SAFELOCK

Safety Switches

Warner Electric offers a large selection of different styles of safety switches. All of the safety switches carry the "CE" mark and are manufactured to all relevant European and International Safety Standards such as, the Machine Directive 89/392/EEC, IEC 947-5, as well as other sub-standards that pertain to specific types of machinery and/or safety installations.

Safety Interlock Switches

Safety Interlock Switches are generally used on the guarding (i.e. protective doors/covers) of industrial machinery, such as test and assembly or packaging machinery in order to shield operators from potential injuries that could result due to unauthorized access.

Solenoid Locking Switches

Solenoid Locking Switches are typically used in applications that require guarding for machines that have coasting rundown cycles after the power supply has been turned off. Application examples include robotic cells, sawmills, as well as stamping presses.

Hinge Interlock Switches

Actuator arms VKS, VKWRE and VKWLI give the user the opportunity to install them as permanently mounted operational arms on flaps and covers or in the case of the AHDB styled actuator to be directly connected to a hinge point of a rotating shaft. The normally closed safety contacts will open after 10 degrees of movement.

Safety Hinge Switches

Safety Hinge Switches are load bearing hinges with the safety contact mounted internally. They are designed for mounting onto extruded aluminum profiles, steel or plastic doors, etc. The switch point of the safety contact is programmable to any point within the 180° operation angle of the switch.

Safety Cable Pull Switches

Safety Cable Pull Switches are used in applications where large exposed areas exist that need to be secured. Application examples include large printing presses and conveyor systems. Safety Cable Pull Switches are required to operate in emergency stop installations and therefore are governed by European Standard EN 418 which governs emergency stop devices.

⚠ Attention

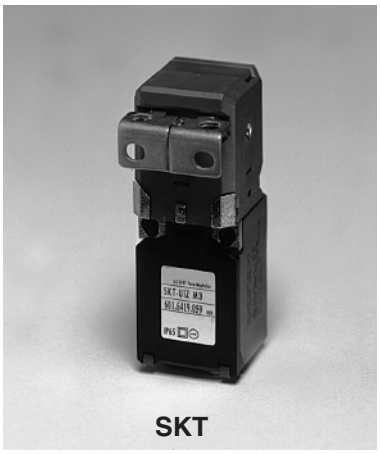
Replacement Keys:

Replacement Keys are made available for replacement purposes only and shall not be used for other purposes such as defeating the Safety Function of any Interlock Switch. To do so may create an unsafe situation which could lead to serious injury or death.

For Replacement Keys: Please contact your local Warner Electric Distributor.

SAFELOCK

SKT and SKI Safety Interlock Switches with Separate Actuator


SKT


SKI

The SKT and SKI safety interlock switches slim compact design according to EN50047 are perfect for safety applications that require a particularly slim and compact switching device while still offering the same advantages, relating to safety, as all other products in this range. The principal function of the SKT and SKI safety interlock switches is to switch the machine drive off when a movable protective guard is opened or removed.

Common Features:

- Limit Switch Design (EN 50047)
- ⧈ Insulated device (IEC 60947-5-1) on all models with plastic housing
- ⊖ Positive Opening safety contacts (IEC 60947-5-1)
- Rotating head allows actuator engagement from four sides or four top positions; no tools are required to rotate head

Model	Part Number	Contacts	Voltage (Max.)	Current (Max.)
SKT-U1Z M3	601-6419-059	1 NO/1 NC (U1Z)	250 VAC	10A
SKT-SU1Z M3	601-6409-060	1 NO/1 NC (SU1Z)	250 VAC	10A
SKT-A2Z M3	601-6469-066	2 NC (A2Z)	250 VAC	10A
SKT-SA2Z M3	601-6469-067	2 NC (SA2Z)	250 VAC	10A
SKI-U1Z M3	601-6819-052	1 NO/1 NC (U1Z)	250 VAC	10A
SKI-SU1Z M3	601-6809-057	1 NO/1 NC (SU1Z)	250 VAC	10A
SKI-A2Z M3	601-6869-056	2 NC (A2Z)	250 VAC	10A
SKI-UV15Z M3	601-6869-058	2 NC/1 NO (UV15Z)	400 VAC	6A

Model Identification

Body Style

SKT = 3.27" tall
SKI = 3.94" tall

Contact Block

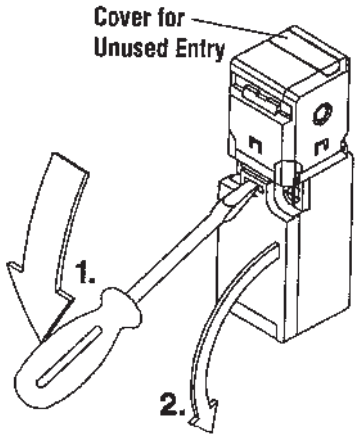
U1Z = 1 NC/1 NO Slow Action
SU1Z = 1 NC/1 NO Snap Action
A2Z = 2 NC Slow Action
SA2Z = 2 NC Snap Action
UV15Z = 2 NC/1 NO Slow Action Make before Break
Z = Forced Disconnect per IEC 60947-5-1

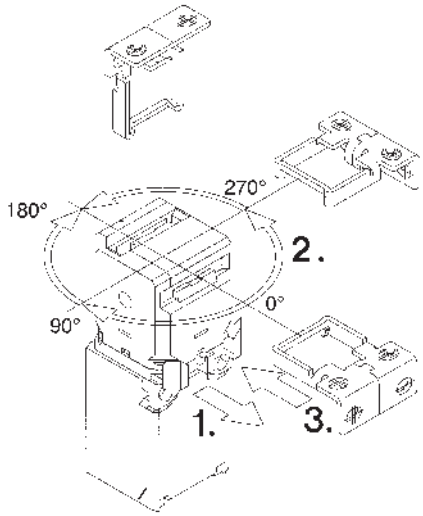
Actuator Style

M3 = Stainless Steel Actuator
For other styles contact factory

Other Specifications	
Max Switching Speed	30 operations per minute
Max Actuator Speed	1 meter per second
Minimum Actuator Radius	150 mm (6 inches)
Contact Material	Silver-nickel alloy
Actuator Extraction Force	12 Newtons (2.6 lbs.)
Mechanical Life	1 million operations
Operating Temperature	–30° to +80°C (–22° to +176°F)
Construction	Glass fiber-reinforced polyamide thermoplastic housing UL94-VO rating
Environmental Rating	NEMA 4/IP65
Certifications	CE CSA UL BG
Weight	SLT = .26 lb. SLI = .29 lb.

SKT and SKI Operational Features





Features

Easy Access

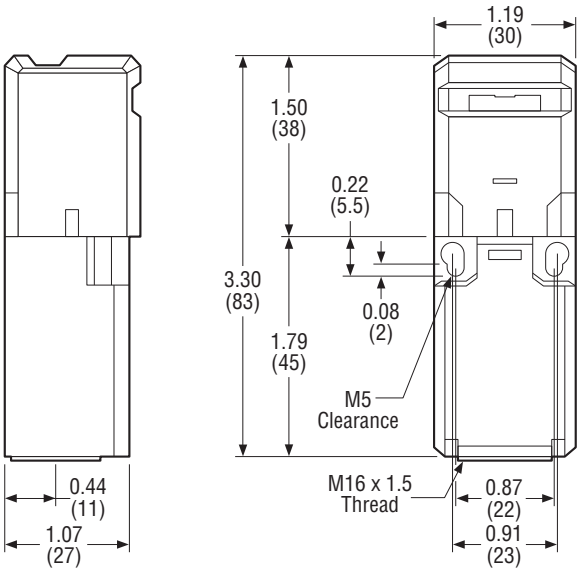
The wiring chamber is accessed via a hinged door. Simply insert a flat-blade screwdriver, as shown, and pry gently down to open.

Rotating Actuator Head

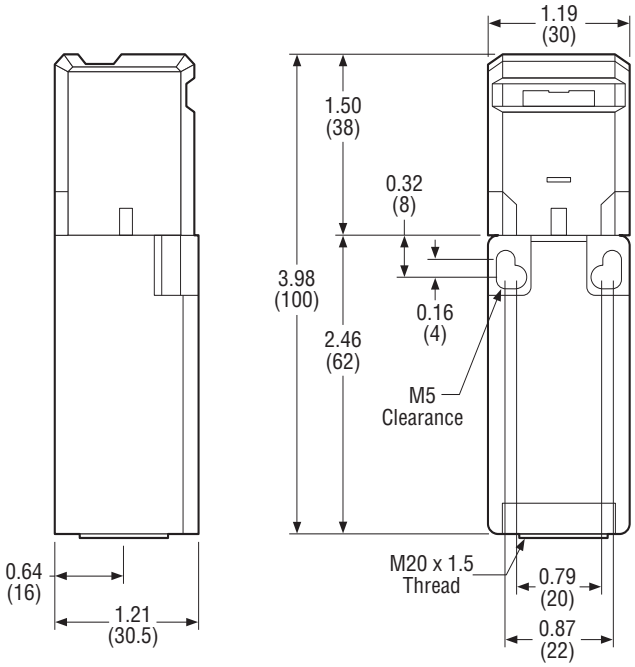
The actuator head may be rotated in 90° increments to create eight possible actuator engagement locations. To rotate the head, pull the holding clamp forward, rotate the head to the desired position, and push the holding clamp back into lock.

SKT Dimensions

inches (mm)



SKI Dimensions



SAFELOCK

SK and SKC Safety Interlock Position Switches with Separate Actuator

Description

The SK and SKC safety position switches offer outstanding performance in personal protective functions.

Constructional safety features of these models have been implemented according to DIN EN 60947-5-1 and test principle GS-ET 15.

The principle function of the SK and SKC safety position switches is to switch the machine drive off when a movable protective guard is opened or removed.

The SKC series is ideal for space limited applications since its overall length is just 2.85 inches (75 mm). A standard SK switch is 3.55 inches (90 mm) long.

