

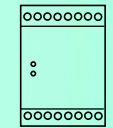


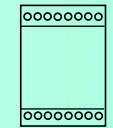
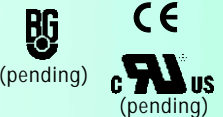

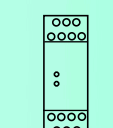


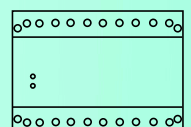


Safety Control Modules for Emergency Stop Circuits





TYPICAL APPLICATIONS	APPROVALS	DIMENSIONS	Category per EN 954-1			
			Input channels	Safety contacts	Auxiliary contacts	Switching Capacity
Single Channel Emergency Stop Module • E-Stop circuits up to Category 2 (EN 954-1) • Sliding door protection • Conveyors / transfer lines	 According to the Machinery Directive: 98/37/EC and IEC/EN 60204 Suitable for interfaces up to CATEGORY 2 per EN 954-1	Front view 22,5 mm x 121 mm x 84 mm / 0.89 in x 4.77 in x 3.31 in	2	1	3 NO 1 NC	4 A
Single Channel Emergency Stop Module • E-Stop circuits up to Category 2 (EN 954-1) • Sliding door protection • Conveyors / transfer lines	 According to the Machinery Directive: 98/37/EC and IEC/EN 60204 Suitable for interfaces up to CATEGORY 2 per EN 954-1	Front view 45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in	2	1	2 NO	10 A
Dual Channel Emergency Stop Module • E-Stop circuits up to Category 4 (EN 954-1) • Door protection • Conveyor / transfer lines	 According to the Machinery Directive: 98/37/EC and IEC/EN 60204 Suitable for interfaces up to CATEGORY 4 per EN 954-1	Front view 22,5 mm x 118 mm x 84 mm / 0.89 in x 4.65 in x 3.31 in	4	2	2 NO 1 NC	7 A
Dual Channel Emergency Stop Module • E-Stop circuits up to Category 4 (EN 954-1) • Door protection • Conveyor / transfer lines	 According to the Machinery Directive: 98/37/EC and IEC/EN 60204 Suitable for interfaces up to CATEGORY 4 per EN 954-1	Front view 45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in	4	2	3 NO 1 NC	10 A
Dual Channel Emergency Stop Module • E-Stop circuits up to Category 4 (EN 954-1) • Door protection • Conveyor / transfer lines	 According to the Machinery Directive: 98/37/EC and IEC/EN 60204 Suitable for interfaces up to CATEGORY 4 per EN 954-1	Front view 100 mm x 121 mm x 74 mm / 3.93 in x 4.76 in x 2.91 in	4	2	6 NO 1 NC	10 A

Response time	Automatic restart	Manual restart	Restart P/B monitoring	FSD monitoring	Power status indicator	Outputs status indicator	Cross-fault detection	Typical electrical lifespan (number of operations)	Sealing	Voltage	Removable strips	DIN rail mounting	FF-SRS5924
35 ms	■	■	■	■	■	■	■	10 ⁶	IP 20	24 Vdc	■	■	 FF-SRS5924
35 ms	■	■	■	■	■	■	■	10 ⁶	IP 20	24 Vdc 120 Vac 230 Vac	■	■	 FF-SRS5934
15 ms	■	■	■	■	■	■	■	0,75 x 10 ⁶	IP 20	24 Vac/dc	■	■	 FF-SRS5925
25 ms	■	■	■	■	■	■	■	10 ⁶	IP 20	24 Vdc 120 Vac 230 Vac	■	■	 FF-SRS5935
30 ms	■	■	■	■	■	■	■	10 ⁶	IP 20	120 Vac 24 Vdc 230 Vac	■	■	 FF-SRS5988

Safety Control Modules for Machine Interfacing

TYPICAL APPLICATIONS	APPROVALS	DIMENSIONS	Category per EN 954-1			
			Input channels	Safety contacts	Switching capacity	
Two Hand Control <ul style="list-style-type: none"> • Interfaces up to Category 1 (EN 954-1) • Category IIIA (EN 574) • Hand injury protection e.g. due to dangerous machine movement • Robotics • Pick and place machines 	 According to Machinery Directive 98/37/EC and IEC/EN 60204 	Front view  45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in	1	2	2 NO	10 A
Safety Door Monitor <ul style="list-style-type: none"> • Interfaces up to Category 4 (EN 954-1) • Monitors the status of limit switches on a safety door 	 According to Machinery Directive 98/37/EC and IEC/EN 60204 	Front view  45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in	4	2	2 NO	10 A
Extension Module <ul style="list-style-type: none"> • Interfaces up to Category 4 (EN 954-1) • Contact multiplication: <ul style="list-style-type: none"> - safety control modules - safety light curtains with relay outputs - other safety devices 	 (pending) According to Machinery Directive 98/37/EC and IEC/EN 60204 	Front view  22.5 mm x 121 mm x 74 mm / 0.89 in x 4.77 in x 2.91 in	③ 1	2	4 NO 1 NC	5 A
Extension Module <ul style="list-style-type: none"> • Interfaces up to Category 4 (EN 954-1) • Contact multiplication: <ul style="list-style-type: none"> - safety control modules - safety light curtains with relay outputs - other safety devices 	 According to Machinery Directive 98/37/EC and IEC/EN 60204 	Front view  100 mm x 121 mm x 74 mm / 3.94 in x 4.76 in x 2.91 in	③ 1	2	7 NO 1 NC	10 A

③ The overall safety category depends on the category of the main safety control module, therefore a higher safety category may be reached.

Response time	Automatic restart	FSD monitoring	Power status indicator	Outputs status indicator	Cross-fault detection	Typical electrical lifespan (number of operations)	Simultaneity of 2 input channels	Sealing	Voltage	Removable terminal strips	DIN rail mount	
30 ms	■	■	■	■	10 ⁶	0.5 s	IP 20	24 Vdc	■	■		FF-SR25980 
30 ms	■	■		■	10 ⁶	3 s	IP 20	24 Vdc 120 Vac 230 Vac	■	■		FF-SRD5985 
35 ms			■	■	10 ⁶		IP 20	24 Vac/dc	■	■		FF-SRE59292 
15 ms			■	■	10 ⁶		IP 20	24 Vac/dc 120 Vac 230 Vac	■	■		FF-SRE3081 



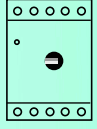



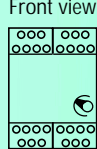


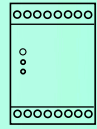


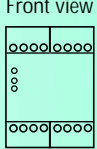
FF-SR25980

FF-SRD5985

FF-SRE59292

FF-SRE3081

Safety Control Modules for Machine Interfacing

TYPICAL APPLICATIONS	APPROVALS	DIMENSIONS	Category per EN 954-1			
			Input channels	Safety contacts	Switching capacity	
Time Delay Module <ul style="list-style-type: none"> Time delay before disconnection of safety interface circuits 	 According to Machinery Directive 98/37/EC and IEC/EN 60204 	Front view  45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in	③ 1	1 or 2	1 NO 1 NC	8 A
Emergency Stop Module with Timer <ul style="list-style-type: none"> Time delay before disconnection of safety interface circuits Door protection: delayed opening of an interlocked protective gate 	 (Pending) According to Machinery Directive 98/37/EC and IEC/EN 60204  (direct safety contacts)  (delayed safety contacts)	Front view  45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in	⑤ 4 ④ 3	2	2 NO 1 NC	5 A ④ ⑤
Standstill Monitor <ul style="list-style-type: none"> Standstill detection of induction motors Used to unlock a safety door guarding a rotating machine only when the hazardous movement is stopped Used to activate an emergency brake when a e-stop signal is received and while the motion is still present. 	 	Front view  45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in	③ 1	1	2 NO 2 NC	8 A
Standstill and Low Speed Monitor <ul style="list-style-type: none"> Standstill monitor / low speed monitor for any kind of rotating devices Used to unlock a safety door guarding a rotating machine only when the hazardous movement is stopped Used to activate an emergency brake when an e-stop signal is received and while the motion is still present 	 (Pending) According to Machinery Directive 98/37/CE and IEC/EN 60204 	Front view  45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in	③ 3	2	2 NO 1 NC	4 A

③ The overall safety category depends on the category of the main safety control module, therefore a higher safety category may be reached. ④ Direct contacts ⑤ Delayed contacts

Response time	Automatic restart	Manual restart	Start P/B monitoring	FSD monitoring	Power status indicator	Stopped motor indicator	Outputs status indicator	Cross-fault detection	Typical electrical lifespan (Number of operations)	Simultaneity of 2 input channels	Sealing	Voltage	Removable terminal strips	DIN rail mounting
									3 x 10 ⁶	IP 20		24 Vdc 120 Vac 230 Vac		FF-SRT
15 ms ⑥	■	■	■	■	■	■	■	■	10 ⁶	IP 20		24 Vac/dc	■	FF-SRST
2 s	■				■	■	■		10 ⁶	IP 20		24 Vdc 120 Vac 230 Vac	■	FF-SR05936
3,2 ms / 8,3 s	■				■	■			10 ⁶	0,5 s IP 20		24 Vac/dc 120 Vac 230 Vac	■	FF-SR05932

⑥ Broken wire detection in measuring inputs

FF-SRT

FF-SRST

FF-SR05936

FF-SR05932

Relay Control Modules to be used with ESPE equipment

TYPICAL APPLICATIONS	APPROVALS	DIMENSIONS	Category per EN 954-1					
			Input channels	ESPE static outputs compatibility	Safety contacts	Switching current		
<p>Dual channel control module (for ESPE with static safety outputs)</p> <p><i>Compatible with Honeywell ESPE FF-SYA, FF-SG, FF-SLG Series</i></p>		<p>Front view</p> <p>22,5 mm x 118 mm x 84 mm / 0.89 in x 4.65 in x 3.31 in</p>	4	2	■	2 NO 1 NC	7 A	
<p>Dual channel control module (for ESPE with static safety outputs)</p> <p><i>Compatible with Honeywell ESPE FF-SYA, FF-SG, FF-SLG Series</i></p>		<p>Front view</p> <p>45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in</p>	4	2	■	⑦ 2 NO 1 NC	6 A	
<p>Dual channel control module (for ESPE with static safety outputs)</p> <p><i>Compatible with Honeywell ESPE FF-SYA, FF-SG, FF-SLG Series</i></p>		<p>Front view</p> <p>45 mm x 118 mm x 84 mm / 1.77 in x 4.64 in x 3.30 in</p>	4	2	■	3 NO 1 NC	6 A	

⑦ Single, not internally redundant contacts

Response time	Automatic restart	Manual restart	Start P/B monitoring	FSD monitoring	Power status monitoring	Inputs status indicator	Outputs status indicator	Restart conditions indicator	Cross-fault detection	Typical electrical lifespan (Number of operations)	Simultaneity of 2 input channels	Sealing	Voltage	Removable terminal strips	DIN rail mounting	
15 ms	■	■	■	■	■	■	■	⊗	7,5 x 10 ⁶	IP 20	24 Vdc	■	■			FF-SRL59252
15 ms	■	■	■	■	■	■	■	⊗	10 ⁶	30 ms	IP 20	24 Vdc	■	■		FF-SRS59392
15 ms	■	■	■	■	■	■	■	⊗	10 ⁶		IP 20	24 Vdc	■	■		FF-SRL59192




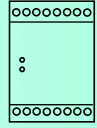
⊗ Cross-fault detection between inputs must be performed by the connected ESPE (Electrosensitive Protective Equipment).

FF-SRL59252

FF-SRS59392

FF-SRL59192

Safety Control Modules to be used with ESPE equipment

TYPICAL APPLICATIONS	APPROVALS	DIMENSIONS	Category per EN 954-1	Input channels	ESPE static outputs compatibility	Safety contacts	Switching current	Switching voltage
<p>Category 4 Muting for Conveyor or Machine Applications</p> <p><i>Compatible with any Honeywell Type 2, Type 3 or Type 4 electrosensitive protective equipment*</i></p> <p><i>Accept one muted safety device and one auxiliary safety device (muted or non muted)</i></p> <p><i>*with some restrictions (see product installation manual)</i></p>	  	<p>Front view</p>  <p>45 mm x 121 mm x 74 mm / 1.77 in x 4.76 in x 2.91 in</p>	4	2 x 2	■	3 NO	5 A	24 Vdc

Response time	Automatic restart	Manual restart	FSD monitoring	Override function	Test output	Power status indicator/output	Muting indicator/output	Outputs status indicator/output	Restart condition indicator/output	Failure diagnostic indicator / output	Cross-fault detection	Typical electrical lifespan	Simultaneity of start muting inputs	Voltage	Removable terminal strips	DIN rail mounting
25 ms	■	■	■	■	■	■	■	■	■	■	2 x 10 ⁶ (1 A)	10 s	24 Vdc	■	■	



FF-SRS5924 Single Channel Emergency Stop Module

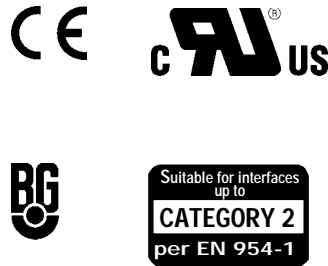
FF-SRS5924

FEATURES

- Complies with EU Directive for machines 98/37/EC, IEC 204, EN 60204, DIN VDE 0113 and UL 508
- Single channel input
- Output: three NO contacts and one NC contact
- Automatic start or manual start modes
- LED indicates power and internal relays status
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Removable terminal strips for ease of maintenance
- Slim housing 22,5 mm / 0.89 in width

TYPICAL APPLICATIONS

- Emergency stop circuits on machines
- Sliding door protection
- Conveyors/transfer lines
- Use with Type 2 Electro-sensitive Protective Equipment (ESPE) for:
 - Point-of operation protection
 - Perimeter/zone guarding protection



The FF-SRS5924 Emergency Stop modules are designed to be used in emergency stop circuits when danger to personnel or machinery is present. This slim housing device has two safety relays with positive-guided contacts to ensure redundancy.

In the **manual start mode**, the module accepts input from the safety device (Type 2 safety light curtain, safety limit or interlock switch, etc.) at A1(+) after activation of the push-button between S33 and S34; then, the normally open safety contacts (13/14...33/34) will close and the normally closed contact (41/42) will open.

In the **automatic start mode**, the module accepts immediate input from the safety device at A1(+); if S33/S34 is jumpered the normally open safety contacts (13/14...33/34) will close and the normally closed contact (41/42) 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-SRS5925, FF-SRS5935, FF-SRS5988).

