Safety Interlock Switches
Product Line Catalog

Safety Switch Features

- Full compliment of safety switches for interlocking mechanical guards with machine stop circuits; several mounting configurations are offered
- Positive opening safety contacts (not dependent on springs); most models also offer monitoring contacts
- Choose models with separate actuator for use on sliding doors and removable covers, or models with integral rotating actuator for use on hinged access doors
- Separate actuators are triple-coded to discourage intentional defeat
- Choose locking actuator models for delaying access until dangerous machine motion stops
- Choose magnetic actuator style for wet areas, including washdown applications
- Full compliance with all standards for safety switch design

the machine safety specialist

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P/N 49446

⚠ IMPORTANT Information Regarding Use of Safety Switches

In the United States, the functions that Banner safety switches are intended to perform are regulated by the Occupational Safety and Health Administration (OSHA). Whether or not any particular safety switch installation meets all applicable OSHA requirements depends upon factors that are beyond the control of Banner Engineering Corp. These factors include the details of how the safety switches are applied, installed, wired, operated, and maintained.

Banner Engineering Corp. has attempted to provide complete application, installation, operation, and maintenance instructions. This information is found in the instruction manual packaged with each safety switch. In addition, we suggest that any questions regarding the use or installation of safety switches be directed to the factory applications department at the telephone numbers or address shown, below.

Banner Engineering Corp. recommends that safety switches be applied according to the guidelines set forth in Euronorm (EN) standards listed, below. Specifically, Banner Engineering Corp. recommends application of safety switches in a configuration which meets safety category 4, per EN 954.

In addition, the user of Banner safety switches has the responsibility to ensure that all local, state, and national laws, rules, codes, and regulations relating to the use of Banner safety switches in any particular application are satisfied. Extreme care is urged that all legal requirements have been met and that all installations and maintenance instructions are followed

Application Assistance

Toll Free:	1-888-3-SENSOR (1-888-373-6767)
Fax:	(612) 544-3573
E-Mail:	sensors@baneng.com
Address:	9714 Tenth Avenue North Minneapolis, MN 55441

U.S. Regulations Applicable to Use of Banner Safety Switches

OSHA Code of Federal Regulations: Title 29, Parts 1900 to 1910
Available from: **Superintendent of Documents**
Government Printing Office
Washington, DC 20402-9371
Tel: 202-783-3238

U.S. Standards Applicable to Use of Banner Safety Switches

ANSI B11 **"Standards for Construction, Care, and Use of Machine Tools"**
Available from: **Safety Director**
National Machine Tool Builders Association
7901 Westpark Drive
McLean, VA 22101-4269

European Standards Applicable to Use of Banner Safety Switches

EN 292-1 & 2	**"Safety of Machinery - Basic Concepts, General Principals for Design"**
EN 294	**"Safety of Machinery - Safety Distances to Prevent Danger Zones Being Reached by the Upper Limbs"**
prEN 811	**"Safety of Machinery - Safety Distances to Prevent Danger Zones Being Reached by the Lower Limbs"**
EN 954	**"Safety of Machinery - Safety Related Parts of Control Systems"**
prEN 999	**"Safety of Machinery - The Positioning of Protective Equipment in Respect to Approach Speeds of Parts of the Human Body"**
prEN 1088	**"Safety of Machinery - Interlocking Devices Associated with Guards - Principles for Design and Selection"**
IEC 204-1	**"Safety of Machinery - Electrical Equipment of Machines"**
IEC 947-5-1	**"Low Voltage Switchgear -Electromechanical Control Circuit Devices"**

Available from: **Global Engineering Documents**
15 Inverness Way East
Englewood, CO 80112-5704
Phone: 1-800-854-7179
Fax: (303) 397-7935

- ⊖ Positive opening contacts (not dependent upon springs)
- Mechanically-coded actuators utilize two independent operating elements to minimize intentional tampering or defeat
- Rotating head allows actuator engagement from front or back or either of two top positions (see diagram, page 4)
- Low-profile design for limited space requirements; only 33 mm (1.3 in) wide
- Tough, glass-reinforced thermoplastic housing; metal actuator
- Choice of in-line actuator or two types of adjustable radius actuators; flexible actuator and high extraction force actuator are available as options
- Design complies with standards BG GS-ET-15 & 19, IEC 947-5-1, and IEC 204-1

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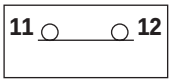
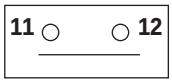
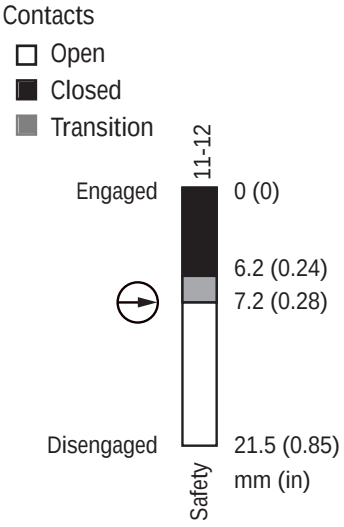
SI-QS75 Series Flat Pack Style

- One, positive opening safety contact for best economy when monitor contacts are not required
- Choice of three standard actuators; two special actuators are available as options (see page 10)
- Actuator head may be rotated (see below)
- NEMA 4 (IP 65) switch housing rating may be increased to NEMA 6 (IP 67) with addition of screw to wiring chamber door

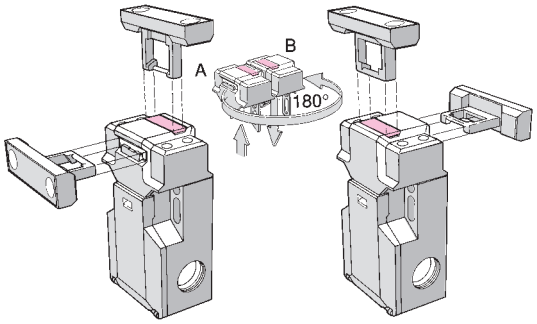
NOTE: ⊖ This symbol for a positive opening contact is used in the Switching Diagrams to identify the point in actuator travel where the normally-closed safety contact is fully open.

SI-QS75 Flat Pack Style Safety Switches

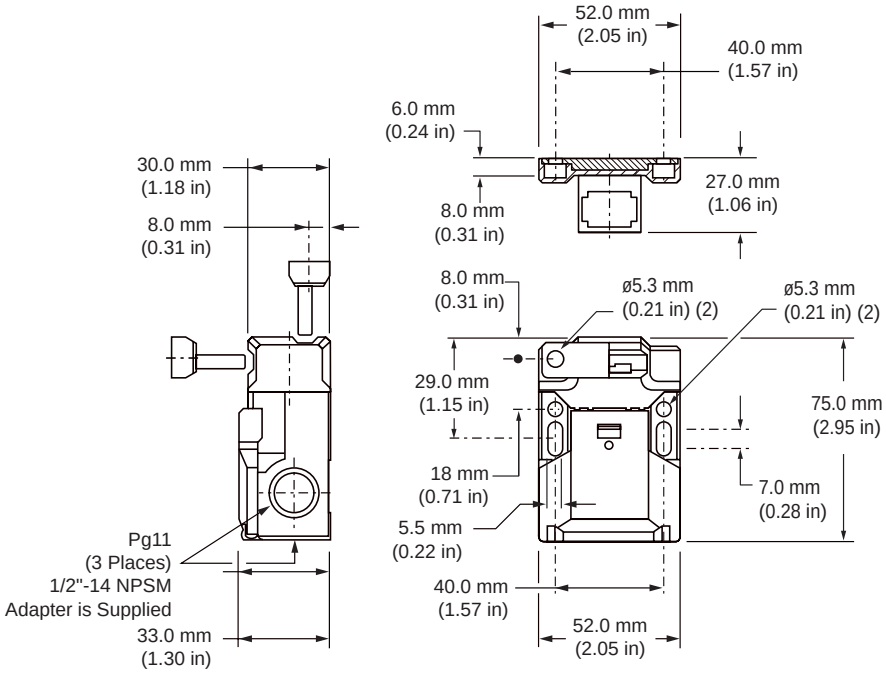
Model Number	Actuator Type	Contact Configuration (Actuator Engaged)	Contact Configuration (Actuator Removed)	Switching Diagram
SI-QS75MC	In-Line 			
SI-QS75MRHC	Horizontal Radius 			
SI-QS75MRVC	Vertical Radius 			

Rotating Actuator Head

The actuator head may be rotated 180º to create four possible actuator engagement locations.

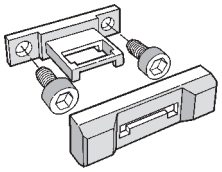


SI-QS75 Series Flat Pack Style Dimensions



Choice of Three Standard Actuators

In-line Actuator



Choose the in-line actuator for applications such as sliding doors, or covers that lift straight off, or on hinged doors with a radius of 150 mm (6 in), or greater. A one-way snap-on cap is supplied to discourage unauthorized removal of the actuator mounting hardware. The actuator is die-cast stainless steel.

