



# Safety Interlock Switches

## PICO-GUARD™ . . . . . page 137

- Compact, non-contact fiber optic safety switches
- Straight, right-angle, dual-lens, extreme-duty and heavy-duty models
- Low-cost alternative to cumbersome machine guarding methods
- Rugged construction for tough environments
- Easy to install



## Magnet Style . . . . . page 141

- Compact 3-piece non-contact system
- Sealed to resist water and dirt
- Designed to resist intentional defeat



## Compact Metal . . . . . page 154

- Rigid and flexible in-line actuators
- Rotating actuator heads



## Hinge Style . . . . . page 144

- Load bearing, lever and rotating hinge styles
- Adjustable range of operation
- One-piece switches



## Locking Style . . . . . page 157

- Two options for locking mechanisms
- Two models for different voltages
- Rigid and flexible in-line actuators
- Rotating actuator heads





## Compact Plastic . . . . . page 148

- Designed to minimize tampering
- Five actuator types
- Actuator engagement from different locations

# SAFETY INTERLOCK SWITCHES

## Selection Chart

Type	Model	Catalog Page	Type	Package Style	Housing Material	Actuator Contacts	Solenoid Contacts
PICO-GUARD™	SFI-S1../R1..		Page 137	Fiber Optic	2-Piece	Plastic	—
	SFI-D1../A1..						
	SFI-M12..						
	SFI-D1E../A1E..						
	SFI-D1H../A1H..						
Magnet	SI-MAG1..		Page 141	Magnetic	2-Piece	Plastic	1 NO & 1 NC
	SI-MAG2..						
	SI-MAG3..						
Hinge	SI-HG80..		Page 144	Mechanical Non-Locking	1-Piece	Metal	1 NC
	SI-LS31R..						
	SI-LS31H..						
Compact Plastic	SI-LS83../LS100..		Page 148	Mechanical Non-Locking	2-Piece	Plastic	2 NC & 1 NO, 1 NC & 1 NO, 2 NC
	SI-QS75../QS90..						
Compact Metal	SI-LM40..		Page 154	Mechanical Non-Locking	2-Piece	Metal	1 NO & 1 NC, 2 NC, 2 NC & 1 NO
Locking	SI-LS42..		Page 157	Mechanical Locking	2-Piece	Plastic	1 NC & 1 NO, 2 NC, 2 NC & 1 NO, 3 NC
	SI-QM100..		Page 160				

NC = Normally Closed, NO = Normally Open

# PICO-GUARD™

## Fiber Optic Interlock Switches

- Interlock switches interface with PICO-GUARD fiber optic controllers.
- Compact, non-contact and easy to install, the switches interlock doors, guards, gates and covers.
- Fiber optic interlock switches eliminate the need to run electrical wires to a hazardous area.
- Fibers connect and disconnect quickly.
- Switches meet Safety Category 4 requirements with one switch pair per guard (per ISO 13849-1).
- Impact-resistant polycarbonate plastic, extreme-duty chemically resistant stainless steel or heavy-duty impact-resistant zinc die-cast models are available.
- Switches have an environmental rating of IEC IP67 and are ATEX and FM approved for use in explosive environments when used with a PICO-GUARD controller.
- Attenuator is available for reducing excess gain in short-run applications.
- Splices are available for easily connecting two fiber sections.



## Models for a variety of applications & environments.



### Straight

- In-line lens housing.
- Right or left side mounting flange.

Page 138.



### Right Angle

- Right-angle lens housing.
- Right or left side mounting flange.

Page 138.



### Dual Lens & Actuator

- Passive U-shaped actuator for lift-off doors and removable guards.
- Center mounting configuration.

Page 138.



### Straight Barrel, 12 mm Threaded Barrel Mounting.

- Impact- and chemically resistant stainless steel.

Page 138.



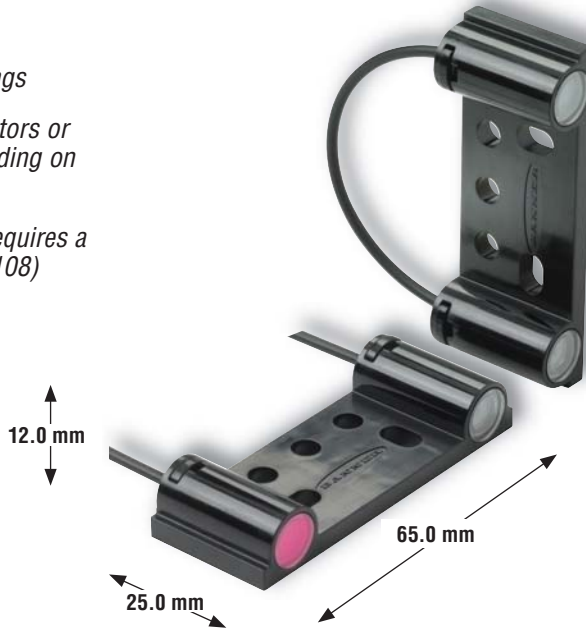
### Dual Lens & Actuator—Extreme- & Heavy-duty

- Actuator with U-shaped configuration allows fiber to “enter” and “exit” from one side of the guard only.
- Extreme-duty chemically resistant stainless steel or heavy-duty impact resistant zinc die-cast models.
- Center mounting configuration.

Page 138.

**PICO-GUARD™ Fiber Optic Interlock Switches**

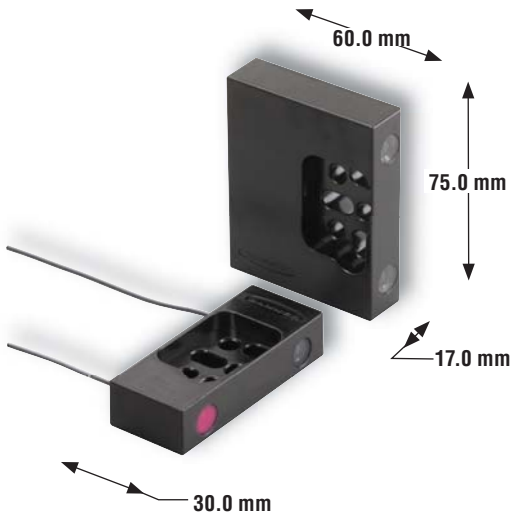
- Six housing styles
- Easy-to-install housings
- Quick-release connectors or integral fibers, depending on model
- A complete system requires a controller (see page 108)



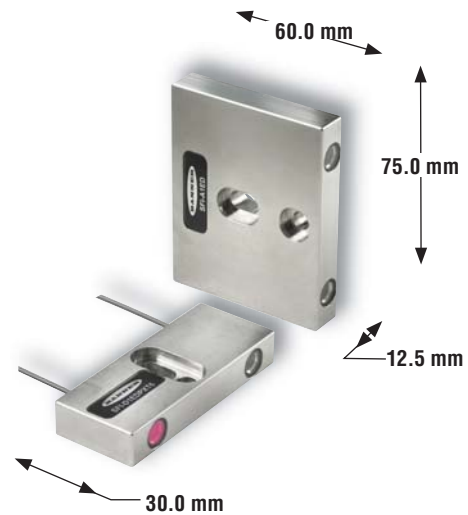
**SFI-A1X and SFI-D1 Models  
(Quick-release Connector)**