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRS5924 Single Channel Emergency Stop Module

FF-SRS5924

SPECIFICATIONS

- Single channel Emergency Stop circuits



Input		
Nominal voltage		24 Vdc (-10%, +10%)
Nominal consumption		1,2 W
Output		
Contact complement		Three NO contacts, one NC contact
Contact type		Safety relay, positive-guided
Response time		Opening in supply circuit (A1 (+)): 35 ms
Start time		Manual/automatic START function: 100 ms
Switching capability		Power factor = 1 with resistive load
Current range (min. to max.)		10 mA to 4 A
Voltage range (min. to max.)		10 to 250 Vac/dc
Switching capability per ac15 (EN 60947-5-1)		NO contact: 3 A / 250 V NC contact: 2 A / 250 V
Typical electrical life expectancy		Power factor = 1 at 230 Vac/dc (See Note 1)
2 A		1 000 000 operations
3 A		500 000 operations
4 A		300 000 operations
Typical power factor (cos φ)		Limitation factor (See Note 2)
0,3		0,45
0,5		0,7
0,7		0,85
1		1
Output contact fuse rating		Time delay 4 A (max.)
Mechanical life		Ten million switching operations
General		
Temperature range		-15 °C to +55 °C / 5 °F to 131 °F at max. 90% humidity (max.)
Sealing		Housing: IP 40 • Terminals: IP 20
Housing material		Thermoplastic
Vibration resistance		Amplitude 0,35 mm; Frequency 10 to 55 Hz
Wire / conductor connection		1 x 2,5 mm ² solid (max.) [14 AWG] or 2 x 1,5 mm ² (max.) [16 AWG] stranded wire with sleeve DIN 46288
Wire / conductor attachment		Removable terminals strips with M3,5 screws; wire contacts are enclosed to prevent electrical shock
Mounting		Quick install rail mounting EN 50022-35, width: 35 mm / 1.38 in
Weight		210 g / 0.46 lb

ORDERING INFORMATION

FF-SRS5924□
 □ = 2 = 24 Vdc (only)

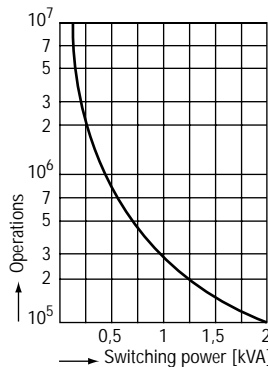
Note 1: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 2: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 3 A (1 000 000 operations), the limitation factor is 0,70.

1 000 000 x 0,70 = 700 000 total operations.

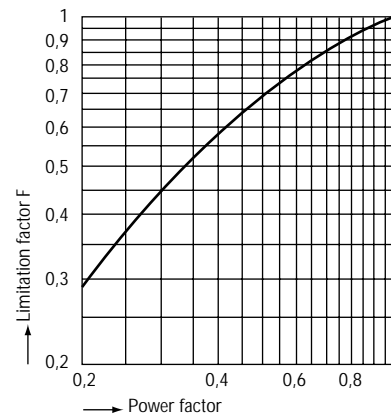
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

(Note 1) Power factor = 1 (cos φ)



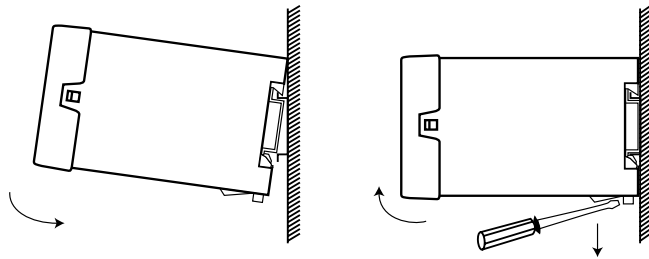
LIMITATION FACTOR FOR INDUCTIVE LOADS

(Note 2) Power factor < 1 (cos φ)



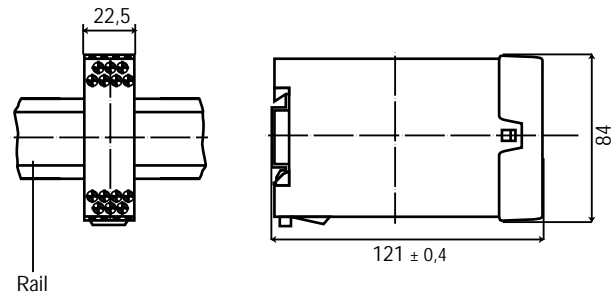
FF-SRS5924

INSTALLATION DIAGRAM

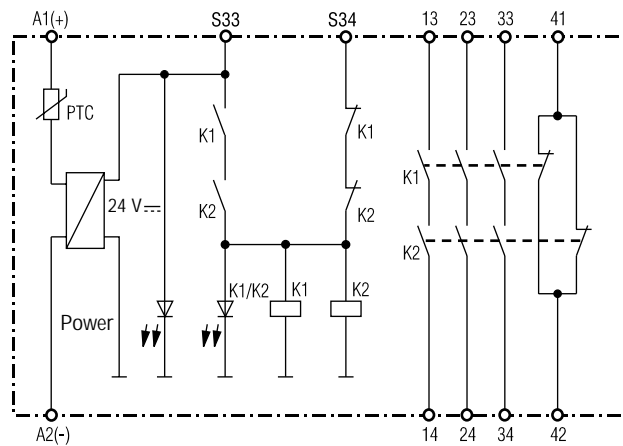


MOUNTING DIMENSIONS

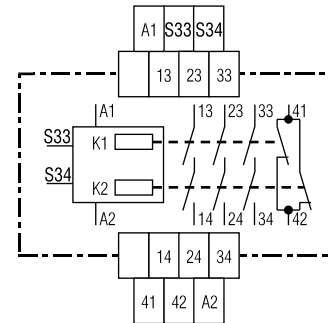
Width: 22,5 mm / 0.89 in; Height: 84 mm / 3.31 in;
Depth: 121 mm / 4.76 in



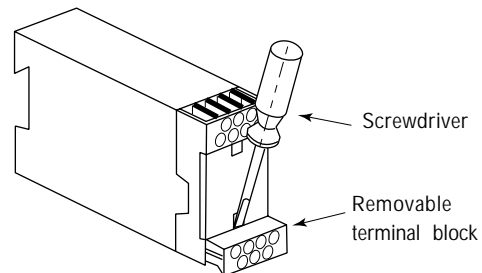
INTERNAL CIRCUITRY



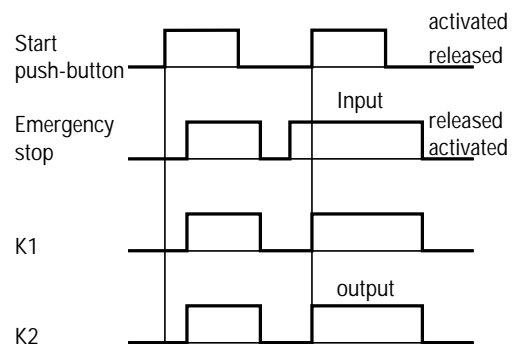
FRONT PANEL



REMOVABLE TERMINAL BLOCKS



FUNCTIONAL DIAGRAM



Functional description

After activation of the safety device (emergency stop condition occurred), the K1/K2 LED will turn OFF, indicating that the two internal safety relays K1 and K2 are de-energized. The normally open safety outputs 13/14... 33/34 will open and the normally closed contact 41/42 will close.

There exist two different start modes:

Manual start mode:

1. After removing the emergency stop condition, press the START push-button to start the safety control module.
2. The K1/K2 LED will turn ON indicating that the internal safety relays K1 and K2 are energized. The three normally open safety contacts will close allowing the machine to operate.

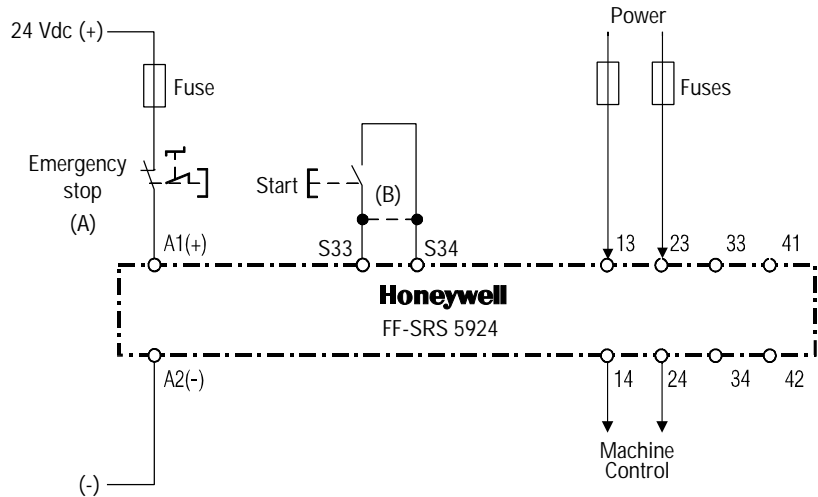
Automatic start mode:

1. After removing the stop condition, the safety control module will immediately reset.
2. The K1/K2 LED will turn ON indicating that the safety relays K1 and K2 are energized. The three normally open safety contacts will close allowing the machine to operate.

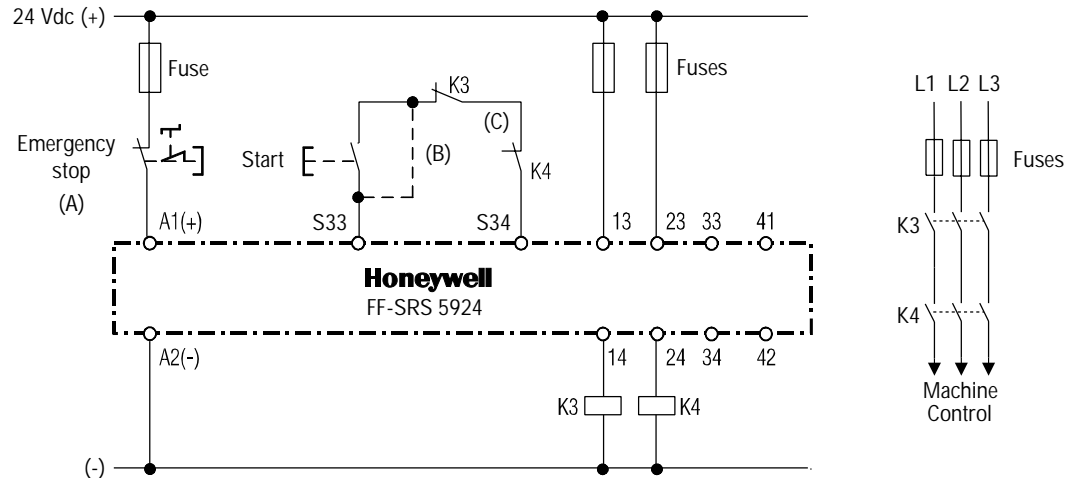
APPLICATION EXAMPLES

FF-SRS5924

Single channel emergency stop connection



Single channel emergency stop connection (with external contactors)



Application notes

Note (A): Single channel safety devices:

This may be an emergency stop push-button with a single output safety device in series such as safety limit or interlock switches (for example: CLS, GK and GSS).

Note (B): Start modes:

Manual start mode: Insert start push-button; the jumper in the start loop S33/S34 is omitted; Automatic start mode: Insert jumper in the start loop S33/S34.

Note (C): External contactors:

With switching currents higher than 4 A, the output contacts should be reinforced by external contactors with positive guided contacts (K3 and K4). The proper operation of the external contactors must be monitored by looping their normally closed contacts into the Start loop between terminals S33/S34 (Final Switching Device (FSD) monitoring).

FF-SRS5934 Single Channel Emergency Stop Module

FF-SRS5934

FEATURES

- Complies with the Machinery Directive 98/37/EC, IEC 204 part 1 (09.92), EN 60204 part 1 (06.93) and UL 508
- Output: two NO contacts, for 250 Vac
- Single channel connection
- Automatic restart
- Start/restart interlock operation is possible with the addition of a push-button (see application examples).
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Switching current up to 10 A
- Voltage drop protection
- LED display for power and internal relay status
- Short circuit protection
- 45 mm / 1.77 in width

TYPICAL APPLICATIONS

- One channel emergency stop circuits
- Sliding door protection
- Conveyors/transfer lines



The FF-SRS5934 Emergency Stop Modules are designed to be used in emergency stop circuits when danger to personnel or machinery is present. This device has two safety relays with positive-guided contacts to ensure redundancy. To ensure proper operation, the module's internal components are monitored once every restart cycle. If your application requires a higher level of safety, use the FF-SRS5935 module.

In an **automatic restart** configuration, the module accepts immediate input from the safety device (emergency stop push-button or safety switch) between L1/A1 (see application example). If S33/S34 and Y1/Y2 are jumpered (or closed), the normally open safety contacts (13/14 and 23/24) will close.

In a **start/restart interlock** configuration (restart push-button is between S33/S34), the module accepts input from the safety device (emergency stop push-button or safety switch) between L1/A1 after activation of the restart push-button (see application example). If Y1/Y2 are jumpered (or closed) when the restart push-button closes, the normally open safety contacts (13/14 and 23/24) will close.

In either configuration, if the safety device is actuated (emergency stop condition occurs), the normally open contacts will open immediately. 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.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRS5934 Single Channel Emergency Stop Module



FF-SRS5934

SPECIFICATIONS

- Single channel Emergency Stop circuits



Input	Nominal voltage	120 Vac (-15 %, +10 %), 230 Vac (-15 %, +10 %), 24 Vdc (-10 %, +10 %)
	Nominal consumption	24 Vdc: 1,6 W
	Start time	Manual/automatic START function: 100ms
Output	Contact complement	2 NO contacts
	Contact type	Safety relay, positive-guided
	Response time	35 ms
	Switching Capability	Power factor = 1 with resistive load
	Current Range (min. to max.)	10 mA to 6 A
	Voltage Range (min. to max.)	0,1 to 250 Vac/dc
	Switching capability per ac15 (EN 60947-5.1)	NO contact: 5 A / 250 Vac - NC contact: 2 A / 250 Vac
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac/dc (See Note 1)
	3 A	1 000 000 operations
	5 A	500 000 operations
	10 A	220 000 operations
	Typical Power Factor (cos φ)	Limitation Factor (See Note 2)
	0,3	0,45
	0,5	0,70
	0,7	0,85
	1	1
	Mechanical life	Ten million switching operations
	Fuse Rating	6 A time delayed
General	Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at max. 90 % humidity
	Sealing	Housing: IP 40 • Terminals: IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz
	Conductor connection	1 x 4 mm ² solid (max.) [12 AWG] or 2 x 1,5 mm ² (max.) [16 AWG] stranded wire with sleeve DIN 46288
	Conductor attachment	M 3,5 screws terminals; wire contacts are enclosed to prevent electrical shock
	Mounting	Quick install rail mounting EN 50022-35
	Weight	450 g / 0.99 lb

ORDERING INFORMATION

FF-SRS5934 □

Voltage:

- 2 = 24 Vdc
- E = 120 Vac
- G = 230 Vac

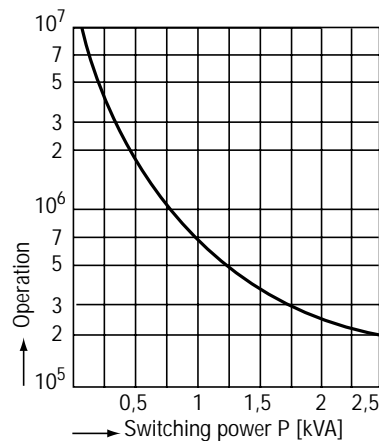
Note 1: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 2: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 3 A (1 000 000 operations), the limitation factor is 0,70.