Horizontal Radius Actuator

Use this actuator on hinged doors with a radius of 50 mm (2 in.), or greater. Once the angle is set, the actuator has flexibility in two dimensions. The actuator is die-cast aluminum.

Vertical Radius Actuator

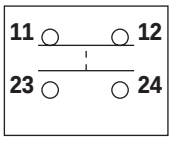
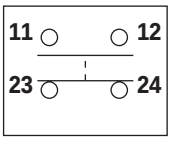
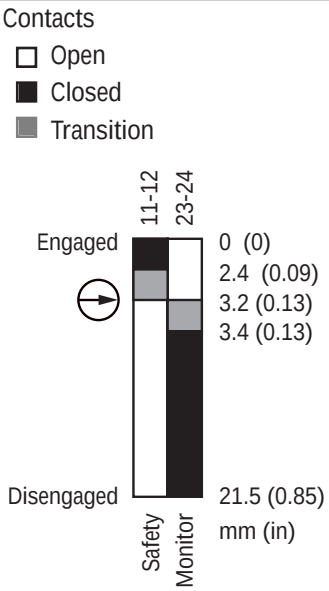
Use this actuator on hinged doors with a radius of 50 mm (2 in.), or greater. Once the angle is set, the actuator has flexibility in two dimensions. The actuator is die-cast aluminum.

Also available: A flexible actuator and a high extraction force actuator (see Accessories, page 10).

SI-QS90 Series Flat Pack Style

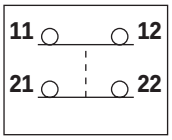
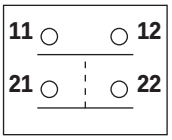
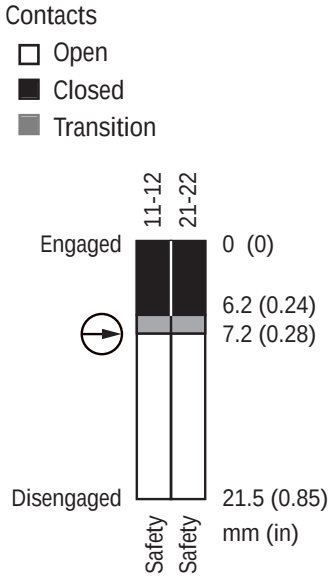
- Three contact arrangements are offered: one N.C. plus one N.O., two N.C., and two N.C. plus one N.O.
- Choice of three standard actuators; two special actuators are available as options (see page 10)
- Actuator head may be rotated (see page 4)
- NEMA 4 (IP 65) switch housing rating may be increased to NEMA 6 (IP 67) with addition of screw to wiring chamber door

SI-QS90 Series: Contact Configuration – One Normally Closed and One Normally Open

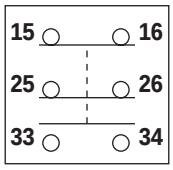
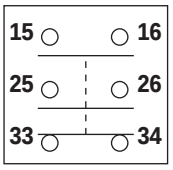
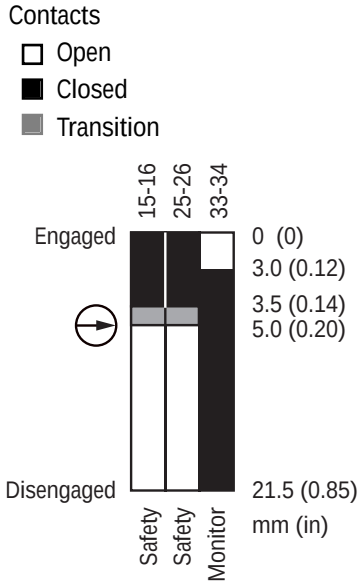
Model Number	Actuator Type	Contact Configuration (Actuator Engaged)	Contact Configuration (Actuator Removed)	Switching Diagram
SI-QS90MD	In-Line 			
SI-QS90MRHD	Horizontal Radius 			
SI-QS90MRVD	Vertical Radius 			

NOTE: ⊖ This symbol for a positive opening contact is used in the Switching Diagrams to identify the point in actuator travel where the normally-closed safety contact is fully open.

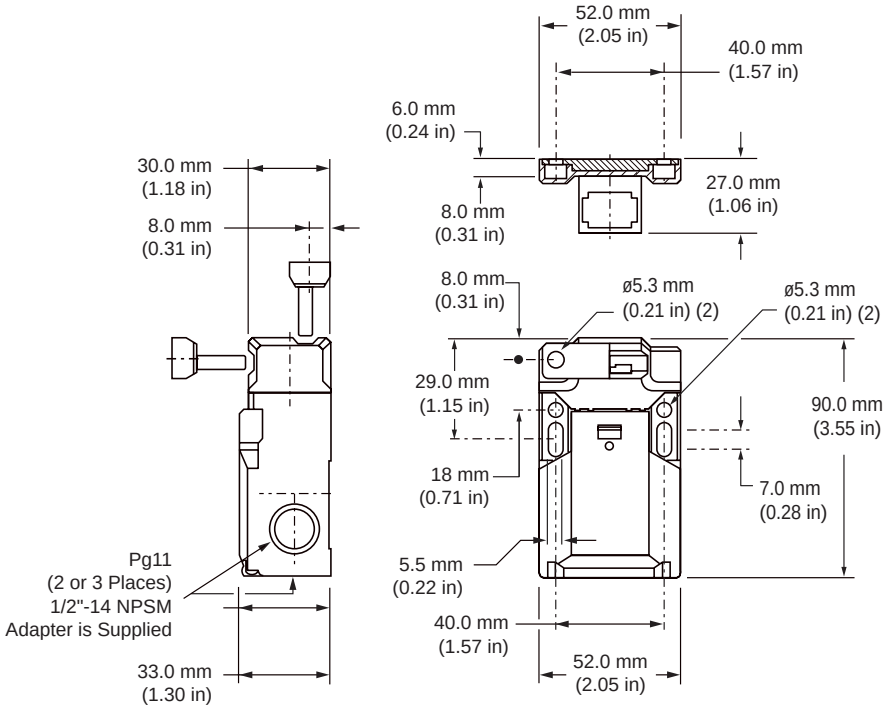
SI-QS90 Series: Contact Configuration – Two Normally Closed

Model Number	Actuator Type	Contact Configuration (Actuator Engaged)	Contact Configuration (Actuator Removed)	Switching Diagram
SI-QS90ME	In-Line 			
SI-QS90MRHE	Horizontal Radius 			
SI-QS90MRVE	Vertical Radius 			

SI-QS90 Series: Contact Configuration – Two Normally Closed and One Normally Open

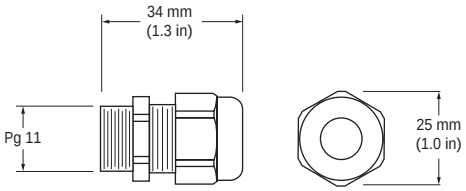
Model Number	Actuator Type	Contact Configuration (Actuator Engaged)	Contact Configuration (Actuator Removed)	Switching Diagram
SI-QS90MF	In-Line 			
SI-QS90MRHF	Horizontal Radius 			
SI-QS90MRVF	Vertical Radius 			

SI-QS90 Series Flat Pack Style Dimensions

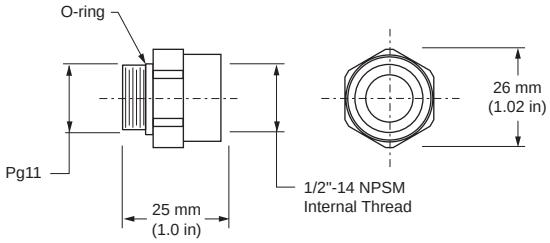


Flat Pack Style Product Specifications	
Contact Rating	10A @ 24V ac, 10A @ 110V ac, 6A @ 230V ac 6A @ 24V dc 2.5 kV max. transient tolerance
European Rating	Utilization categories: AC15 and DC13 Switches with 1 & 2 contact pairs: U_i = 500V ac, I_{th}= 10A Switches with 3 contact pairs: U_i = 400V ac, I_{th}= 6A
Contact Material	Silver-nickel alloy
Maximum Switching Speed	30 operations per minute
Maximum Actuator Speed	1 meter/second (39 inches/second)
Minimum Actuator Engagement Radius	In-line actuators: 150 millimeters (6 inches) Adjustable actuators: 50 millimeters (2 inches)
Actuator Extraction Force	10 Newtons (2.2 lbf)
Mechanical Life	1 million operations
Wire Connections	Screw terminals with pressure plates accept the following wire sizes – For switches with one or two contacts: Stranded and solid: 20 AWG (0.5 mm^2) to 16 AWG (1.5 mm^2) for one wire Stranded: 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires For switches with three contacts: Stranded and solid: 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for one wire Stranded: 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires
Cable Entry	PG 11 threaded entrance. Adapter supplied to convert PG 11 to $^1/_2$ - 14 NPSM threaded entrance. (See Application Notes, below).
Construction	Glass fiber-reinforced polyamide thermoplastic housing UL94-VO rating
Environmental Rating	IP 65 (NEMA 4) Note: Addition of a screw to the wiring access door increases sealing to IP 67 (NEMA 6)
Operating Temperature	-30 to +80ºC (-22 to +176ºF)
Weight	SI-QS75 models: 0.11 kg (0.25 lb) SI-QS90 models: 0.13 kg (0.29 lb)
Application Notes	Models with one and two contacts have three cable entry locations (bottom and two sides); models with three contacts have two cable entry locations (two sides). All entry locations are sealed with knockouts. To remove knockouts, thread the PG 11 to $^1/_2$ - 14 NPSM conduit adapter or optional PG 11 cable gland into one of the threaded entry locations. The knockout will break open just before the adapter or cable gland bottoms out.
Certifications	