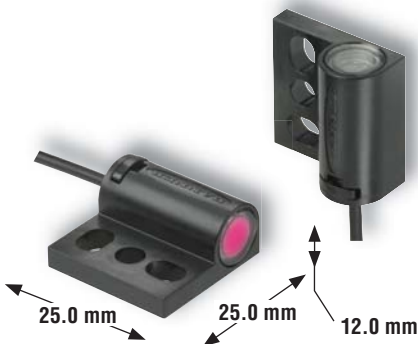
**SFI-M12 Models  
(Integral Fibers)**



**SFI-D1HD and SFI-A1HD Models  
(Integral Fibers)**



**SFI-D1E and SFI-A1E Models  
(Integral Fibers)**



**SFI-S1 Models  
(Quick-release Connector)**



**SFI-R1 Models  
(Quick-release Connector)**

**SAFETY INTERLOCK SWITCHES**

PICO-GUARD SWITCHES

MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES







PLASTIC STYLE SWITCHES

METAL STYLE SWITCHES

LOCKING STYLE SWITCHES



**PICO-GUARD™ Fiber Optic Interlock Switches**

Models	Housing Material	Orientation/Type	Fiber Length*	Separation and Max. Switching Distance	Data Sheet	
SFI-S1R	Plastic	Straight, Right Mounting		Bulk or Precut	1 mm = ± 10 mm 25 mm = ± 11 mm 50 mm = ± 12 mm	109909
SFI-S1L		Straight, Left Mounting				
SFI-R1R	Plastic	Right-angle, Right Mounting		Bulk or Precut	1 mm = ± 11 mm 25 mm = ± 21 mm 50 mm = ± 33 mm	109907
SFI-R1L		Right-angle, Left Mounting				
SFI-D1	Plastic	Dual, Center Mounting		Bulk or Precut	1 mm = ± 10 mm 25 mm = ± 11 mm 50 mm = ± 12 mm	109908
SFI-A1		Actuator, Polyethylene Jacket, Center Mounting				
SFI-A1XP		Actuator, Polyethylene Jacket, PVC Sheath, Center Mounting				
SFI-A1XT		Actuator, Polyethylene Jacket, Fluoropolymer Sheath, Center Mounting				
SFI-M12SS06UXT	316 Stainless Steel	Straight, Polyethylene Jacket, Fluoropolymer Sheath, 12 mm Barrel Mounting		1.8 m	1 mm = ± 10 mm 25 mm = ± 11 mm 50 mm = ± 12 mm	117201
SFI-M12SS15UXT				4.5 m		
SFI-M12SS30UXT				9.0 m		
SFI-D1EDPXT6	316 Stainless Steel	Straight, Polyethylene Jacket, Fluoropolymer Sheath, Center Mounting		1.8 m	1 mm = ± 10 mm 25 mm = ± 11 mm 50 mm = ± 12 mm	120125
SFI-D1EDPXT15				4.5 m		
SFI-D1EDPXT30				9.0 m		
SFI-D1EDPXT50				15.3 m		
SFI-A1ED		Actuator, Center Mounting	—			
SFI-D1HDPS6†	Zinc	Straight, Polyethylene Jacket, Center Mounting		1.8 m	1 mm = ± 10 mm 25 mm = ± 11 mm 50 mm = ± 12 mm	121307
SFI-D1HDPS15†				4.5 m		
SFI-D1HDPS30†				9.0 m		
SFI-D1HDPS50†				15.3 m		
SFI-D1HDPXT6†		Straight, Polyethylene Jacket, Fluoropolymer Sheath, Center Mounting		1.8 m		
SFI-D1HDPXT15†				4.5 m		
SFI-D1HDPXT30†				9.0 m		
SFI-D1HDPXT50†				15.3 m		
SFI-A1HD	Actuator, Center Mounting	—				

\* Fibers available in bulk to be cut to length or precut lengths with polished ends. Order fibers separately (see page 188). Integral fiber lengths are listed.

† Optional fiber guide available (SFA-FGD1HD). See data sheet p/n 123560.

**SAFETY INTERLOCK SWITCHES**

PICO-GUARD SWITCHES

MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES


PLASTIC STYLE SWITCHES

METAL STYLE SWITCHES

LOCKING STYLE SWITCHES



**PICO-GUARD™ Controller** (required for a complete system)

Models	Description	Product Information	Data Sheet
	<b>SFCDT-4A1</b> <ul style="list-style-type: none"> <li>The four-optical-channel controller is available with or without auxiliary channel outputs.</li> <li>Two dual-channel Universal Safety Stop Interface (USSI) inputs can connect to other safeguarding devices or controllers.</li> <li>Two solid-state diverse-redundant 0.5 A maximum safety outputs (OSSDs).</li> </ul>	Page 108	69761
	<b>SFCDT-4A1C</b> <ul style="list-style-type: none"> <li>Redundant DIP switches determine whether power-up is auto or manual and whether output operation is trip or latch.</li> <li>Optional external device monitoring (EDM) allows the system to monitor the status of external devices such as MPCEs.</li> <li>If not needed, up to three optical channels can be shut off.</li> </ul>		

**PICO-GUARD™ Fiber Optic Interlock Switches Specifications**

<b>Operating Distance</b>	1-50 mm max.
<b>Mounting</b>	<b>SFI-S..., SFI-R..., SFI-D1, SFI-A1 and SFI-AIX.. models:</b> Holes for M4 (#10) screws (not included) <b>SFI-D1E..., SFI-AIED, SFI-D1H... and SFI-A1H... models:</b> Holes for M6 screws (not included) <b>SFI-M12... models:</b> Two M12 x 1.25 nuts (provided)
<b>Construction</b>	<b>SFI-S..., SFI-R..., SFI-D1, SFI-A1 and SFI-AIX.. models:</b> Polycarbonate plastic housing and window; acrylic lens <b>SFI-M12, SFI-D1E.. and SFI-AIED models:</b> 316 stainless steel housing, glass window, PTFE-sheathed plastic fiber <b>SFI-D1H... and SFI-A1H... models:</b> Cast zinc housing, glass window, PTFE-sheathed or PE plastic fiber.
<b>Operating Conditions</b>	<b>Temperature:</b> 0° to +70° C <b>Relative humidity:</b> 95%
<b>Environmental Rating</b>	IEC IP67
<b>Certifications</b>	For a list of certifications see page 238.

**PICO-GUARD™ Fiber Optic Controller Specifications**

See pages 110-111.

SAFETY INTERLOCK SWITCHES

PICO-GUARD SWITCHES

MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES

PLASTIC STYLE SWITCHES

METAL STYLE SWITCHES

LOCKING STYLE SWITCHES

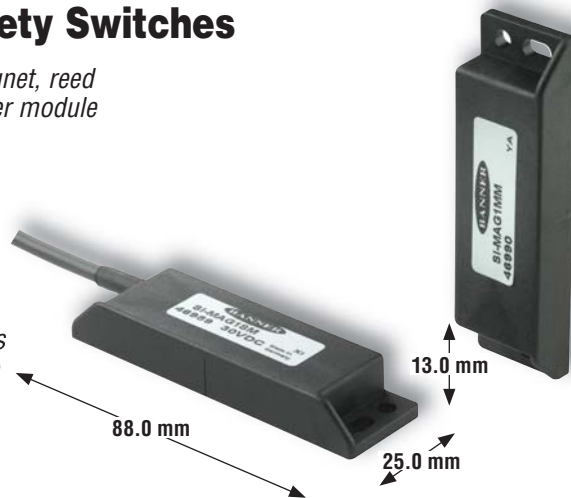
# Magnet Style Non-Contact Safety Interlock Switches

- Sealed components resist water, dirt and are more accommodating to misalignment than mechanical switches.
- Shifts in distance and alignment don't compromise sensing.
- Coded magnets minimize the risk of intentional defeat.
- Compact size makes it possible to conceal the switch.
- Magnets with different polarizations add security.
- For safety applications, switch must be used with gate monitoring module GM-FA-10J.



## Magnet Style Safety Switches

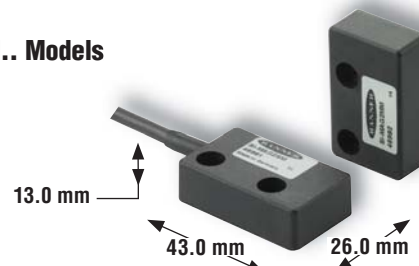
- 3-piece system: coded magnet, reed switch sensor and controller module
- Easy installation
- Three housing styles
- NEMA 4X and IEC IP67 rating
- A complete system requires a guard monitoring module (see page 113)



SI-MAG1SM.. and SI-MAG1MM.. Models



SI-MAG3SM and SI-MAG3MM Models



SI-MAG2SM and SI-MAG2MM Models



### SI-MAG Safety Switches

Models		Contacts	Sensor Cable*	Switching Distance***		Data Sheet	
				Min. ON	Max. OFF		
SI-MAG1SM	Sensor		3 m	—	—	60998	
SI-MAG1SMCO†	Sensor			—	—		
SI-MAG1MM	Coded Magnet			0-3 mm	3-14 mm		
SI-MAG1MM90**				0-8 mm	8-16 mm		
SI-MAG1MMHF	Coded Magnet	—	—	—	—		
SI-MAG2SM	Sensor		3 m	—	—		60998
SI-MAG2MM	Coded Magnet			0-4 mm	4-8 mm		
SI-MAG3SM	Sensor		3 m	—	—	60998	
SI-MAG3MM	Coded Magnet			0-3 mm	3-7 mm		

NC = Normally Closed Output, NO = Normally Open Output

\* For 9 m cable, add **W/30** to the 3 m model number (example, **SI-MAG1SM W/30**).

