Honeywell

Safety Electronic Products Line Guide

The invisible shield, from the industry visionaries. Honeywell Sensing and Control (S&C) safety light curtains use a non-visible, non-harmful screen of infrared light to provide enhanced worker safety. The photoelectric barriers are composed of several aligned beams in emitting and receiving columns. Interrupting a single beam will signal the emergency stop for any machine. What's more, different resolutions permit the detection of an approaching finger, hand, limb, or body. Honeywell S&C also offers expert design and construction. Metal housings and reduced window sizes mean enhanced performance in harsh environments, meeting the needs of potential machine guarding applications from point-of-operation protection, access detection, and presence sensing to gate monitoring and electrical-to-machine-circuitry interfacing.

FEATURES

SAFETY LIGHT CURTAINS FF-ST4 Basic Series. FF-ST4 Standard Series. FF-ST4 Advanced B Series. FF-ST4 Advanced M Series.

Features: Type 4 per IEC61496-1/2, SIL3 per IEC61508 • Resolutions: 14 mm [0.55 in], 18 mm [0.71 in], 30 mm [1.18 in], 80 mm [3.15 in] • Protection heights: 200 mm to 1400 mm [7.87 in to 55.12 in] (14 mm [0.55 in] and 18 mm [0.71 in] resolution) or 200 mm to 1800 mm [7.87 in to 70.87 in] (30 mm [1.18 in] and 80 mm [3.15 in] resolution) • Scanning ranges: 0 m to 3.5 m [0 ft to 11.48 ft] (14 mm [0.55 in] resolution) or 0,25 m to 10 m [0.82 ft to 32.81 ft] (other resolutions) • Patented, unique solid state safety OSSD outputs allow longer cable lengths • Patented, automatic polarity recognition inputs provide easy, last minute configuration • M12-, 5- and 8-pole plugs • ASIC technology provides enhanced response times • Metal housing and reduced window size provide sturdy design • Optimized overall size with reduced inactive zones • Different function packages available • Optional AS-i Safe field module

Benefits:

FF-ST4 Basic Series: Includes automatic restart and AS-I Safe field module.

FF-ST4 Standard Series: Includes external device monitoring, automatic restart, and restart interlock.

FF-ST4 Advanced B Series: Includes external device monitoring, automatic restart, restart interlock, and one-or-two-beam floating blanking.

FF-ST4 Advanced M Series: Includes external device monitoring, automatic restart, restart interlock, and muting (or bypass).

FF-ST4 Basic Series, FF-ST4 Standard Series, FF-ST4 Advanced B Series, FF-ST4 Advanced M Series.

Contributes to improved workplace ergonomics and productivity by replacing doors. Key functions offered in various combinations to improve productivity, minimize maintenance time. Modern solid-state and ASIC technology minimizes maintenance operations and reduces installation time. Easy last-minute configuration achieved through patented automatic polarity recognition inputs. Patented push-pull safety outputs provide longer cable length through an M12 cord set (with reduced wire section). Floating blanking of any beam in the field provides application flexibility. No software, dip switch, or configuration/micro card required for product configuration. Metal body and small window provide sturdy design. Two lateral grooves and mounting accessories allow easy mounting in most locations. Accessories include mounting kits, connectors, power supply, and relay modules. Higher overall scanning ranges with a range of resolutions and protective heights provide a versatile product line appropriate for many applications. Potential applications include material handling equipment, automotive plant floor machinery and equipment for the packaging, paper, food and beverage, and machine tool industries, as well as special machines.

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Enhanced performance, productivity, and safety. Honeywell S&C safety electronic products have a proven track record of flexibility, with separate or self-contained control units, various housing sizes, resolutions, scanning ranges, and protection heights. Solutions can be tailored to exact specifications. Also, our patented inputs — with automatic polarity recognition — reduce wiring needs while increasing configurations while delivering existing pre-wired M12 cord set advantages.

ASIC technology provides better response times than microprocessors, benefiting users with shortened safety distances and reduced overall machine size. And Honeywell S&C's patented push-pull type OSSD outputs also allow for low impedance, eliminating M12 limited wire section constraints. Additional advantages include: unique, patented solid-state safety OSSD output, allowing longer cable length; an optimized overall size; reduced inactive zone. Our patented automatic polarity recognition inputs allow for easy last-minute configuration (FF-ST4 Series).