Cable Glands

Size	Model	Used with Switch Models	For Cable Diameters	Dimensions
Pg 11 Plastic	**SI-QS-CG11**	All	5.0 to 10.0 mm (0.20 to 0.40 in)	

Conduit Adapters

Size	Model	Used with Switch Models	Thread Conversion	Dimensions
1/2"- 14 NPSM Plastic	**SI-QS-11**	All Note: One is included with each switch.	Pg 11 to 1/2"- 14 NPSM	

Optional Actuators

Type	Model	Application
Flexible 	**SI-QS-FSA**	For doors or covers where alignment is difficult to maintain. Flexes in all directions.
High Force 	**SI-QS-100**	For particularly heavy or large doors. Adjustable from 50 to 100 Newtons (force).

Replacement Actuators		
Type	**Model**	**Application**
In-line 	**SI-QS-SSA**	For doors or covers with a radius of 150 mm (6 in), or greater. A one-way snap-on cap is supplied to discourage unauthorized removal of the actuator mounting hardware.
Horizontal Radius 	**SI-QS-HMA**	For hinged doors with a radius of 50 mm (2 in) or greater
Vertical Radius 	**SI-QS-VMA**	For hinged doors with a radius of 50 mm (2 in) or greater

WARNING!

Spare actuators must **NEVER** be used to bypass or otherwise defeat the protective function of a safety switch.

Limit Switch Style Safety Switches

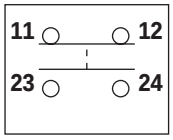
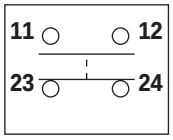
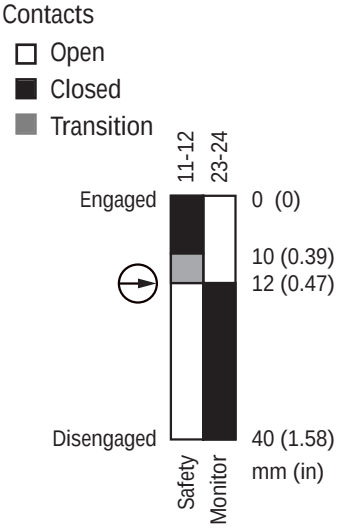
- ⊖ Positive opening contacts (not dependent upon springs)
- Models which have a separate actuator are keyed to discourage intentional tampering or defeat
- Industry standard limit switch housings: both 40 millimeter and low-profile 31 millimeter styles are available
- Models available with rotating actuators for hinged door applications
- Some models feature rotating actuator head
- Designs comply with standards BG GS-ET-15 & 19, IEC 947-5-1, and IEC 204-1

SECTION CONTENTS

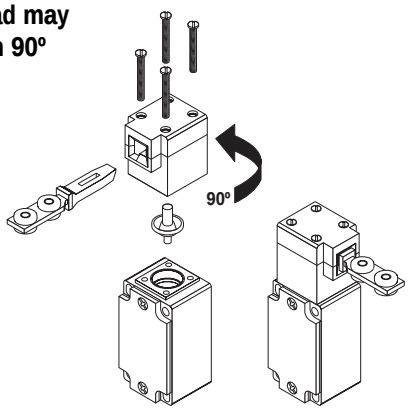
SI-LM40 Series Switches with In-Line Actuator

- Metal switch housing
- In-line actuator
- Standard limit switch housing
- Switch weight: 0.34 kg (0.75 lbs)

Limit Switch Style Safety Switches with In-Line Actuator

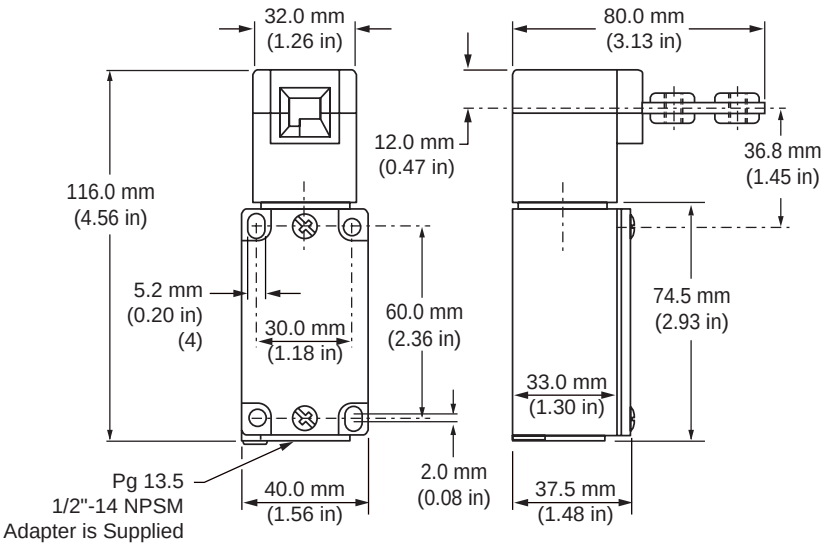
Model Number	Actuator Type	Contact Configuration (Actuator Engaged)	Contact Configuration (Actuator Removed)	Switching Diagram
SI-LM40MKHD Metal Actuator Head Metal Switch Housing	In-line			

Actuator head may be rotated in 90º increments.

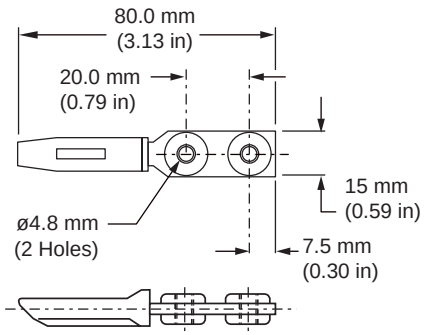


NOTE: ⊖ This symbol for a positive opening contact is used in the Switching Diagrams to identify the point in actuator travel where the normally-closed safety contact is fully open.

SI-LM40MKHD Safety Switch Dimensions



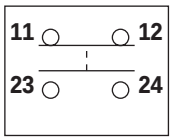
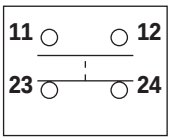
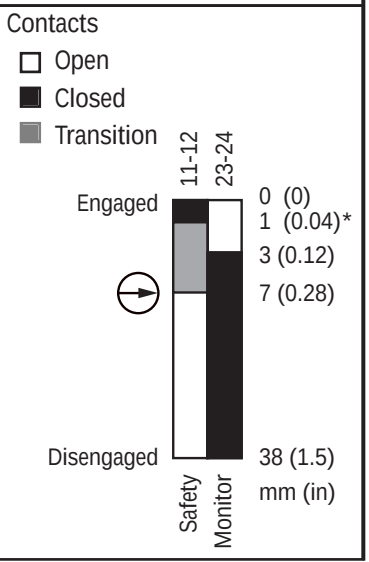
Actuator Dimensions for SI-LM40MKHD



SI-LM40/LS40 Series Switches with Flexible In-Line Actuator

- Available with metal or glass-reinforced thermoplastic switch housing
- In-line actuator; Flexes in all directions
- Standard limit switch housing
- Switch weight: Plastic: 0.24 kg (0.54 lbs)
  Metal: 0.31 kg (0.68 lbs)

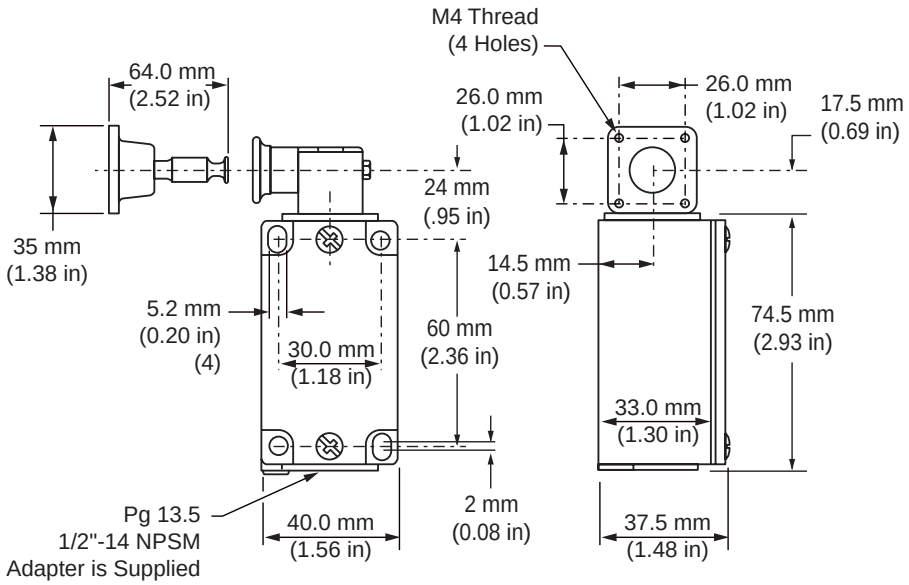
Limit Switch Style Safety Switches with Flexible In-Line Actuator