\*\* Difference is in Direction of Approach. See page 273 for more information.

\*\*\* For proper reset, switches must be positioned greater than 14 mm apart.

† Cable opposite

NOTE: The sensor and its magnet must be mounted at a minimum distance of 15 mm from any magnetized or ferrous material (example, steel) for proper operation.

SAFETY INTERLOCK SWITCHES

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### Gate Monitoring Module (required for a complete system)

Models	Description	Product Information	Data Sheet
 GM-FA-10J	<ul style="list-style-type: none"> <li>The gate module monitors up to 10 Banner coded magnets for contact failure or wiring fault.</li> <li>Two-channel operation monitors redundant switches on a single guard; one-channel operation monitors single switches on two guards.</li> <li>Two redundant output switching channels connect to control-reliable power interrupt circuits and are rated for up to 250V ac at up to 6 A.</li> <li>The reset input can be used for external device monitoring (EDM).</li> <li>The gate monitoring module uses 24V ac/dc at less than 150 mA.</li> </ul>	Page 113	60998



## SI-MAG Safety Switches Specifications

<b>Switching Elements</b>	Three pole-stable reed switches
<b>Repeat Switching Accuracy</b>	± 0.1 mm
<b>Construction</b>	Epoxy-encapsulated circuit in polyamide housing
<b>Environmental Rating</b>	NEMA 4X; IEC IP67
<b>Switching Capacity</b>	30V dc max. @ 0.25 W
<b>Operating Temperature</b>	-5° to +70° C
<b>Connections</b>	Integral PVC-jacketed 3 m 4-wire cable. Cable O.D. is 5 mm. Wires are 24 AWG. (0.25 mm <sup>2</sup> )
<b>Certifications</b>	For a list of certifications see page 238.
<b>Wiring Diagrams</b>	<b>1-Channel Coded Magnet Switches:</b> WD043 (p. 271) <b>2-Channel Positive Opening Switches:</b> WD044 (p. 271) <b>1-Channel (Multiple Guards):</b> WD045 (p. 272) <b>2-Channel (Multiple Guards):</b> WD046 (p. 272)

# Hinge Style Interlocking Switches

- Three types are available—load-bearing hinge, hinged lever, and rotating hinge.
- Safety switching point can be set anywhere within 0-180° operating range.
- One-piece switch eliminates need for alignment, engagement, and risk of breakage of a separate actuator.
- Design meets positive opening requirements for safety interlocks (→).



**SAFETY INTERLOCK SWITCHES**



*SI-HG80 Hinge Style Models . . . . . Page 144*

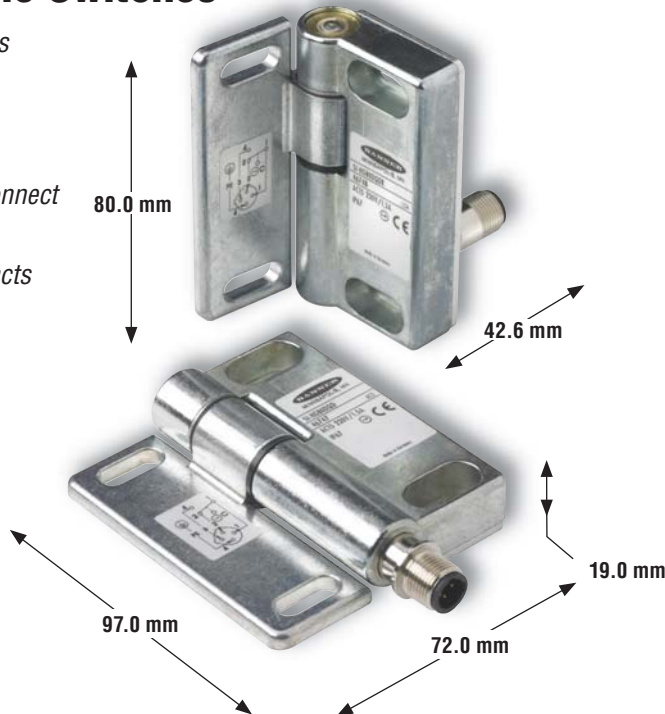


*SI-LS31R Rotary Hinge Style Models. . . . . 145*

*SI-LS31H Hinge Lever Style Models. . . . . 146*

## SI-HG80 Hinge Style Switches

- In-line and right-angle models
- Corrosion-resistant
- 180° range
- 4-pin Micro-style quick-disconnect cable fittings
- Positive opening safety contacts (IEC 60947-5-1) (→)



**SI-HG80DQD In-Line (bottom) and HG80DQDR Right-Angle (top) Models**

PICO-GUARD SWITCHES  
MAGNET STYLE SWITCHES  
HINGE STYLE SWITCHES  
PLASTIC STYLE SWITCHES  
METAL STYLE SWITCHES

**SI-HG80 Hinge Style Switches, 80 mm**



Models	Actuator Type	Contact(s)	Contact Config. & Switch Diagram	Data Sheet
SI-HG80DQD	In-line Integral load bearing	SPDT	SD001 (Page 240)	46735
SI-HG80DQDR	Right-angle Integral load bearing			
SI-HG80A	Blank hinge	N/A		

Hinge 180°      SPDT = Single Pull Double Throw Contacts

**SI-LS31R Rotary Hinge Style Switches**

- Glass reinforced thermoplastic switch housing
- Plated steel actuator
- Rotating actuator head
- Insulated device on all models (IEC 60947-5-1)
- Positive opening safety contacts (IEC 60947-5-1)



SI-LS31R Models



SAFETY INTERLOCK SWITCHES

PICO-GUARD SWITCHES

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METAL STYLE SWITCHES

LOCKING STYLE SWITCHES

**SI-LS31R Rotary Hinge Style Switches, 31 mm**




Models	Actuator Type	Contact(s)	Contact Config. & Switch Diagram	Data Sheet
SI-LS31RTD	Rotary Shaft	1 NC & 1 NO	SD002 (Page 240)	50163
SI-LS31RTE		2 NC	SD003 (Page 240)	

360° Rotary      NC = Normally Closed Contact, NO = Normally Open Contact

# SAFETY INTERLOCK SWITCHES

## Hinge Style Safety Switches

### SI-LS31H Hinge Lever Style Switches

- Glass reinforced thermoplastic switch housing
- Plated steel actuator
- Rotating head
- Insulated device on all models (IEC 60947-5-1)
- Positive opening safety contacts (IEC 60947-5-1) 



SI-LS31H Models

### SI-LS31H Hinge Lever Style Switches, 31 mm



SAFETY INTERLOCK SWITCHES

PICO-GUARD SWITCHES


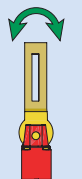

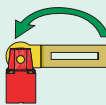

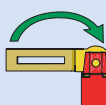
MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES

PLASTIC STYLE SWITCHES

METAL STYLE SWITCHES

LOCKING STYLE SWITCHES

Models	Actuator Type	Contact(s)	Contact Config. & Switch Diagram	Data Sheet
SI-LS31HGD	 Vertical Hinged Lever ± 90°	 1 NC & 1 NO	SD004 (Page 240)	50165
SI-LS31HGE			2 NC	
SI-LS31HGRD	 Right-Hand Hinged Lever 180°	 1 NC & 1 NO	SD006 (Page 240)	
SI-LS31HGRE			2 NC	
SI-LS31HGLD	 Left-Hand Hinged Lever 180°	 1 NC & 1 NO	SD008 (Page 241)	
SI-LS31HGLE			2 NC	

 Hinge 90°    
  One-Directional 180°    
  One-Directional 180°    
 NC = Normally Closed Contact, NO = Normally Open Contact

### SI-HG80 Hinge Style Switches Specifications

Output Rating	3A @ 250V ac max. 2.5 kV max. transient tolerance NEMA A300 P300
European Rating	Utilization categories: AC15 and DC13 (IEC 90497-5-1) $U_i = 250V$ ac, $I_{th} = 3A$
Maximum Switching Speed	20 operations per minute