1 000 000 x 0,70 = 700 000 total operations.

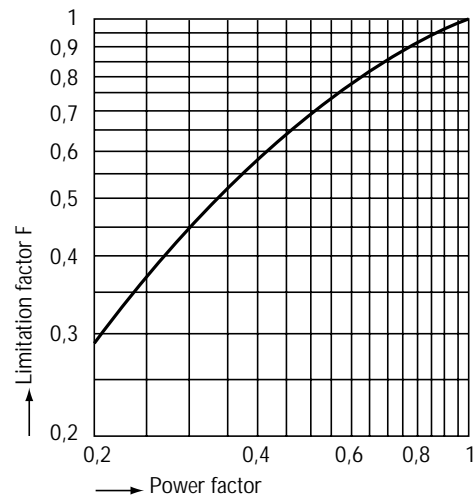
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ)

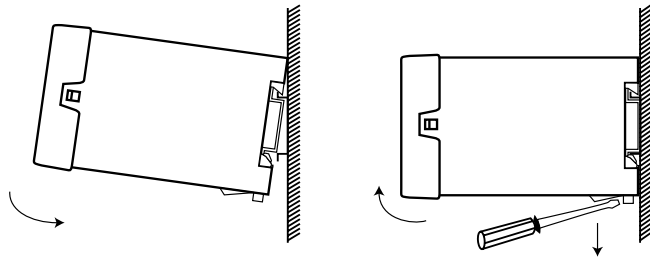


LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ)

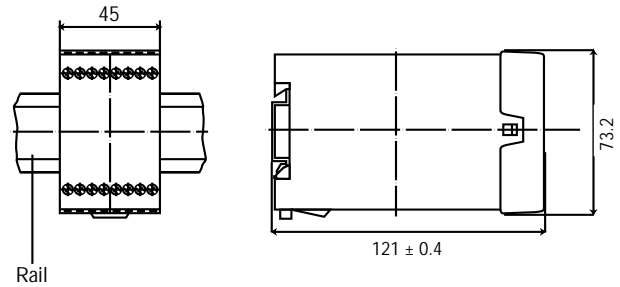


INSTALLATION DIAGRAM

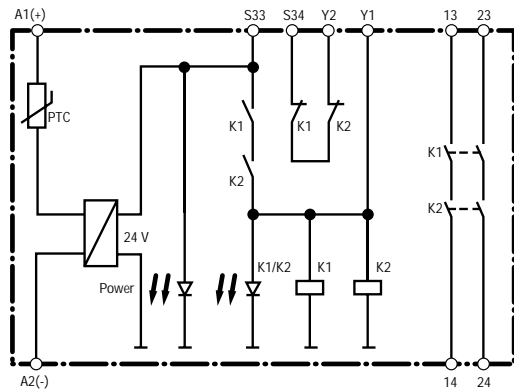


MOUNTING DIMENSIONS

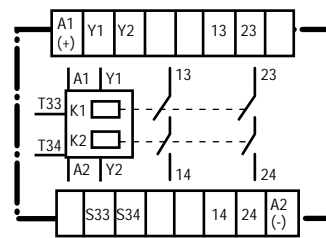
Width: 45 mm / 1.77 in; Height: 74 mm / 2.91 in;
Depth: 121 mm / 4.76 in



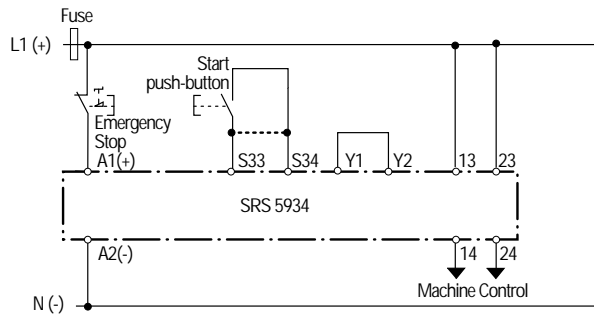
INTERNAL CIRCUITRY



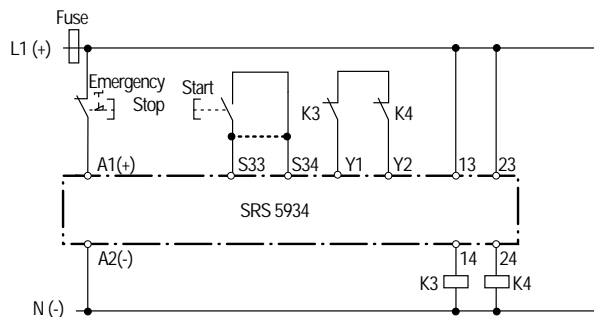
WIRING DIAGRAM



APPLICATION EXAMPLES

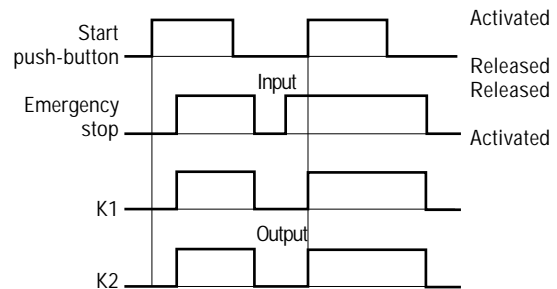


One-channel emergency stop connection (Y1-Y2, connected), optional automatic or manual start. For automatic restart, set the connection S33 - S34.



Contact reinforcement through external relays (K3, K4). For currents > 10 A, the output contacts can be reinforced by external guided relays. The status of the external relays will be monitored through their NC contacts in the Y1-Y2 loop.

FUNCTIONAL DIAGRAM



FF-SRS5925 Dual channel Emergency Stop Module

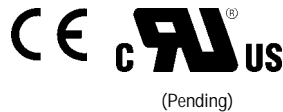
FF-SRS5925

FEATURES

- Complies with EU Directive for machines 98/37/EC, IEC 204, EN 60204, DIN VDE 0113
- Dual channel input
- Output: two NO contacts and one NC contact
- Switching current from 1 mA to 7 A (5 µm gold plated contacts allow low current)
- Automatic start or manual start modes
- Line fault detection and detection of blocked start push button
- Selectable cross fault detection in emergency stop control circuit
- LED indicates power and the status of both internal relays
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Voltage drop protection
- Removable terminal strips for ease of maintenance
- Slim housing 22,5 mm / 0.89 in width

TYPICAL APPLICATIONS

- Emergency-stop circuits on machines
- Door protection
- Conveyors/transfer lines
- Use with Type 3 or Type 4 Electro-sensitive Protective Equipment for:
 - Point-of operation protection
 - Perimeter/zone guarding protection



The FF-SRS5925 Emergency Stop modules are designed to be used in emergency stop circuits when danger to personnel or machinery is present. This slim housing device has two safety relays with positive-guided contacts to ensure redundancy.

In the **manual start mode**, the module accepts input from the safety device (light curtain, safety mat, safety switches, etc) between S11/S12 and S21/S22 after activation of the push-button between S33 and S34; then, the normally open safety contacts (13/14, 23/24) will close and the normally closed contact (31/32) will open.

In the **automatic start mode**, the module accepts immediate input from the safety device (light curtain, mat, safety switches, etc) between S11/S12 and S21/S22; if S33/S34 are jumpered, the normally open safety contacts (13/14, 23/24) will close and the normally closed contact (31/32) 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.

Cross fault monitoring must be used when two independent safety inputs are provided to this module to increase the overall safety level of the solution (see typical application examples).

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRS5925 Dual channel Emergency Stop Module

SPECIFICATIONS

- Dual channel Emergency Stop circuits



FF-SRS5925

Input	
Nominal voltage	24 Vac/dc (-5 %, +10 %)
Nominal power consumption	Dc: 2 W (approximately)
Nominal frequency	50 to 60 Hz
Start time	Manual START function: 40 ms Automatic START function: 500 ms
Nominal voltage at S11	23 Vdc (provided by control module)
Input current between S11/S12 and S21/S22	40 mA
Minimum voltage at S12	21 Vdc when activated
Cable resistance between S11/S12 and S21/S22	68 Ω (max.)
Output	
Contact complement	2 NO contacts, 1 NC contact
Response time	Opening of inputs (S11/12; S21/22): 15 ms Opening in supply circuit (24 Vac/dc(+)/A1): 50 ms
Contact type	Safety relay, positive-guided
Current Range (min. to max.)	1 mA to 7 A (See Note 1)
Voltage Range (min. to max.)	0,1 to 250 Vac/dc
Switching Capability per ac15 (EN 60947-5-1)	NO contacts: 3 A / 230 V; NC contact: 2 A / 230 V
Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac/dc (See Note 2)
2 A	1 000 000 operations
5 A	220 000 operations
7 A	110 000 operations
Typical Power Factor (cos φ)	Limitation Factor (See Note 3)
0,3	0,45
0,5	0,7
0,7	0,85
1	1
Operating frequency	1200 switching cycles/hour (max.)
Output contact fuse rating	Time delay 6 A (max.)
Mechanical life	Ten million switching operations
General	
Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at 90% humidity (max.)
Sealing	Housing: IP 40 • Terminals: IP 20
Housing material	Thermoplastic
Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz
Wire/conductor connection	1 x 2,5 mm ² solid (max.) [14 AWG] or 2 x 1,5 mm ² (max.) [16 AWG] stranded wire with sleeve DIN 46288
Wire/conductor attachment	Removable block terminals with M 3,5 screws; wire contacts are enclosed to prevent electrical shock
Mounting	Quick install rail mounting EN 50022-35, width: 35 mm / 1.38 in
Weight	220 g / 0.49 lb

ORDERING INFORMATION

FF-SRS5925□
 □ = 2 = 24 Vdc (only)

Note 1: Contact damage

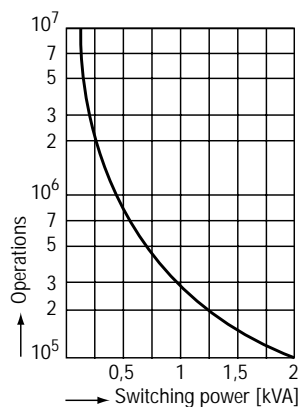
To ensure the 1 mA capability during the life-time of the contact, never exceed 300 mA or 60 V.

Note 2: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 2 A (750 000 operations), the limitation factor is 0,70. 750 000 x 0,70 = 525 000 total operations.

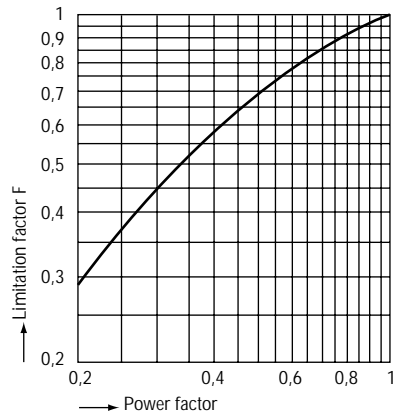
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

(Note 2) Power factor = 1 (cos φ)



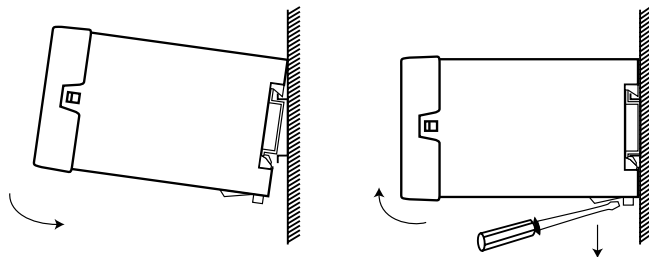
LIMITATION FACTOR FOR INDUCTIVE LOADS

(Note 3) Power factor < 1 (cos φ)



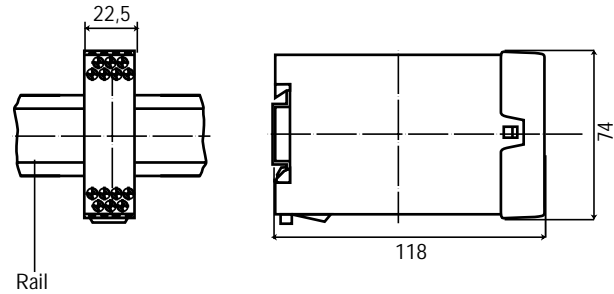
FF-SRS5925

INSTALLATION DIAGRAM

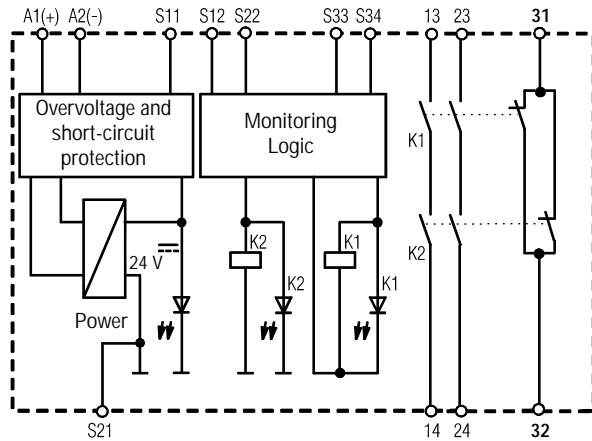


MOUNTING DIMENSIONS

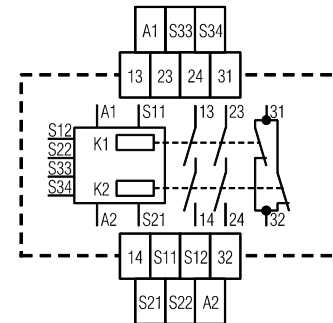
Width: 22,5 mm / 0.89 in; Height: 74 mm / 2.91 in;
Depth: 118 mm / 4.65 in