Type 4 Safety Light Curtains	FF-ST4 Basic Series	FF-ST4 Standard Series
Safety category	Type 4 per IEC61496 (similar to SIL3 per IEC61508)	Type 4 per IEC61496 (similar to SIL3 per IEC61508)
Application (resolution)	Finger (14 mm [0.55 in] and 18 mm [0.71 in]) Hand (30 mm [1.18 in]) Limb and body (80 mm [3.15 in])	Finger (14 mm [0.55 in] and 18 mm [0.71 in]) Hand (30 mm [1.18 in]) Limb and body (80 mm [3.15 in])
Scanning range (resolution)	0 m to 3.5 m [0 ft to 11.48 ft] (14 mm [0.55 in]) 0,25 m to 10 m [0.82 ft to 32.81 ft]	0 m to 3.5 m [0 ft to 11.48 ft] (14 mm [0.55 in]) 0,25 m to 10 m [0.82 ft to 32.81 ft]
Product section	42 mm [1.65 in] x 55 mm [2.17 in]	42 mm [1.65 in] x 55 mm [2.17 in]
Protected height (resolution)	200 mm to 1400 mm [7.87 in to 55.12 in] (14 mm [0.55 in] and 18 mm [0.71 in]) 200 mm to 1800 mm [7.87 in to 70.87 in] (30 mm [1.18 in] and 80 mm [3.15 in])	200 mm to 1400 mm [7.87 in to 55.12 in] (14 mm [0.55 in] and 18 mm [0.71 in]) 200 mm to 1800 mm [7.87 in to 70.87 in] (30 mm [1.18 in] and 80 mm [3.15 in])
Differentiator	Robust housing	Robust housing; selection through wiring
Connectors	M12/5 pole (100 m [328.08 ft])	M12/5 and 8 pole (100 m [328.08 ft])
Basic interface module	FF-SRL60252 or AS-i Safe	FF-SRE60292
External device monitoring (EDM)	no	yes
Automatic restart (AUTO)	yes	yes
Restart interlock (RES)	no	yes
Muting (or bypass)	no	no
1- or 2-beam floating blanking	no	no
AS-i Safe module	yes	no
Presence Sensing Device Initiation (PSDI)[1] module	yes	no
Emergency stop auxiliary inputs	no	no

1. For the automatic machine cycle start upon beam clearance.

ASIC technology

Unlike most of the safety light curtains available, Honeywell safety light curtains use Application Specific Integrated Circuits (ASICs) to meet the requirements of safety standards. ASIC circuits, which are tailor-made integrated circuits, are widely used in the mass production of electronics.

The correct operation of a microprocessor-based device relies on the integrity of its software. A failure of the memory hosting the software may deteriorate the instructions carried out by the microprocessor and may lead to an erratic behavior of the device. This is why the integrity of the information contained in the memory must be self-checked, which logically affects the device response time.

Honeywell safety light curtains are not software based devices (they do not require self-test for memory integrity check), and as such, do not fall in the scope of the newly released IEC61508 standard. The Honeywell safety light curtains also benefit from the ASIC circuit's characteristics such as large integration scale, small current consumption, high

Type 4 Safety Light Curtains	FF-ST4 Advanced B Series	FF-ST4 Advanced M Series
Safety category	Type 4 per IEC61496 (similar to SIL3 per IEC61508)	Type 4 per IEC61496 (similar to SIL3 per IEC61508)
Application (resolution)	Finger (14 mm [0.55 in] and 18 mm [0.71 in]) Hand (30 mm [1.18 in])	Finger (14 mm [0.55 in] and 18 mm [0.71 in]) Hand (30 mm [1.18 in]) Limb and body (80 mm [3.15 in])
Scanning range (resolution)	0 m to 3.5 m [0 ft to 11.48 ft] (14 mm [0.55 in]) 0,25 m to 10 m [0.82 ft to 32.81 ft]	0 m to 3.5 m [0 ft to 11.48 ft] (14 mm [0.55 in]) 0,25 m to 10 m [0.82 ft to 32.81 ft]
Product section	42 mm [1.65 in] x 55 mm [2.17 in]	42 mm [1.65 in] x 55 mm [2.17 in]
Protected height (resolution)	200 mm to 1400 mm [7.87 in to 55.12 in] (14 mm [0.55 in] and 18 mm [0.71 in]) 200 mm to 1800 mm [7.87 in to 70.87 in] (30 mm [1.18 in])	200 mm to 1400 mm [7.87 in to 55.12 in] (14 mm [0.55 in] and 18 mm [0.71 in]) 200 mm to 1800 mm [7.87 in to 70.87 in] (30 mm [1.18 in] and 80 mm [3.15 in])
Differentiator	Robust housing; selection through wiring	Robust housing; selection through wiring
Connectors	M12/5 and 8 pole (100 m [328.08 ft])	M12/5 and 8 pole (100 m [328.08 ft])
Basic interface module	FF-SRE60292	FF-SRE60292
External device monitoring (EDM)	yes	yes
Automatic restart (AUTO)	yes	yes
Restart interlock (RES)	yes	yes
Muting (or bypass)	no	yes
1- or 2-beam floating blanking	yes	no
AS-i Safe module	no	no
Presence Sensing Device Initiation (PSDI)[1] module	no	no
Emergency stop auxiliary inputs	no	no

[1] For the automatic machine cycle start upon beam clearance.

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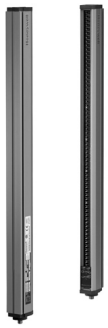
immunity to electrical noise, and high speed. ASICs work in the multi-task mode, while microprocessors are sequential. Honeywell is in compliance with safety standard requirements for response times of electro-sensitive protective equipment (that must include the safety outputs OSSD reaction time to failures).

Push-Pull outputs

Conventional safety OSSD outputs using solid state open collectors accept limited cable length and wire section. Beyond a certain limit, the line impedance affects the high frequency test pulses used to monitor the safety OSSD outputs, resulting into a lock out condition for the light curtain. The alternative is to add cable length with higher wire sections.