## SI-HG80 Hinge Style Switches Specifications (cont'd)

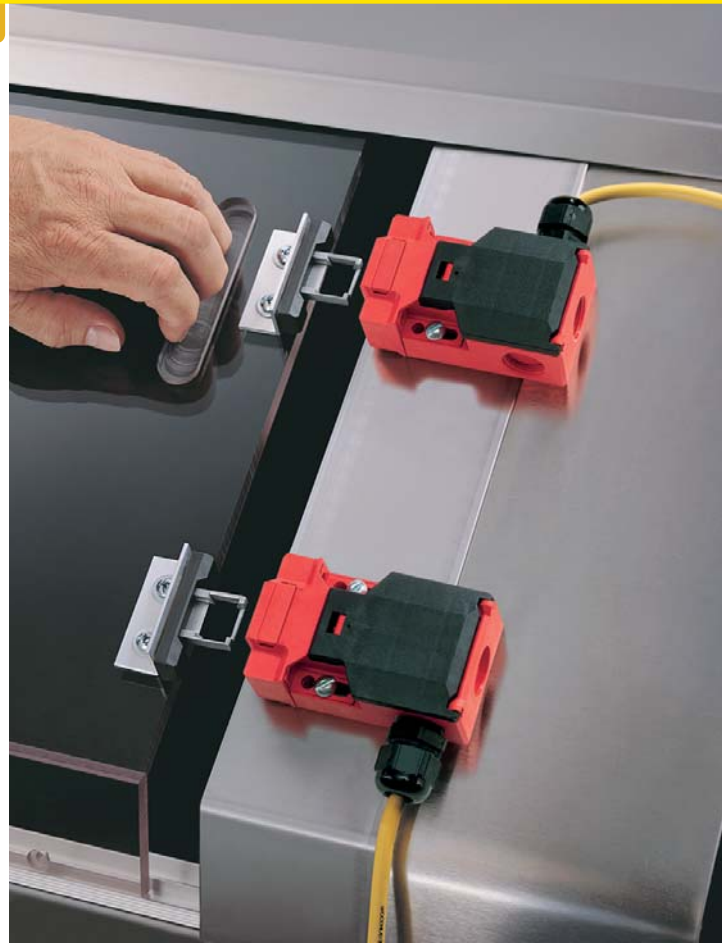
<b>Mechanical Life</b>	1 million operations
<b>Short Circuit Protection</b>	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.
<b>Force Exerted by Guard per Switch</b>	<b>Axial:</b> 750 N max. <b>Radial:</b> 1000 N max.
<b>Operating Range</b>	0° to 180°
<b>Mounting</b>	4 x M6 screws
<b>Wire Connections</b>	4-pin Micro-style quick-disconnect (QD) fitting. Cables are ordered separately. See page 177.
<b>Construction</b>	Zinc Die-cast (GD-Zn)
<b>Environmental Rating</b>	NEMA 4; IEC IP67
<b>Operating Temperature</b>	-25° to +70° C
<b>Weight</b>	0.40 kg
<b>Application Notes</b>	To avoid excessive radial stress in applications containing large doors, the hinge switch should be mounted either in pairs of two, or in conjunction with a blank hinge (see page 145).
<b>Certifications</b>	For a list of certifications see page 238.
<b>Contact Configuration and Switching Diagrams</b>	SD001 (p. 240)

## SI-LS31 Hinge Style Switches Specifications

<b>Contact Rating</b>	10A @ 24V ac, 10A @ 110V ac, 6A @ 230V ac 6A @ 24V dc 2.5 kV max. transient tolerance NEMA A300 P300																
<b>European Rating</b>	Utilization categories: AC15 and DC13 $U_i = 500V$ ac $I_{th} = 10A$	<table border="1"> <thead> <tr> <th rowspan="2">U V</th> <th colspan="2">40-60 Hz</th> </tr> <tr> <th><math>I_v/AC-15</math> A</th> <th><math>I_v/DC-13</math> A</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>10</td> <td>6</td> </tr> <tr> <td>110</td> <td>10</td> <td>1</td> </tr> <tr> <td>230</td> <td>6</td> <td>.4</td> </tr> </tbody> </table>		U V	40-60 Hz		$I_v/AC-15$ A	$I_v/DC-13$ A	24	10	6	110	10	1	230	6	.4
U V	40-60 Hz																
	$I_v/AC-15$ A	$I_v/DC-13$ A															
24	10	6															
110	10	1															
230	6	.4															
<b>Contact Material</b>	Silver-nickel alloy																
<b>Maximum Switching Speed</b>	50 operations per minute																
<b>Mechanical Life</b>	1 million operations																
<b>Required Actuation Force</b>	<b>SI-LS31R models:</b> 10 N cm <b>SI-LS31H models:</b> 15 N cm																
<b>Short Circuit Protection</b>	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.																
<b>Wire Connections</b>	Screw terminals with pressure plates accept the following wire sizes – <b>Stranded and solid:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 16 AWG (1.5 mm <sup>2</sup> ) for one wire <b>Stranded:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 18 AWG (1.0 mm <sup>2</sup> ) for two wires																
<b>Cable Entry</b>	M20 x 1.5 threaded entrance Adapter supplied to convert from M20 x 1.5 to ½" - 14 NPT threaded entrance																
<b>Construction</b>	Glass fiber-reinforced thermoplastic UL94-V0 rating; plated steel actuator																
<b>Environmental Rating</b>	IEC IP65																
<b>Operating Temperature</b>	-30° to +80° C																
<b>Weight</b>	0.09 Kg																
<b>Certifications</b>	For a list of certifications see page 238.																
<b>Contact Configuration and Switching Diagrams</b>	<b>SI-LS31R models:</b> SD002 and SD003 (p. 240) <b>SI-LS31H models:</b> SD004, SD005, SD006, SD007, SD008 and SD009 (pp. 240-241)																

# Compact Plastic Flat Pack and Limit Switch Styles

- Mechanically coded actuators use two independent operating elements to minimize intentional tampering or defeat.
- Rotating head requires no tools.
- Four standard actuators are available, as well as an optional high-extraction-force actuator.
- IEC IP65 switch housing rating increases to IEC IP67 with addition of a screw to the wiring chamber door.



**SAFETY INTERLOCK SWITCHES**



CABLE GLANDS  
PAGE 182

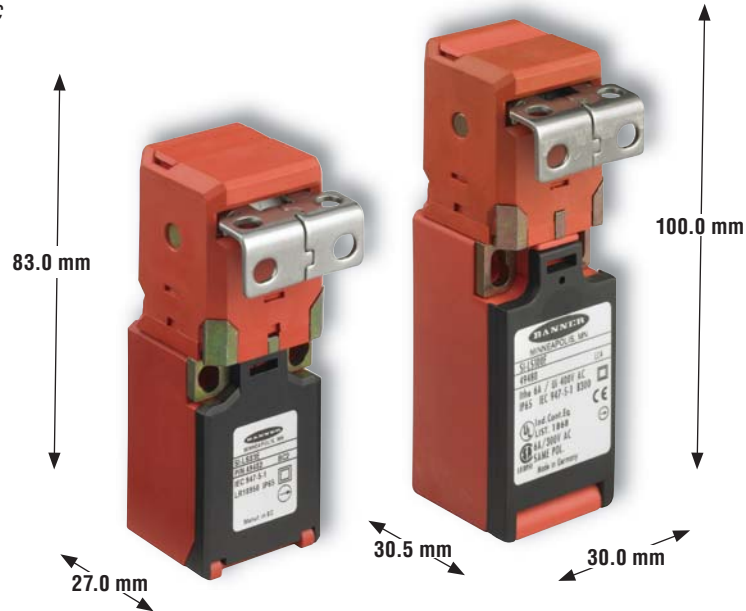


ACTUATORS  
PAGE 224

SI-LS83 and SI-LS100 Models . . . . . Page 149  
SI-QS75 and SI-QS90 Models . . . . . 150

## SI-LS83 and SI-LS100 Plastic Style Switches

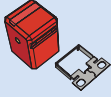
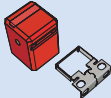

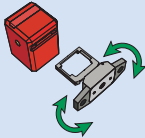
- Low profile for confined spaces
- Tough glass-reinforced thermoplastic housing
- Limit switch design (EN 50047)
- In-line or right-angle actuator
- Actuator engagement from four side or four top positions
- Insulated device on all models (IEC 60947-5-1)
- Positive opening safety contacts (IEC 60947-5-1) ⊕



**SI-LS83 Models**                      **SI-LS100 Models**  
**(both models shown with Right-Angle Rigid Inline Actuator)**

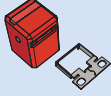
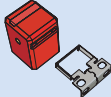

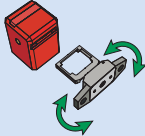
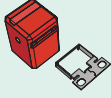
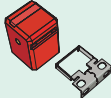