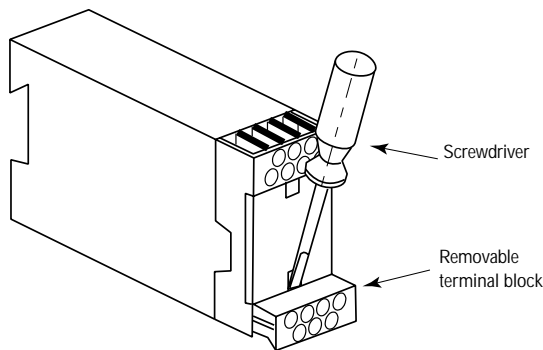
INTERNAL CIRCUITRY



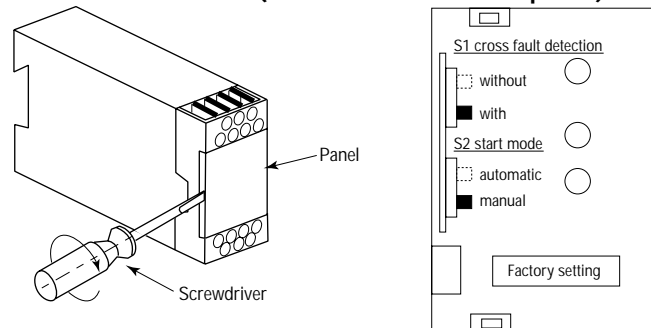
FRONT PANEL



REMOVABLE TERMINAL BLOCKS



SWITCH SETTINGS (located behind front panel)



FUNCTIONAL DIAGRAM

Functional description

If the safety device is actuated (emergency stop condition occurs), the internal relays K1 and K2 de-energize, the normally open safety contacts 13/14..23/24 will open immediately and the normally closed safety contact 31/32 will close. This emergency stop condition is relayed via the contacts of the module (and optional external contactors K3/K4) to the machine control circuitry to arrest dangerous motion and/or remove power.

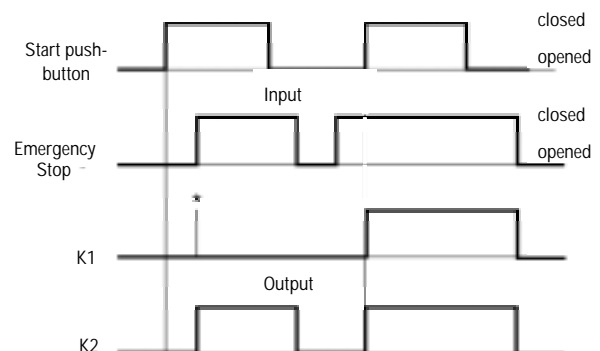
*Line fault Detection on Start push-button

If the start push button is closed before voltage is applied to S12 and S22 the safety contacts of the module cannot close. This additional feature ensures the detection of a line fault via the start push-button or a blocked start push button. In case of a push-button failure the module can not be restarted.

Two switches S1 and S2 are used to select the restart mode and the operating mode for cross fault detection. These switches are located behind the front panel.

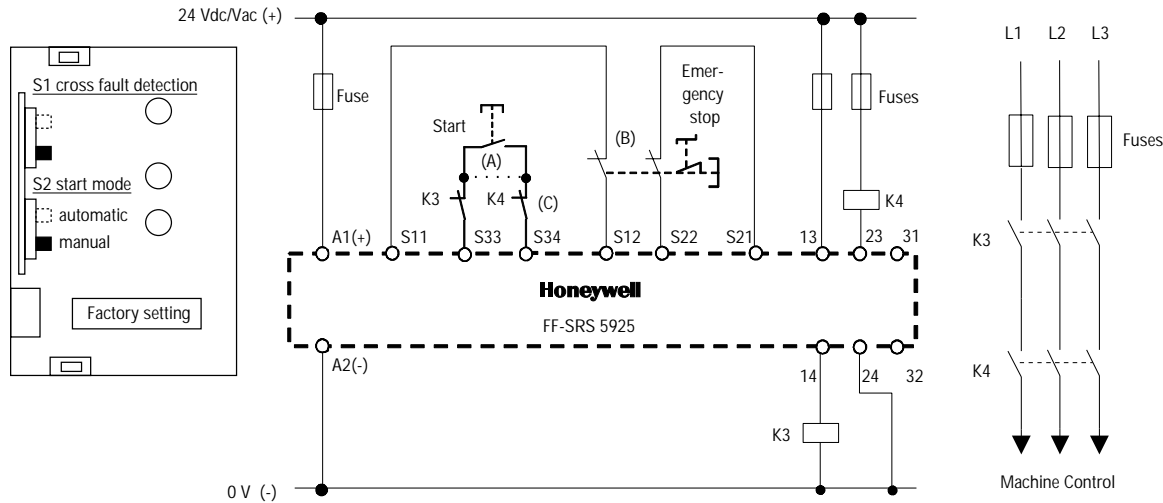
Switch S1 is used to select an operating mode for cross fault detection between the two input channels (S11/S12 and S21/S22).

Switch S2 is used to select automatic or manual restart mode. In the automatic restart mode, an additional jumper must be set into the restart loop (S33/S34, see Application Examples).

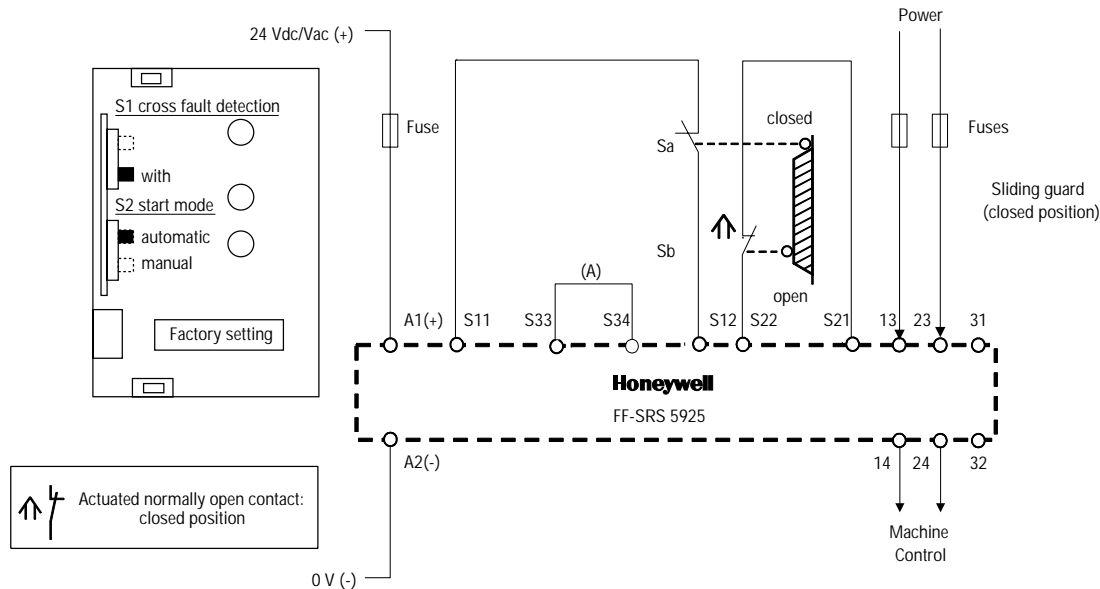


APPLICATION EXAMPLES

Dual-channel emergency stop circuitry (with cross fault monitoring, external contactors)



Dual-channel safety door monitoring (with cross fault monitoring, automatic start mode)



Protective gates are designed to limit or block access to the moving parts of dangerous machinery. These gates can be equipped with locking or interlocking devices, usually safety limit switches or any other safety sensors/switches.

The FF-SRS5925 Emergency Stop module monitors the status of these safety sensor positions. When the protective gate is open, the initiation of dangerous motion is prevented. When the door is closed again, the next machine cycle can start, but only after initiating an external manual restart sequence.

After opening the door, the two external safety switch contacts Sa and Sb will open and the two internal safety relays K1 and K2 will de-energize. The normally open safety outputs 13/14 and 23/24 will open relaying the stop condition to the machine control circuitry. After closing the door, Sa and Sb close and the internal relays K1 and K2 will energize automatically. The two normally open safety contacts will close and an external manual restart sequence may then be initiated (allowing the machine to operate).

Application notes:

Note (A): Start modes:

Manual start mode: Insert start push-button into the start loop S33/S34 and select internal switch to manual start mode

Automatic start mode: Insert jumper into the start loop S33/S34 and select internal switch S2 to automatic start mode

Note (B): Dual channel safety devices:

This may be an emergency stop push-button in series with dual output safety switching devices (OSSD) such as: safety light curtains (FF-SB, FF-LS), single beam (FF-SPS4), modular safety light curtains (FF-SCAN), safety laser scanner (FF-SE), safety mats (FF-SM), dual output safety limit or interlock switches (for example, CLS and GK).

Note (C): External contactors:

With switching currents higher than 7 A, the output contacts should be reinforced by external contactors with positive guided contacts (K3 and K4). The proper operation of the external contactors must be monitored by looping their normally closed contacts in series into the Start loop between S33/S34 (Final Switching Device (FSD) monitoring).

FF-SRS5935 Dual Channel Emergency Stop Module

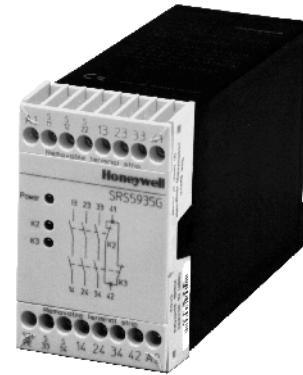
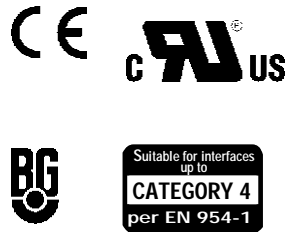
FF-SRS5935

FEATURES

- Complies with the Machinery Directive 98/37/EC, IEC 204, EN 60204, DIN VDE 0113 and UL 508
- Output: three NO contacts and one NC contact for ac 250 V
- Gold plated, 5 µm contacts allow accurate low current to PLC (PLC is NOT to be used as a safety function)
- Dual channel connection
- Line fault detection and detection of blocked start push-button
- Automatic restart or start/restart interlock modes of operation
- Selectable cross fault detection in emergency stop control circuit
- Operating status display
- LED indicates power and channels one and two (internal relays) status
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Switching current up to 10 A
- Voltage drop protection
- Removable terminal strips for ease of maintenance
- 45 mm / 1.77 in width

TYPICAL APPLICATIONS

- Two channel emergency stop circuits on machines
- Point-of operation protection
- Door protection
- Perimeter/zone guarding protection
- Conveyors/transfer lines



The FF-SRS5935 Emergency Stop modules are designed to be used in emergency stop circuits when danger to personnel or machinery is present. This device has two safety relays with positive-guided contacts to ensure redundancy.

This module contains two internal switches (S1 and S2) that are used to set various modes of operation. This feature ensures application flexibility. In the **start/restart interlock mode**, the module accepts input from the safety device (light curtain, safety mat, safety switches, etc.) between S11/S12 and S21/S22 after activation of the push-button between S33 and S34; then, the normally open safety contacts (13/14, 23/24, 33/34) will close and the normally closed contact (41/42) will open.

In the **automatic restart mode**, the module accepts immediate input from the safety device (light curtain, mat, safety switches, etc.) between S11/S12 and S21/S22 (S33 and S34 are jumpered if external relay monitoring is not needed); then normally open safety contacts (13/14, 23/24, 33/34) will close and the normally closed contact (41/42) 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.

Cross fault monitoring must be used when two independent safety inputs are provided to this module to increase the overall safety level of the solution (see typical application examples).

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRS5935 Dual Channel Emergency Stop Module



FF-SRS5935

SPECIFICATIONS

- Dual channel Emergency Stop circuits

Input	Nominal voltage	120 Vac (-15%, +10%), 230 Vac (-15%, +10%), 24 Vdc (-10%, +20%)
	Nominal power consumption	24 Vdc: 2 W; 230 Vac: 4 VA
	Nominal frequency	50 to 60 Hz
	Start time	Manual START function; 50 ms (-25%, +50%); Automatic START function; 1 s (-25%, +50%)
	Nominal voltage between S11/S12 and S21/S22	24 Vdc with 35 mA current ± 25% (provided by control module)
	Minimum voltage between S11/S12 and S21/S22	21 Vdc when activated
	Cable resistance between S11/S12 and S21/S22	68 Ω (max.)
Output	Contact complement	3 NO contacts, 1 NC contacts
	Response time	After opening of input S12/11 or S21/22): 25 ms; Opening in supply circuit (L1(+)/A1): 50 ms
	Contact type	Safety relay, positive-guided
	Switching Capability	Power factor = 1 with resistive load
	Current Range (min. to max.)	1 mA to 10 A (See Note 1)
	Voltage Range (min. to max.)	0,1 to 250 Vac/dc
	Switching capability per ac15 (EN 60947-5.1)	NO contact: 5 A / 250 Vac - NC contact: 2 A / 250 Vac
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (See Note 2)
	3 A	1 000 000 operations
	5 A	500 000 operations
	10 A	220 000 operations
	Typical Power Factor (cos φ)	Limitation Factor (See Note 3)
	0,3	0,45
	0,5	0,70
	0,7	0,85
	1	1
	Operating frequency	600 switching cycles/h
	Fuse Rating	6 A time delayed
	Mechanical life	Ten million switching operations
General	Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at max. 90% humidity (max.)
	Sealing	Housing: IP 40 • Terminals: IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz
	Conductor connection	1 x 4 mm ² solid (max.) [12 AWG] or 2 x 1,5 mm ² (max.) [16 AWG] stranded wire with sleeve DIN 46288
	Conductor attachment	Removable block terminals with M 3,5 screws; wire contacts are enclosed to prevent electrical shock
	Mounting	Quick install rail mounting EN 50022-35
	Weight	450 g / 0.99 lb

ORDERING INFORMATION

FF-SRS5935 □

Voltage:

- 2 = 24 Vdc
- E = 120 Vac
- G = 230 Vac

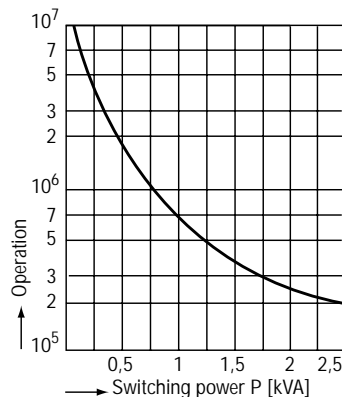
Note 1: To ensure the 1 mA capability during the lifetime of the contact, NEVER exceed 300 mA or 60 V.

