Metric knockouts align with international standards making selection easier and more universal. Plus the PG standard is still available. All of Altech's enclosures are internationally accepted and stand up to the harshest environments. They protect against dust, water and corrosion while enhancing the value of your product. Rated up to IP66 (NEMA type 4x), Altech enclosures are available in a wide range of sizes.

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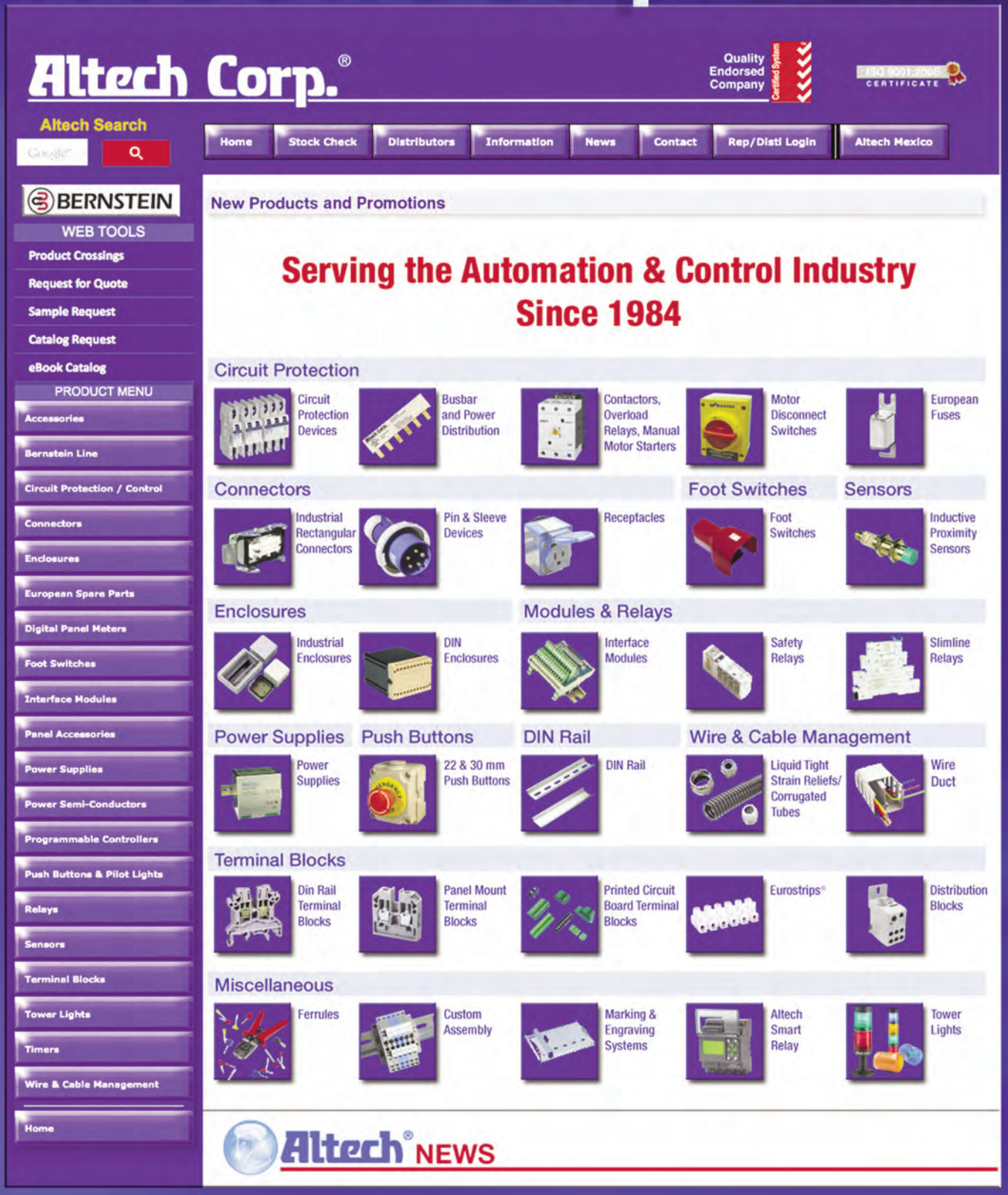
Motor Disconnect Switches



Altech's line of Motor Disconnect Switches are UL 508 listed as Manual Motor Controllers for AC Motor Starting Across-the-line and AC General use. This new 16 page catalog includes the 3 different handle designs, which are all available in gray/black or yellow/red housings. Electrical ratings are 25-150A / 600V. The switches are non-fused DIN Rail mountable. Neat features include: snap-on auxiliary switches, door mounting kit and a retrofit 30A fuse holder. Also featured are Enclosed Motor Disconnect Switches & Fused Enclosed Motor Disconnect Switch (30A) in plastic or stainless housings.

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