Common Features

Safety Category:	4
Protection Class:	NEMA 4
Mechanical Life:	1 x 10^6 Cycles
Temperature:	-22°F to +176°F
Switch Rate:	30 per minute max.
Actuator Holding Force:	2.3 lbs. [10 N] other options available
Enclosure:	PA 6 Thermoplastic (UL 94-V0)
Approvals:	UL, CSA, and BG approved

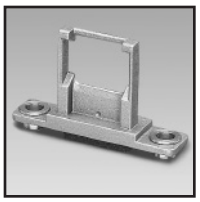
Model	Part Number	Contacts	Voltage (max.)	Current (max.)	Actuator Style	Drawing
SKC-A1Z M	601-6169-039	1 N.C.	500 VAC	10 A	M	A
SK-U1Z M	601-6119-016	1 N.C., 1 N.O.	500 VAC	10 A	M	B
SK-U1Z MRH	601-6119-041	1 N.C., 1 N.O.	500 VAC	10 A	MRH	B
SK-U1Z MRV	601-6119-040	1 N.C., 1 N.O.	500 VAC	10 A	MRV	B
SK-UV15Z M	601-6169-026	2 N.C., 1 N.O.	400 VAC	6 A	M	B
SK-UV15Z MRH	601-6169-064	2 N.C., 1 N.O.	400 VAC	6 A	MRH	B
SK-UV15Z MRV	601-6169-065	2 N.C., 1 N.O.	400 VAC	6 A	MRV	B
SK-UV15Z F	601-6169-063	2 N.C., 1 N.O.	400 VAC	6 A	F	B

Model Identification

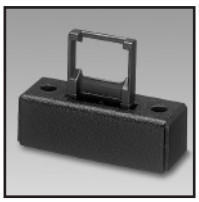
Body Style	Contact Block	Actuator Style
SK	U1Z	M

A1Z = 1 N.C., Forced Disconnect
U1Z = 1 N.C., 1 N.O., Forced Disconnect
UV15Z = 2 N.C., 1 N.O., Forced Disconnect Make Before Break

Normally Closed Contacts ⊖ Forced Disconnect per IEN EN 947-5-1 Ch. 3



Type M Metal Actuator
Cast Stainless Steel



Type F Flexible Actuator
Tolerates Misalignment of Guard Door

Type MRH Horizontal Short Radius Actuator
Hinge Distance 2" [50 mm] Or More

Type MRV Vertical Short Radius Actuator
Hinge Distance 2" [50 mm] Or More

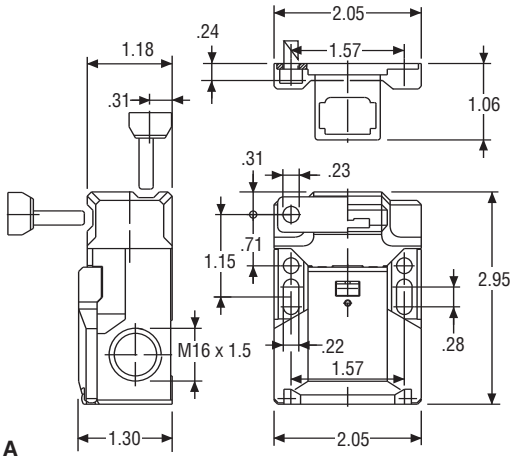
Non-Standard Options

F30: Actuator holding force of 7 lbs. [30 N]
F100: Actuator holding force of 23 lbs. [100 N]
FE10: Actuator not retained

Other contact arrangements are also available. Consult the factory for details.

Model SKC

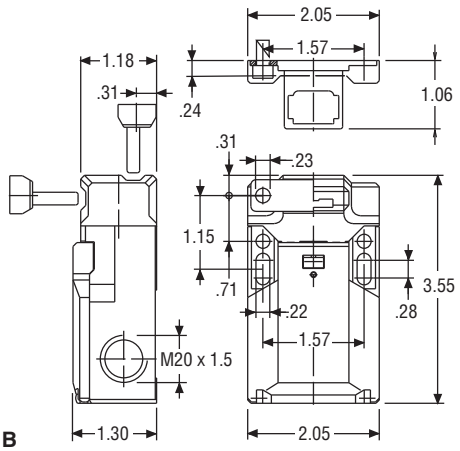
(Dimensions are in inches)



A

Model SK

(Dimensions are in inches)



B

SK and SKC Operational Features

Easy Access

The self retained snap on cover is released by a screw driver (Fig. 1) and can be opened to an angle of 135˚ providing easy access to the wiring terminals (Fig. 2).

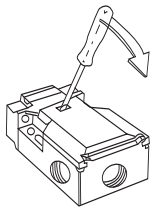


Fig. 1

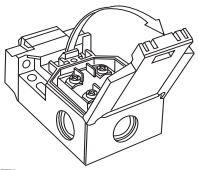
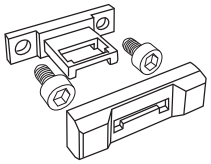


Fig. 2

Removal Protection

A cover cap with one-way latching to seal the assembly screws prevents unauthorized removal of the actuator.



Multi Directional Actuation

After opening the switch cover, the head can be removed from the top (Fig. A). After a rotation of 180˚ (Fig B) the head can be attached again on the enclosure and locked by the switch cover. This results in four directions of approach.

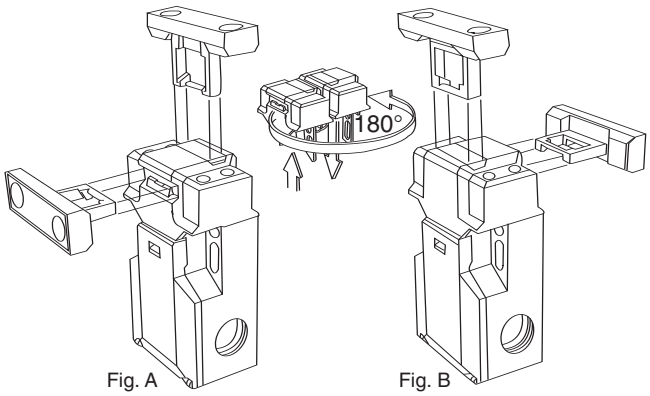


Fig. A

Fig. B

- Triple coding of the actuator for a high level of safety
- Increased functional safety through two interlocks operating independently
- Actuator mates with switch in one of four positions
- Actuator has smooth surface with no protruding sharp parts
- Forced disconnection of the N.C. contacts
- Three cable entries
- Conduit adapter provided (1/2 NPT) Cord grip available upon request
- Manufactured to DIN EN 60947-5-1, IEC 947-5-1, and test principle GS-ET 15

GC Safety Interlock Position Switch with Separate Actuator

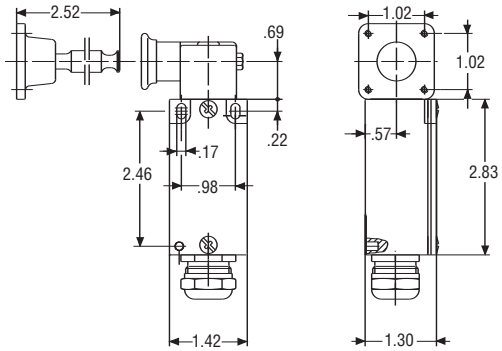
Description

The GC Style Interlock Position Switch is a unique type of switch because of its “Pole” type actuator that fits more like a plug than the other interlock switches. The head offers a flexible spring type adjustment, making it very flexible in operation.

- Rugged, heavy duty metal housing
- Positive forced disconnection of the N.C. contacts
- Contacts galvanically isolated
- Cord grip provided
- UL, CSA, and SUVA Approved

GC

(Dimensions are in inches)



Model:	**GC-U1Z VT 90˚**
Part Number:	**612-1100-555**
Enclosure:	Die Cast Aluminum
Contacts:	1 Normally Closed ⊖ Forced Disconnect per IEC 947-5-1 Ch. 3 1 Normally Open
Voltage Rating:	500 VAC (max.)
Current Rating:	10 A (max.)
Protection Class:	NEMA 4
Mechanical Life:	25 x 10^3 Cycles
Temperature:	-22°F to +176°F
Switch Rate:	10 per minute max.

SAFELOCK
Integral Safety Hinge Switch

IP 67 Metal housing

Hinged machinery guards and covers as well as safety fence doors may be found in every type of industry.

The safety hinge switch SHS is the integration of a safety switch and load bearing hinge for industrial applications.

Designed to facilitate mounting onto extruded aluminum profiles, steel or plastic doors, the slim profile of the SHS even when fully closed, allows the hinge to be readily mounted where space is constrained.

Traditional safety switches with separate actuator keys are often subject to mechanical wear, particularly when mounted on the closing edge of guards where accumulated tolerances can cause misalignment. The SHS removes this problem with the safety contact mounted internally, inaccessible to the user and therefore providing excellent tamper protection. One or more switches may be used dependent on the category of safety protection required. Matching hinges without safety contacts are also available, allowing the style to be standardized for general use. In operation, consideration must be given to the required contact operation angle, which is determined by guard size and the maximum allowable guard opening distance before actuation.

Safe:
- 2 SHS hinge switches each with a forced disconnect safety contact allow safety category 4 systems to be configured subject to the required risk analysis and safety contact monitoring.

Flexible:
- The hinge operation angle is 0-180°.
- The switch point may similarly be selected through 180°.
- AC/DC to 250 V or 60 VDC versions available.

Fast:
- Industry standard M12 x 1 connectors with axial and radial (rear) mounting available as well as fixed cable version.