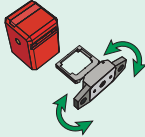


### SI-LS100 Plastic Style, 100 mm

Kits			Contact(s)	Contact Config. & Switch Diagram	Data Sheet
Kit Model*	Actuator Type	Interlock			
SI-LS100SF	SI-QS-SSA-2 Straight Rigid In-Line 	SI-LS100F	2 NC & 1 NO	SD010 (Page 241)	59622
SI-LS100SRAF	SI-QS-SSA-3 Rigid In-Line 	SI-LS100F			
SI-LS100MRFF	 SI-QS-SSU Flexible In-Line 	SI-LS100F			

### SI-LS83 Plastic Style, 83 mm



Kits			Contact(s)	Contact Config. & Switch Diagram	Data Sheet
Kit Model*	Actuator Type	Interlock			
SI-LS83SD	SI-QS-SSA-2 Straight Rigid In-Line 	SI-LS83D	1 NC & 1 NO	SD011 (Page 241)	59622
SI-LS83SRAD	SI-QS-SSA-3 Rigid In-Line 	SI-LS83D			
SI-LS83MRFD	 SI-QS-SSU Flexible In-Line 	SI-LS83D			
SI-LS83SE	SI-QS-SSA-2 Straight Rigid In-Line 	SI-LS83E	2 NC	SD012 (Page 241)	
SI-LS83SRAE	SI-QS-SSA-3 Rigid In-Line 	SI-LS83E			
SI-LS83MRFE	 SI-QS-SSU Flexible In-Line 	SI-LS83E			

 Multi-Directional      NC = Normally Closed Contact, NO = Normally Open Contact

\* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only.

**SAFETY INTERLOCK SWITCHES**

PICO-GUARD SWITCHES

MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES

PLASTIC STYLE SWITCHES


METAL STYLE SWITCHES

LOCKING STYLE SWITCHES

# SAFETY INTERLOCK SWITCHES

## Compact Plastic Style Safety Switches

### SI-QS75 and SI-QS90 Plastic Style Switches

- Actuator engagement from front, back, or either of two top positions
- Insulated device on all models
- Positive opening safety contacts (IEC 60947-5-1) 



SI-QS75 Models      SI-QS90 Models  
(both models shown with Rigid In-Line Actuator)

SAFETY INTERLOCK SWITCHES

PICO-GUARD SWITCHES

MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES

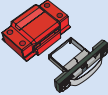

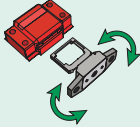
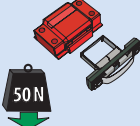
PLASTIC STYLE SWITCHES

METAL STYLE SWITCHES

LOCKING STYLE SWITCHES

### SI-QS75 Flat-Pack Style Switches, 75 mm



Kit Model*	Kits		Contact	Contact Config. & Switch Diagram	Data Sheet
	Actuator Type	Interlock			
SI-QS75MC	SI-QS-SSA-4 Rigid In-Line 	SI-QS75C	1 NC	SD013 (Page 242)	49370
SI-QS75MFC	 SI-QS-SSU Flexible In-Line 	SI-QS75C			
SI-QS75MCHF (High-Force)	SI-QS-SSA Rigid In-Line 	SI-QS75CHF			

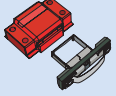

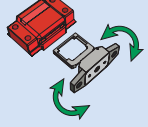
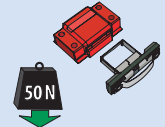
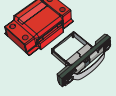

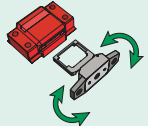
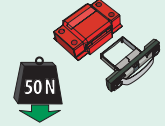
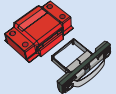

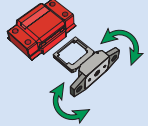
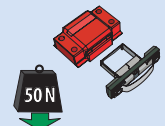
 Multi-Directional      NC = Normally Closed Contact, NO = Normally Open Contact

\* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only.





**SI-QS90 Flat-Pack Style Switches, 90 mm**

Kits			Contact(s)	Contact Config. & Switch Diagram	Data Sheet
Kit Model*	Actuator Type	Interlock			
SI-QS90MD	SI-QS-SSA-4 Rigid In-Line 	SI-QS90D	1 NC & 1 NO	SD014 (Page 242)	49370
SI-QS90MFD	 SI-QS-SSU Flexible In-Line 	SI-QS90D			
SI-QS90MDHF (High-Force)	SI-QS-SSA Rigid In-Line 	SI-QS90DHF			
SI-QS90ME	SI-QS-SSA-4 Rigid In-Line 	SI-QS90E	2 NC	SD015 (Page 242)	49370
SI-QS90MFE	 SI-QS-SSU Flexible In-Line 	SI-QS90E			
SI-QS90MEHF (High-Force)	SI-QS-SSA Rigid In-Line 	SI-QS90EHF			
SI-QS90MF	SI-QS-SSA-4 Rigid In-Line 	SI-QS90F	2 NC & 1 NO	SD016 (Page 242)	49370
SI-QS90MFF	 SI-QS-SSU Flexible In-Line 	SI-QS90F			
SI-QS90MFHF (High-Force)	SI-QS-SSA Rigid In-Line 	SI-QS90FHF			

 Multi-Directional      NC = Normally Closed Contact, NO = Normally Open Contact

\* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only.

- SAFETY INTERLOCK SWITCHES
- PICO-GUARD SWITCHES
- MAGNET STYLE SWITCHES
- HINGE STYLE SWITCHES
- PLASTIC STYLE SWITCHES
- METAL STYLE SWITCHES
- LOCKING STYLE SWITCHES

## SI-LS83 and SI-LS100 Plastic Style Switches Specifications

<b>Contact Rating</b>	10A @ 24V ac, 10A @ 110V ac, 6A @ 230V ac 6A @ 24V dc 2.5 kV max. transient tolerance NEMA A300 P300																	
<b>European Rating</b>	Utilization categories: AC15 and DC13 (IEC 60947-5-1) Switches with 1 & 2 contact pairs: $U_i = 500V$ ac, $I_{th} = 10A$ Switches with 3 contact pairs: $U_i = 400V$ ac, $I_{th} = 5A$																	
	<table border="1"> <thead> <tr> <th colspan="3">40-60 Hz</th> </tr> <tr> <th><math>U_i</math> V</th> <th><math>I_{th}/AC-15</math> A</th> <th><math>I_{th}/DC-13</math> A</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>10</td> <td>6</td> </tr> <tr> <td>110</td> <td>10</td> <td>1</td> </tr> <tr> <td>230</td> <td>6</td> <td>.4</td> </tr> </tbody> </table>			40-60 Hz			$U_i$ V	$I_{th}/AC-15$ A	$I_{th}/DC-13$ A	24	10	6	110	10	1	230	6	.4
40-60 Hz																		
$U_i$ V	$I_{th}/AC-15$ A	$I_{th}/DC-13$ A																
24	10	6																
110	10	1																
230	6	.4																
<b>Contact Material</b>	Silver-nickel alloy																	
<b>Maximum Switching Speed</b>	30 operations per minute																	
<b>Maximum Actuator Speed</b>	1 m/second																	
<b>Mechanical Life</b>	1 million operations																	
<b>Minimum Actuator Engagement Radius</b>	<b>In-line actuators:</b> 150 mm <b>Flexible actuators:</b> 50 mm in all directions																	
<b>Actuation Extraction Force</b>	12 N																	
<b>Short Circuit Protection</b>	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.																	
<b>Wire Connections</b>	<b>Stranded and solid:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 18 AWG (1.0 mm <sup>2</sup> ) for one wire <b>Stranded:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 18 AWG (1.0 mm <sup>2</sup> ) for two wires																	
<b>Cable Entry</b>	M20 x 1.5 for <b>SI-LS100</b> and M16 x 1.5 for <b>SI-LS83</b> threaded entrance. Adaptor supplied to convert to ½"- 14 NPT threaded entrance.																	
<b>Construction</b>	Glass fiber-reinforced thermoplastic UL94-VO rating																	
<b>Environmental Rating</b>	IEC IP65 Note: Addition of a No. 3 x ¼" screw (max) to the wiring access door increases sealing to IEC IP67; NEMA 4X																	
<b>Operating Temperature</b>	-30° to +80° C																	
<b>Weight</b>	<b>SI-LS83 models:</b> 0.12 kg <b>SI-LS100 models:</b> 0.13 kg																	
<b>Certifications</b>	For a list of certifications see page 238.																	
<b>Contact Configuration and Switching Diagrams</b>	<b>SI-LS100 models:</b> SD010 (p. 241) <b>SI-LS83 models:</b> SD011 and SD012 (p. 241)																	