Note 2: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 3 A (1 000 000 operations), the limitation factor is 0,70. 1 000 000 x 0,70 = 700 000 total operations.

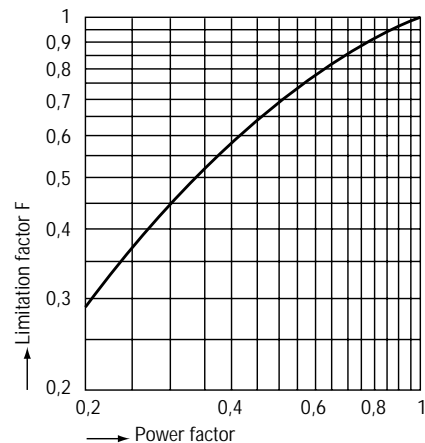
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ)



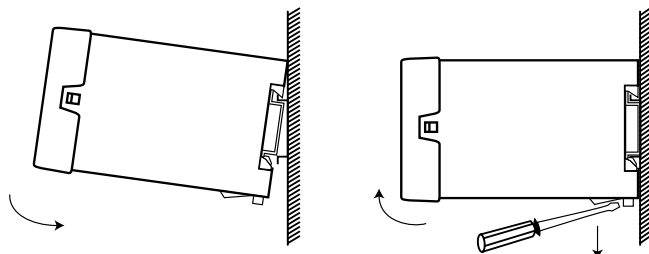
LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ)



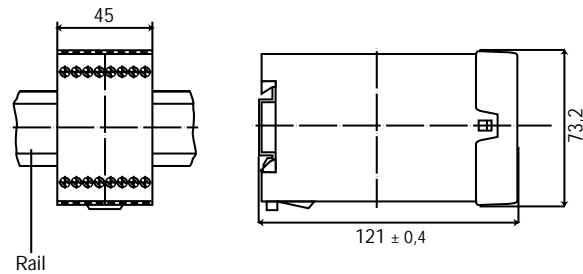
FF-SRS5935

INSTALLATION DIAGRAM

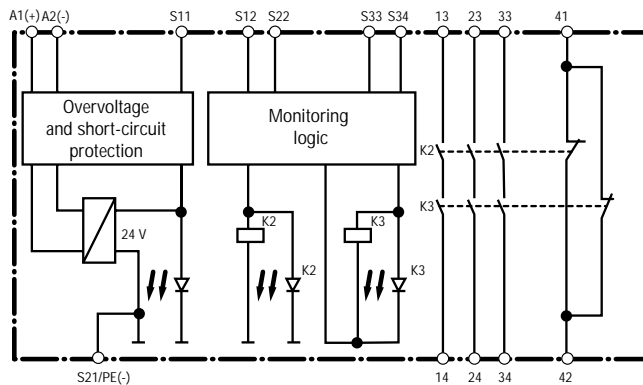


MOUNTING DIMENSIONS

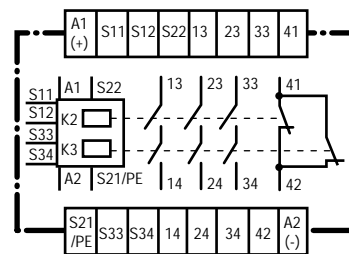
Width: 45 mm / 1.77 in; Height: 74 mm / 2.91 in;
Depth: 121 mm / 4.76 in



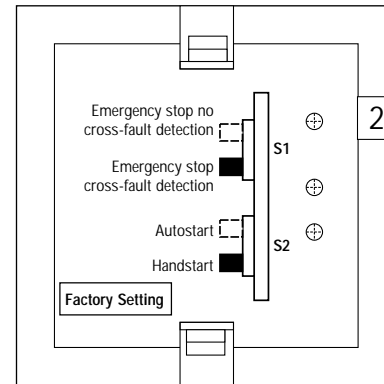
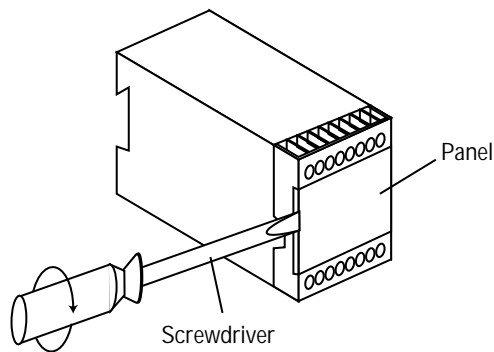
INTERNAL CIRCUITRY



WIRING DIAGRAM



FF-SRS5935 PROGRAMMING: Switch Settings



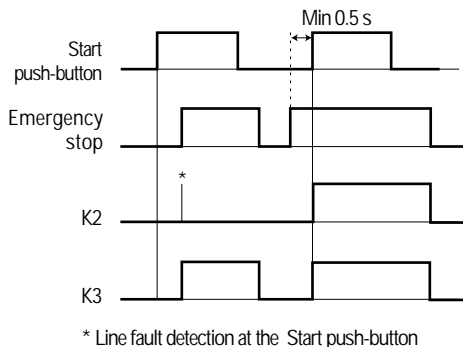
Switches S1 and S2 are used to select **automatic start**, **manual start** and emergency stop with or without **cross fault detection**. These switches are located behind the front cover panel.

Switch S2 is used to select automatic or manual start. In addition, terminals S33 and S34 must be shunted for automatic start to function.

Switch S1 is used to select an operating mode for cross fault detection between the two inputs and push-button failure.

The emergency stop module must be connected as illustrated in the following application examples.

FUNCTIONAL DIAGRAM



FUNCTIONAL DESCRIPTION

If the start push-button is closed before voltage is applied to S12 and S22 (also, if a line fault occurs via the start push-button), the output contacts cannot be switched to START.

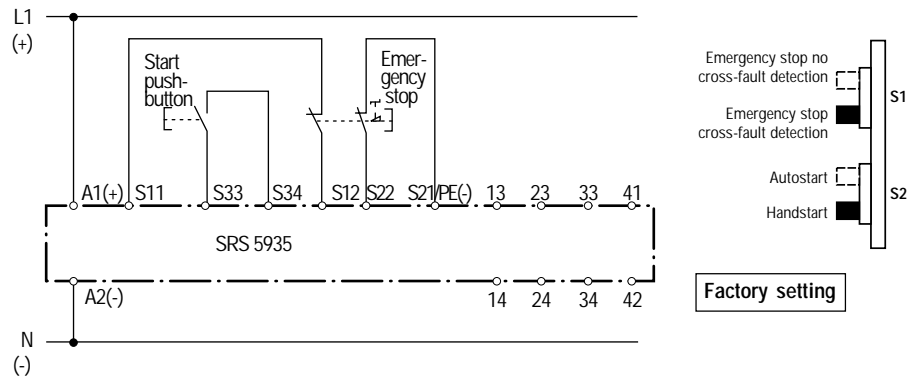
The module's PE testing terminal allows insulation monitoring on IT networks. This terminal serves as a reference point for checking the control voltage and provides a connection contact during an emergency stop with cross fault detection.

Notice that connecting the PE terminal to ground on dc versions implies the deactivation of the internal short-circuit protection.

One or more FF-SRE3081 Extension Modules or external contactors with positively driven contacts can be used to multiply the number of contacts of the FF-SRS5935 Emergency Stop Module. If multiple safety contacts are used in parallel with one load, the maximum admissible current can be increased.

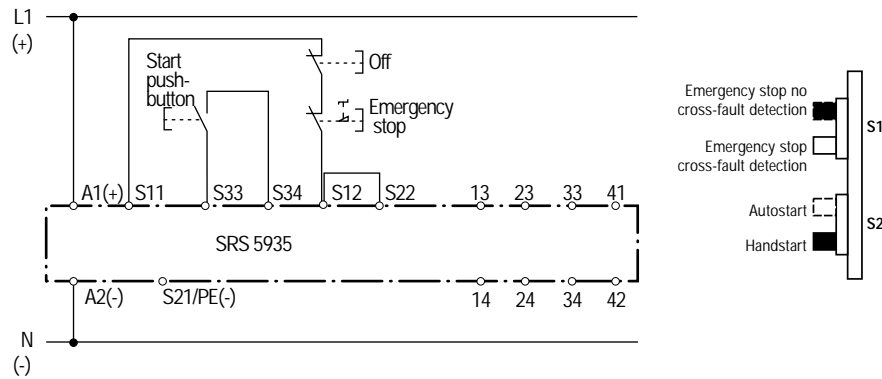
APPLICATION SCHEMATICS

Dual-channel emergency stop circuit with cross fault detection (recommended interface)



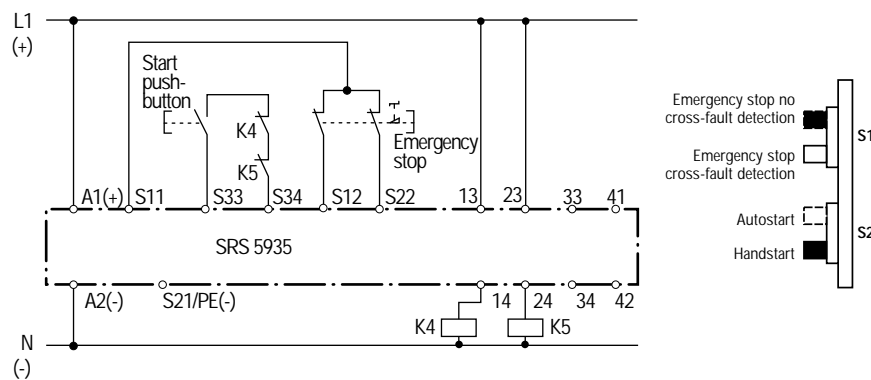
The circuit redundancy in the emergency stop control circuit and therefore gives the highest safety level.

Single-channel emergency stop circuit



This circuit has no redundancy in the emergency stop circuit.

Dual-channel emergency stop circuit without cross fault detection



With switching current >10 A, the output contacts should be reinforced by external contactors (K4 and K5) with positive-guided contacts. The proper operation of the external contactors is monitored by looping NC contacts into the restart circuit (terminals S33-S34).

FF-SRS5988 Dual Channel Emergency Stop Module

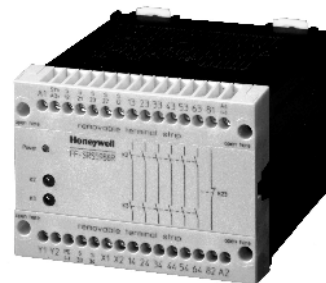
FF-SRS5988

FEATURES

- Complies with EU Directive for machines 98/37/EC, IEC 204, EN 60204-1, DIN VDE 0113
- Dual channel input
- Output: six NO contacts and one NC contact
- Dual voltage device 24 Vdc/120 Vac or 24 Vdc/230 Vac
- Switching current from 1 mA to 10 A (5 µm gold plated contacts allow low current)
- Line fault detection and detection of blocked start push-button
- Automatic start or manual start modes
- Selectable cross fault detection in emergency stop control circuit
- LED indicates power and the status of the two output channels (internal relays)
- Mechanical life up to thirty million operations
- Electrical life up to one million operations
- Voltage drop protection
- Removable terminal strips for ease of maintenance
- 100 mm / 3.94 in width

TYPICAL APPLICATIONS

- Emergency stop circuits on machines
- Door protection
- Conveyors/transfer lines
- Use with Type 3 or Type 4 Electro-sensitive Protective Equipment for:
 - Point-of operation protection
 - Perimeter/zone guarding protection



The FF-SRS5988 Emergency Stop modules are designed to be used in emergency stop circuits when danger to personnel or machinery is present. This device offering six NO and one NC output contacts has two safety relays with positive-guided contacts to ensure redundancy.

In the **manual start mode**, the module accepts input from the safety device (light curtain, safety mat, safety switches, etc.) between S11/S12 and S21/S23 after activation of the push-button between S33 and S34; then, the normally open safety contacts (13/14...63/64) will close and the normally closed contact (81/82) will open.

In the **automatic start mode**, the module accepts input from the safety device (light curtain, mat, safety switches, etc.) between S11/S12 and S21/S23 (Y1 and Y2 are jumpered if external relay monitoring is not needed); then, the normally open safety contacts (13/14...63/64) will close and the normally closed contact (81/82) 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.

Cross fault monitoring is used when two independent safety inputs are provided to this module to increase the overall safety level of the solution (see typical application examples).

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRS5988 Dual Channel Emergency Stop Module



Suitable for interfaces up to
CATEGORY 4
per EN 954-1



FF-SRS5988

SPECIFICATIONS

- Dual channel Emergency Stop circuits

Input	
Nominal voltage (Dual voltage device)	120 Vac (-20 %, +10 %) / 24 Vdc (-10 %, +20 %) 230 Vac (-20 %, +10 %) / 24 Vdc (-10 %, +20 %)
Nominal power consumption	Dc: 3 W / ac: 6 VA
Nominal frequency	50 to 60 Hz
Start time	Manual START function: 30 ms Automatic START function: 1 s
Nominal voltage at S11 / at S21	23 Vdc (provided by control module) / 0 V
Input current between S11/S12 and S21/S23	110 mA dc
Minimum voltage at S12/A4 and at S22/A4	21 Vdc when activated
Cable resistance between S11/S12 and S21/S23	68 Ω (max.)
Output	
Contact complement	6 NO contacts, 1 NC contact
Response time	Opening of inputs (S11/12; S21/23): 30 ms Opening in supply circuit: 50 ms
Contact type	Safety relay, positive-guided
Switching capability	Power factor = 1 with resistive load
Current Range (min. to max.)	1 mA to 10 A (See Note 1)
Voltage Range (min. to max.)	0,1 to 250 Vac/dc
Switching Capability per ac15 (EN 60947-5-1)	NO contacts: 5 A / 230 V; NC contact: 2 A / 230 V
Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac/dc (See Note 2)
3 A	1 000 000 operations
5 A	500 000 operations
10 A	220 000 operations
Typical Power Factor (cos φ)	Limitation Factor (See Note 3)
0,3	0,45
0,5	0,7
0,7	0,85
1	1
Operating frequency	600 switching cycles/hour (max.)
Output contact fuse rating	Time delay 6 A (max.)
Mechanical life	Thirty million switching operations
General	
Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at 90% humidity (max.)
Sealing	Housing: IP 40 • Terminals: IP 20
Housing material	Thermoplastic
Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz
Wire/conductor connection	1 x 4 mm ² solid (max.) [12 AWG] or 2 x 1,5 mm ² (max.) [16 AWG] stranded wire with sleeve DIN 46288
Wire/conductor attachment	Removable block terminals with M 3,5 screws; wire contacts are enclosed to prevent electrical shock
Mounting	Quick install rail mounting EN 50022-35, width: 35 mm / 1.38 in
Weight	840 g / 1.85 lbs

ORDERING INFORMATION

FF-SRS5988□

P = 120 Vac / 24 Vdc
R = 230 Vac / 24 Vdc

Note 1: Contact damage

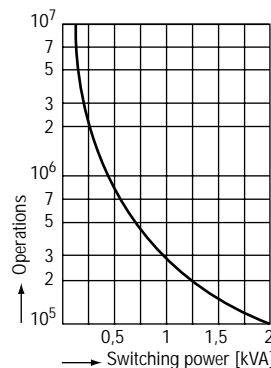
To ensure the 1 mA capability during the life-time of the contact, never exceed 300 mA or 60 V.