Reliable:
- A cast Zinc alloy body allows the SHS a high degree of mounting freedom.
- In its hinge capacity the SHS can bear up to 750 N axially and over 1000 N radially, when the switching point has been set.
- Ingress protection to IP 67

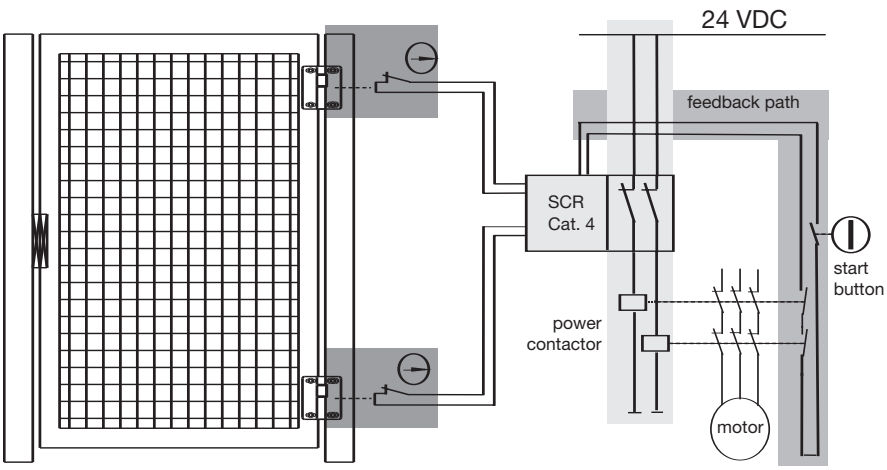
SHS Configuration Summary

Part No.	Description	Contact Function	Type DC	Type AC/DC	Quick Disconnect axial (SA)	Fixed Cable radial (SR)	Fixed Cable axial (KA)	Fixed Cable radial (KR)	BG-Type Approval
601-9261-009	SHS-A1Z-SA	A1Z	—	X	Metal	—	—	—	—
601-9261-010	SHS-A1Z-SR	A1Z	X	—	—	Plastic	—	—	—
601-9261-011	SHS-A1Z-KA5	A1Z	—	X	—	—	X	—	**BG**
601-9261-014	SHS-A1Z-KR5	A1Z	—	X	—	—	—	X	**BG**
601-9261-015	SHS-A1Z-SA	A1Z	X	—	Metal	—	—	—	—
601-9261-016	SHS-A1Z-SR	A1Z	—	X	—	Metal	—	—	—
601-9261-017	SHS-A1Z-SA-BG	A1Z	—	X	Metal	—	—	—	**BG**
601-9261-018	SHS-A1Z-SR-BG	A1Z	—	X	—	Metal	—	—	**BG**
601-9291-013	SHS-OZ	Hinge without safety contact	—	—	—	—	—	—	—

True Category 4
(EN 954-1/2)

- true electrical redundancy
- true mechanical redundant safety
- avoids mechanical common mode failure

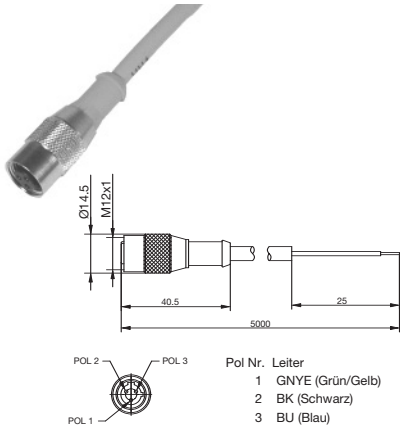
Installation example:



Plug M 12 x 1with molded cable

Terminal code,
AC/DC configuration
1 = green-yellow
2 = black
3 = blue

AC/DC Configuration

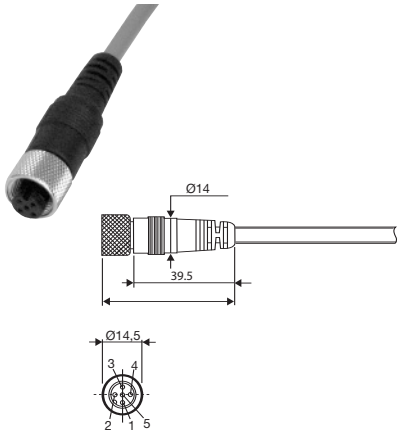


Straight line	Right-angle
on request	**on request**
AN-KAB.SHS **5M** AC	AN-KAB.SHS **5M**
325-1103-234	**325-1103-236**
—	—

Material of cable sleeve:	PVC (UL)/PVC (UL)
Material body/Contact carrier:	PUR (UL)/PUR (UL)
Rated voltage max.:	300 VAC
Current carrying capacity max.:	3 A
Temperature range min./max.:	-25 °C/+70 °C
	-13 °F/+158 °F
Cable structure mm²:	3 x 0.5
Protection class after installation:	IP 67

Terminal code,
DC configuration
1 = brown
2 = -
3 = blue
4 = black

DC Configuration

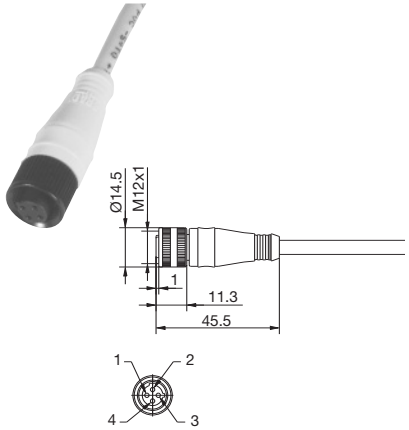


Straight line	Right-angle
AN-KAB.SHS **2M** DC	AN-KAB.SHS **2M** DC
325-1003-221	**325-1003-224**
AN-KAB.SHS **5M** DC	AN-KAB.SHS **5M** DC
325-1003-222	**325-1003-225**
AN-KAB.SHS **10M** DC	AN-KAB.SHS **10M** DC
325-1003-223	**325-1003-226**

Material of cable sleeve:	PVC/PVC
Material body/Contact carrier:	PUR/PUR
Rated voltage max.:	60 VAC/75 VDC
Current carrying capacity max.:	1.5 A
Temperature range min./max.:	-25 °C/+70 °C
	-13 °F/+158 °F
Cable structure mm²:	3 x 0.34
Protection class after installation:	IP 67

Terminal code,
AC/DC configuration
1 = brown
2 = black
3 = blue
4 = green-yellow

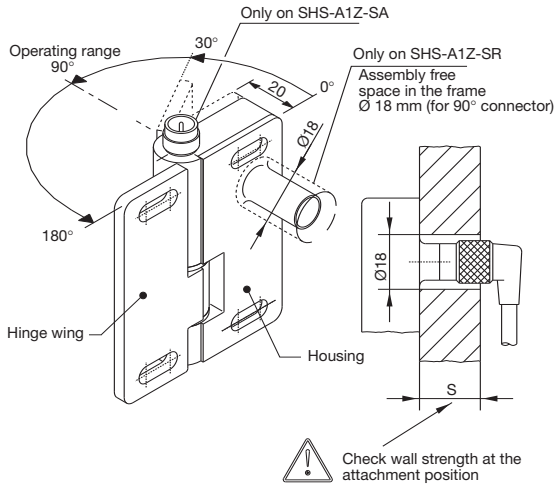
AC/DC Configuration



Straight line	Right-angle
—	—
AN-KAB.SHS **5M** AC	AN-KAB.SHS **5M** AC
325-1004-219	**325-1004-220**
—	—

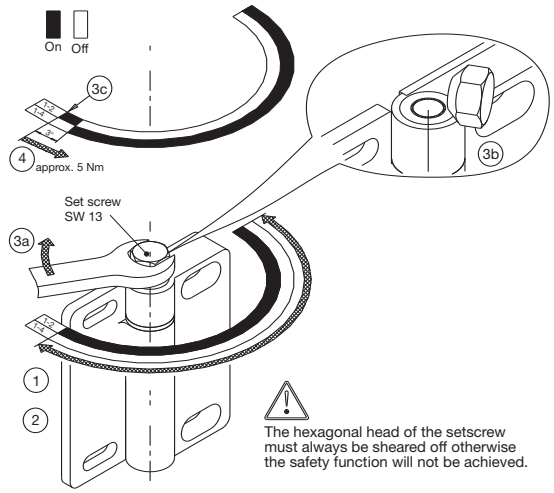
Material of cable sleeve:	PVC/PVC
Material body/Contact carrier:	PUR/Nylon 6.6
Rated voltage max.:	300 VAC
Current carrying capacity max.:	4.0 A
Temperature range min./max.:	-5 °C/+70 °C
	+23 °F/+158 °F
Cable structure mm²:	4 x 0.34
Protection class after installation:	IP 68

Safety Hinge Switch Operation and Set Point Programming



For proper installation the procedure below must be followed.

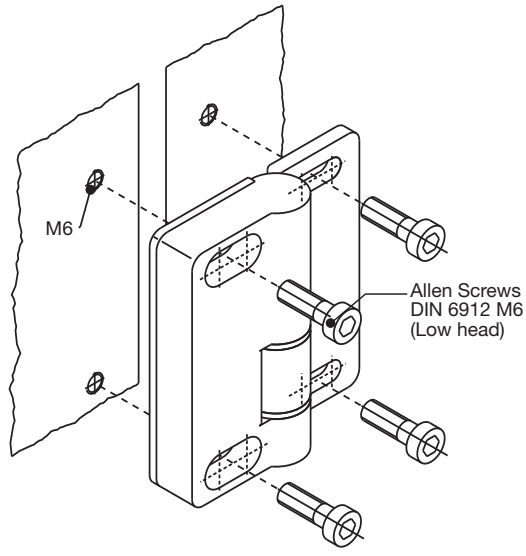
a) SHS without switching point set shall be mounted under no load condition on the guard.
b) SHS switching point shall be set in one successive procedure.
c) The guard shall be moved only after properly setting the switch point.
d) Finally, the set SHS shall be completely fixed on the guard.



1. The guard door must turn freely through the total operating range.
2. Fix the guard door in the closed position.

3.a Tighten the setscrew with a box spanner (SW13/max. 20 mm) until resistance is met.
3.b Continue until the setscrew shears. (Md = 25Nm)
3.c The set point for the switching angle is now fixed.