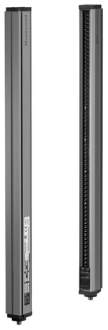
The Honeywell safety OSSD outputs are low impedance solid state Push-Pull outputs, completely immune to the line impedance. As a result, the M12 limited wire section is no longer a constraint. Push-Pull outputs also provide enhanced reliability regarding current leakage and common mode failure.

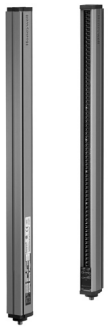


Type 4 Safety Light Curtains	FF-SYB Series - point of operation or presence sensing
Safety category	Type 4 per IEC61496 (similar to SIL3 per IEC61508)
Application (resolution)	Finger (14 mm [0.55 in]) Hand (30 mm [1.18 in]) Limb (50 mm [1.97 in])
Scanning range (resolution)	0 m to 6 m [0 ft to 19.69 ft] (14 mm [0.55 in]) 0 m to 20 m [0 ft to 65.62 ft] (30 mm [1.18 in] and 50 mm [1.97 in])
Product section	42 mm [1.65 in] x 55 mm [2.17 in]
Protected height (resolution)	300 mm to 1800 mm [11.81 in to 70.87 in] (14 mm [0.55 in], 30 mm [1.18 in] and 50 mm [1.97 in])
Differentiator	Fully bundled functionality; selections through micro-cards; long scanning ranges
Connectors	M12/5 and 8 pole (100 m [328.08 ft])
Basic interface module	FF-SRE60292
External device monitoring (EDM)	yes
Automatic restart (AUTO)	yes
Restart interlock (RES)	yes
Muting (or bypass)	yes
1- or 2-beam floating blanking	yes
AS-i Safe module	yes
Presence Sensing Device Initiation (PSDI)[1] module	yes
Emergency stop auxiliary inputs	yes

[1] For the automatic machine cycle start upon beam clearance.

Configuration through wiring
The FF-ST4 and FF-ST2 Series safety light curtains offer flexible configuration of different mode of operations through the M12, 8 pole plug. The Honeywell patented inputs with automatic polarity recognition reduce the amount of wiring and increase the number of configurations while keeping the advantages of the pre-wired, off-the shelf M12 cord sets.





Type 4 Multibeam Safety Light Curtains	FF-SYB Series - access detection (long range)	FF-SYB Series - access detection (short range)
Safety category	Type 4 per IEC61496 (similar to SIL3 per IEC61508)	Type 4 per IEC61496 (similar to SIL3 per IEC61508)
Application (number of beams)	Body (2, 3 or 4)	Body (2)
Scanning range	0 m to 30 m [0 ft to 98.43 ft] (standard range) 5 m to 80 m [16.40 ft to 262.47 ft] (long range)	0 m to 7 m [0 ft to 22.97 ft] with passive mirrors
Beam separation distance	2-beam: 500 mm [19.69 in] spacing (body/access) 3-beam: 400 mm [15.75 in] spacing (body/access) 4-beam: 300 mm [11.81 in] spacing (body/access)	2-beam: 500 mm [19.69 in] beam spacing (body/access)
Product section	42 mm [1.65 in] x 55 mm [2.17 in]	42 mm [1.65 in] x 55 mm [2.17 in]
Differentiator	Fully bundled functionality; selections through micro-cards	Fully bundled functionality; selections through micro-cards
Connectors	M12/5 and 8 pole (100 m [328.08 ft])	M12/8 pole (100 m [328.08 ft])
Basic interface module	FF-SRE60292	FF-SRE60292
External device monitoring (EDM)	yes	yes
Automatic restart (AUTO)	yes	yes
Restart interlock (RES)	yes	yes
Muting (or bypass)	yes	yes
1- or 2-beam floating blanking	yes	no
Emergency stop auxiliary inputs	yes	yes

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Type 2 Safety Light Curtains		
	FF-ST2 Standard A Series	**FF-ST2 Standard M Series**
Safety category	Type 2 per IEC61496 (similar to SIL2 per IEC61508)	Type 2 per IEC61496 (similar to SIL2 per IEC61508)
Application (resolution)	Finger (18 mm [0.71 in]) Hand (30 mm [1.18 in]) Limb and body (80 mm [3.15 in])	Finger (18 mm [0.71 in]) Hand (30 mm [1.18 in]) Limb and body (80 mm [3.15 in])
Scanning range	0,25 m to 10 m [0.82 ft to 32.81 ft]	0,25 m to 10 m [0.82 ft to 32.81 ft]
Product section	42 mm [1.65 in] x 55 mm [2.17 in]	42 mm [1.65 in] x 55 mm [2.17 in]
Protected height (resolution)	200 mm to 1400 mm [7.87 in to 55.12 in] (18 mm [0.71 in]) 200 mm to 1800 mm [7.87 in to 70.87 in] (30 mm [1.18 in] and 80 mm [3.15 in])	200 mm to 1400 mm [7.87 in to 55.12 in] (18 mm [0.71 in]) 200 mm to 1800 mm [7.87 in to 70.87 in] (30 mm [1.18 in] and 80 mm [3.15 in])
Differentiator	Robust housing	Robust housing
Connectors	M12/5 pole (100 m [328.08 ft])	M12/5 pole (100 m [328.08 ft])
Basic interface module	FF-SRE60292	FF-SRE60292
External device monitoring (EDM)	yes	yes
Automatic restart (AUTO)	yes	no
Restart interlock (RES)	no	yes