Model Number	Actuator Type	Contact Configuration (Actuator Engaged)	Contact Configuration (Actuator Removed)	Switching Diagram
SI-LM40MKVD Metal Actuator Head Metal Switch Housing	Flexible In-line			
SI-LS40MKVD Metal Actuator Head Plastic Switch Housing				

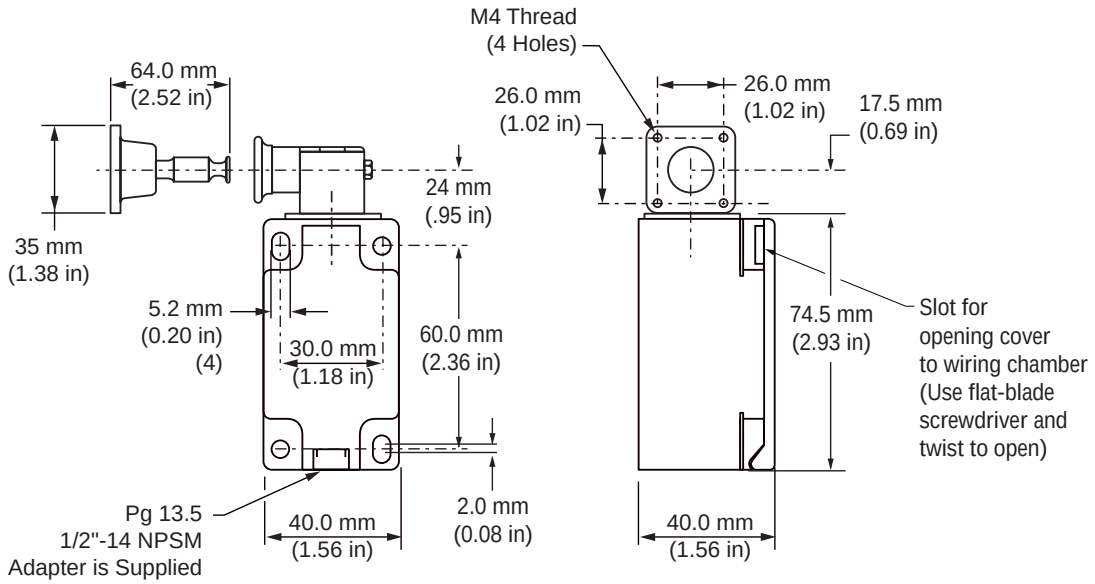
*Please note that only 1mm of movement will open the closed contact.

NOTE: ⊖ This symbol for a positive opening contact is used in the Switching Diagrams to identify the point in actuator travel where the normally-closed safety contact is fully open.

SI-LM40MKVD Safety Switch Dimensions



SI-LS40MKVD Safety Switch Dimensions

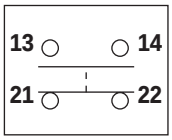
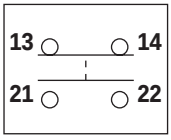
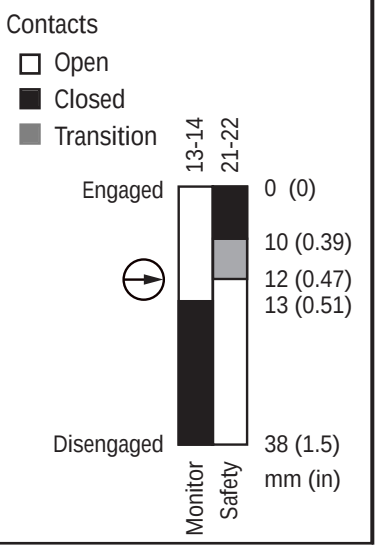


SI-LS31 Series Switches with In-Line Actuator

- Low-profile limit switch design with 22 mm mounting dimension
- Glass-reinforced thermoplastic switch housing with coded actuator
- Fixed actuator head (NOT rotatable)
- Switch weight: 0.09 kg (0.20 lbs)

From left to right:
SI-LS31PKVD and SI-LS31PKHD

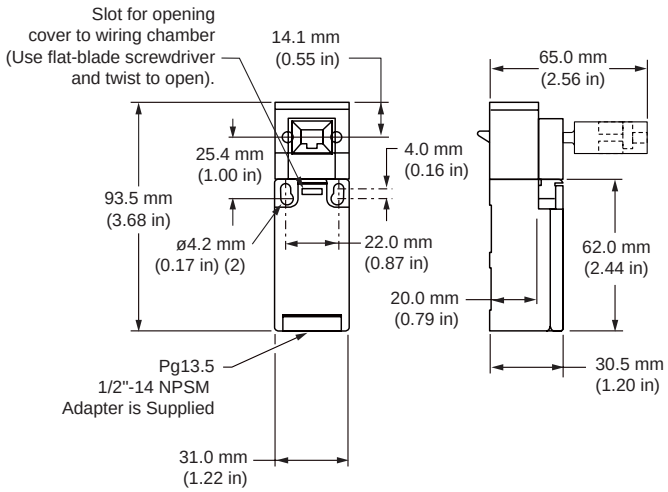
SI-LS31 Series Switches with In-Line Actuator

Model Number	Actuator Type	Contact Configuration (Actuator Engaged)	Contact Configuration (Actuator Removed)	Switching Diagram
SI-LS31PKHD	Horizontal In-line			
SI-LS31PKVD	Vertical In-line			

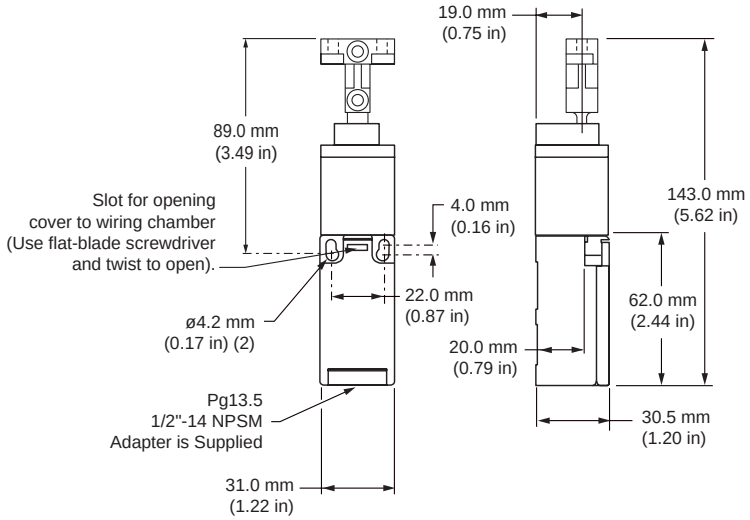
NOTE: ⊖ This symbol for a positive opening contact is used in the Switching Diagrams to identify the point in actuator travel where the normally-closed safety contact is fully open.

Important Note:
Actuator head is **NOT** rotatable.

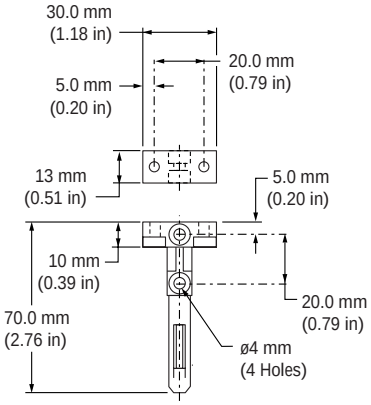
SI-LS31PKHD Safety Switch Dimensions



SI-LS31PKVD Safety Switch Dimensions



Actuator Dimensions for SI-LS31PKHD and SI-LS31PKVD Models

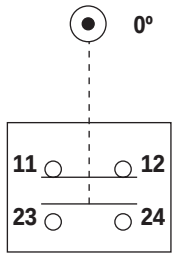
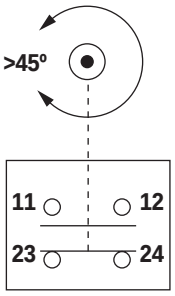
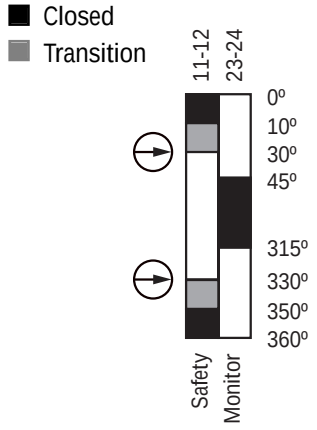


SI-LS31 Series Switches with Rotary Hinge Actuator

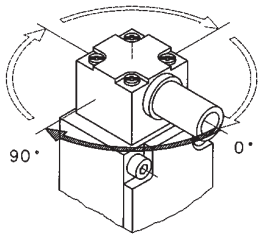
- Rotating shaft connects directly to door hinge
- Low-profile limit switch design with 22 mm mounting dimension
- Glass-reinforced thermoplastic switch housing with plated steel actuator
- Actuator head rotatable in 90 degree increments
- Switch weight: 0.09 kg (0.20 lbs)

NOTE: ⊖ This symbol for a positive opening contact is used in the Switching Diagrams to identify the point in actuator travel where the normally-closed safety contact is fully open.