4. An increased actuation force (torque approx. 5 Nm) is required during the first use of the guard.

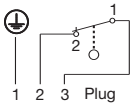
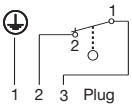


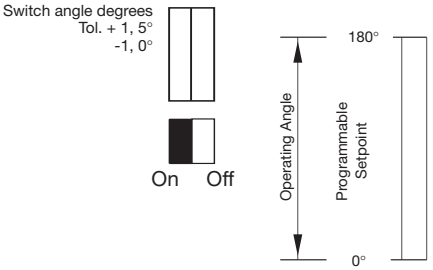
Operating angle

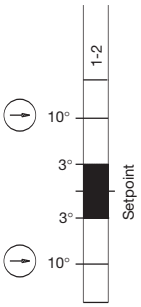
0° - 30° = Allen Screw DIN 6912 necessary without washer in the hinge wing

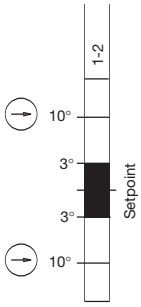
30° - 180° = Allen Screw DIN 912 permissible washer DIN 125 in the hinge wing

SAFELOCK
SHS Hinge Switches

Designation	SHS-A1Z-SA-BG	SHS-A1Z-SR-BG
Part number	**601-9261-017**	**601-9261-018**
Contact diagram		
Forced disconnect to IEC 947-5-1 annex k	1 2 3 Plug	1 2 3 Plug
Za: non-galv. separated contact	⊖ C	⊖ C
Zb: galv. separated contact	•/–	•/–
Slow make and break/snap action	iw	iw
Sealed internally (iw)/ externally (w)		



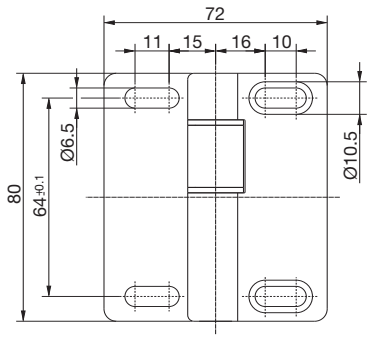


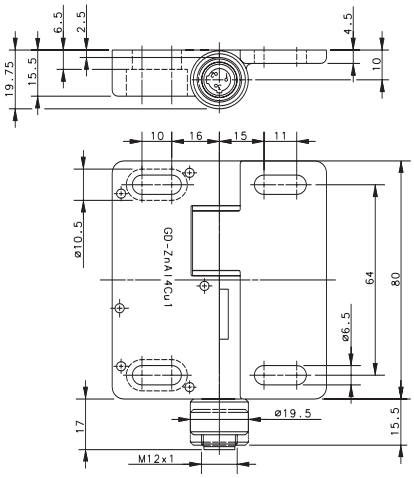


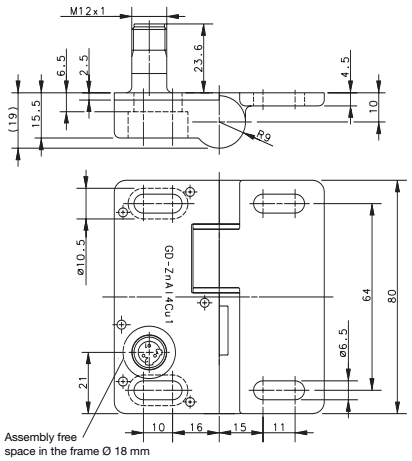
Switching hysterisis: -1.0°

Voltage	max.	250 VAC	250 VAC
Thermal current	max.	3A	3A
Utilization category per IEC 947-5-1 AC 15/DC 13		60 V / 0.5 A	60 V / 0.5 A
		230 VAC / 1.5 A	230 VAC / 1.5 A
Switching frequency	max.	1200 / h	1200 / h
Mechanical life - switching operations		1 x 10^6	1 x 10^6
Operating temperature	min./max.	–25 °C / +70 °C	–25 °C / +70 °C
		–13 °F / +158 °F	–13 °F / +158 °F
Approvals		BG, UL and CSA	BG, UL and CSA
Weight		0.4 kg	0.4 kg
Delivery: ex-stock/built to order		•/–	•/–

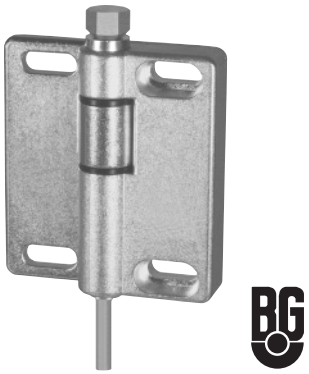
(All dimensions in mm)

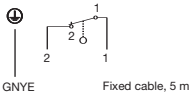
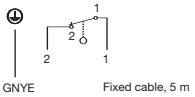


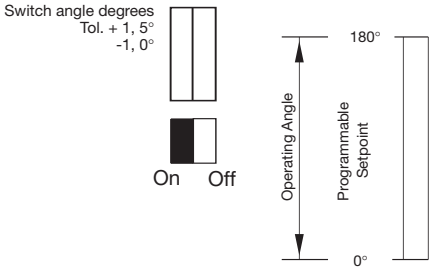


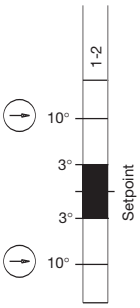


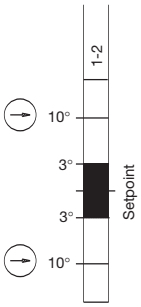
SAFELOCK
SHS Hinge Switches



Designation	SHS-A1Z-KA-5	SHS-A1Z-KR-5
Part number	**601-9261-011**	**601-9261-014**
Contact diagram		
Forced disconnect to IEC 947-5-1 annex k		
Za: non-galv. separated contact		
Zb: galv. separated contact	⊖ C	⊖ C
Slow make and break/snap action	•/–	•/–
Sealed internally (iw)/ externally (w)	iw	iw



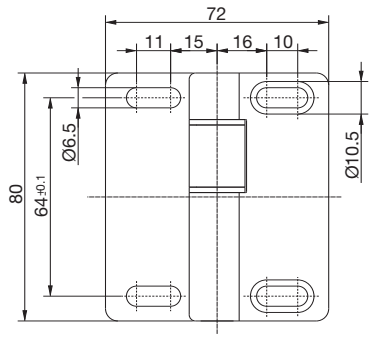


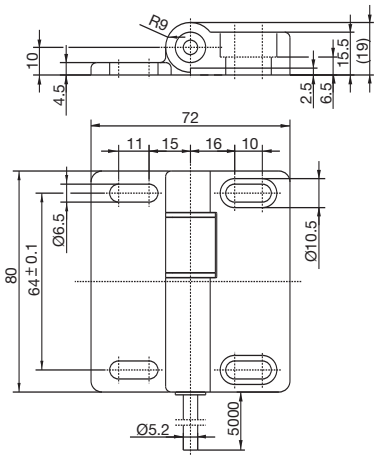


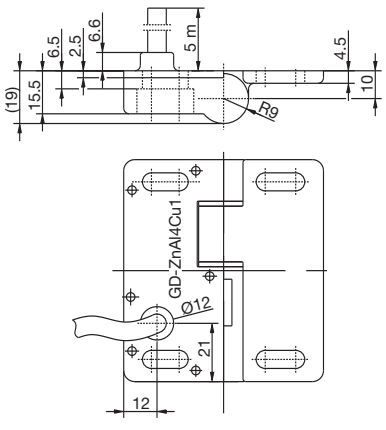
Switching hysterisis: -1.0°

Voltage	max.	250 VAC	250 VAC
Thermal current	max.	3A	3A
Utilization category per IEC 947-5-1 AC 15/DC 13		60 V/0.5 A	60 V/0.5 A
		230 VAC/1.5 A	230 VAC/1.5 A
Switching frequency	max.	1200/h	1200/h
Mechanical life - switching operations		1 x 10^6	1 x 10^6
Operating temperature	min./max.	–25 °C/+70 °C	–25 °C/+70 °C
		–13 °F/+158 °F	–13 °F/+158 °F
Approvals		BG, UL and CSA	BG, UL and CSA
Weight		0.4 kg	0.4 kg
Delivery: ex-stock/built to order		•/–	•/–

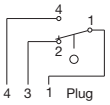
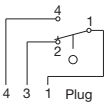
(All dimensions in mm)

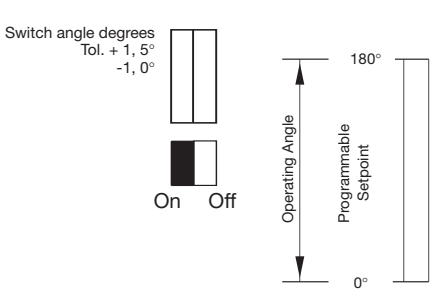


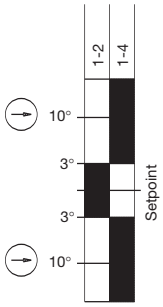


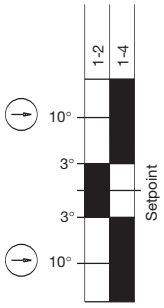


SAFELOCK
SHS Hinge Switches

Designation	SHS-A1Z-SA	SHS-A1Z-SR
Part number	**601-9261-015**	**601-9261-010**
Contact diagram		
Forced disconnect to IEC 947-5-1 annex k		
Za: non-galv. separated contact	⊖ C	⊖ C
Zb: galv. separated contact	•/–	•/–
Slow make and break/snap action	iw	iw
Sealed internally (iw)/ externally (w)		



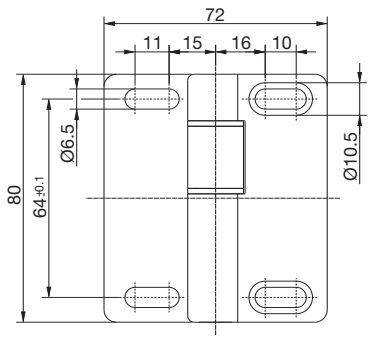


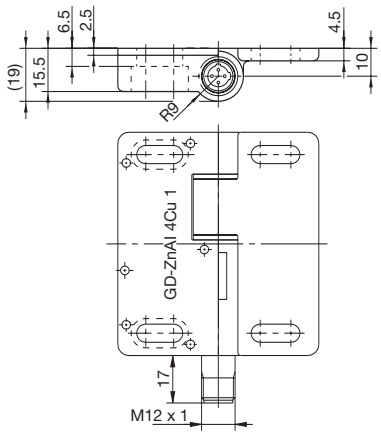


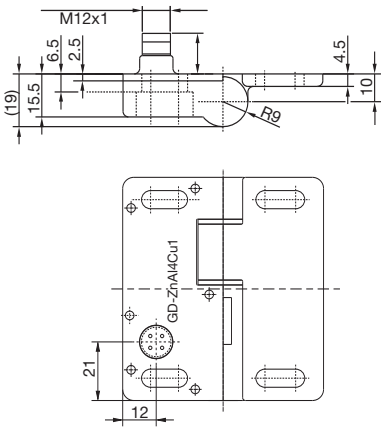
Switching hysterisis: -1.0°

Voltage	max.	250 VAC	250 VAC
Thermal current	max.	3A	3A
Utilization category per IEC 947-5-1 AC 15/DC 13		60 V / 0.5 A	60 V / 0.5 A
		—	—
Switching frequency	max.	1200 / h	1200 / h
Mechanical life - switching operations		1 x 10^6	1 x 10^6
Operating temperature	min./max.	–25 °C / +70 °C	–25 °C / +70 °C
		–13 °F / +158 °F	–13 °F / +158 °F
Approvals		UL and CSA	UL and CSA
Weight		0.4 kg	0.4 kg
Delivery: ex-stock/built to order		•/–	•/–