Note 2: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 3 A (1 000 000 operations), the limitation factor is 0,70. 1 000 000 x 0,70 = 700 000 total operations.

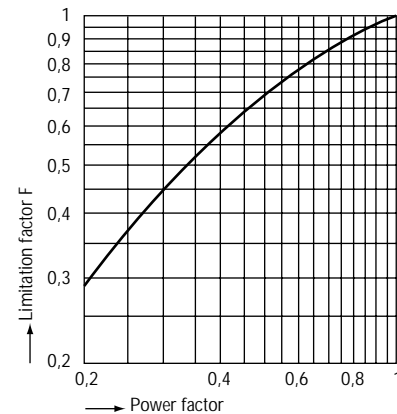
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

(Note 2) Power factor = 1 (cos φ)

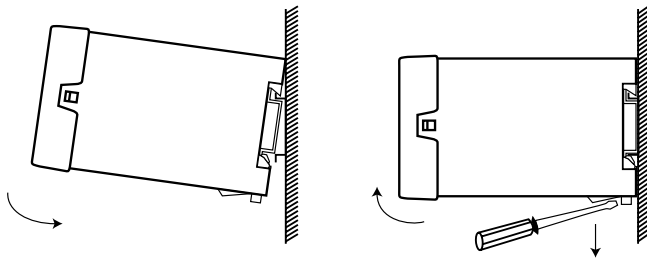


LIMITATION FACTOR FOR INDUCTIVE LOADS

(Note 3) Power factor < 1 (cos φ)

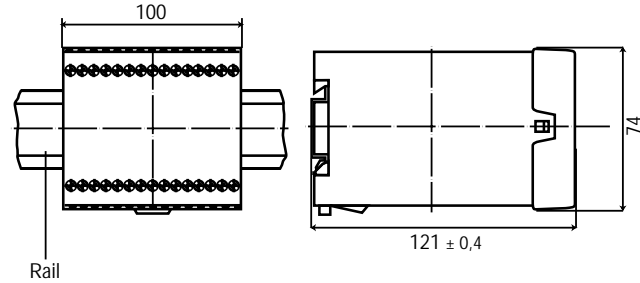


INSTALLATION DIAGRAM



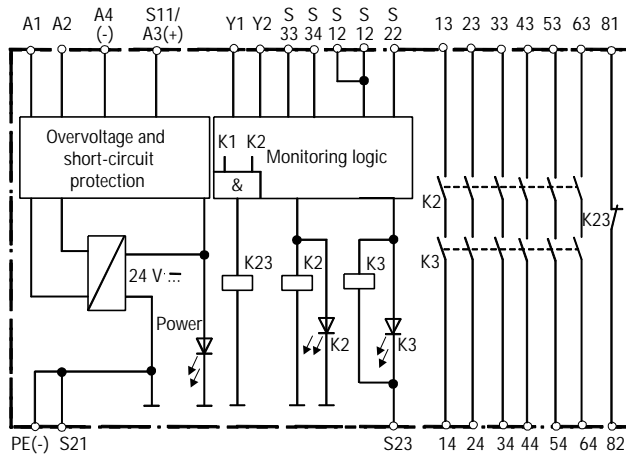
MOUNTING DIMENSIONS

Width: 100 mm / 3.94 in; Height: 74 mm / 2.91 in;
Depth: 121 mm / 4.76 in

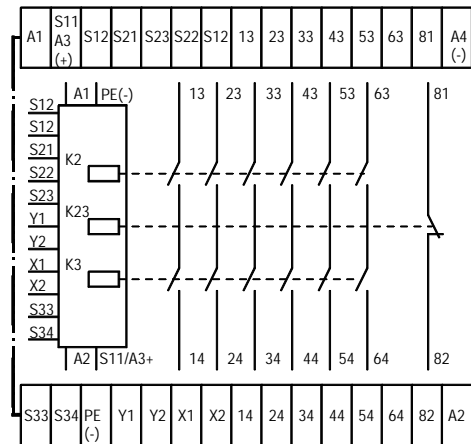


FF-SRS5988

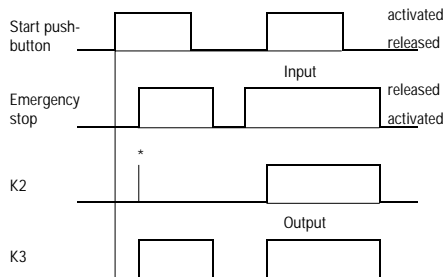
INTERNAL CIRCUITRY



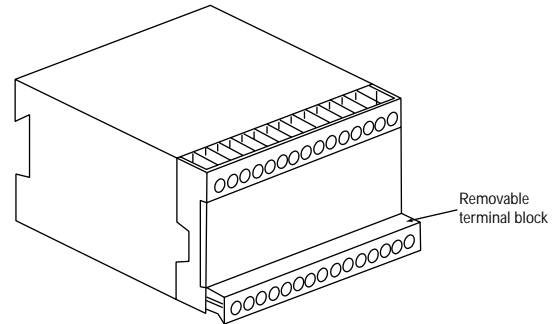
WIRING DIAGRAMS



FUNCTIONAL DIAGRAM



REMOVABLE TERMINAL BLOCKS



Functional description

If the safety device is actuated (emergency stop condition occurs), the internal relays K2 and K3 de-energize, the normally open safety contacts 13/14... 63/64 will open immediately and the normally closed monitoring contact 81/82 will close. This emergency stop condition is relayed via the safety contacts of the module (and optional external safety contactors K4 and K5) to the machine control circuitry to arrest dangerous motion and/or remove power.

* Line fault Detection on Start push-button:

If the start push button is closed before voltage is applied to S12 and S23 the safety contacts of the module cannot close. This additional feature ensures the detection of a line fault via the start push-button or a blocked start push button. In case of a push-button failure the module can not be restarted.

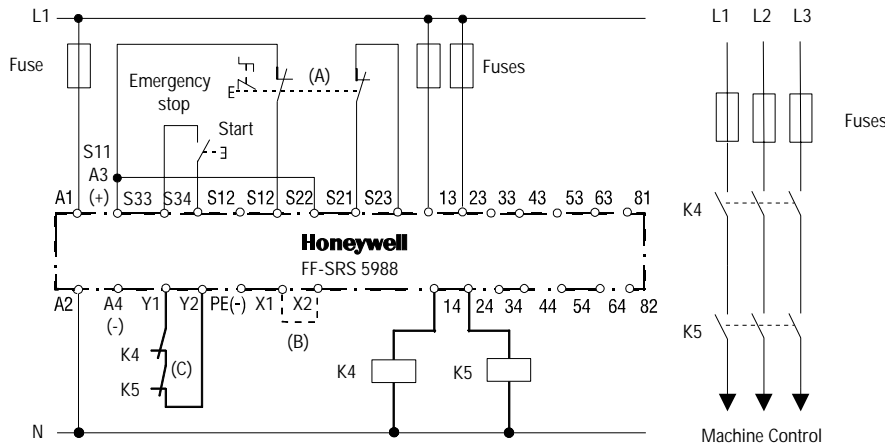
SETTING OF START MODE

Start Mode	Jumper between X1/X2	Start push-button between S33/S34	Description
Manual start mode	• not connected •		This module offers the possibility to function in the automatic start mode or manual start mode
Automatic start mode	• connected •		Insert the start push-button between terminals S33/S34 for manual start mode.
			Insert a jumper between X1/X2 for automatic start mode to function

APPLICATION EXAMPLES

Dual-channel emergency stop circuitry (with cross fault monitoring, manual start mode, external contactors)

FF-SRS5988

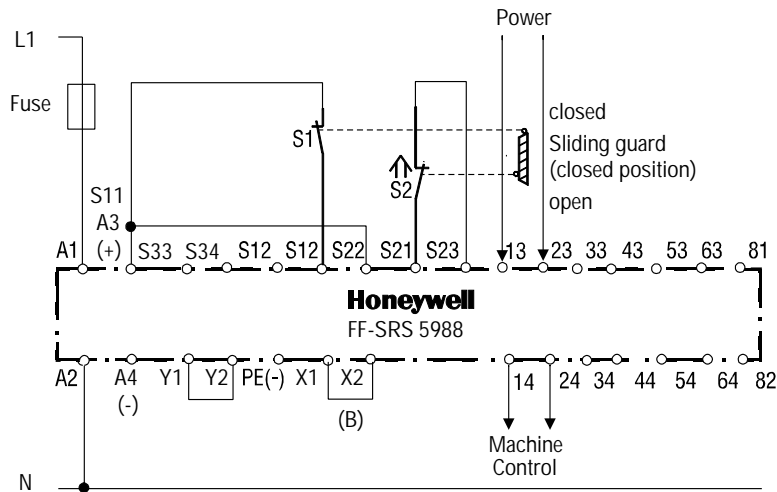


Dual-channel safety door monitoring (with cross fault monitoring, automatic start mode)

Protective gates are designed to limit or block access to the moving parts of dangerous machinery. These gates can be equipped with locking or interlocking devices, usually safety limit switches or any other safety sensors/switches.

The FF-SRS5988 Emergency Stop module monitors the status of these safety sensor positions. When the protective gate is open, the initiation of dangerous motion is prevented. When the door is closed again, the next machine cycle can start, but only after initiating an external manual restart sequence.

After opening the door, the two external safety switch contacts S1 and S2 will open (as illustrated above) and the two internal safety relays K2 and K3 will de-energize. The normally open safety outputs 13/14... 63/64 will open relaying the stop condition to the machine control circuitry. After closing the door, S1 and S2 close and the internal relays K2 and K3 will energize. The six normally open safety contacts will close and an external manual restart sequence may then be initiated (allowing the machine to operate).



APPLICATION NOTES

Note (A): Dual channel safety devices:

This may be an emergency stop push-button in series with dual output safety switching devices (OSSD) such as safety light curtains (FF-SB, FF-LS), single beam (FF-SPS4), modular safety light curtain (FF-SCAN), safety mat (FF-SM), safety laser scanner (FF-SE), or safety limit switches (i.e. 2CLS, GK).

Note (B): Start modes:

Manual start mode: Insert start push-button between S33/S34; no jumper must be set between X1/X2

Automatic start mode: Insert jumper between X1/X2

Note (C): External contactors:

With switching currents higher than 10 A, the output contacts should be reinforced by external contactors with positive guided contacts (K4 and K5). The proper operation of the external contactors must be monitored by looping their normally closed contacts into the Final Switching Device (FSD) monitoring loop (Y1/Y2). If no external contactors are used, Y1/Y2 has to be jumpered to let the module function.

FF-SRS59392 Dual Channel Interface Control Module for Electrosensitive Protective Equipment

FEATURES

- Complies with EU Directive for machines 98/37/EC, IEC 204, EN 60204, DIN VDE 0113
- Supply voltage: 24 Vdc
- Dual input compatible with the safety static outputs of Honeywell Electrosensitive protective Equipment
- Two cross-monitored relays with guided contacts delivering two N.O. contacts and one N.C. contact
- Switching current from 1 mA to 6 A (gold plated 5 µm contacts allow low current)
- Response time: 15 ms
- Selectable automatic or manual restart modes (with permanent short-circuit detection)
- Selectable Final Switching Devices monitoring loop for the control of external relays or contactors
- LEDs indicates inputs and outputs status, and restart condition
- Removable terminal strips for ease of maintenance
- 45 mm / 1.77 in width housing

TYPICAL APPLICATIONS

To be used with the FF-SYA safety light curtain in point-of operation protection or zone guarding protection such as:

- Metal-forming, milling and drilling machines
- Spot-welding machines and fine-boring machines
- Pressing, moulding and thermoforming machines
- Conveyors/transfer lines



The FF-SRS59392 Interface Control Module is designed to be used with the FF-SYA Safety Light Curtain in emergency stop circuits when danger to personnel or machinery is present. Its slim 45 mm / 1.77 in width housing is ideal for space restricted areas. This module provides a Control Reliable interface between the FF-SYA Light Curtain and the machine control circuitry. A single fault does not prevent the normal stopping action from taking place but will prevent the next machine cycle to start until the fault is corrected. This is accomplished by the use of redundant circuitry, self-checking capability and positive guided safety relay outputs. These redundant safety relay outputs are rated for 6 amps to directly operate with the machine control actuators using 2 NO and 1 NC output contacts. These output contacts are also gold plated to ensure compatibility with very low current requirements (such as a monitoring circuit).

The FF-SRS59392 Module 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. The FF-SRS59392 is equipped with LED indicators that provide diagnostic information and is equipped with removable wiring strips to make replacement fast and easy.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

MISUSE OF PRODUCT

- The FF-SRS59392 module is designed to be used with the Honeywell FF-SYA safety light curtain equipped with fail-safe solid state outputs. The FF-SYA performs cross-fault detection between its outputs. The FF-SRS59392 module does not perform the cross-fault detection between its inputs. To ensure the highest safety category, do NOT use the FF-SRS59392 with any other equipment. For other equipment, use the FF-SRS5935 or FF-SRS5925 dual channel emergency stop module. Both modules perform the cross-fault detection between the safety device outputs.

