

Safety Switches

Safety switches monitor doors, gates, and other movable physical guards that separate personnel from a hazard. They will send a signal to the machine control system if the guard has been opened, removed, or is out of position.

- Non-Contact Switches
- Hinge Switches
- Mechanical Switches
- Locking Switches





Full Line of Door and Gate Sensing Switches





Non-Contact Switches

- Two piece design where sensor and actuator do not contact
- In-Series Diagnostics (ISD) provides users with data from each sensor in a cascade chain
- Cascade up to 32 sensors while achieving the highest level of safety
- Accommodating to misalignment
- IP69 solutions available
- Available with the highest level of tamper resistance



Hinge Switches

- One piece sensor and actuator with hinge function
- Fast installation and set-up with repostionable safety switch point
- Stainless steel and IP69 available
- Matching hinges without sensing available for additional door support
- Available with up to 270° safety switch point operation range



Mechanical Switches

- Two piece design with mechanical operator feedback
- Flexible actuator options for misalignment
- Rotatable heads for flexible installation
- Mechanically coded actuators minimize tampering
- Up to 15N latching force to reduce downtime due to vibrating doors



Locking Switches

- Two piece design with up to 2000N locking force for safety or process critical applications
- Flexible actuator option for misalignment
- Rotatable heads for flexible installation
- Mechanically coded actuators minimize tampering
- Up to 15N latching force to position door prior to locking

Sliding Guards	\checkmark		\checkmark	\checkmark
Small Doors and Gates	\checkmark	\checkmark	\checkmark	\checkmark
Heavy Doors and Large Gates	\checkmark		\checkmark	\checkmark
Position Monitoring (ie. tool orientation)			\checkmark	



Non-contact switch on a sliding door



Mechanical switch on large gate



Hinge switch on a door



Locking switches on large gate



Selection Guide – Safety Switches

	NON CONTACT				HINGE		
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	SI-MAG	SI-RF Single Door	SI-RF Cascade	SI-RF Cascade and ISD	SI-HG63	SI-HG80	
Switch Technology	Magnetic	RFID	RFID	RFID	Mechanical	Mechanical	
Environmental Rating	IP67	IP69	IP69	IP69	IP67 IP69 (stainless steel)	IP65	
Tamper Resistance - Coding Level	Low	Low, High, Unique	Low, High, Unique	Low, High, Unique	Low	Low	
Safety Rating (single sensor)	Ple/Cat 4	Ple/Cat 4	Ple/Cat 4	Ple/Cat 4	up to Ple/Cat 4*	Plc/Cat 3**	
Housing	plastic	plastic	plastic	plastic	metal	metal	
Assured On S _{ao} / Misalignment Tolerance (mm)	3-5	10	10	10			
# of Cascaded Sensors at Ple/Cat4			32	32			
Non-Contact	\checkmark	\checkmark	\checkmark	\checkmark			
Position Monitoring	~	\checkmark	~	\checkmark			
LED Status Indication		\checkmark	\checkmark	\checkmark			
ISD (In-Series Diagnostics)				\checkmark			
Locking (1K to 2K N Force)							
Latching (~10N Force)							

* Dual Switch Hinge model or applicable second safety switch added for Ple/Cat 4 ** Ple/Cat 4 achieved with applicable second safety switch added

ROTATING HEAD	MECHANICAL		LOCKING & SENSING MECHANICAL		
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SI-LS31/32	SI-LS100/83	SI-QS90/75	SI-LM40	SI-LM42	SI-QM100
Mechanical	Mechanical	Mechanical	Mechanical	Mechanical & Solenoid Locking	Mechanical & Solenoid Locking
IP65	IP65	IP65	IP65	IP65	IP65
Low	Low	Low	Low	Low	Low
Plc/Cat 3**	Plc/Cat 3**	Plc/Cat 3**	Plc/Cat 3**	Plc/Cat 3**	Plc/Cat 3**
plastic	plastic	plastic	metal	plastic	metal
Limit Switch models available	Limit Switch models available		Limit Switch models available		
				✓	\checkmark
	\checkmark	\checkmark	 Image: A second s	~	\checkmark



Non-Contact – RFID Switches





In-Series Diagnostics (ISD) makes it easy to access diagnostic data from devices in a safety system without special equipment or designated cabling. Users can troubleshoot machine safety systems, prevent system faults, and reduce equipment downtime. This innovative, next generation technology is exclusive to safety devices from Banner Engineering. For more information go to www.bannerengineering.com/isd



RFID Cascade with In-Series Diagnostics

- Multiple door RFID non-contact gate/door sensing solution
- 4-pin QD connections for cost-effective, simple, error-free installation
- Resistant to high vibration and operations with metallic shavings
- Connect up to 32 sensors in series while maintaining the highest level of safety
- Door status and sensor health sent to PLC/HMI for simple trouble shooting





EtherNet/IP PROFIL hérén HMI

lodbus

PLC



SC10 Safety Controller

ISD to IO-Link Module ISD to IO-Link Gateway • Connect up to 32 ISD inputs

or Safety Controller

- Safety Controller and ISD to PLC Gateway
- Free and intuitive PC configuration software
- Connects up to 64 ISD devices and has 6 available safe inputs for other devices
- Two independently controlled safety relay outputs with 6 Amps each





- SI-RFA-DM2 IP69-rated

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• Easily daisy-chain to a Safety Relay

Non-Contact – Magnetic Switches

- Cost-effective non contact solution minimizes device wear and tear. even in applications with persistent use
- 3 to 5 mm misalignment tolerence
- A single magnetic pair can achieve up to Category 4/PLe safety rating
- Coded magnets minimize the potential for intentional defeat
- Available in cable or QD models



SI-MAGB1 ..