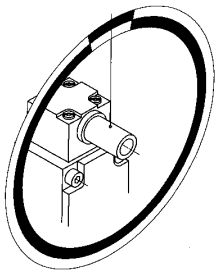
SI-LS31 Series Switches with Rotary Hinge Actuator

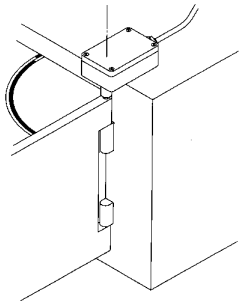
Model Number	Actuator Type	Contact Configuration (Axle in home position = 0º)	Contact Configuration (Axle Rotated 45º in either direction)	Switching Diagram
SI-LS31RTD	Rotary Shaft			

Loosen four screws to rotate actuator head to any of four 90 degree positions.



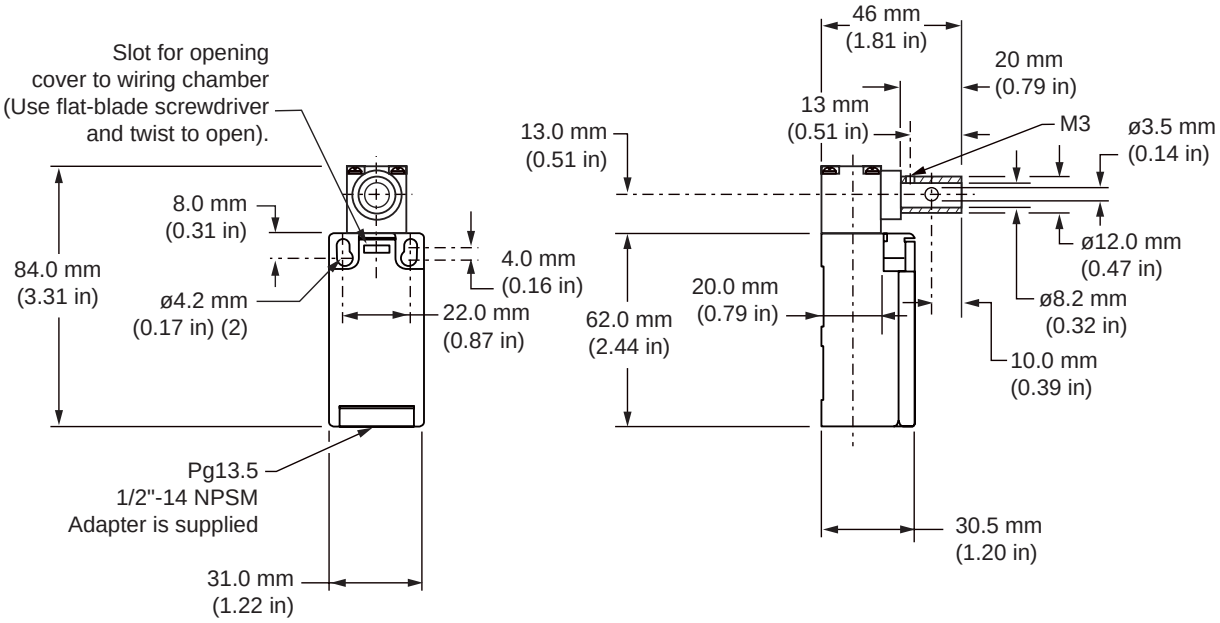
The closed contact (11-12) fully opens (i.e. positive break occurs) within ±30º of the neutral shaft position.





The outside diameter of the axle is 12.0 mm (0.47 in). The inside diameter of the axle is 8.2 mm (0.32 in).The axle is fastened to the hinge mechanism using a drift pin.

SI-LS31RTD Safety Switch Dimensions



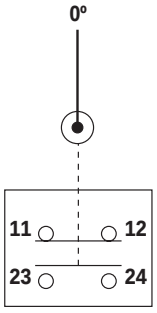
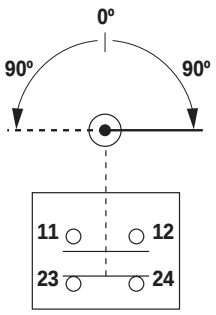
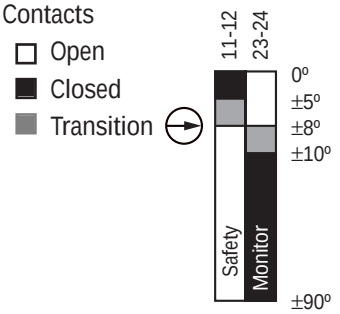
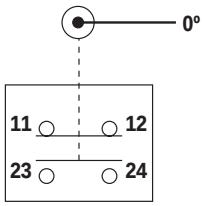
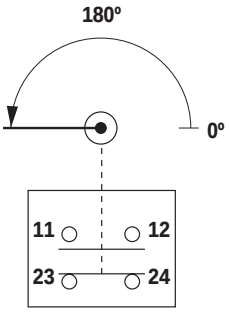
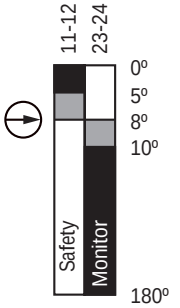
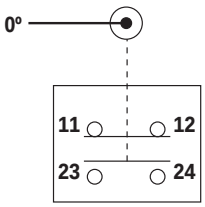
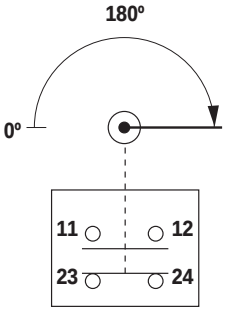
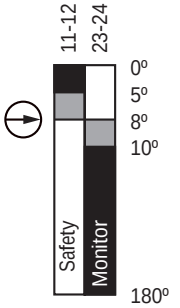
SI-LS31 Series Switches with Hinged Lever Actuator

- For use on doors or flaps
- Low-profile 31 mm limit switch design with 22 mm mounting dimension
- Glass-reinforced thermoplastic switch housing with plated steel actuator
- Actuator head rotatable in 90 degree increments
- Switch weight: 0.09 kg (0.20 lbs)

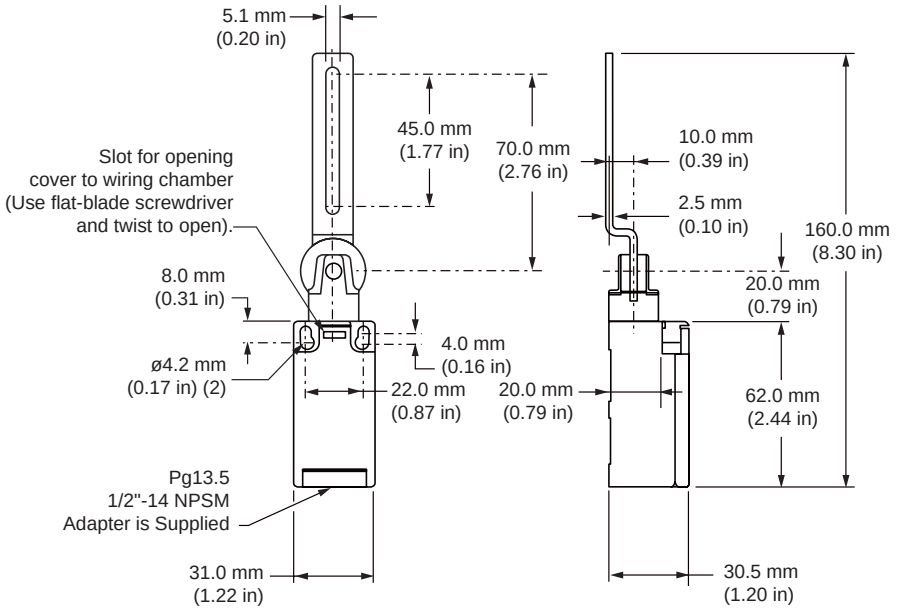
NOTE: ⊖ This symbol for a positive opening contact is used in the Switching Diagrams to identify the point in actuator travel where the normally-closed safety contact is fully open.