⚠ WARNING

IMPROPER SAFETY PRODUCT USE IN THE UNITED STATES

- Type 2 safety light curtains as defined by IEC/EN 61496-1 and IEC/EN 61496-2 do not meet United States OSHA 1910.217, United States ANSI B11.1, B11.2, B11.19 and B11.20 requirements. Although Type 2 safety products are acceptable for certain applications outside the Unites States, they are not generally acceptable in the United States due to current United States regulations and standards.
- In the United States, Type 2 safety light curtains may be used under limited circumstances as defined by the ANSI/R15.06-1999 standard. In Canada, IEC/EN 61496-1 and IEC/EN 61496-2 are recognized as product standards, however, application standards do not typically allow Type 2 light curtain use.
- Do not use Type 2 safety products in the United States if the applicable standard requires a control reliable solution.
- For Risk Assessment, refer to ANSI TR3 and ANSI/R15.06-1999 for the United States; refer to the Ministry of Labor for Canada.
- Consult with local safety agencies before installing a Type 2 safety light curtain product.

Failure to comply with these instructions may result in death or serious injury.

Safety Switch Modules

	FF-SRS Emergency Stop	FF-SRST Emergency Stop with Delayed Contacts	FF-SR2 Two-hand Controls
Potential application	Emergency stop device; door monitoring	Delayed emergency stop device; door monitoring with solenoid key switch	Machine cycle start
Safety category	Cat. 2 or 4 per EN954-1	Cat. 3 and 4 per EN954-1	Cat. IIIA and IIIC per EN574
Housing width	22,5 mm [0.89 in], 45 mm [1.77 in], 100 mm [3.94 in]	45 mm [1.77 in]	22,5 mm [0.89 in], 45 mm [1.77 in]
Supply voltage	24Vdc, 120 Vac, 230 Vac	24 Vac/dc	24Vdc, 120 Vac, 230 Vac
Output contact	3 NO / 1 NC 6 NO / 1 NC	2 NO / 1 NC direct 2 NO / 1 NC delayed	2 NO 2 NO / 1 NC 3 NO / 1 NC
Switching capacity	10 mA to 5 A 1 mA to 10 A	1 mA to 5 A	1 mA to 5 A 1 mA to 10 A
Embedded functions	Input short-circuit and cross-fault detection; manual/auto restart with EDM loop	Manual/auto restart with EDM loop; selectable time ranges	0.5 s input time monitoring
Differentiator	Removable terminal strips; high switching capacity; ac supply voltages	Removable terminal strips	Removable terminal strips; high switching capacity; ac supply voltages

Safety Switch Modules

	FF-SR0 Standstill Monitoring	FF-SRT Delayed Extension
Potential application	Motor control	Delayed emergency stop device; contact multiplication; current switching capacity
Safety category	Cat. 1 and 3 per EN954-1	Cat. 1 per EN954-1
Housing width	45 mm [1.77 in]	22,5 mm [0.89 in]
Supply voltage	24Vdc, 120 Vac, 230 Vac	24 Vdc
Output contact	2 NO / 1 NC 2 NO / 2 NC	3 NO / 1 NC
Switching capacity	1 mA to 4 A 10 mA to 10 A	Up to 3 A
Embedded functions	Motor back EMF monitoring or rotation frequency measurement	Selectable time ranges
Differentiator	Removable terminal strips; high switching capacity; ac supply voltages	Dual timing circuit

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Safety Light Curtain Modules	FF-SRL Basic	FF-SRL59022 PSDI
Potential application	Safety device with solid state outputs	Automatic machine cycle start
Safety category	Cat. 4 per EN954-1	Cat. 4 per EN954-1
Housing width	22,5 mm [0.89 in], 45 mm [1.77 in]	45 mm [1.77 in]
Supply voltage	24 Vdc	24 Vdc
Output contact	3 NO / 1 NC	3 NO
Switching capacity	10 mA to 5 A 1 mA to 10 A	1 mA to 5 A
Embedded functions	Manual/auto restart with EDM loop	Manual restart with EDM loop, Presence Sensing device Initiation: single or dual stroke with selectable time window
Differentiator	Removable terminal strips; high switching capacity	Removable terminal strips

Safety Light Curtain Modules	FF-SRM Muting	FF-SRE Extension
Potential application	Momentary deactivation of the safety light curtain	Contact multiplication; current switching capacity
Safety category	Cat. 4 per EN954-1	Cat. 1 per EN954-1
Housing width	45 mm [1.77 in]	22,5 mm [0.89 in], 100 mm [3.94 in]
Supply voltage	24 Vdc	24 Vac/dc, 120 Vac, 230 Vac
Output contact	3 NO	4 NO + 2 NC 7 NO + 1 NC
Switching capacity	1 mA to 5 A	10 mA to 5 A 1 mA to 10 mA
Embedded functions	Manual/auto restart with EDM loop; 2 or 4 muting inputs; 1 or 2 light curtains; muting lamp; auxiliary emergency stop circuit	Redundant relay outputs (pair of safety relays with guided contacts)
Differentiator	Removable terminal strips	Removable terminal strips; high switching capacity; ac supply voltages

FF-SYB Series.