## SI-QS75 and SI-QS90 Flat-Pack Style Switches Specifications

<b>Contact Rating</b>	10A @ 24V ac, 10A @ 110V ac, 6A @ 230V ac 6A @ 24V dc 2.5 kV max. transient tolerance NEMA A300 P300																	
<b>European Rating</b>	Utilization categories: AC15 and DC13 (IEC 60947-5-1) Switches with 1 & 2 contact pairs: $U_i = 500V$ ac, $I_{th} = 10A$ Switches with 3 contact pairs: $U_i = 400V$ ac, $I_{th} = 5A$	<table border="1"> <thead> <tr> <th colspan="3">40-60 Hz</th> </tr> <tr> <th><math>U_i</math> V</th> <th><math>I_o/AC-15</math> A</th> <th><math>I_o/DC-13</math> A</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>10</td> <td>6</td> </tr> <tr> <td>110</td> <td>10</td> <td>1</td> </tr> <tr> <td>230</td> <td>6</td> <td>.4</td> </tr> </tbody> </table>		40-60 Hz			$U_i$ V	$I_o/AC-15$ A	$I_o/DC-13$ A	24	10	6	110	10	1	230	6	.4
40-60 Hz																		
$U_i$ V	$I_o/AC-15$ A	$I_o/DC-13$ A																
24	10	6																
110	10	1																
230	6	.4																
<b>Contact Material</b>	Silver-nickel alloy																	
<b>Maximum Switching Speed</b>	30 operations per minute																	
<b>Maximum Actuator Speed</b>	1 m/second																	
<b>Mechanical Life</b>	1 million operations																	
<b>Minimum Actuator Engagement Radius</b>	<b>In-line actuators:</b> 150 mm <b>Flexible actuators:</b> 50 mm in all directions																	
<b>Actuation Extraction Force</b>	10 N; High force models: 50 N																	
<b>Short Circuit Protection</b>	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.																	
<b>Wire Connections</b>	Screw terminals with pressure plates accept the following wire sizes – <b>For switches with one or two contacts:</b> <b>Stranded and solid:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 16 AWG (1.5 mm <sup>2</sup> ) for one wire <b>Stranded:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 18 AWG (1.0 mm <sup>2</sup> ) for two wires  <b>For switches with three contacts:</b> <b>Stranded and solid:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 18 AWG (1.0 mm <sup>2</sup> ) for one wire <b>Stranded:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 18 AWG (1.0 mm <sup>2</sup> ) for two wires																	
<b>Cable Entry</b>	M20 x 1.5 for <b>SI-QS90</b> and M16 x 1.5 for <b>SI-QS75</b> threaded entrance. Adapter supplied to convert M20 x 1.5 to 1/2" - 14 NPT threaded entrance.																	
<b>Construction</b>	Glass fiber-reinforced thermoplastic UL94-VO rating																	
<b>Environmental Rating</b>	IEC IP65 Note: Addition of a No. 3 x 1/4" screw (max) to the wiring access door increases sealing to IEC IP67; NEMA 4X																	
<b>Operating Temperature</b>	-30° to +80° C																	
<b>Weight</b>	<b>SI-QS75 models:</b> 0.11 kg <b>SI-QS90 models:</b> 0.13 kg																	
<b>Application Notes</b>	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 supplied M16 x 1.5 or M20 x 1.5 to 1/2" - 14 NPT conduit adapter or optional M16 x 1.5 or M20 x 1.5 cable gland into one of the threaded entry locations. The knockout will break open just before the adapter or cable gland bottoms out.																	
<b>Certifications</b>	For a list of certifications see page 238.																	
<b>Contact Configuration and Switching Diagrams</b>	<b>SI-QS75 models:</b> SD013 (p. 242) <b>SI-QS90 models:</b> SD014, SD015 and SD016 (p. 242)																	

# Compact Metal Limit Switch Style with In-Line Actuator

- Rigid and flexible in-line actuators are available.
- Actuator head rotates to four possible positions, in 90° increments.

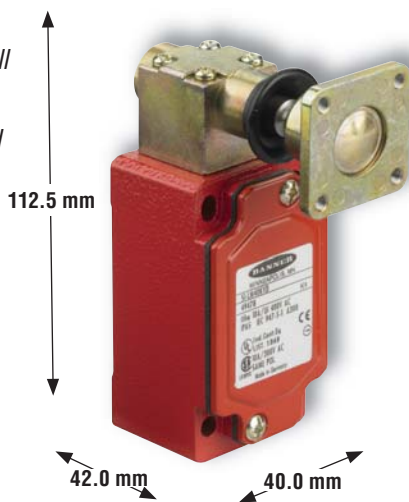


**SAFETY INTERLOCK SWITCHES**



## SI-LM40 Metal Style Switches

- Standard limit switch design
- Stainless steel actuators
- Trumpet-style switch option
- Protective earth terminal on all models (IEC 60947-1)
- Reset function (ANSI B11 and NFPA 79)
- Positive opening safety contacts (IEC 60947-5-1) →



**SI-LM40MKV Models**  
(with flexible in-line actuator)



**SI-LM40MKH Models**  
(shown with rigid in-line actuator)



**SI-LM40 Limit Switch Style, 40 mm**

Kits			Contact(s)	Contact Config. & Switch Diagram	Data Sheet	
Kit Model*	Actuator Type	Interlock				
SI-LM40MKHD	SI-QS-SSA Straight Rigid In-Line 	SI-LM40KHD	1 NO & 1 NC	SD017 (Page 242)	49372	
SI-LM40MKHFD	 SI-QM-SMFA Flexible In-Line 	SI-LM40KHD				
SI-LM40MKHE	SI-QM-SSA Straight Rigid In-Line 	SI-LM40KHE	2 NC	SD018 (Page 242)		
SI-LM40MKHFE	 SI-QM-SMFA Flexible In-Line 	SI-LM40KHE				
SI-LM40MKHF	SI-QM-SSA Straight Rigid In-Line 	SI-LM40KHF	2 NC & 1 NO	SD019 (Page 243)		
SI-LM40MKHFF	 SI-QM-SMFA Flexible In-Line 	SI-LM40KHF				
SI-LM40MKVD	 SI-QM-90A Flexible In-Line 	SI-LM40KVD	1 NO & 1 NC	SD020 (Page 243)		50159
SI-LM40MKVE	SI-QM-90A Flexible In-Line 	SI-LM40KVE	2 NC	SD021 (Page 243)		

 Multi-Directional      NC = Normally Closed Contact, NO = Normally Open Contact

\* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only.

- SAFETY INTERLOCK SWITCHES
- PICO-GUARD SWITCHES
- MAGNET STYLE SWITCHES
- HINGE STYLE SWITCHES
- PLASTIC STYLE SWITCHES
- METAL STYLE SWITCHES
- LOCKING STYLE SWITCHES