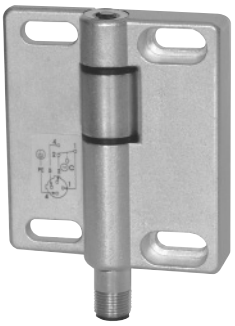
(All dimensions in mm)

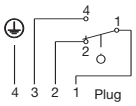
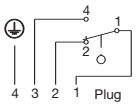


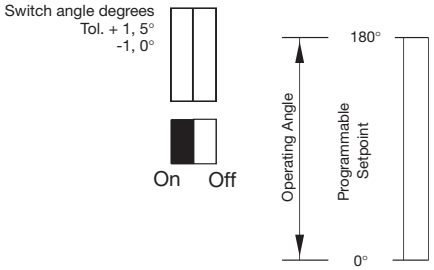


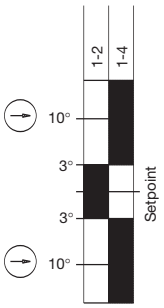


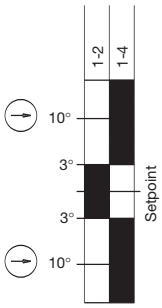
SAFELOCK
SHS Hinge Switches



Designation	SHS-A1Z-SA	SHS-A1Z-SR
Part number	**601-9261-009**	**601-9261-016**
Contact diagram		
Forced disconnect to IEC 947-5-1 annex k		
Za: non-galv. separated contact	⊖ C	⊖ C
Zb: galv. separated contact	•/–	•/–
Slow make and break/snap action	iw	iw
Sealed internally (iw)/ externally (w)		



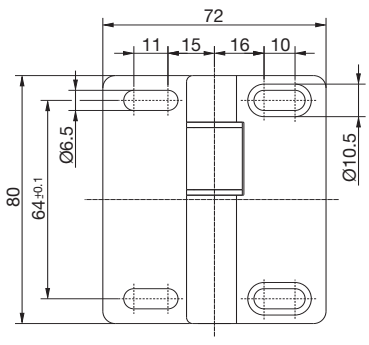


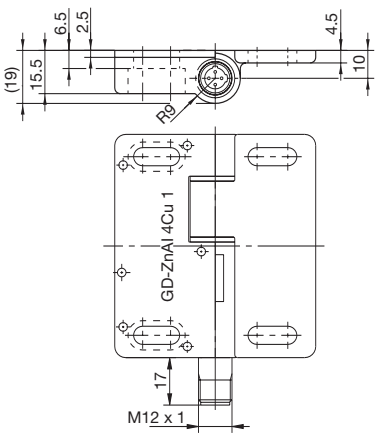


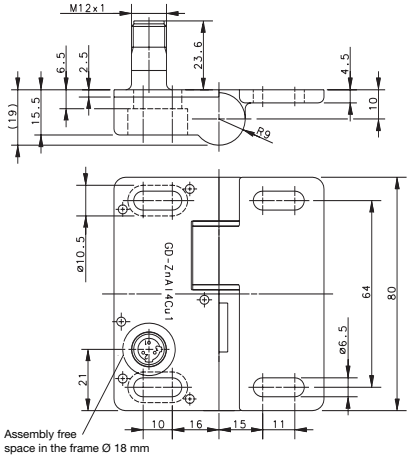
Switching hysterisis: -1.0°

Voltage	max.	250 VAC	250 VAC
Thermal current	max.	3A	3A
Utilization category per IEC 947-5-1 AC 15/DC 13		60 V/0.5 A	60 V/0.5 A
		230 VAC/1.5 A	230 VAC/1.5 A
Switching frequency	max.	1200/h	1200/h
Mechanical life - switching operations		1 x 10^6	1 x 10^6
Operating temperature	min./max.	–25 °C/+70 °C	–25 °C/+70 °C
		–13 °F/+158 °F	–13 °F/+158 °F
Approvals		UL and CSA	UL and CSA
Weight		0.4 kg	0.4 kg
Delivery: ex-stock/built to order		•/–	•/–

(All dimensions in mm)







SAFELOCK
I88 Style Position Safety Hinge Interlock Switches

The I88 style Hinge Safety Switch is available with two distinctive types of operational actuators.

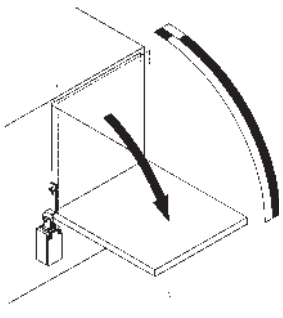
Actuator arms VKS,VKW RE and VKW LI give the user the opportunity to install them as permanently mounted operational arms on flaps and covers, as shown in the drawings below.

The AHDB styled actuator is designed to be directly connected to a hinge point of a rotating shaft. The normally closed safety contacts will open after 10 degrees of movement.

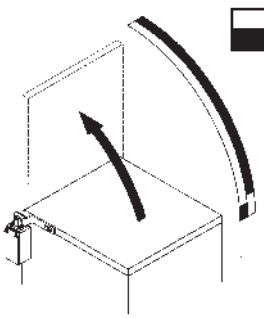
Arm/Linear

Shaft/Rotary

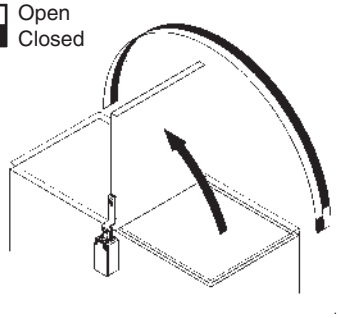
- Insulated plastic housing with hinged cover
- Forced disconnection of the N.C. contacts
- Contacts galvanically isolated
- Conduit adapter



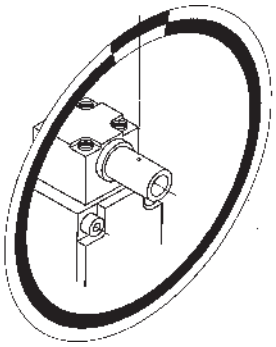
VKS (Vertical)



Hinged Arms



VKW (Horizontal)



Hinged Shaft

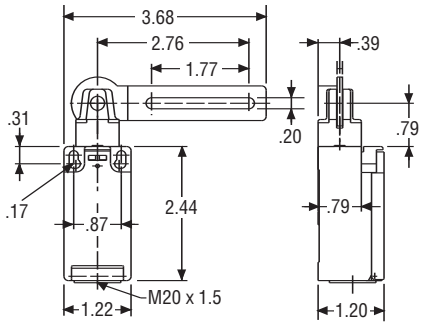
Model: **I88-U1Z VKS**
Part Number: **608-6100-093**
Operation: **Central**

Model: **I88-U1Z VKW RE**
Part Number: **608-6100-094**
Operation: **Right**

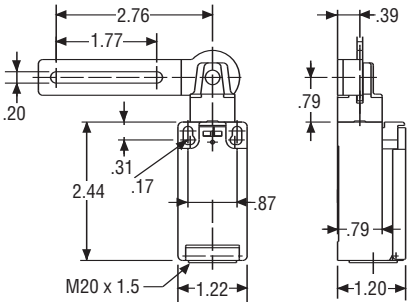
Model: **I88 -U1Z VKW LI**
Part Number: **608-6100-095**
Operation: **Left**

Enclosure: Thermoplastic
Contacts: 1 Normally Closed
⊖ Forced Disconnect per IEC 947-5-1 Ch. 3
1 Normally Open
Voltage Rating: 500 VAC (max.)
Current Rating: 10 A (max.)
Protection Class: NEMA 4
Mechanical Life: 1 x 10^6 Cycles
Temperature: -22°F to +176°F
Switch Rate: 50 per minute max.
Approvals: UL, CSA

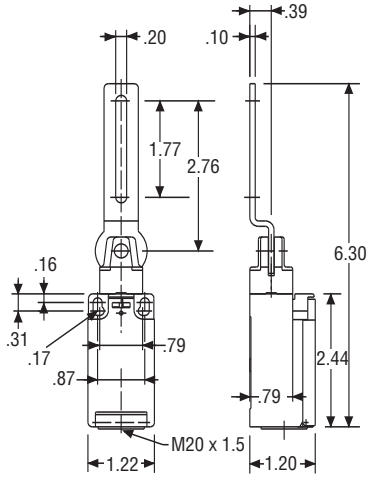
(Dimensions are in inches)



I88-U1Z VKW RE

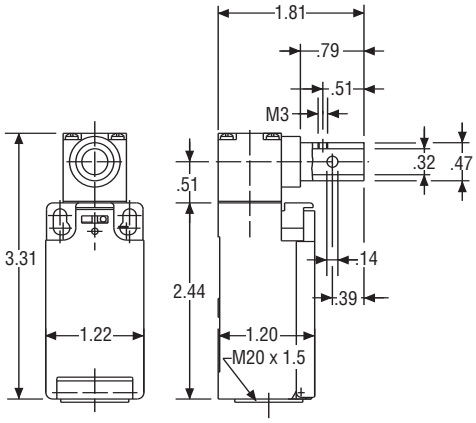


I88 -U1Z VKW LI



I88-U1Z VKS

Model: **I88-U1Z AHDB**
Part Number: **618-6100-267**
Enclosure: Thermoplastic
Contacts: 1 Normally Closed
⊖ Forced Disconnect per IEC 947-5-1 Ch. 3
1 Normally Open
Voltage Rating: 500 VAC (max.)
Current Rating: 10 A (max.)
Protection Class: NEMA 4
Mechanical Life: 1 x 10^6 Cycles
Temperature: -22°F to +176°F
Switch Rate: 50 per minute max.
Approvals: UL, CSA



I88-U1Z AHDB

SAFELOCK
Solenoid Locking Interlock Switches with Separate Actuator

SLK

Description

The SLK series of Solenoid Locking Switches are designed to ensure movable protective guards and are kept locked in place on machinery until the operating sequence or machine cycle is completed.