Features: Type 4 per IEC/EN 61496 – parts 1 and 2, SIL3 per IEC61508; meets applicable parts of North American standards and regulations • Self-contained device • External Device Monitoring (EDM) • Manual or automatic restart • Two or four inputs for muting signals • Manual muting override • Muting lamp/diagnosis output or static (solid state) non-safety output for signaling • Input for serial connection of an auxiliary safety device • Two static (solid state) safety outputs with short circuit and cross-fault detection • Compact cross section

Features specific to point-of-operation/ presence sensing models: Resolutions 14 mm [0.55 in] dia. for finger detection, 30 mm [1.18 in] dia. for hand detection and 50 mm [1.97 in] dia. for leg detection • Scanning range up to 20 m [65.62 ft] • Protection heights up to 1830 mm [72.05 in] • 1- or 2-beam floating blanking

Features specific to access detection/ long range models: Resolution 2-beam (500 mm [19.69 in] spacing), 3-beam (400 mm [15.75 in] spacing), 4-beam (300 mm [11.81 in] spacing) • Scanning range up to 80 m [262.47 ft] • 1- or 2-beam floating blanking • Optional beacon (integrated muting lamp)

Features specific to access detection/ short range models: Resolution 2-beam with 500 mm [19.69 in] beam spacing • Scanning range up to 7 m [22.97 ft] with passive mirrors • Optional beacon (integrated muting lamp)

Benefits: Self-contained device does not require separate control unit. Built-in functions such as floating blanking, muting, external device monitoring, manual restart, and serial connection eliminate need for additional control modules and reduce cost and installation time. Patented configuration cards for quick set-up and easy replacement. Included mounting brackets allow for multiple mounting positions. Enhanced diagnostics include signal strength, cross-talk, muting, blanking, restart, and failure indication. Selection of the infrared emission power allows cross-talk reduction. Long scanning distance covers most perimeter guarding applications. Optional floor mounting posts with individual mirrors protect several sides of a machine with only one system. Potential applications for point-of-operation and presence sensing models include presses and punches, metal-forming, milling and drilling machines, spot-welding and fine-boring machines, pressing, molding and thermoforming machines, stacking, transporting and conveyor technology, handling equipment and assembly lines. Potential applications for access detection models (long range and short range) include access detection to robot areas, stacking machines, transporting and conveyor technology, handling equipment and assembly lines, and the palletizing industry.

FF-ST2 Standard A Series and FF-ST2 Standard M Series.

Features: Type 2 per IEC61496-1/2, SIL2 per IEC61508 • Resolutions: 18 mm [0.71 in], 30 mm [1.18 in], 80 mm [3.15 in] • Protection heights: 200 mm to 1400 mm [7.87 in to 55.12 in] (18 mm [0.71 in] resolution) or 200 mm to 1800 mm [7.87 in to 70.87 in] (30 mm [1.18 in] and 80 mm [3.15 in] resolutions) • Scanning range: 0,25 m to 10 m [0.82 ft to 32.81 ft] • Patented, unique solid state safety OSSD outputs allow longer cable length • M12-, 5-pole plugs • ASIC technology provides enhanced response times • Metal housing and reduced window size provide sturdy design • Optimized overall size with reduced inactive zones

Benefits: FF-ST2 Standard A series: Includes external monitoring device and automatic restart. FF-ST2 Standard M series: Includes external monitoring device and restart interlock. FF-ST2 Standard A series and FF-ST2 Standard M series: Contribute to improved workplace ergonomics and productivity by replacing doors. Key functions offered in various combinations to improve productivity, minimize maintenance time. Modern solid-state and ASIC technology minimize maintenance operations and reduce installation time. Easy last-minute configuration achieved through patented automatic polarity recognition inputs. Patented push-pull safety outputs provide longer cable length through an M12 cord set (with reduced wire section). No software, dip switch, or configuration/micro card required for product configuration. Metal body and small window provide sturdy design. Two lateral grooves and mounting accessories allow easy mounting in most locations. Accessories include mounting kits, connectors, power supply, and relay modules. Higher overall scanning ranges with a variety of resolutions and protective heights provide a versatile product line appropriate for many applications. Potential applications include material handling equipment, automotive plant floor machinery and equipment for the packaging, paper, food and beverage, and machine tool industries as well as special machines.

SAFETY SWITCH MODULES

FF-SRS Emergency Stop.

Features: Complies with EU Directive for machines 98/37/EC, IEC/EN 60204, DIN VDE 0113 and UL 508 • Automatic start or manual start modes • LED indicates power and internal relays status • Expected mechanical life up to ten million operations • Expected electrical life up to one million operations • Line fault detection and detection of blocked start push button • Voltage drop protection

Features specific to FF-SRS5924: Single channel input • Output: three NO contacts and one NC contact • Removable terminal strips for ease of maintenance • Slim housing 22,5 mm [0.89 in] width • Switching current from 10 mA to 4 A

Features specific to FF-SRS6025: Dual channel input • Selectable cross fault detection in emergency stop control circuit • Output: three NO contacts and one NC contact • Slim housing 22.5 mm [0.89 in] width • Switching current from 10 mA to 5 A