# SAFETY INTERLOCK SWITCHES

## Compact Metal Style Safety Switches

### SI-LM40 Limit Style Switches Specifications

<b>Contact Rating</b>	10A @ 24V ac, 10A @ 110V ac, 6A @ 230V ac 6A @ 24V dc 2.5 kV max. transient tolerance NEMA A300 P300																	
<b>European Rating</b>	Utilization categories: AC15 and DC13 $U_i = 500V$ ac, $I_{th} = 10A$	<table border="1"> <thead> <tr> <th colspan="3">40-60 Hz</th> </tr> <tr> <th>U V</th> <th><math>I_o</math>/AC-15 A</th> <th><math>I_o</math>/DC-13 A</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>10</td> <td>6</td> </tr> <tr> <td>110</td> <td>10</td> <td>1</td> </tr> <tr> <td>230</td> <td>6</td> <td>.4</td> </tr> </tbody> </table>		40-60 Hz			U V	$I_o$ /AC-15 A	$I_o$ /DC-13 A	24	10	6	110	10	1	230	6	.4
40-60 Hz																		
U V	$I_o$ /AC-15 A	$I_o$ /DC-13 A																
24	10	6																
110	10	1																
230	6	.4																
<b>Contact Material</b>	Silver-nickel alloy																	
<b>Maximum Switching Speed</b>	<b>SI-LM40MKH models:</b> 50 operations per minute <b>SI-LM40MKV models:</b> 10 operations per minute																	
<b>Maximum Actuator Speed</b>	<b>SI-LM40MKH models:</b> 1.5 m/second <b>SI-LM40MKV models:</b> 0.5 m/second																	
<b>Mechanical Life</b>	<b>SI-LM40MKH models:</b> 1 million operations <b>SI-LM40MKV models:</b> 25,000 operations																	
<b>Minimum Actuator Engagement Radius</b>	<b>SI-LM40MKH models only:</b> Rigid actuator: 400 mm Flexible actuator: 150 mm																	
<b>Actuation Extraction Force</b>	<b>SI-LM40MKH models:</b> 10 N <b>SI-LM40MKV models:</b> 20 N																	
<b>Short Circuit Protection</b>	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.																	
<b>Wire Connections</b>	Screw terminals with pressure plates accept the following wire sizes – <b>Stranded and solid:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 16 AWG (1.5 mm <sup>2</sup> ) for one wire <b>Stranded:</b> 20 AWG (0.5 mm <sup>2</sup> ) to 18 AWG (1.0 mm <sup>2</sup> ) for two wires																	
<b>Cable Entry</b>	M20 x 1.5 threaded entrance Adapter supplied to convert M20 x 1.5 to ½" - 14 NPT threaded entrance																	
<b>Construction</b>	Aluminum alloy die cast																	
<b>Environmental Rating</b>	IEC IP65																	
<b>Operating Temperature</b>	-30° to +80° C																	
<b>Weight</b>	<b>SI-LM40MKH models:</b> 0.34 kg <b>SI-LM40MKV models:</b> 0.31 kg																	
<b>Certifications</b>	For a list of certifications see page 238.																	
<b>Contact Configuration and Switching Diagrams</b>	<b>SI-LM40MKH..D models:</b> SD017 (p. 242) <b>SI-LM40MKH..F models:</b> SD019 (p. 243) <b>SI-LM40MKH..E models:</b> SD018 (p. 242) <b>SI-LM40MKV.. models:</b> SD020 and SD021 (p. 243)																	

SAFETY INTERLOCK SWITCHES

PICO-GUARD SWITCHES

MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES

PLASTIC STYLE SWITCHES

METAL STYLE SWITCHES

LOCKING STYLE SWITCHES



# Locking Style

## with Spring or Solenoid Locking

- Two locking mechanisms are available: spring lock with energized solenoid release and energized solenoid lock with spring release.
- Rigid and flexible in-line actuators are available.
- Actuator head can be rotated in 90° increments to eight possible actuator positions: four vertical and four horizontal.
- Two models are available, based on voltage.



*SI-LS42 Spring Lock/Solenoid Unlock Models . . . Page 158*  
*SI-LS42 Solenoid Lock/Spring Unlock Models . . . . . 159*  
*SI-QM100 Models . . . . . 160*

### SI-LS42 Locking Style Switches

- Insulated device on all models (IEC 60947-5-1)
- Solenoid voltages: 24V ac/dc; and 24 to 48V dc or 24 to 230V ac
- Stainless steel actuator
- Positive opening safety contacts (IEC 60947-5-1)



**SI-LS42 Models**  
(shown with rigid in-line actuator)

# SAFETY INTERLOCK SWITCHES

## Locking Style Safety Switches

### SI-LS42 Safety Switches, 42 mm - Spring Lock and Solenoid Unlock



Kits		Interlock	Contact(s)	Solenoid Voltage	Contact Config. & Switch Diagram	Data Sheet
Kit Model	Actuator Type					
SI-LS42DMSG	SI-QM-SSA Straight Rigid In-Line		SI-LS42DSG	Actuator Contacts: <b>1 NC &amp; 1 NO</b>	24V ac/dc	SD022 (Page 243)
SI-LS42UMSG						
SI-LS42DMSGF	SI-QM-SMFA Flexible In-Line		SI-LS42DSG	Solenoid Monitor Contacts: <b>1 NC &amp; 1 NO</b>	24V ac/dc	SD023 (Page 243)
SI-LS42UMSGF						
SI-LS42DMSH	SI-QM-SSA Straight Rigid In-Line		SI-LS42DSH	Actuator Contacts: <b>2 NC</b>	24V ac/dc	SD023 (Page 243)
SI-LS42UMSH						
SI-LS42DMSHF	SI-QM-SMFA Flexible In-Line		SI-LS42DSH	Solenoid Monitor Contacts: <b>1 NC &amp; 1 NO</b>	24V ac/dc	SD024 (Page 243)
SI-LS42UMSHF						
SI-LS42DMSI	SI-QM-SSA Straight Rigid In-Line		SI-LS42DSI	Actuator Contacts: <b>2 NC &amp; 1 NO</b>	24V ac/dc	SD024 (Page 243)
SI-LS42UMSI						
SI-LS42DMSIF	SI-QM-SMFA Flexible In-Line		SI-LS42DSI	Solenoid Monitor Contact: <b>1 NC</b>	24V ac/dc	SD025 (Page 244)
SI-LS42UMSIF						
SI-LS42DMSJ	SI-QM-SSA Straight Rigid In-Line		SI-LS42DSJ	Actuator Contacts: <b>3 NC</b>	24V ac/dc	SD025 (Page 244)
SI-LS42DMSJF	SI-QM-SMFA Flexible In-Line		SI-LS42DSJ	Solenoid Monitor Contact: <b>1 NC</b>		

60099

SAFETY INTERLOCK SWITCHES

PICO-GUARD SWITCHES

MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES

PLASTIC STYLE SWITCHES

METAL STYLE SWITCHES

LOCKING STYLE SWITCHES



Multi-Directional

NC = Normally Closed Contact, NO = Normally Open Contact

\* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only.





**SI-LS42 Safety Switches, 42 mm - Solenoid Lock and Spring Unlock**

Kits			Interlock	Contact(s)	Solenoid Voltage	Contact Config. & Switch Diagram	Data Sheet
Kit Model	Actuator Type						
SI-LS42DMMG	SI-QM-SSA Straight Rigid In-Line		SI-LS42DMG	Actuator Contacts: <b>1 NC &amp; 1 NO</b>	24V ac/dc	SD022 (Page 243)	60099
SI-LS42UMMG			SI-LS42UMG		24-48V dc/ 24-230V ac		
SI-LS42DMMGF			SI-LS42DMG	Solenoid Monitor Contacts: <b>1 NC &amp; 1 NO</b>	24V ac/dc		
SI-LS42UMMGF			SI-LS42UMG		24-48V dc/ 24-230V ac		
SI-LS42DMMH	SI-QM-SSA Straight Rigid In-Line		SI-LS42DMH	Actuator Contacts: <b>2 NC</b>	24V ac/dc	SD023 (Page 243)	
SI-LS42UMMH			SI-LS42UMH		24-48V dc/ 24-230V ac		
SI-LS42DMMHF			SI-LS42DMH	Solenoid Monitor Contacts: <b>1 NC &amp; 1 NO</b>	24V ac/dc		
SI-LS42UMMHF			SI-LS42UMH		24-48V dc/ 24-230V ac		
SI-LS42DMMI	SI-QM-SSA Straight Rigid In-Line		SI-LS42DMI	Actuator Contacts: <b>2 NC &amp; 1 NO</b>	24V ac/dc	SD024 (Page 243)	
SI-LS42UMMI			SI-LS42UMI		24-48V dc/ 24-230V ac		
SI-LS42DMMIF			SI-LS42DMI	Solenoid Monitor Contact: <b>1 NC</b>	24V ac/dc		
SI-LS42UMMIF			SI-LS42UMI		24-48V dc/ 24-230V ac		
SI-LS42DMMJ	SI-QM-SSA Straight Rigid In-Line		SI-LS42DMJ	Actuator Contacts: <b>3 NC</b>	24V ac/dc	SD025 (Page 244)	
SI-LS42DMMJF			SI-LS42DMJ	Solenoid Monitor Contact: <b>1 NC</b>			



Multi-Directional

NC = Normally Closed Contact, NO = Normally Open Contact

\* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only.