From left to right: SI-LS31HGLD, SI-LS3IHGD, and SI-LS31HGRD

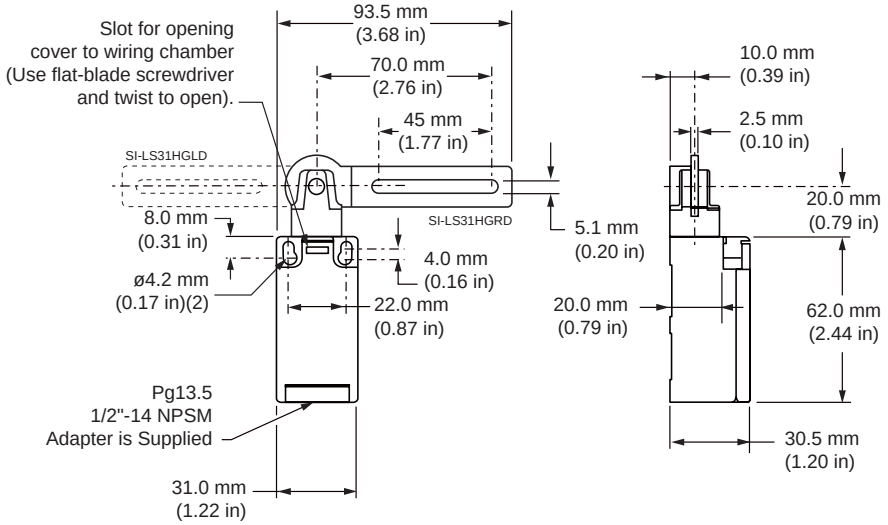
SI-LS31 Switches with Hinged Lever Actuator

Model Number	Actuator Type	Contact Configuration (Lever in normal position)	Contact Configuration (Lever rotated)	Switching Diagram
SI-LS31HGD	Vertical Hinged Lever ±90º			
SI-LS31HGRD	Right-hand Hinged Lever 180º			
SI-LS31HGLD	Left-hand Hinged Lever 180º			

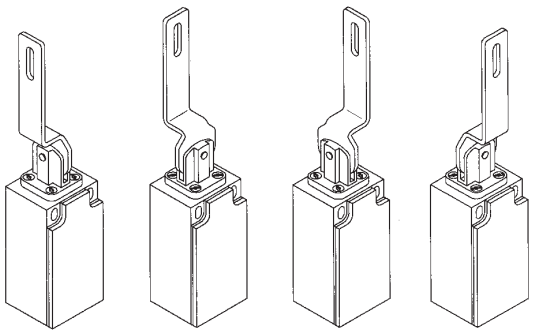
SI-LS31HGD Safety Switch Dimensions



SI-LS31HGRD and HGLD Safety Switch Dimensions

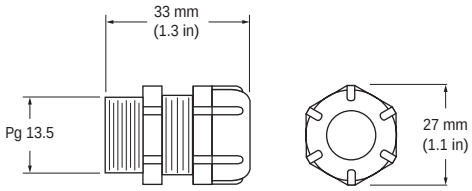
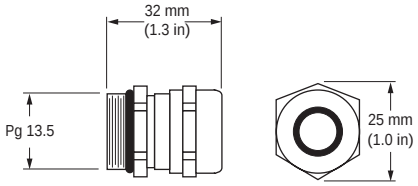


Actuator head may be rotated in 90º increments.

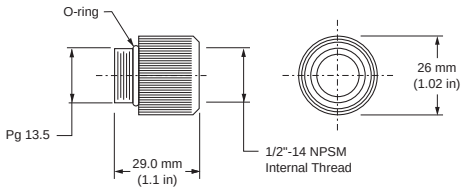
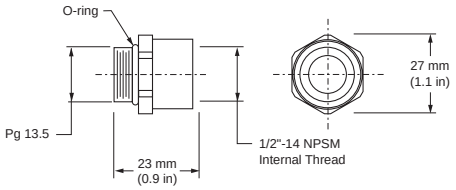


Limit Switch Style Product Specifications	
Contact Rating	10A @ 24V ac, 10A @ 110V ac, 6A @ 230V ac 6A @ 24V dc 2.5 kV max. transient tolerance
European Rating	Utilization categories: AC15 and DC13 U_i = 500V ac I_{th} = 10A
Contact Material	Silver-nickel alloy
Maximum Switching Speed	50 operations per minute (exception: 10 operations per minute for models SI-LM40MKVD and SI-LS40MKVD)
Maximum Actuator Speed	In-line actuators: 1.5 meters/second (5 feet/second), except models SI-LM40MKVD and SI-LS40MKVD: 0.5 meters/second (20 inches/second)
Minimum Actuator Engagement Radius	In-line actuators for 40 mm switches: 800 millimeters (32 inches) In-line actuators for 31 mm switches: 400 millimeters (16 inches) Models SI-LM40MKVD and SI-LS40MKVD: 150 millimeters (6 inches)
Required Actuation Force	In-line type actuators: 10 N (2.2 lbf); models SI-LM40MKVD and SI-LS40MKVD: 20 N (4.4 lbf) Axle type hinge actuators: 10 N cm (0.9 lbf in) Lever type hinge actuators: 15 N cm (1.3 lbf in)
Mechanical Life	1 million operations (exception: 25,000 operations for models SI-LM40MKVD and SI-LS40MKVD)
Wire Connections	Screw terminals with pressure plates accept the following wire sizes – Stranded and solid: 20 AWG (0.5 mm^2) to 16 AWG (1.5 mm^2) for one wire Stranded: 20 AWG (0.5 mm^2) to 18 AWG (1.0 mm^2) for two wires
Cable Entry	PG 13.5 threaded entrance Adapter supplied to convert to PG 13.5 to ½ - 14 NPSM threaded entrance (See dimension drawings on page 24)
Construction	Models with plastic switch housing: Glass fiber-reinforced thermoplastic UL94-VO rating Models with metal housing: Aluminum alloy die cast with black epoxy paint
Environmental Rating	IP 65 (NEMA 4)
Operating Temperature	-30 to +80ºC (-22 to +176ºF)
Weight	See model selection charts
Certifications	

Cable Glands

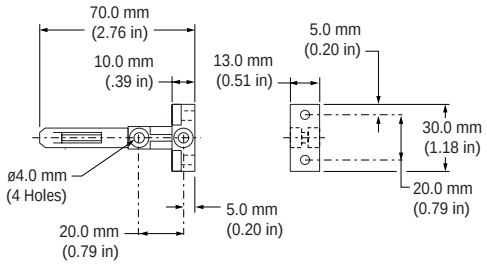
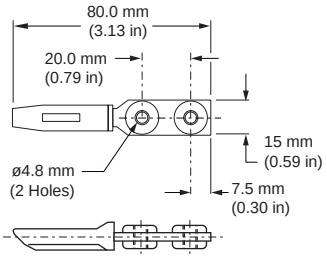
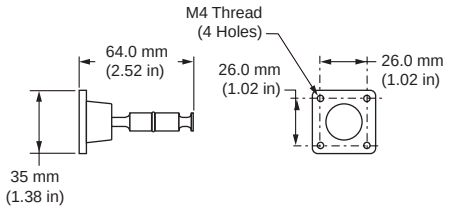
Size	Model	Used with Switch Models	For Cable Diameters	Dimensions
Pg 13.5 Plastic	**SI-QS-CG13**	All with plastic housing	6.0 to 12.0 mm (0.24 to 0.47 in)	
Pg 13.5 Metal	**SI-QM-CG13**	All with metal housing	5.0 to 12.0 mm (0.20 to 0.47 in)	

Conduit Adapters

Size	Model	Used with Switch Models	Thread Conversion	Dimensions
½”-14 NPSM Plastic	**SI-QS-13**	All with plastic housing	Pg 13.5 to ½”- 14 NPSM	
½”-14 NPSM Metal	**SI-QM-13**	All with metal housing	Pg 13.5 to ½”- 14 NPSM	

Note: One conduit adapter is supplied with each switch.

Replacement Actuators

Size	Model	Models Used with	Dimensions
In-line Plastic	**SI-QS-31PA**	SI-LS31PKHD SI-LS31PKVD	
In-line Metal	**SI-QM-SSA**	SI-LM40MKHD	
In-line Flexible Metal	**SI-QM-90A**	SI-LM40MKVD SI-LS40MKVD	

WARNING!

Spare actuators must **NEVER** be used to bypass or otherwise defeat the protective function of a safety switch.