Features specific to FF-SRS5935: Dual channel input • Selectable cross fault detection in emergency stop control circuit • Output: three NO contacts and one NC contact • Removable terminal strips for ease of maintenance • 45 mm [1.77 in] width • Switching current from 1 mA to 10 A

Features specific to FF-SRS5988:
Dual channel input • Selectable cross fault detection in emergency stop control circuit • Output: six NO contacts and one NC contact • Removable terminal strips for ease of maintenance • 100 mm [3.93 in] width • Switching current from 1 mA to 10 A

Benefits:
The FF-SRS Emergency Stop modules are designed to be used in emergency stop circuits when danger to personnel or machinery is present. These slim housing devices have two safety relays with positive-guided contacts for enhanced redundancy. In the manual start mode, the module accepts input from the safety device (e.g., safety limit or interlock switch, non-contact magnetic switch, etc.) after activation of the push-button; then, the normally open safety contacts will close and the normally closed contact will open. In the automatic start mode, the module accepts immediate input from the safety device; if the restart inputs are jumpered, the normally open safety contacts will close and the normally closed contact will open. In either mode, if the safety device is actuated (emergency stop condition occurs), the normally open contact will open immediately and the normally closed contact will close. This emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to arrest dangerous motion and/or remove power. The FF-SRS5924 is a single channel device and relies on a single safety input. If a single safety input does not provide the level of safety required, use one of the dual channel safety control modules (FF-SRS6025, FF-SRS5935, FF-SRS5988). Potential applications include emergency stop circuits on machines, sliding door protection, conveyors and transfer lines.

FF-SRST Emergency Stop with Delayed Contacts.

Features:
Complies with the Machinery Directive for 98/37/EC, IEC 204, EN 60204, DIN VDE 0113 and UL 508 • Dual channel input • Safety outputs: two direct NO contacts, one direct NC contact, two NO delayed contacts and one NC delayed contact • Wide range of adjustable delay times • Switching current from 1 mA to 5 A • Automatic start or manual start mode with short circuit detection on the pushbutton input • Selectable cross-fault detection in emergency stop control circuit • LEDs indicate power and internal relays status • Expected mechanical life up to ten million operations • Expected electrical life up to one million operations • Over voltage and short-circuit protection • Removable terminal strips for ease of maintenance • 45 mm [1.77 in] width

Benefits:
Designed to be used in emergency stop circuits where danger to personnel or machinery is present. This device has four internal safety relays with positive-guided contacts, of which two of these safety relays are delayed. In the manual start mode, the module accepts input from the safety device (e.g., safety light curtain, safety mat, safety switches, etc.) after activation of the push-button. In the automatic start mode, the module accepts immediate input from the safety device. After restart, the normally open safety contacts will close and the normally closed contacts will open. If an emergency stop condition occurs (safety device is actuated), two relays will de-energize immediately, and two relays will de-energize after the selected delay time has elapsed. This emergency stop condition is signaled by the direct safety contacts for the machine control circuitry to first stop the dangerous motion and then to remove power after a certain time by the delayed contacts. Potential applications include emergency stop circuits on machines, Category 1 emergency stop circuits per EN 418 and NFPA79 (delayed isolation of power after machine stoppage), and door protection (delayed opening of an interlocked protective gate).

FF-SR2 Two-Hand Controls.

Features:
Complies with the Machinery Directive 98/37/EC and UL 508 • 0.5 s simultaneity check between inputs • Gold plated, 5 µm contacts allow low current down to 1 mA • Expected mechanical life up to ten million operations • Expected electrical life up to one million operations • Switching current up to 5 A • Voltage drop protection • Overvoltage and shortcircuit protection • Final switching device monitoring loop • LED indicators for power and outputs

Features specific to FF-SR25933:
Type IIIC per EN 574, Category 4 per EN 954-1• Inputs for two dual-contact pushbuttons • 45 mm [1.77 in] width with 3 NO and 1 NC outputs (ac versions) or 22.5 mm [0.89 in] width with 2 NO and 1 NC outputs (dc version)

Features specific to FF-SR25980:
Type IIIA per EN 574, Category 1 per EN 954-1 • Inputs for two single-contact pushbuttons • 45 mm [1.77 in] width with 2 NO outputs (ac and dc versions)

Benefits: Provides protection against injury due to machine movement. Cost-effective solutions for machine guarding, when the upper limbs of a single operator are exposed to a hazard. Two push-buttons which force the use of two-hand activation simultaneously. Accepts input from one or two contacts delivered by each of the two push-buttons. When both pushbuttons are activated within half a second and maintained, the normally open safety contacts of the module switch on. Otherwise another activation is required. When one of the push-buttons is released, the normally open safety contacts of the module switch off immediately. Potential applications include manual load or unload stations for machines; designed for press two-hands safety controls.

FF-SR0 Standstill Monitoring.