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

FF-SRS59392

FF-SRS59392

• Dual Channel Interface Control Module - Electrical interface for Electrosensitive protective equipment



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Supply voltage	
Nominal voltage (A1/A2)	24 Vdc (-15 %, +15 %)
Power consumption	3,5 W
Fuse protection	315 mA, time delayed
Restart functions	
Restart push-button input (S33/S34)	For the connection of a N.O. contact, 0,1 to 1,5 s closing time, permanent short-circuit detection, 20 Vdc min. voltage (without pressing the push-button), 10 mA/24 Vdc min. current, 470 Ω max. cable resistance
Restart mode input (X1/X3)	For setting the manual or automatic restart mode, voltage presence
Restart time	100 ms after the ESPE inputs are energized (automatic restart) or push-button release (manual restart)
FSD monitoring loop	
FSD contacts input (Y1/Y2)	For the connection in series of the FSDs N.C.contacts (FSDs reaction time: 250 ms), permanent short-circuit detection, 20 Vdc min. voltage, 30 mA/24 Vdc min. current, 150 Ω max. cable resistance
FSD monitoring input (X1/X2)	For setting the FSD monitoring loop, voltage presence
ESPE inputs	
Input current	30 mA/24 Vdc (relays energized), 5 mA/24 Vdc (relays de-energized)
Input voltage	19 to 27,6 Vdc
Protection	Reversed polarity, over-voltages up to 32 Vdc
Outputs	
Contacts available	2 N.O., 1 N.C. (2 safety relays with guided contacts)
Response time	15 ms max. (See timing diagrams)
Start time at power up	100 ms (automatic restart mode)
Current range	1 mA min., 6 A max. (See Note 1)
Voltage range	0,1 Vac/dc min., 250 Vac/dc max.
Switching capability per ac15 (EN 60947-5-1)	N.O. contact: 3 A / 230 Vac, N.C. contact: 2 A / 230 Vac
Typical electrical life expectancy	Power factor = 1 at 230 Vac (See Figure 1, Note 3) 1 A : > 2 000 000 ac / > 400 000 dc ; 3 A : > 500 000 ac / > 300 000 dc 5 A : > 300 000 ac / > 200 000 dc ; 6 A : > 200 000 ac / > 150 000 dc
Typical power factor (See Fig. 2, Note 2 and 3)	Limitation factor: 0,45 (cos φ = 0,3), 0,70 (cos φ = 0,5), 0,85 (cos φ = 0,7), 1 (cos φ = 1)
Operating frequency	1200 switching cycles / h (max.)
External fuse rating	6 A max. time delayed
Mechanical life	10 million switching operations
Environmental specifications	
Temperature range	Operation: 0 °C to 55 °C / 32 °F to 131 °F Storage: -20 °C to 70 °C / -4 °F to 170 °F, at 90 % humidity max.
Sealing	Housing: IP 40 • Terminals: IP 20
Housing material	Thermoplastic
Vibration resistance	Amplitude 0,35 mm, frequency 10 to 55 Hz
Connection	Removable terminal strips, one ø2,5 mm ² (14 AWG) or two ø1,5 mm ² (16 AWG) stranded wires per terminal
Mounting	Quick install rail mounting EN 50022-35, 35 x 15 mm / 1.38 x 0.59 in size
Weight	280 g / 0.61 lb

Ordering information
FF-SRS59392 (24 Vdc)

NOTE 1: To ensure the 1 mA capability during the life-time of the contact, NEVER exceed 300 mA and 60 V.

NOTE 2: Install arc suppression device across loads to avoid module contact arcing and ensure specified relay life expectancy.

NOTE 3: Total operations = operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 3 A/230 Vac, the limitation factor is 0,70 and the number of operations is 500 000 x 0,70 = 350 000.

Figure 1 - Contacts life for a 100 % resistive load (typical) - Note 1
 Power factor = 1 (cos φ)

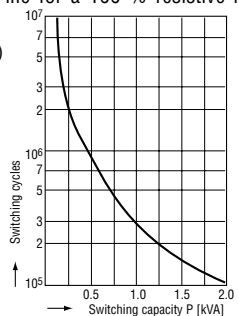
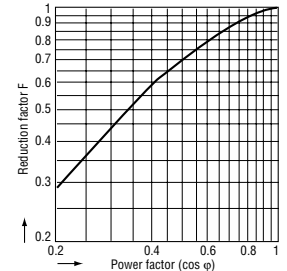


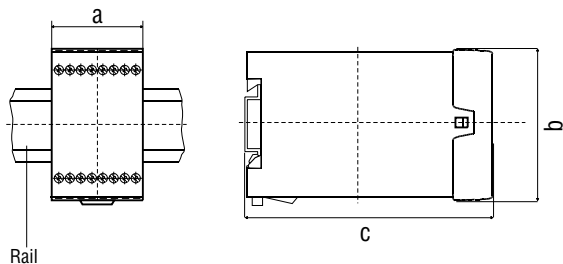
Figure 2 - Limitation factor inductive loads - Note 2 - Power factor < 1 (cos φ)



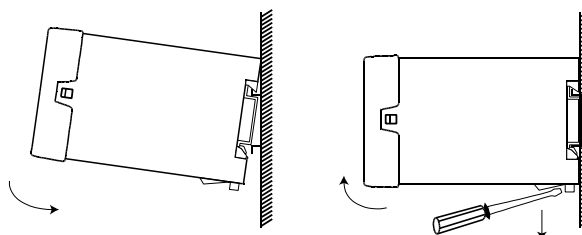
FF-SRS59392

Mounting dimensions

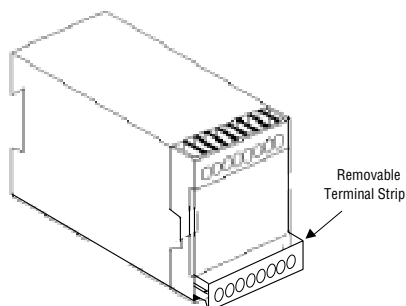
- a Width: 45 mm / 1.77 in
- b Height: 74 mm / 2.91 in
- c Depth: 121 mm / 4.76 in



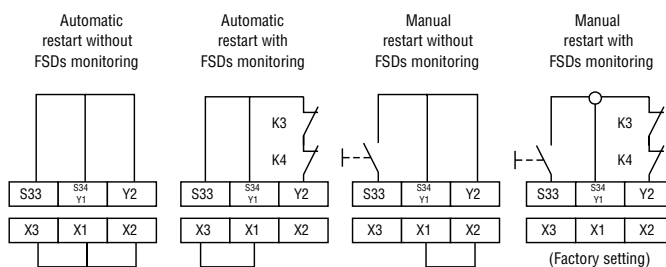
Mounting procedure



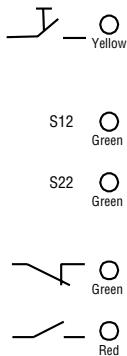
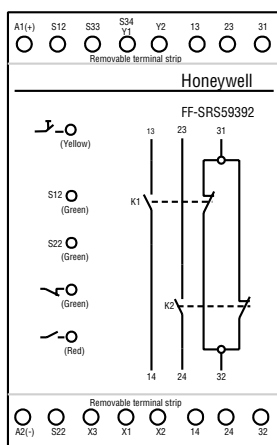
Removable terminal strips



Jumper links setting diagram



Module front panel



Selected Restart Mode

- Automatic restart selected
- Manual restart selected
- Press and release the restart push-button

ESPE Inputs Status

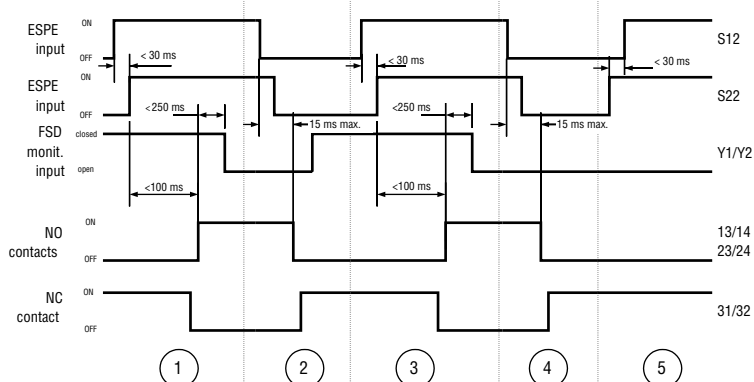
- Both safety device outputs are closed
- Both safety device outputs are open

Relay Outputs Status

- Internal relays are energized, NO contacts are closed, NC contact is open.
- Internal relays are de-energized, NO contacts are open, NC contact is closed.

- light off
- light on
- blinking light

Automatic restart functional diagram (with Final Switching Devices monitoring)

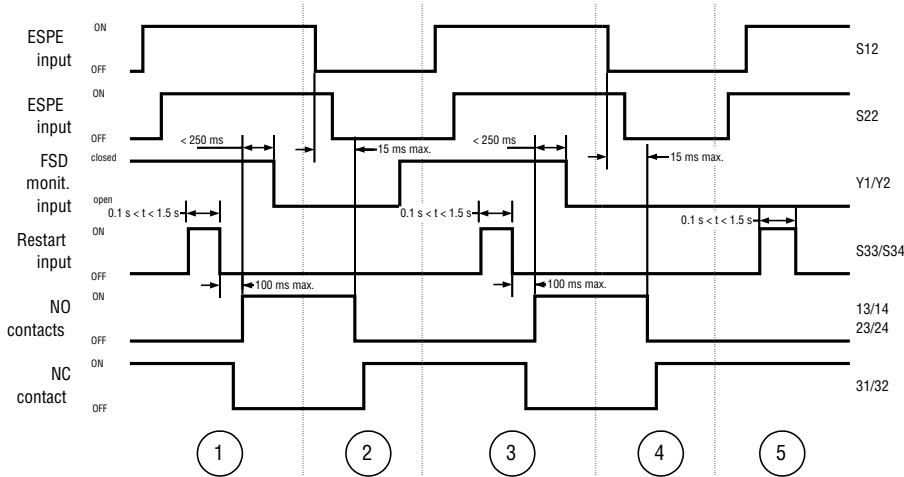


1. Normal operation: emergency stop condition is removed and the FSDs monitoring loop opens.
2. Normal operation: emergency stop condition occurs and the FSDs monitoring loop closes.
3. Normal operation: emergency stop condition is removed and the FSDs monitoring loops opens.
4. Failure on the FSDs: emergency stop condition occurs and the FSDs monitoring loop remains open.
5. Failure on the FSDs: emergency stop condition is removed but the machine cannot restart.

In the automatic restart mode, the Normally Open (N.O.) contacts (13/14, 23/24) will close and the Normally Closed (N.C.) contact (31/32) will open if the two input signals from the FF-SYA light curtain are present, provided these signals are coincident and the external relays reaction time is within the specification (if the Final Switching Devices monitoring loop is set). If the emergency stop condition occurs the N.O. contacts will open within the 15 ms response time 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 module will not restart if the FSD monitoring loop remains permanently open, or remains closed for more than 250 ms or permanently.

Manual restart functional diagram (with Final Switching Devices monitoring)



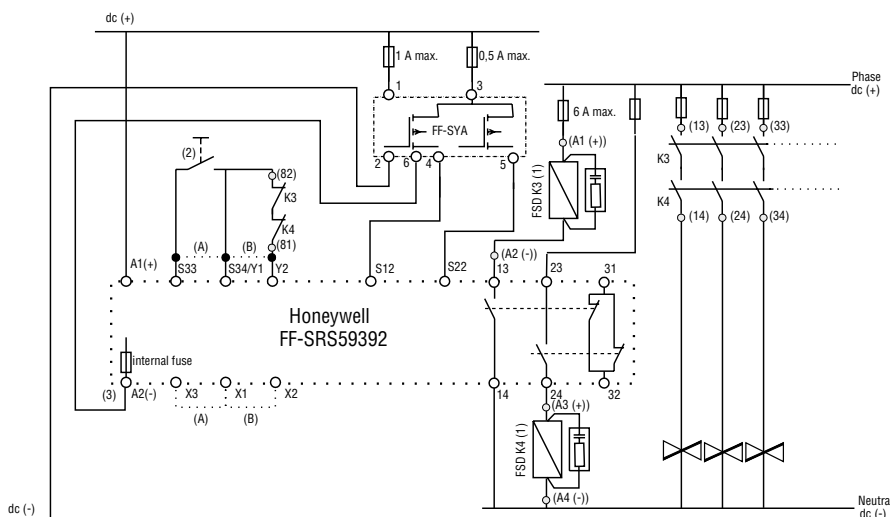
1. Normal operation: emergency stop condition is removed and the FSDs monitoring loop opens after the push-button is pressed and released.
2. Normal operation: emergency stop condition occurs and the FSDs monitoring loop closes.
3. Normal operation: emergency stop condition is removed and the FSDs monitoring opens after the push-button is pressed and released.
4. Failure on the FSDs: emergency stop condition occurs and the FSDs monitoring loop remains open.
5. Failure on the FSDs: emergency stop condition is removed but the machine cannot restart after the push-button is pressed and released.

In the manual restart mode, the N.O. contacts (13/14, 23/24) will close and the N.C. contact (31/32) will open after the push-button is pressed and released, provided the two input signals are available and provided the Final Switching Devices monitoring loop is closed (if is set). If the emergency stop condition occurs the N.O. contacts will open within the 15 ms response time 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 module will not restart:

- if the push-button is actuated for more than 1,5 s, or if a permanent short-circuit of the restart push-button input occurs,
- if the FSD monitoring loop remains permanently open, or remains closed for more than 250 ms or permanently.

Wiring diagram (using 2 N.O. contacts): Manual restart with FSD monitoring



- (1) Always install arc suppressors across the coils of external safety relays (these arc suppressors are not necessary, if the FSDs relays K3 & K4 are supplied by the FF-SRE3081 extension module for which correct wiring is also indicated).
 - (2) Use a 120 or 230 Vac electrically insulated push-button.
 - (3) The module and the ESPE must be connected to the same 0 V.
ESPE: Electrosensitive Protective Equipment.
FSD: Final Switching Device.
- (A) Jumpered if the manual restart mode is not used.
(B) Jumpered if the FSDs K3 and K4 are not used.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products

Asia Pacific Headquarters

Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
Fax: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax: 1300-36-04-70

China - PRC - Beijing

Honeywell China Inc.
Phone: +(86-10) 8458-3280
Fax: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6237-0237
Fax: +(86-21) 6237-1237

China - Hong Kong S.A.R.