Locking Style Safety Switches

- ⊖ Positive opening contacts (not dependent upon springs)
- Actuators are keyed to discourage intentional tampering or defeat
- Choice of two locking mechanism types:
  - Spring lock with energized solenoid unlock
  - Energized solenoid lock with spring unlock
- Both types are available with choice of 24V dc, 115 V ac, or 230V ac solenoid operating voltage
- Actuator head rotatable in 90º increments
- Monitor contacts for both switching contact and solenoid status
- Designs comply with standards BG GS-ET-19, IEC 947-5-1, and IEC 204-1

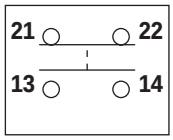
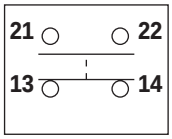
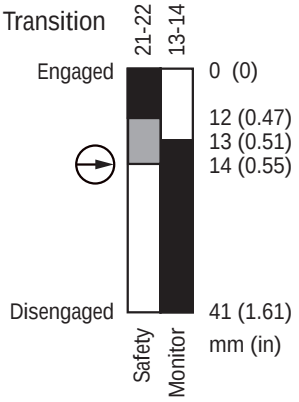
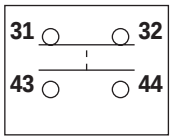
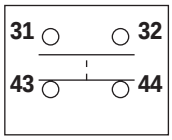
Section Contents

Locking Style Safety Switches

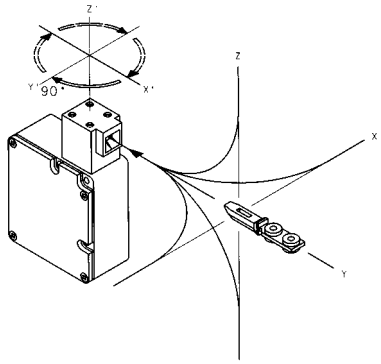
- Spring Lock/Solenoid Unlock: The actuator is mechanically locked when it is fully inserted into the actuator head. The actuator is unlocked by applying voltage to the solenoid.
- Solenoid Lock/Spring Unlock: The fully-inserted actuator is locked when voltage is applied to the solenoid. The actuator is unlocked when voltage is removed from the solenoid.
- Choose 24V dc, 115V ac, or 230V ac solenoid operating voltage

From left to right: Spring Lock/Solenoid Unlock Model and Solenoid Lock/Spring Unlock Model

Locking Style Safety Switches

Model Number	Solenoid Voltage	Locking Configuration	Contact Configuration (Actuator Engaged and Locked)	Contact Configuration (Actuator Unlocked and Removed)	Switching Diagram
SI-QM100DMSG **SI-QM100AMSG** **SI-QM100BMSG**	24 V dc 115 V ac 230 V ac	Spring Lock Solenoid Unlock	Switching Contacts 	Switching Contacts 	Contacts Open Closed Transition 
SI-QM100DMMG **SI-QM100AMMG** **SI-QM100BMMG**	24 V dc 115 V ac 230 V ac	Solenoid Lock Spring Unlock	Solenoid Monitor Contacts 	Solenoid Monitor Contacts 	

Actuator head may be rotated in 90º increments.

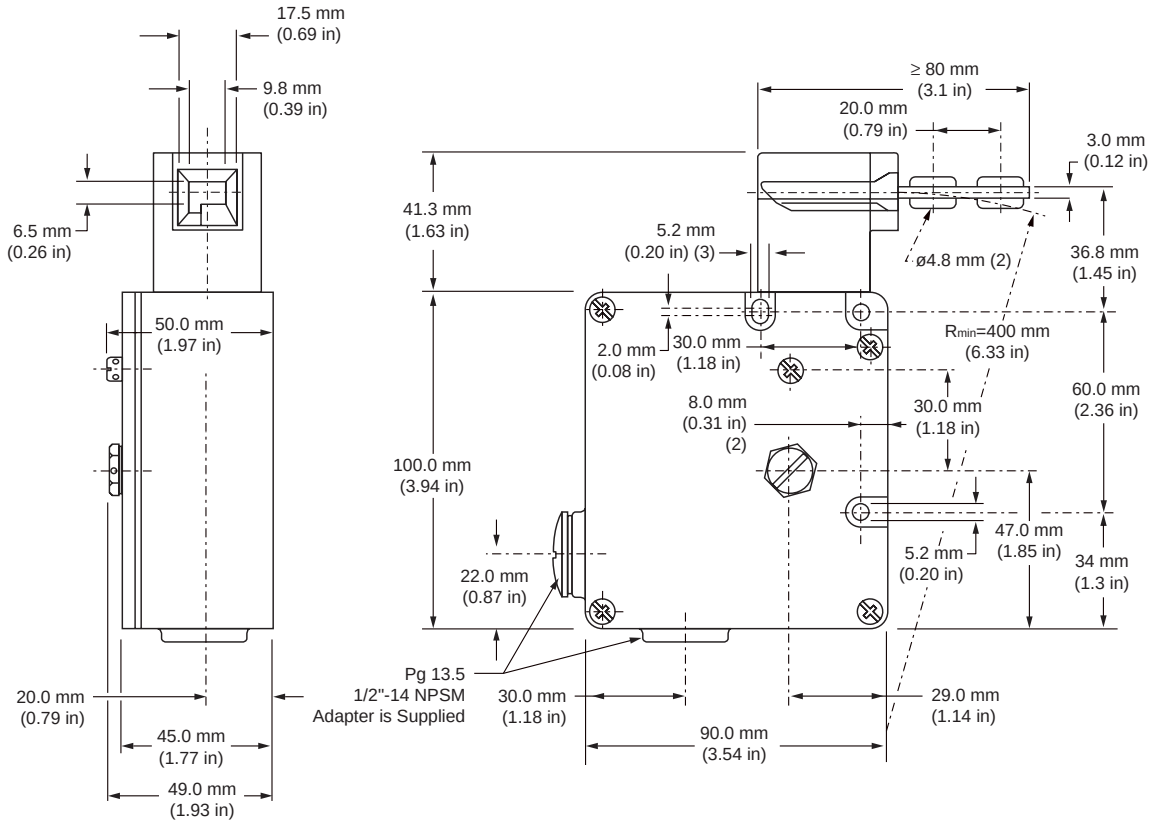


NOTE: ⊖ This symbol for a positive opening contact is used in the Switching Diagrams to identify the point in actuator travel where the normally-closed safety contact is fully open.

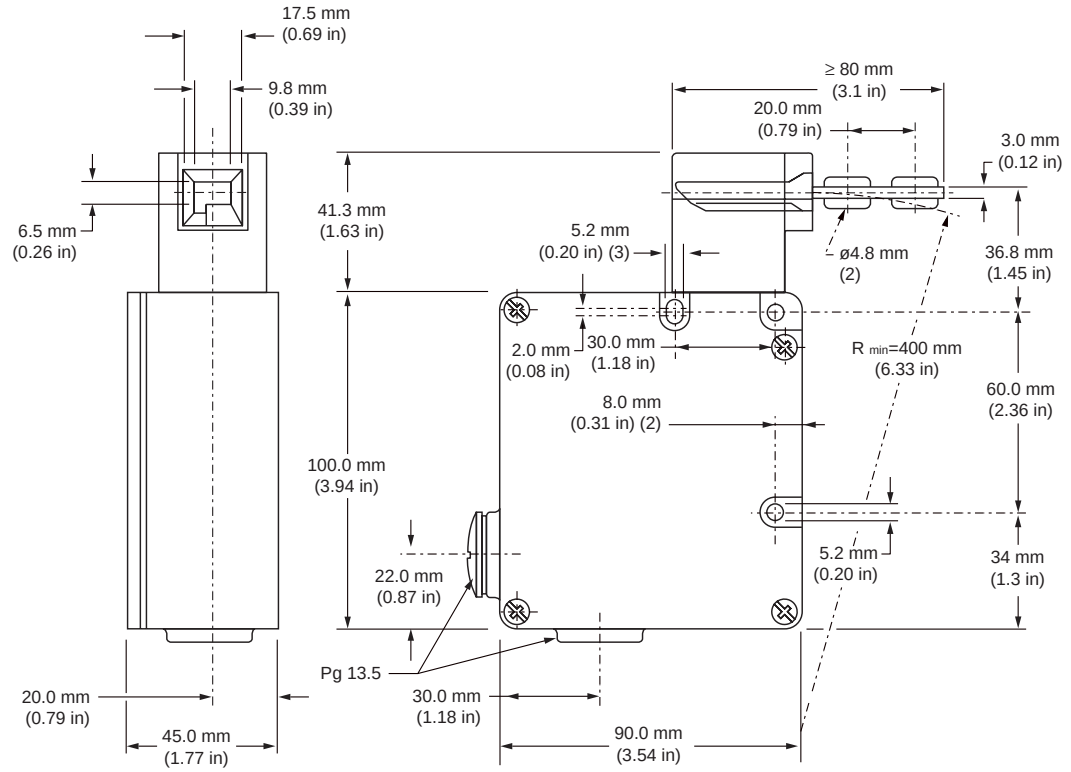
Important Note:
Be certain that the actuator is fully engaged before removing the actuator head screws during the rotation process.