QD models require mating cordset











SI-MAGB3..



NOTE: When ordering housing 1 or 2 with a QD connection, you will receive an M8 Pico connector. When ordering housing 3 with a QD connection you will receive an M12 Euro connector.

Hinge Switches

- Mounts at the axis of a swinging guard where the possibility of misalignment is at its lowest, minimizing the opportunity for nuisance trips
- Achieves Category 4/PLe safey rating with two switches deployed
- Once set, the switch point setting mechanism is fully concealed within the switch, preventing access and complicating any attempts to bypass safety functions
- Available in stainless steel, IP69-rated models that resist high-pressure, high-temperature washdown and similar challenges
- Hinge switches are similar in appearance to standard door hinges, making them completely inconspicuous once installed
- One piece device installs quickly with no need to align the switch and actuator





SI-HG63 stainless steel models shown





A 270° range of motion ensures that movable guards can be opened when the hazard is in a safe state without interfering with the movement of personnel or equipment outside the protected area.

SI-HG80DQD Inline QD Fitting

SI-HG80DQDR Right-angle QD Fitting

SI-HG80A Blank Hinge

SI-LS31HG Lever Hinge Switch

SI-LS3R Rotary Hinge Switch



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Mechanical Switches

- Mechanical safety interlock switches consist of an actuator mounted to a
 movable machine guard aligned with a switch mounted to the machine.
 The actuator must be inserted into the switch for the machine to operate.
- Mechanically coded actuators use two independent operating elements, making it difficult to bypass safety functions
- A machine guard door will not easily open if the actuator is properly embedded into the switch, minimizing nuisance trips caused by machine vibration
- Operators can feel when the actuator has been fully inserted into the switch, ensuring that the guard has been properly closed
- Achieves Category 4/PLe safey rating with two switches deployed on a guard
- IP65-rated safety devices that resist dust, dirt, and some exposure to water and similar environmental challenges



Limit Switches

- Cost effective one piece sensor
- No actuator allows for fewer alignment issues
- · Hideable making them more tamper-resistant
- Mechanically coded actuators use two independent operating elements to minimize intentional tampering or defeat
- Rotating head and top or side engagement allows for eight different actuator positions
- Design meets positive opening requirements for safety switches



* 90MF models = Straight actuator with F contacts 90MFF models = Flexible actuator with F contacts ** Available with 75M models only

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Locking Switches

- Locking safety switches include a machine mounted switch and a guard mounted actuator that prevent access to an area by remaining locked together until the hazardous motion has come to a complete stop.
- Rotating head requires little or no tools to adjust to one of four positions allowing for flexible positioning
- Can be used to prevent access to a hazard, ensure critical processes are not interrupted, or secure material and equipment from theft or tampering
- Mechanically coded actuators use two independent operating elements, making it difficult to bypass safety functions
- Once locked, a machine guard door will not open, eliminating an opportunity for nuisance trips, even if exposed to frequent impact or prolonged vibration
- Operators can feel when the switch and actuator have locked, ensuring that the guard has
 been properly closed
- IP67-rated safety devices that resist dust, dirt, and some exposure to water and similar environmental challenge



SI-LS42..



SI-LS42 with an optional K30L indicator

Model	Color
SI-K30LGRX7P	Green, Red
SI-K30LRX7P	Red





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Selecting Controllers and Safety Relays

Industrial safety controllers and relays provide an interface between safety devices and the machines and processes those devices monitor for a complete and easy-to-use safety control solution.

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Series	XS26	SC26	SC10	ES	UM	GM
# of Input Terminals	up to 154*	up to 26	10*	1	1	1
Independently Controlled Safe Outputs	up to 68*	2	2	1	1	1
Max.Safety Output Rating	0.5A, 6A* ea.	0.5A ea.	6A ea.	7A	7A	6A
In-Series Diagnostics (ISD)	-		\checkmark			
ON/OFF Delay	\checkmark	\checkmark	\checkmark			
PCCC Modbus	\checkmark	\checkmark	\checkmark			
RFID	\checkmark	\checkmark	\checkmark		\checkmark	
Magnetic Switches	 Image: A second s	\checkmark	\checkmark			\checkmark
Hinge Switches	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
Mechanical Switches	~	\checkmark	\checkmark	\checkmark	\checkmark	
Limit Switches	\checkmark	~	\checkmark	\checkmark	~	
Locking Switches	~	\checkmark	\checkmark	~	~	

NOTE: Up to Cat. 4 PL e. per EN ISO 13849-1; SIL 3 per IEC 61508 and IEC 62061. See www.bannerengineering.com for additional information. * Expandable input and output modules available