Features:
Complies with the Machinery Directive 98/37/EC and UL 508 • Designed for Category 1 Emergency Stop functions per EN 418 and NFPA79 • Expected mechanical life up to ten million operations • Expected electrical life up to one million operations • Voltage drop protection • 45 mm [1.77 in] width

Features specific to FF-SR05936:
Category 1 per EN 954-1 • Monitors back EMF generated by 3-phase and single phase inductive motors • No

motor impedance limit • Broken wire detection on monitoring circuit • Positive-guided output contacts: two NO, two NC • Switching current up to 10 A • Green LED's indicate stopped motor and power status • Red LED indicates line breakage status

Features specific to FF-SR05932:
Category 3 per EN 954-1 • Monitors rotation frequency • Inputs for two 3-wire proximity sensors (with PNP or NPN solid state output) • Compatible with motors driven by frequency variators, soft starters etc. • Rotation frequency threshold adjustable via DIP switches • Positive-guided output contacts: two NO, one NC • Switching current up to 4 A • Green LED for power status, green LED for rotation frequency on channel 1 and channel 2 below programmed detection level • Removable terminal blocks

Benefits:
If the stopping time of the machinery is unpredictable, use a standstill monitor module. The FF-SR05936 module measures the back EMF of the connected motor from the terminals of one stator winding. When the EMF has decreased near zero, the FF-SR05936 detects that the motor has stopped and energizes its output relays. In addition, FF-SR05936 monitors the connections to the motor for broken wires. The FF-SR05932 module measures the rotation frequency of rotating devices using two external proximity sensors. When the rotation frequency falls below a programmable threshold level, the FF-SR05932 module will energize its safety relay outputs. The detection threshold of the rotation frequency is programmable in four ranges using internal DIP switches. Potential applications include stopped motor monitor for three phase and single phase asynchronous motors or any kind of rotating devices, used to unlock a door which is guarding a rotating machine only when the movement is stopped, and used in conjunction with emergency stop modules to activate an emergency brake when an e-stop signal is received and while motion is still present.

FF-SRT Delayed Extension.

Features:
Complies with the Machinery Directive 98/37/EC, IEC 255, VDE 0435, and UL 508 • Provides a delay after the module is de-energized • Output: one NC, one NO positive-guided contacts • Available with two time delay circuits (channels) • Available with selectable delay up to 30 s • LED status indication • Expected mechanical life up to ten million operations • Expected electrical life up to 300000 operations • Switching current up to 8 A • Voltage drop protection • 45 mm [1.77 in] width

Benefits:
The FF-SRT Time Delay module provides a time delay before safety contacts are opened. The output contacts of the two time delay circuits are connected in series. When the displayed time has elapsed, the safety contacts within the module open safely, even if one of the contacts is welded. When power is applied to the module, the normally closed contact will open immediately and the normally open contact will close. After power is removed from the module, the normally closed contact will close and the normally open contact will open after the set time has elapsed. For example, this module may be used with an emergency stop module. The emergency stop module will immediately forward the emergency stop condition to the machine control circuitry. The time delay module can be used to keep some non-safety related machinery operating (door locked) for a short period of time to avoid an unsafe condition or simplify the machine startup cycle. Potential applications include time delay required before disconnection of safety interface circuit.

FF-SRL Basic.

Features:
Complies with EU Machinery Directive 98/37/EC, IEC 204, EN 60204, DIN VDE 0113 • Dual input compatible with the safety static outputs of Honeywell electro-sensitive protective equipment • Output: three NO contacts and one NC contact • Automatic start or manual start modes • Line fault detection and detection of blocked start push-button • LED indicates power and the status of both internal relays • Expected mechanical life up to ten million operations • Expected electrical life up to one million operations • Voltage drop protection

Features specific to FF-SRL60252:
• Switching current from 10 mA to 5 A
• Slim housing 22,5 mm [0.89 in] width

Features specific to FF-SRL5919:
• Switching current from 1 mA to 6 A
• Removable terminal strips for ease of maintenance • Slim housing 45 mm [1.77 in] width

Benefits:
The FF-SRL relay modules are designed to be used with electro-sensitive protective equipment with safety static outputs when danger to personnel or machinery is present. This slim housing device has two safety relays with positive-guided contacts for enhanced redundancy. The FF-SRL modules can be wired for either automatic or manual restart modes of operation, and also provides Final Switching Device (FSD) monitoring if interfaced with external switching devices. They are equipped with LED indicators that provide diagnostic information, and are equipped with removable terminal strips to make replacement fast and easy. In the manual start mode, the module accepts input from the safety device after activation of the push-button; then, the normally open safety contacts will close and the normally closed contact will open. In the automatic start mode, the module accepts input from the safety device; if the restart inputs are jumpered, the normally open safety contacts will close and the normally closed contact will open. In either mode, if the safety device is actuated (emergency stop condition occurs), the normally open contact will open immediately and the normally closed contact will close. This emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to arrest dangerous motion and/or remove power. Potential applications include electro-sensitive protective equipment with static outputs in point-of-operation protection or zone guarding protection such as: metal

forming, milling and drilling machines, spot-welding machines and fine-boring machines, molding and thermoforming machines, and conveyors/transfer lines.

FF-SRL59022 PSDI (Presence Sensing Device Initiation).