Locking Style Product Specifications	
Contact Rating	4A @ 250V ac max. 2.5 kV max. transient tolerance
Contact Material	Silver-nickel alloy
Maximum Actuator Speed	1.5 meters/second (5 ft/second)
Minimum Actuator Engagement Radius	400 millimeters
Actuator Extraction Force	1000 Newtons (220 lbf) when locked
Mechanical Life	1 million operations
Wire Connections	Screw terminals with pressure plates accept wire size: 1.5 mm^2 (16 AWG) max. solid; 2.5 mm^2 (14 AWG) max. stranded, 1 mm^2/18AWG when using all 11 terminals
Cable Entry	Pg 13.5 threaded entrance. Adapter supplied to convert to PG 13.5 to $^1/_2$ - 14 NPSM threaded entrance.
Construction	Aluminum die-cast; black epoxy paint finish
Environmental Rating	IP 67 (NEMA 6)
Operating Temperature	-30 to +60ºC (-22 to +140ºF)
Weight	0.55 kg (1.2 lb)
Application Notes	When rotating the actuator head, the actuator MUST BE FULLY ENGAGED. When using a model with solenoid locking, the lock mechanism will disengage upon solenoid power failure
Certifications	

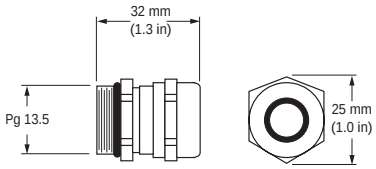
SI-QM100..MSG Series Safety Switch Dimensions



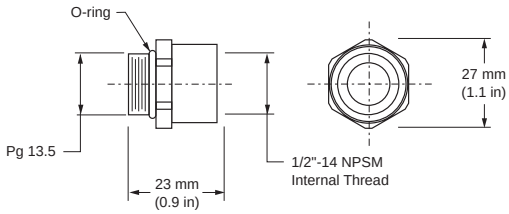
SI-QM100..MMG Series Safety Switch Dimensions



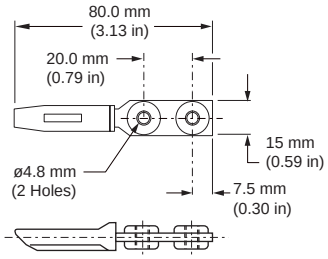
Cable Glands

Size	Model	Used with Switch Models	For Cable Diameters	Dimensions
Pg 13.5 Metal	**SI-QM-CG13**	All	5.0 to 12.0 mm (0.20 to 0.47 in)	

Conduit Adapters

Size	Model	Used with Switch Models	Thread Conversion	Dimensions
$^{1}/_{2}$"- 14 NPSM Metal	**SI-QM-13**	All Note: One is included with each switch.	Pg 13.5 to $^{1}/_{2}$"- 14 NPSM	

Replacement Actuators

Size	Model	Used with Switch Models	Dimensions
In-line Metal	**SI-QM-SSA**	All	

WARNING!

Spare actuators must **NEVER** be used to bypass or otherwise defeat the protective function of a safety switch.

Magnetic Style Safety Switches

- Non-contact safety switches are the best choice for washdown applications; the switch components are sealed and rated NEMA 4X (IP 67)
- Tolerant of dirt buildup, sensing distance, and alignment
- System consists of three components:
  - Coded magnet
  - Reed switch sensor
  - Controller module
- Magnet contains several differently-polarized magnets, and sensor contains pole-stable reed contacts to minimize any possibility of defeat
- Easy installation; can be concealed for added defeat resistance
- Sensor reed switches provide diverse input to the controller module

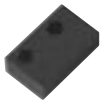
Table of Contents

Controller with Magnet Sensors and Coded Magnets

SI-MAG Series Magnetic Style Switches

- Choice of two magnet/sensor pairs; either pair works together with model SI-MAG1C controller
- Magnet is coded and controller requires simultaneous diverse switching of three reed switches to minimize possibility of defeat

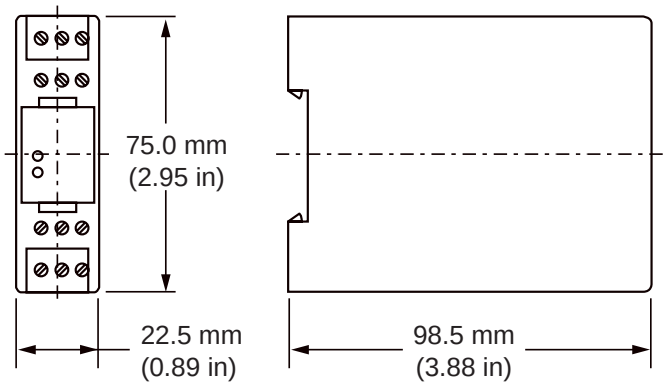
Magnetic Style Safety Switches

Magnet Sensor	Coded Magnet	Controller	Sensor Cable	Switching Distance Min. ON	Switching Distance Max OFF
SI-MAG1SM 	SI-MAG1MM 	SI-MAG1C 	3 m (10 ft)	3 mm (0.12 in)	14 mm (0.55 in)
SI-MAG2SM 	SI-MAG2MM 			4 mm (0.16 in)	8 mm (0.32 in)

SI-MAG1C Controller Specifications	
Supply Voltage and Current	24V dc ±15% (10% maximum ripple) at less than 100mA
Sensor Compatibility	Model **SI-MAG1SM** or **SI-MAG2SM** magnet sensor
Output Configuration	Two series-connected (redundant) normally-open safety relay contacts Contact Material: silver-nickel alloy Contact Ratings: Maximum Voltage: 250V ac/dc Maximum Current: 4A ac or dc (resistive load) Maximum Power: 1700VA Mechanical Life: 1,000,000 operations Electrical Life: 100,000 operations at full resistive load NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts
Status Indicators	Amber - Power ON Red - Sensor not actuated; output open
Housing	Polycarbonate; Rated NEMA 1 (IEC IP 20)
Mounting	Mounts to standard 35 mm DIN rail track. Must be installed inside an enclosure rated NEMA 3 (IEC IP54) or better
Wire Connections	Screw terminals with pressure plates accept wire size: 0.2 mm^2 (26 AWG) min. to 2.5 mm^2 (12 AWG) max.
Operating Temperature	0 to 55ºC (+32 to 131ºF)
Dimensions	See drawings on page 34
Certifications	

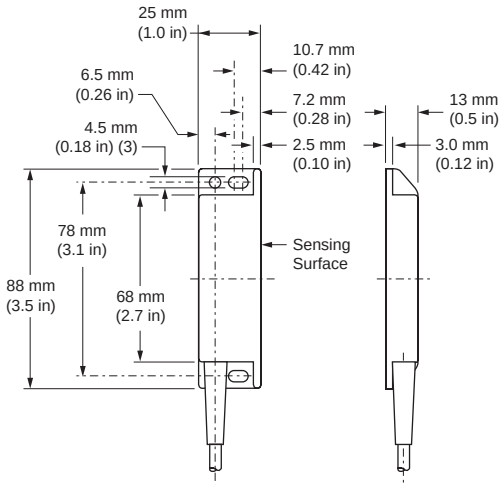
SI-MAG1SM or SI-MAG2SM Sensor Specifications	
Switching Elements	Three pole-stable reed switches
Repeat Switching Accuracy	±0.1 mm (±0.004 in)
Construction	Epoxy-encapsulated circuit in polyamide housing
Environmental Rating	IP 67 (NEMA 4X)
Operating Temperature	-5 to +70ºC (+23 to 158ºF)
Connections	Integral PVC-jacketed 3 m (10 ft) 4-wire cable. Cable O.D. is 5 mm (0.2 in). Wires are 24 AWG (0.25 mm^2)

Controller Dimensions

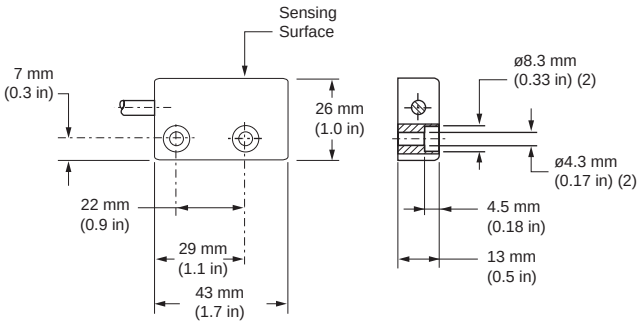


Sensor Dimensions

SI-MAG1SM

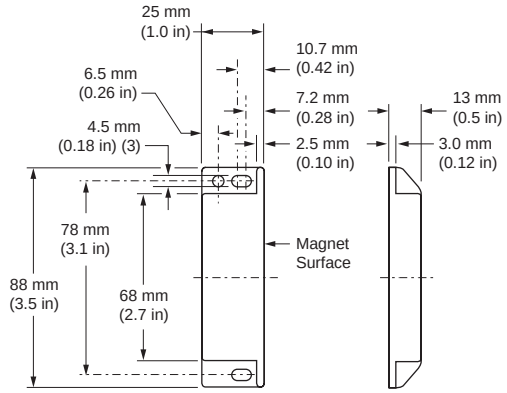


SI-MAG2SM

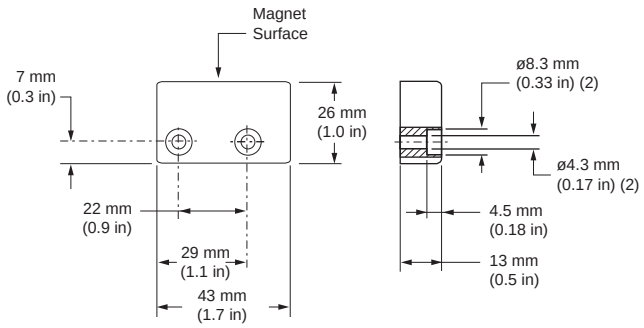


Coded Magnet Dimensions

SI-MAG1MM



SI-MAG2MM



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