The actuator key is held in position under force, while the interlocking mechanism is activated. The interlocking mechanism is directly connected to the machine's control system.

Safety Interlock Switches perform three functions:

1. Allow the machine/process to operate when the protective guard is in position and locked.
2. Ensure the machine/process cannot operate when the actuator key is not in the locked and closed position.
3. Monitor the switch and the interlocking mechanism during operation.

System Description

Two types of locking methods are available:

Spring Lock...Mechanically locked-power to solenoid unlocks actuator

Magnetic Lock...Power to solenoid locks actuator in position.

Features

- Compact and slim in design
- Rugged plastic insulated housing
- Triple coding of the actuator for a high level of safety
- Flexible mounting options with rotatable actuator head (4X90°) and horizontal or vertical actuator approach
- Three cable entries
- Wiring chamber protected to IP 67/NEMA 4

Electrical Features

Switching Devices

Rated isolation voltage max.:	250 V
Thermal Continuous Current max.:	10 A
Category of Use:	AC 15 230 V/4 A
Short Circuit protection:	DIAZED- DIN VDE 0636 Part 1 6 A/inert gl/gG

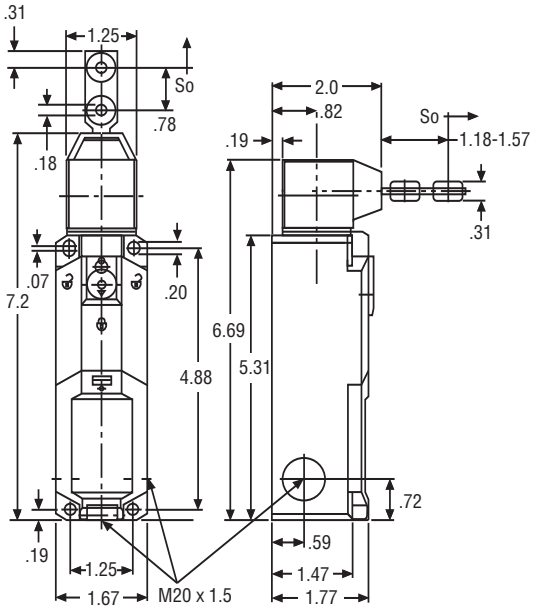
Solenoid

Duration of Current:	3.4/100% ED
Temperature Class:	E (120°C)
Inrush Power Consumption:	56 VA (0.2s)
Permanent Power Consumption:	1.1 VA (constant)
Switching Frequency:	600/hr. max.

Actuation

- Standard actuator allows 8 different mounting positions
  4 Horizontal in 90° increments
  4 Vertical in 90° increments

(Dimensions are in inches)



Head Mounted Vertical (Standard Actuator)

Head Mounted Horizontal (Standard Actuator)

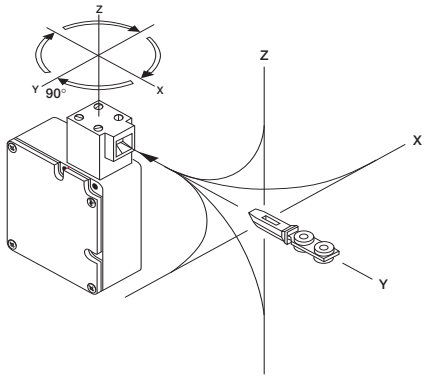
Mechanical Characteristics

Enclosure:	PA 6 GV (UL94-V0)
Actuator Key:	Stainless Steel/PA
Ambient Temperature:	–25°C to +70°C
Switching Function:	2 NC; 2 NO contacts
Mechanical Life:	1,000,000 cycles
Actuation Radius:	400mm min.
Approach Speed:	V = 0.5m/s max
Weight:	approx. 0.3 kg
Locking Force:	1000 N (250 lbs.)

Part Number	Designation	Locking Spring Force Magnet Force	Connection Assembly Safety Equipment	Connection Assembly Locking	Control Voltage	Add. Functions Auxiliary Release (AR)	Add. Functions LED (L)	Actuator Standard Radial Actuator
601-8119-001	SLK-FVTU24UC-55-AR	Spring Force	1 NC ⊖ 1 NO	1 NC ⊖ 1 NO	24 VAC/DC	AR	—	Standard
601-8119-002	SLK-FVTU24-230MC-55-AR	Spring Force	1 NC ⊖ 1 NO	1 NC ⊖ 1 NO	24–48 VDC + 24–230 VAC	AR	—	Standard
601-8119-003	SLK-MVTU24UC-55	Magnet Force	1 NC ⊖ 1 NO	1 NC ⊖ 1 NO	24 VAC/DC	—	—	Standard
601-8119-004	SLK-MVTU24-230MC-55	Magnet Force	1 NC ⊖ 1 NO	1 NC ⊖ 1 NO	24–48 VDC + 24–230 VAC	—	—	Standard

SAFELOCK

Solenoid Locking Interlock Switches with Separate Actuator



Description

The SLM series of Solenoid Locking Switches is designed to ensure movable protective guards are kept locked in place on machinery until the operating sequence or machine cycle is completed.

The actuator key is held in position under force, while the interlocking mechanism is activated. The interlocking mechanism is directly connected to the machine's control system.

Safety Interlock Switches perform three functions:

1. Allow the machine/process to operate when the protective guard is in position and locked.
2. Ensure the machine/process cannot operate when the actuator key is not in the locked and closed position.
3. Monitor the switch and the interlocking mechanism during operation.

System Description

Two types of locking methods are available:

Spring Lock...Mechanically locked-power to solenoid unlocks actuator

Magnetic Lock...Power to solenoid locks actuator in position

Features:

- UL, CSA, and BG approved
- Triple coding of the actuator for a high level of safety
- Rugged, heavy duty, metal housing
- Actuator approach direction can be changed in 90° increments
- Actuator has smooth surface with no protruding sharp parts
- Forced disconnection of the N.C. contacts
- Contacts galvanically isolated
- Two cable entries
- Conduit adapter or cord grip provided
- Manufactured to VDE 0660 part 200, IEC 947-5-1, and test principle GS-ET 19

Model Identification

Body Style	Lock Type	Actuator	Solenoid Voltage	Contact Block	Release Type
SLM	F	VTW	24 DC	55	AR

F = Spring Lock
M = Magnetic Lock

AR = Auxiliary Release

24 DC = 24 VDC
120 AC = 110-130 VAC
50-60 Hz

55 = 1 N.C., ⊕ Forced Disconnect per IEC 947-5-1 Ch. 3
1 N.O.
(Actuator and Lock Monitor Contacts)

Non-Standard Options

- 230 VAC/50 Hz solenoid voltage
- Key operated auxiliary release (Spring Lock Only)
- Mushroom head auxiliary release with key reset (Spring Lock Only)
- LED indicators for switch status
- Extended length actuator

Consult the factory for details.

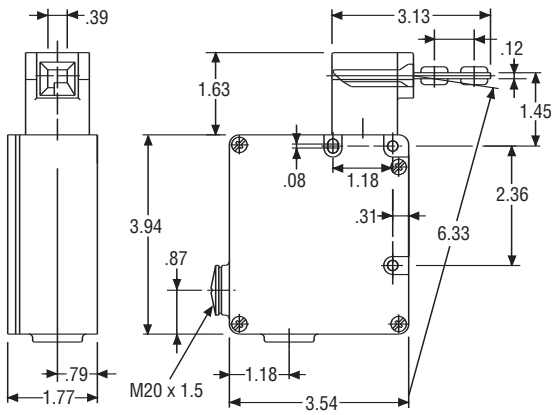
Common Features

Safety Category:	4
Contact Voltage:	250 V (maximum)
Contact Current:	10 A (maximum)
Protection Class:	NEMA 4
Mechanical Life:	1 x 10^6 Switching Cycles
Temperature:	-22°F to +140°F
Actuator Locking Force:	225 lbs. [1000 N]
Actuator Holding Force:	4.5 lbs. [20 N]
Operating Radius:	15.7" [400 mm] (minimum)
Enclosure:	Die Cast Aluminum

Model (Spring Lock)	Part Number	Solenoid Voltage
SLM-FVTW 24 DC-55-AR	601-7119-020	24 VDC
SLM-FVTW 120 AC-55-AR	601-7119-032	120 VAC

Model (Magnetic Lock)	Part Number	Solenoid Voltage
SLM-MVTW 24 DC-55	601-7119-023	24 VDC
SLM-MVTW 120 AC-55	601-7119-033	120 VAC

(Dimensions are in inches)



SAFELOCK

MUZ-602 and MUZ-202
Coded Magnetic Monitoring Systems

BIA Rated for Safety Category 3 EN 954-1
Single Failsafe System With Partial Fault Recognition

MUZ 202


MUZ 602

Description

The monitoring controls available to Category 3 certification are the MUZ-202, two channel control and the MUZ-602 six channel control. The number of channels indicated refers to the maximum number of Coded Magnetic Sensors that can be used per control.

Both controls can only be used with series MAK-xx36 Coded Magnetic Sensors and corresponding Magnets TK-xx-CD, as shown on page 57.

These systems are intended for use with movable protective guard installations, i.e. flaps, doors, and covers.

Magnetic Coded Monitoring Systems offer an alternative to mechanical interlock switches, especially on machines that operate in areas where cleaning, disinfecting, or contamination play a major role, as the sensor and magnet are fully encapsulated.