Features:

Category 4 control module per EN 954-1 • Complies with IEC 61508 and EN 61496-1 European standards • Meets the applicable parts of the US and Canadian regulations and standards • Safety relay outputs: 3 NO contacts • Response time: 26 ms • Integrated start and restart interlock facility • Monitored start push-button • External Device Monitoring (EDM) loop for the control of external contactors • 45 mm [1.77 in] slim housing • Detailed diagnostic information for easy troubleshooting via external and internal indicators • LED indicators for relay status and diagnostic information • Input for external key operated switch for selection of number of intrusions and intrusion time

Benefits:

The FF-SRL59022 is a programmable safety relay module offering various Presence Sensing Device Initiation modes (PSDI with single/double intrusion) in one device. The FF-SRL59022 is permanently self-checked and complies with the requirements of the EN 954-1 European standard for Category 4 safety devices, IEC 61508 and EN 61496-1. Any internal failure is detected and leads to the de-energization of its safety relay outputs. The FF-SRL59022 module offers an extensive diagnostic through indicator that eases troubleshooting of the application. Presence Sensing Device Initiation module simplifies a semi-automatic machine process requiring periodic manual interventions of an operator during the machine cycle. Typically, an operator needs to load or unload the machine intruding the connected safety light curtain once or twice. After the programmed number of intrusions have been performed, the machine restarts automatically. Potential applications include safeguarding of manual loading/unloading of presses requiring single or double Intrusion of the safety device (PSDI modes), conveyor lines, transfer lines, robots, presses, press-brakes, rubber and plastic machines, woodworking machines, material handling, and rotating working tables.

FF-SRM Muting.

Features:

Category 4 muting module as per the EN 954-1 and EN 61496-1 European Standards • Meets the applicable parts of the US and Canadian regulations and standards ANSI/RIA/OSHA • Multi-functional module is programmable through internal selectors (muting functions, mutual exclusion mode) • Compatible with many type 2, type 3 or type 4 safety devices (e.g., safety light curtains, safety mats, safety switches) and muting sensors • Works with safety devices and muting sensors with static outputs or relay outputs • Inputs for 1 mutable safety device and 1 non-mutable safety device or up to 2 mutable safety devices • Inputs for 2 or 4 sensors to start and end the muting sequence • Uni-directional or bi-directional muting • Maximum muting time programmable in wide ranges (10 s to unlimited) • Safety relay outputs: 3 NO • Auxiliary static outputs for the muting lamp, diagnostic information, and output relay status • Response time: 25 ms • Integrated start and restart interlock capability • Monitored start push-button • Test output for safety device testing • External Device Monitoring (EDM) loop for the control of external contactors • 45 mm/1.77 in slim housing • Detailed diagnostic information for easy troubleshooting via external and internal indicators • LED indicators for relay status and diagnostic information

Benefits:

The FF-SRM200P2 is a programmable safety control module offering various muting modes and a mutual exclusion mode in one device. The FF-SRM200P2 is permanently self-checked and complies with the requirements of the EN 954-1 European standard for Category 4 safety devices and EN 61496-1. Any internal failure is detected and leads to the de-energization of its safety relay outputs. Depending on mode, up to two safety devices (e.g., light curtains, safety mats, safety switches etc.) protecting a hazardous area, and up to four sensors (e.g., for starting or ending a muting sequence) can be connected. If needed, the correct functioning of the connected safety devices may be monitored by the module through its test output. The FF-SRM200P2 module offers an extensive diagnostic through indicators, which allow for easy troubleshooting in potential muting applications. In the muting mode, the module is an interface between one or two safety devices (e.g., light curtains, safety mats, safety switches, etc.) and the control circuitry of a hazardous machine for which it is necessary to mute the safety device(s) at certain steps of the process. In the mutual exclusion mode, the module monitors two safety devices (typically light curtains, switches), protecting hazardous areas accessible by operators and machines. The operator's access to the area is only allowed during the safe period of the machine cycle without stopping the hazardous movement. Potential applications include conveyor lines, palletizers and depalletizers, automotive transfer lines, packaging and wrapping machines, machines where manual operations must be done outside of hazardous phases of the machine cycle (e.g., mechanical or hydraulic presses, press-brakes, welding robots, double transfer lines), hazardous areas being mutually accessed by material handling robots or operators doing manual operations (mutual exclusion mode).

FF-SRE Extension.

Features:

Complies with the Machinery Directive 98/37/EC, IEC 204, EN 60204, DIN VDE 0113, and UL 508 • Redundant and positive-guided contacts • LEDs indicate channel one and two status • Expected mechanical life up to ten million operations • Expected electrical life up to one million operations

Features specific to FF-SRE6029:

Output: four NO contacts and two NC contacts • Switching current from 10 mA to 5 A • 22,5 mm [0.89 in] width

Features specific to FF-SRE3081:
Output: seven NO contacts and one NC contact • Switching current up to 10 A • Removable terminal strips for easy maintenance • 100 mm [3.94 in] width

Benefits:
The FF-SRE Extension Modules provide contact multiplication of emergency stop modules, safety door modules and other safety devices with external relay monitoring capability (e.g., safety light curtain, safety mat, etc.). These modules receive two safety inputs from a connected safety device. Immediately, the normally open safety contacts will close and the normally closed safety contacts will open. If a safety device is actuated (an emergency stop condition occurs), the normally open contact will open immediately and the normally closed contact will close. This emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to arrest dangerous motion and/or remove power. The normally closed contact of the extension module must be connected to the external loop monitoring circuit of the connected safety device. This configuration will ensure that the two safety relays in the extension module are operating correctly. Potential applications include extension for emergency stop modules, safety door monitors, safety light curtains or other safety devices.

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004758-2-EN IL50 GLO
January 2009