**SAFETY INTERLOCK SWITCHES**

PICO-GUARD SWITCHES

MAGNET STYLE SWITCHES

HINGE STYLE SWITCHES

PLASTIC STYLE SWITCHES


METAL STYLE SWITCHES

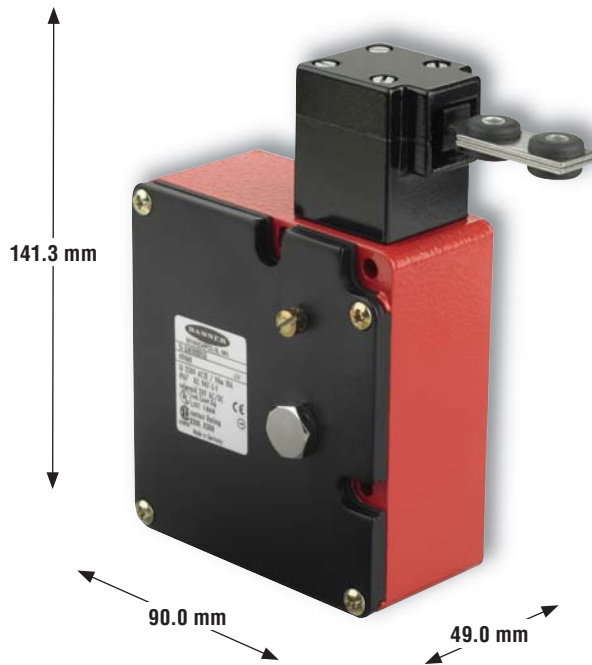
LOCKING STYLE SWITCHES

# SAFETY INTERLOCK SWITCHES

## Locking Style Safety Switches

### SI-QM100 Locking Style Switches

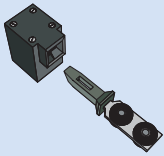
- Keyed actuators
- Solenoid voltages: 24V dc or 120V ac
- Standard mounting hole pattern (EN 50041)
- Positive opening safety contacts (IEC 60947-5-1) 



**SI-QM100 Models**  
(shown with rigid in-line actuator)

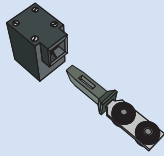
### SI-QM100 Safety Switches, 100 mm - Spring Lock and Solenoid Unlock




Kits			Contact(s)	Solenoid Voltage	Contact Config. & Switch Diagram	Data Sheet
Kit Model	Actuator Type	Interlock				
SI-QM100DMSG	SI-QM-SSA Straight Rigid In-Line 	SI-QM100DSG	Switching Contacts: <b>1 NC &amp; 1 NO</b>	24V dc	SD026 (Page 244)	49374
SI-QM100AMSG		SI-QM100ASG	Solenoid Monitor Contacts: <b>1 NC &amp; 1 NO</b>	120V ac		

### SI-QM100 Safety Switches, 100 mm - Solenoid Lock and Spring Unlock



Kits			Contact(s)	Solenoid Voltage	Contact Config. & Switch Diagram	Data Sheet
Kit Model	Actuator Type	Interlock				
SI-QM100DMMG	SI-QM-SSA Straight Rigid In-Line 	SI-QM100DMG	Switching Contacts: <b>1 NC &amp; 1 NO</b>	24V dc	SD026 (Page 244)	49374
SI-QM100AMMG		SI-QM100AMG	Solenoid Monitor Contacts: <b>1 NC &amp; 1 NO</b>	120V ac		

 Multi-Directional      NC = Normally Closed Contact, NO = Normally Open Contact

\* A kit contains an interlock and actuator. Individual interlocks (without actuator) are for replacement purposes only.

SAFETY INTERLOCK SWITCHES

PICO-GUARD SWITCHES

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METAL STYLE SWITCHES

LOCKING STYLE SWITCHES

## Locking Style Switches Specifications

<b>Contact Rating</b>	4A @ 250V ac max. 2.5 kV max. transient tolerance NEMA A300 P300																	
<b>European Rating</b>	Utilization categories: AC15 and DC13 (IEC 60947-5-1) Switches with 1 & 2 contact pairs: $U_i = 500V$ ac $I_{th} = 2.5A$	<table border="1"> <thead> <tr> <th colspan="3">40-60 Hz</th> </tr> <tr> <th><math>U_p</math> V</th> <th><math>I_{AC-15}</math> A</th> <th><math>I_{DC-13}</math> A</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>4</td> <td>3</td> </tr> <tr> <td>110</td> <td>4</td> <td>0.7</td> </tr> <tr> <td>230</td> <td>4</td> <td>0.3</td> </tr> </tbody> </table>		40-60 Hz			$U_p$ V	$I_{AC-15}$ A	$I_{DC-13}$ A	24	4	3	110	4	0.7	230	4	0.3
40-60 Hz																		
$U_p$ V	$I_{AC-15}$ A	$I_{DC-13}$ A																
24	4	3																
110	4	0.7																
230	4	0.3																
<b>Contact Material</b>	Silver-nickel alloy																	
<b>Solenoid Power Consumption</b>	<b>SI-LS42 models:</b> 1.1 VA / Inrush 56 VA (0.2 sec) <b>SI-QM100 models:</b> 5.2 W																	
<b>Maximum Actuator Speed</b>	1.5 m/second																	
<b>Mechanical Life</b>	1 million operations																	
<b>Minimum Actuator Engagement Radius</b>	<b>Rigid actuator:</b> 400 mm <b>Flexible actuator:</b> 150 mm																	
<b>Actuation Extraction Force</b>	<b>SI-LS42 models:</b> 2000 N when locked <b>SI-QM100 models:</b> 1000 N when locked																	
<b>Short Circuit Protection</b>	6 amp Slow Blow, 10 amp Fast Blow. Recommended external fusing or overload protection.																	
<b>Wire Connections</b>	<p><b>SI-LS42 models:</b> 10 cage clamp elements 1.5 mm stranded max. / 16 AWG</p> <p><b>SI-QM100 models:</b> Screw terminals with pressure plates accept the following wire sizes – 16 AWG (1.5 mm<sup>2</sup>) max. solid; 14 AWG (2.5 mm<sup>2</sup>) max. stranded, 18 AWG (1 mm<sup>2</sup>) when using all 11 terminals</p>																	
<b>Cable Entry</b>	M20 x 1.5 threaded entrance Adapter supplied to convert M20 x 1.5 to ½" - 14 NPT threaded entrance																	
<b>Construction</b>	<b>SI-LS42 models:</b> Glass fiber-reinforced polyamide thermoplastic housing; UL 94-V0 rating <b>SI-QM100 models:</b> Aluminum alloy die cast																	
<b>Environmental Rating</b>	IEC IP67																	
<b>Operating Temperature</b>	<b>SI-LS42 models:</b> -30° to +70° C <b>SI-QM100 models:</b> -30° to +60° C																	
<b>Weight</b>	<b>SI-LS42 models:</b> 0.3 kg <b>SI-QM100 models:</b> 0.81 kg																	
<b>Application Notes</b>	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.																	
<b>Certifications</b>	For a list of certifications see page 238.																	
<b>Contact Configuration and Switching Diagrams</b>	<b>SI-LS42 models:</b> SD022, SD023, SD024 & SD025 (pp. 243-244) <b>SI-QM100 models:</b> SD026 (p. 244)																	

Now that you've  
seen the light,  
can you ever  
go back to a  
mechanical  
safety  
switch?



[bannerengineering.com](http://bannerengineering.com)

**PICO-GUARD™**  
Breakthrough Fiber Optic  
Safety Interlock Technology



**No Wires, Incredibly Easy to Install**

- ▶ Fiber optics eliminate electrical wires and expensive wiring.
- ▶ Easy-to-mount optical components and cut-to-length, snap-in plastic fiber optic cable.
- ▶ Easily add additional interlocks to any optical channel instantly.

**No Mechanical Contacts or Actuators**

- ▶ Eliminates failure-prone mechanical components.
- ▶ Avoids mechanical actuator alignment issues.
- ▶ Non-contact optical elements eliminate wear.

**Sleek, Advanced Controller**

- ▶ Compact DIN-rail-mountable controller features four separate channels.
- ▶ Each channel can control several optical interlocks in the same loop.
- ▶ Select trip or latch output, plus selectable external device monitoring.
- ▶ Removable terminal blocks for convenience.



**Patent-pending Universal Safety Stop Interface (USSi)**

- ▶ Incredible flexibility allows direct connection of two or more PICO-GUARD controllers to control a single machine when required.
- ▶ Directly connect other safety devices such as light screens, E-Stop buttons, and rope pulls to integrate many safety functions into one controller.

**Type 4, Category 4 Design**

- ▶ Designed to meet ISO 13849-1 (EN954-1) Category 4 and IEC 61496-1 Type 4 requirements.
- ▶ First system to meet Category 4 with a single switch point.
- ▶ Patent pending, diverse-redundant, self-checking system.
- ▶ FMEA (Failure Mode and Effects Analysis) tested for control reliability.

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**the machine safety specialist**

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