Features

- BIA rated for Safety Category 3
- Forced disconnection of the safety contacts
- Control unit mounts to 35 mm DIN rail (TS 35)
- BIA Approved

System Operation

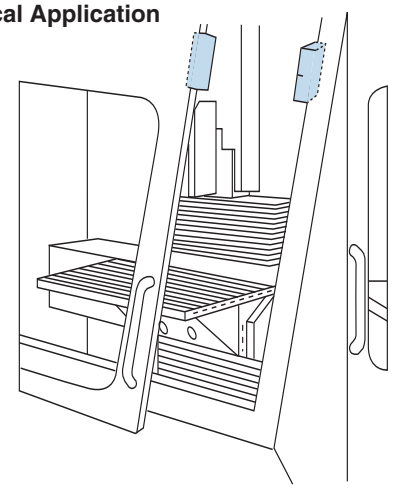
The correct operation of the system is ensured, as the circuitry monitors each sensor and magnet to ensure they are aligned correctly, by using an evaluation circuit with two timing stages.

Only when all the sensors have met this requirement will the controls output relay give the signal for the machine to operate.

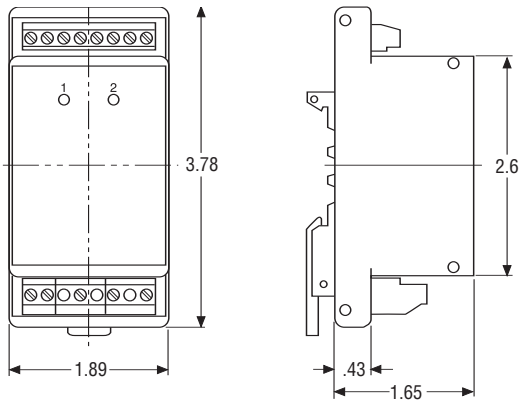
Within this series of controls an additional output contact is available, to be used for informational purposes only and not for any safety function.

Model	MUZ-202/D24-UM	MUZ-602/D24-UM
Part Number	639-2702-301	639-2706-302
Enclosure	PA 6.6 Plastic	
Channels	2	6
Safety Contact	1 Normally Closed, Forced Disconnect	
Monitor Contact	1 Normally Open	
Operating Voltage	24 VDC	
Operating Current	100 mA	
Switching Voltage	250 VAC (max.)	
Switching Current	8 A (max.)	
Switching Capacity	1700 VA (MAX.)	
Protection Class	IP 20 (Equivalent to NEMA 1)	
Temperature	+32°F to +131°F [0°C to +55°C]	

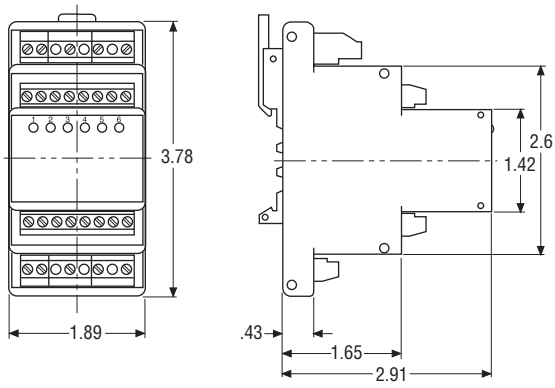
Typical Application



(Dimensions are in inches)



MUZ 202



MUZ 602

SAFELOCK

Coded Magnetic Sensors
Coded Magnets

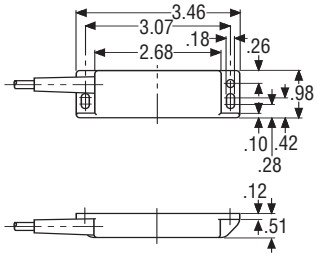
Coded magnetic sensors and coded magnets are designed for use with special purpose safety controllers. They cannot be operated by simple bar magnets.

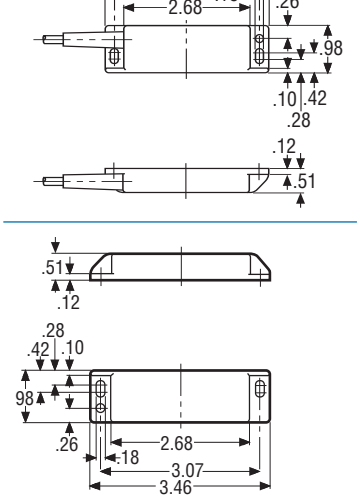
Model	Part Number
MAK-4236-3[1]	649-0642-301
MAK-4236-STK[2]	649-0642-305
TK-42-CD	640-2042-301

[1]Sensor with 10 ft. (3 m) Cable
(19 ft. (6 m) and 29 ft. (9 m) Special Order)
[2]Sensor with Connector (Cable Sold Separately)
Uses either a 413-9100-228 or 413-9100-230 cable

Enclosure: PA 6.6 Plastic
Voltage Rating: 30 VDC (max.)
Current Rating: 4 mA (max.)
Protection Class: NEMA 6
Operating Range: 0.12" (3 mm) On (min.)
0.55" (14 mm) Off (max.)
Temperature: –4°F to +158°F
Controller Type: MUZ-x02/xxx

(Dimensions are in inches)

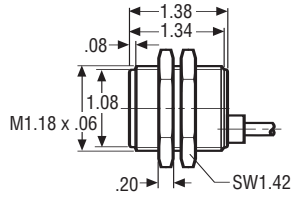




Model	Part Number
MAK-5336-3 [1]	649-0653-310
MAK-5336-STK [2]	649-0653-313
TK-43-CD	640-2043-023

[1] Sensor with 10 ft. (3 m) Cable
(19 ft. (6 m) and 29 ft. (9 m) Special Order)
[2] Sensor with Connector (Cable Sold Separately)
Uses cable 413-9100-266

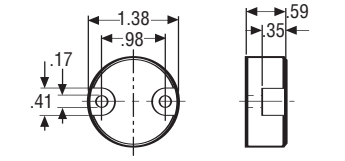
Enclosure: PA 6.6 Plastic
Voltage Rating: 30 VDC (max.)
Current Rating: 4 mA (max.)
Protection Class: NEMA 6
Operating Range: 0.12" (3 mm) On (min.)
0.28" (7 mm) Off (max.)
Temperature: -4°F to +158°F
Controller Type: MUZ-x02/xxx

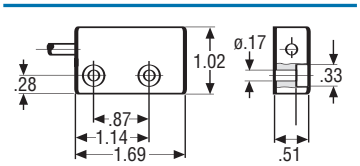


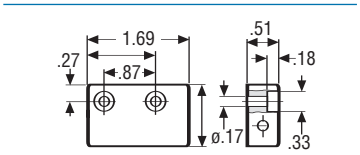
Model	Part Number
MAK-5236-3 [1]	649-0652-306
MAK-5236-STK [2]	649-0652-309
TK-52-CD-HF	640-2052-305

[1] Sensor with 10 ft. (3 m) Cable
(19 ft. (6 m) and 29 ft. (9 m) Special Order)
[2] Sensor with Connector (Cable Sold Separately)
Uses either a 413-9100-228 or 413-9100-230 cable

Enclosure: PA 6.6 Plastic
Voltage Rating: 30 VDC (max.)
Current Rating: 4 mA (max.)
Protection Class: NEMA 6
Operating Range: 0.16" (4 mm) On (min.)
0.31" (8 mm) Off (max.)
Temperature: –4°F to +158°F
Controller Type: MUZ-x02/xxx







Cables for Sensors with Connectors

Material: PUR (Cable)
PA 12 (Connector)
Cable Length: 8 ft. (2.5 m)
Protection Class: NEMA 6

Model	Part Number
GDK-R06US/S00-2.5PU	413-9100-228
WDK-R06US/S00-2.5PU	413-9100-230
WDK-M12UA/S00-2.5PU	413-9100-266

Cable Pull Safety Switches

For Cable Lengths of 10, 15, 30 and 75 ft. Single Direction for Standard and Safety Applications

Description

Cable pull switches give personal ready access to a machine stop switch over a long distance by pulling on the cable. They are especially suited for use along conveyors or on the perimeter of large manufacturing machines.

Safety cable pull switches (type Si) are safety devices according to IEC 947-5-1 and VDC 0660, T200. The action of the N.C. emergency stop contacts is forced due to the contact elements being securely attached to the plunger. This safety switch has make-before-break contacts. The machine will stop when the cable is pulled or when the cable breaks. These functions are made possible by the overlapping contacts of the UV type contact blocks. This operation requires the Cable to be held in position under tension. See the Typical Installation drawing on page 59 for further information.

A latch option keeps the stop contact open after the cable has been pulled and released. The latch is reset by operating a push-button on the switch. Machine restarting is not possible until the latch is reset.

The maximum length of the cable is only limited by its weight. The weight of the cable must not exceed the tension force of the switching system. The maximum length of unsupported cable must not exceed 15 ft.

CE

Standard Cable Pull Switch

Model	Part Number	*Cable Length	Pull Force	Voltage (max.)	Current (max.)	Enclosure	**Drawing
SI-U1Z	601-3812-075	10 ft.	5.5 lbs.	380 VAC	10 A	Plastic	A
SEK-U1Z	601-1811-133	15 ft.	18 lbs.	500 VAC	10 A	Plastic	B
SEM2-U1Z	601-2811-029	15 ft.	18 lbs.	500 VAC	10 A	Aluminum	C
SD-U1	601-1411-856	30 ft.	27 lbs.	500 VAC	16 A	Aluminum	F
SD-U1/LATCH	601-1411-868	30 ft.	27 lbs.	500 VAC	16 A	Aluminum	E

Safety Cable Pull Switch

Model	Part Number	*Cable Length	Pull Force	Voltage (max.)	Current (max.)	Enclosure	**Drawing
SiI-UV1Z	601-3832-076	10 ft.	5.5 lbs.	380 VAC	10 A	Plastic	A
SiEK-UV1Z	601-1831-134	15 ft.	18 lbs.	500 VAC	10 A	Plastic	B
SiEM2-UV1Z	601-2831-022	15 ft.	18 lbs.	500 VAC	10 A	Aluminum	C
SiEM2-UV1Z/LATCH	601-2831-023	15 ft.	18 lbs.	500 VAC	10 A	Aluminum	D
SiD-UV1Z	601-1431-857	30 ft.	27 lbs.	380 VAC	16 A	Aluminum	F
SiD-UV1Z/LATCH	601-1431-869	30 ft.	27 lbs.	380 VAC	16 A	Aluminum	E
SiD-UV1Z	601-2431-877	75 ft.	45 lbs.	500 VAC	16 A	Aluminum	G
SiD-UV2Z/LATCH	601-2441-907	75 ft.	45 lbs.	380 VAC	16 A	Aluminum	H

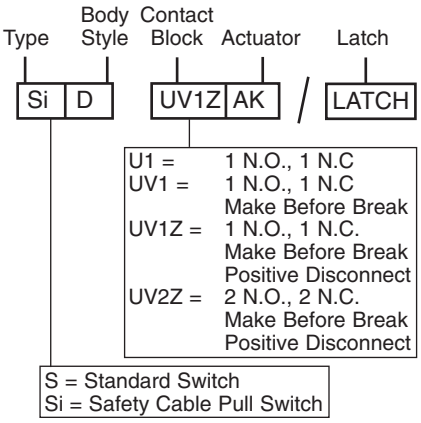
*Recommended Cable Length
**Drawings shown on page 59

Accessories
Single Direction Cable Kit

Cable Length	Part Number
15 ft.	8010-448-001
30 ft.	8010-448-002
75 ft.	8010-448-003

Each One Way Cable Kit Includes:
Length of cable as listed
1 Wrought Iron Tension Screw
4 Galvanized Clamps
4 Galvanized Thimbles
(Customer to provide Eye Screws)
Individual accessories are also available.

Model Identification



Cable Pull Switches

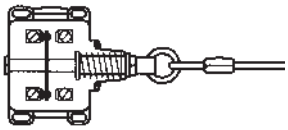
For Cable Lengths of 10, 15, 30 and 75 Feet Single Direction Mechanical and Installation Information

(Dimensions are in inches)

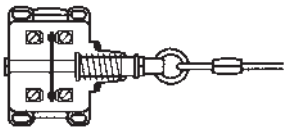
Common Features

Degree of Protection: NEMA 4
Temperature: –22°F to +176°F
Enclosure: Die cast aluminum or glass fiber reinforced thermoplastic
Approvals: UL, CSA

Standard Switch Installation

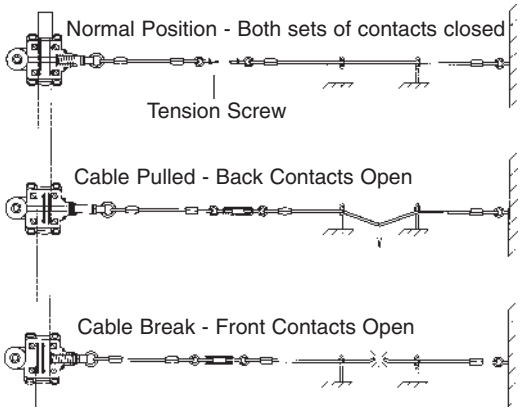


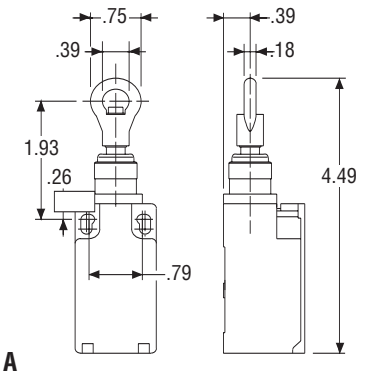
Normal Position



Cable Pull

Safety Switch Installation





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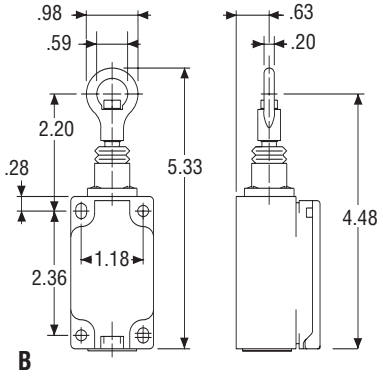

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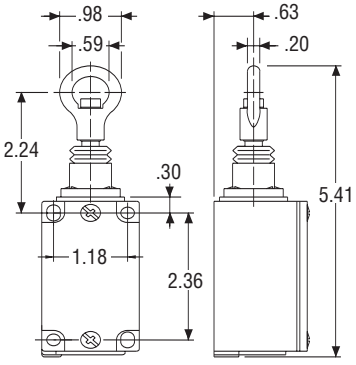

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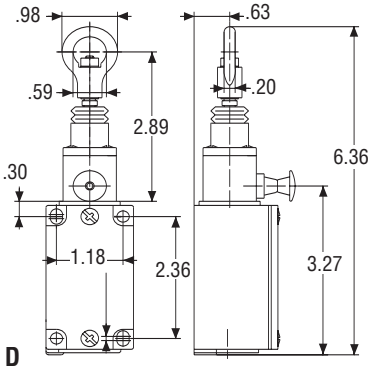

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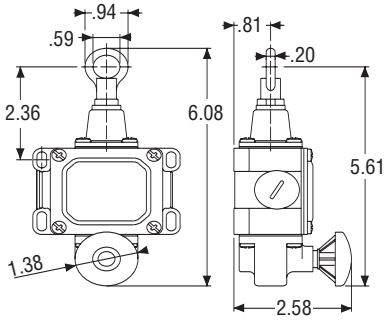

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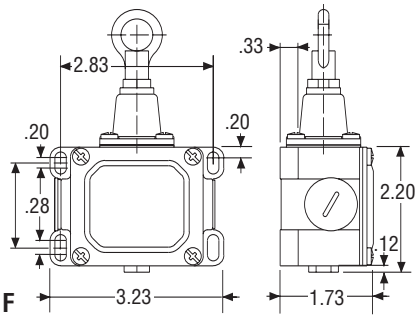

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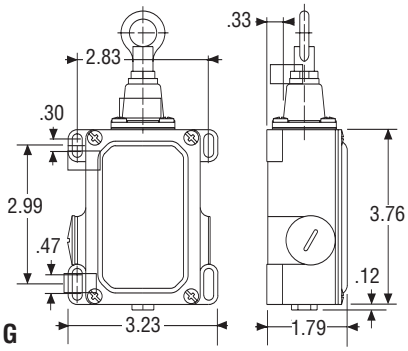

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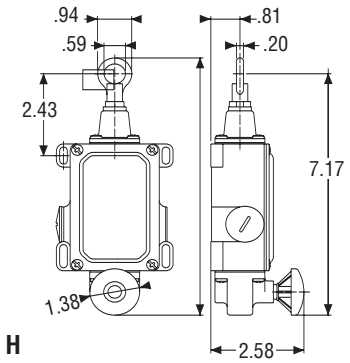


H

Cable Pull Switches

For Cable Lengths Up To 250 Feet
Two Way Direction
For Standard and Safety Applications


Si1


Si2

Description

For cable runs greater than 75 feet, two directional cable pull switches are recommended. Two directional switches can be used in applications of cable runs up to 250 feet (125 feet on each side of the installed switch). This type of cable pull switch operates with the cables under tension. During prestressing of the cable, both sets of contacts are in their original state. Pulling the cable on either side of the switch will cause the actuator on the switch to be displaced. When the displacement reaches a prespecified angle, the switch will lock and the contacts will not be able to switch back to their original state. The lock-out feature ensures that the machine cannot be restarted until the switch is manually reset by the operator. Cocking springs must be used at both ends of the installation, as shown in the Typical Installation drawing. Any cable length over 15 feet should be supported with an eye screw.

Common Features

Degree of Protection: NEMA 4
Temperature: –22°F to +176°F
Enclosure: Die cast aluminum
Latch: Standard with pull ring reset
Approvals: UL, CSA, (Si1 = BG)

Two Way Direction Accessory Cable Kit

Cable Length	Part Number
105 ft. [32 m]	8010-448-004
200 ft. [61 m]	8010-448-005
250 ft. [76 m]	8010-448-006

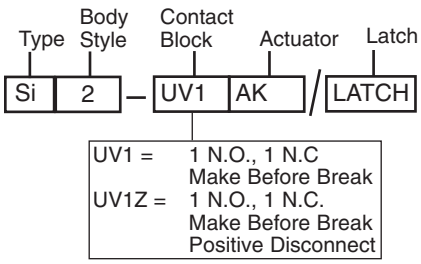
Each Two Way Direction Cable Kit Includes:
Length of cable as listed
2 Tension Springs
4 Galvanized Clamps
4 Galvanized Thimbles
(Customer to provide Eye Screws)
Individual accessories are also available.

Two Way Direction Safety Cable Pull Switch

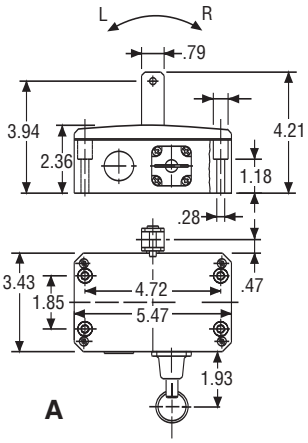
Model	Part Number	Cable Length*	Switching Angle	Voltage (max.)	Current (max.)	Drawing
Si1-UV1ZAK/LATCH	601-4735-001	225 ft.	30 Degrees	500 VAC	10 A	A
Si2-UV1AK/LATCH	601-5735-002	250 ft.	30 Degrees	500 VAC	10 A	B

* Recommended Cable Length

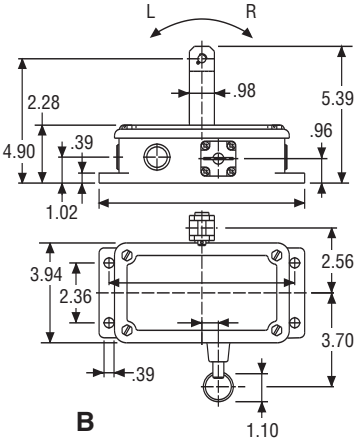
Model Identification



(Dimensions are in inches)



A



B

Typical Installation Arrangement