Honeywell Ltd.
Phone: +(852) 2953-6412
Fax: +(852) 2953-6767

Indonesia

Honeywell Indonesia Pte Ltd.
Phone: +(62) 21-535-8833
Fax: +(62) 21-5367-1008

India

TATA Honeywell Ltd.
Phone: +(91) 20 687 0445/0446
Fax: +(91) 20 681 2243/687 5992

Japan

Honeywell Inc
Phone: +(81) 3 5440 1425
Fax: +(81) 3 5440 1368

South Korea

Honeywell Korea Co Ltd
Phone: +(822) 799-6167
Fax: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
Fax: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
Fax: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
Fax: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Thailand

Honeywell Systems (Thailand) Ltd.
Phone: +(662) 693-3099
Fax: +(662) 693-3085

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
Fax: +(886-2) 2245-3242

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246 Fax:
+(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
Fax: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 979 00 23
Fax: +(359) 2 979 00 24

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 261 123 457
Fax: +(420) 261 123 461

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
Fax: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
Fax: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40 Fax:
+(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444 Fax:
+(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(36 1) 451 4300 Fax:
+(36 1) 451 4343

Italy Honeywell S.p.A. Phone:

+(39) 02 92146 450/456
Fax: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11 Fax:
+(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00 Fax:
+(47) 66 76 20 90

Poland

Honeywell Sp. z o.o.
Phone: +(48)606 0964
Fax: +(48)606 0901

Portugal

Honeywell Portugal Lda Phone:
+(351 21) 424 50 00 Fax: +(351
21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 21 231 64 37/38
Fax: +(40) 21 231 6439

Commonwealth of Independent States (CIS)

Z.A.O. Honeywell
Phone: +(7 095) 796 98 36
Fax: +(7 095) 796 98 93

Slovak Republic

Honeywell s.r.o.
Phone: +(421 2) 58 247 403
Fax: +(421 2) 58 247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 805 1201
Fax: +(27) 11 805 1504

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
Fax: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
Fax: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
Fax: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 575 6620 Fax:
+(90) 216 575 6637

Ukraine

Honeywell
Phone: +(380) 44 201 44 74
Fax: +(380) 44 201 44 75

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481481
Fax: +(44) 1698 481676

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
Fax: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd. Phone:
+(9712) 443 2119
Fax: +(9712) 443 2536

NORTH AMERICA

USA/Canada

Honeywell
Control Products, International
Headquarters
Phone: 1-800-537-6945
1-815-235-6847
Fax: 1-815-235-6545
E-mail: info.sc@honeywell.com

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
Fax: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia Phone:
+(55-11) 4166-1900 Fax: +(55-
11) 4166-1901

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688 Fax:
+(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
Fax: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1 Fax:
+(593-2) 981-562

Mexico

Honeywell S.A. de C.V. Phone:
+(52) 55 5259-1966 Fax: +(52)
55 5570-2985

Peru

Honeywell Peru
Phone: +(511) 445-2136/1891
Fax: +(511) 348-3552

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075 Fax:
+(809) 792-0053

Trinidad

Honeywell Inc
Phone: +(868) 624-3964
Fax: +(868) 624-3969

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211 Fax:
+(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2004 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

FF-SRS6025 Dual Channel Emergency Stop Module

FEATURES

- Complies with EU Directive for machines 98/37/EC
- Meets the applicable parts of the US & Canadian regulations and standards ANSI/RIA/OSHA
- Category 4 as per the EN 954-1 European standard
- Dual channel input
- Output: three NO contacts and one NC contact
- Switching current from 10 mA to 5 A
- Automatic start or manual start modes
- Detection of blocked start push-button
- Selectable cross-fault detection in emergency stop control circuit
- LED indicates power and the status of both internal relays
- Very high mechanical and electrical lifetime
- Overvoltage and short-circuit protection
- Slim housing 22,5 mm / 0.89 in width

TYPICAL APPLICATIONS

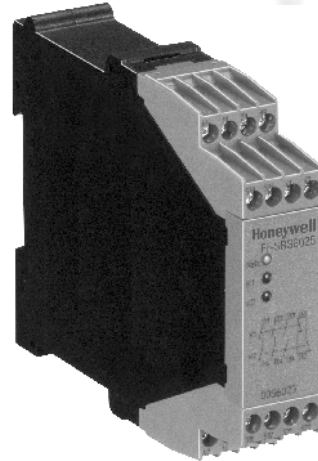
- Emergency-stop circuits on machines
- Door protection
- Conveyors/transfer lines
- Monitoring of safety devices like:
 - emergency stop push-buttons
 - safety light curtains
 - safety switches
 - safety mats



(Pending)



(Pending)



FF-SRS6025

The FF-SRS6025 dual channel emergency stop modules are designed for use in emergency stop circuits when danger to personnel or machinery is present.

The FF-SRS6025 safety control module monitors the outputs of safety devices (e.g. emergency stop push-buttons, safety light curtains, safety mats, safety switches, etc.). If the safety device is actuated, the emergency stop condition is relayed via the safety contacts of the safety control module to the machine control circuitry to stop the hazard and to remove power.

The FF-SRS6025 helps to create a control reliable safety solution by providing redundancy and self-checking circuitry.

This device offers two channel inputs and two internal safety relay outputs with positive-guided contacts. This ensures redundancy in its in-and outputs.

The slim housing of only 22,5 mm (0.89 in.) width allows this safety control module to fit into every cabinet or even helps to reduce the overall cabinet size.

Other features include high current capability, an automatic start and manual start mode, cross-fault monitoring and external relays monitoring.

WARNING

MISUSE OF DOCUMENTATION

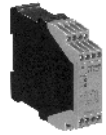
- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRS6025 Dual channel Emergency Stop Module

SPECIFICATIONS

• Dual channel Emergency Stop circuits



Input	
Nominal voltage	24 Vdc (-10 %, +10 %)
Nominal power consumption	1.3 W
Nominal voltage at S11	22 Vdc (provided by control module)
Input current between S11/S12 and S21/S22	25 mA
Minimum voltage at S12	20 Vdc when activated
Start time	Manual START function: 20 ms (falling signal edge) Automatic START function: 350 ms
Output	
Contact complement	3 NO contacts, 1 NC contact
Response time	Opening of inputs (S11/12; S21/22): 65 ms Opening in supply circuit (24 Vac/dc(+)/A1): 65 ms
Contact type	Safety relay, positive-guided
Current Range (min. to max.)	10 mA to 5 A
Voltage Range (min. to max.)	0,1 to 250 Vac
Switching Capability per AC15 (EN 60947-5-1)	NO contacts: 3 A / 230 Vac ; NC contact: 2 A / 230 Vac
Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (See Note 1)
0,5 A	5.500.000 operations
1 A	2 000 000 operations
2 A	1 000 000 operations
5 A	250 000 operations
Typical Power Factor (cos φ)	Limitation Factor (See Note 2)
0,3	0,45
0,5	0,7
0,7	0,85
1	1
Operating frequency	1200 switching cycles/hour (max.)
Output contact fuse rating	Time delay 6 A (max.)
Mechanical life	Twenty million switching operations
General	
Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at 90% humidity (max.)
Sealing	Housing: IP 40 • Terminals: IP 20
Housing material	Thermoplastic
Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz (per IEC/EN 60068-2-6)
Wire/conductor connection	Solid wire: 1 x 4 mm ² [12 AWG] or 2 x 2,5 mm ² [14 AWG] Stranded wire with sleeve: 1 x 2,5 mm ² [14 AWG] or 2 x 1,5 mm ² (max.) [16 AWG]
Wire/conductor attachment	M 3,5 screw terminals
Mounting	Quick install rail mounting IEC/EN 60715, width: 35 mm / 1.38 in
Weight	220 g / 0.49 lb

ORDERING INFORMATION

FF-SRS6025□

□ = 2 = 24 Vdc (only)

Note 1: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 2: Total operations = operations (power factor 1) x limitation factor F.

Example:

U = 230 Vac, I = 1 A, power factor cos φ = 0,5

Switching power P = U x I = 230 VA

Contact life (cos φ = 1, P = 230 VA) =

2 000 000 operations

Limitation factor F (cos φ = 0,5) = 0,7

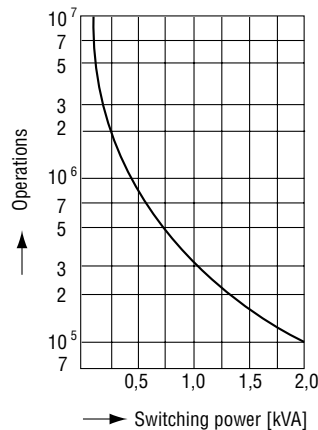
Contact life (cos φ = 0,5, P = 230 VA) =

F x contact life (cos φ = 1, P = 230 VA) =

2 000 000 x 0,7 = 1 400 000 operations.

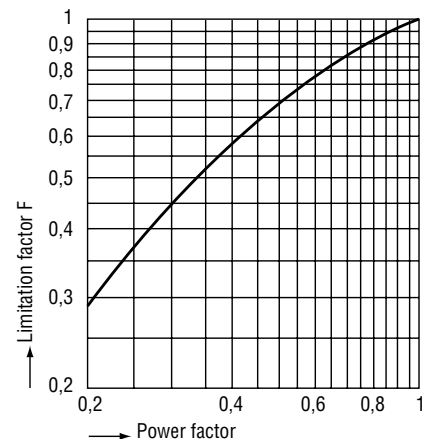
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

(Power factor (cos φ) = 1, see Note 1)

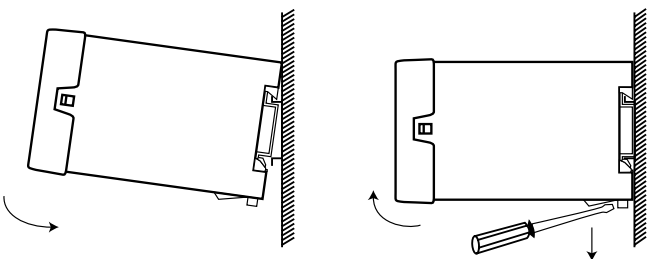


LIMITATION FACTOR F FOR INDUCTIVE LOADS

(Power factor (cos φ) < 1 See Note 2)

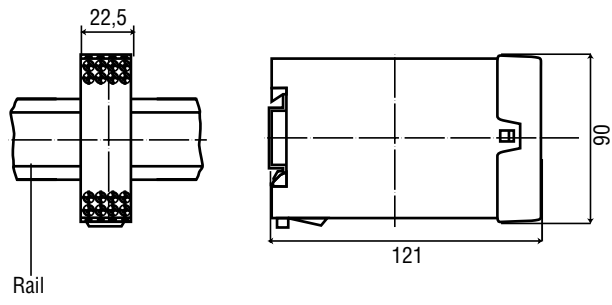


INSTALLATION DIAGRAM

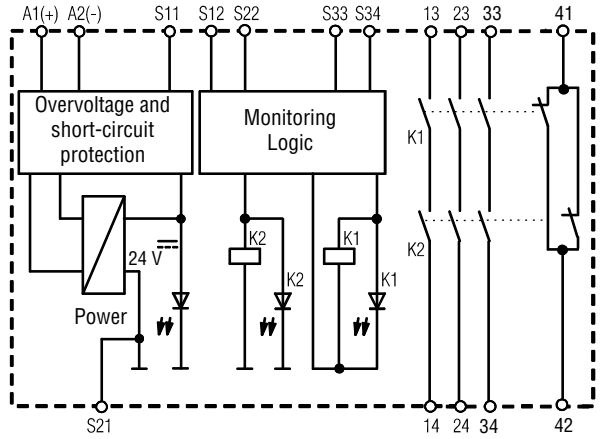


MOUNTING DIMENSIONS

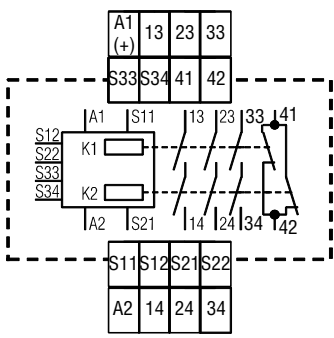
Width: 22,5 mm / 0.89 in; Height: 90 mm / 3.55 in; Depth: 121 mm / 4.77 in



INTERNAL CIRCUITRY



FRONT PANEL



FUNCTIONAL DESCRIPTION

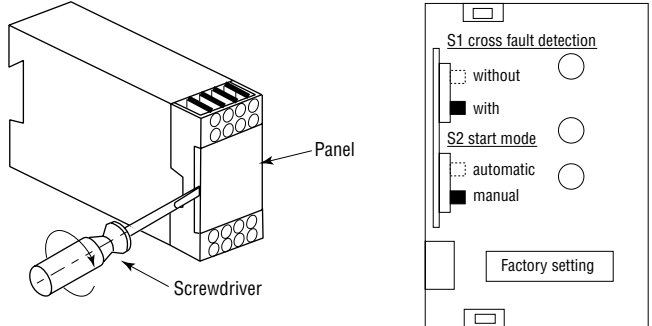
The FF-SRS56025 safety control monitors dual channel outputs of safety devices (e.g. emergency stop push-buttons, light curtains, mats, switches, etc.).

If the safety device is actuated, the emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to stop the hazard and to remove power.

In the manual start mode, a push-button needs to be pushed and released, to re-energise the internal safety relays KA and K2. In the automatic start mode, the internal safety relays K1 and K2 re-energise automatically.

Both relays K1 and K2 must be energised to have the normally open contacts 13/14, 23/24 and 33/34 in a closed position.

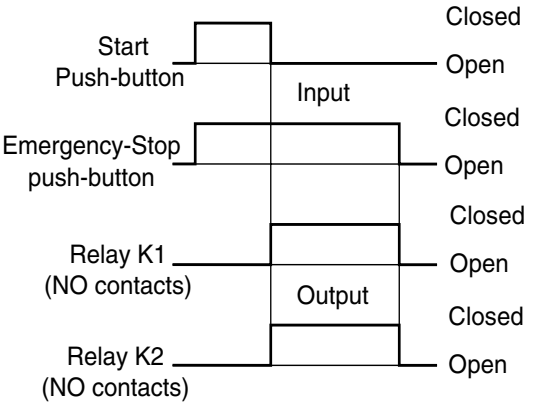
MODE SETTING



The FF-SRS6025 emergency stop module contains two internal switches (S1 and S2) for the mode settings. To access to these switches, remove the front panel using a screwdriver.

Switch S1 is used to select an operating mode for cross-fault detection between the two inputs. Cross-fault monitoring must be used when two independent safety inputs are provided to this module to achieve the overall level of the solution.

Switch S2 is used to select the start/restart modes. In the manual start/restart mode, a start push-button needs to be pushed and released to re-energise the safety relay contacts. In the automatic start mode, the safety relay contacts energise automatically, after releasing the connected safety device.

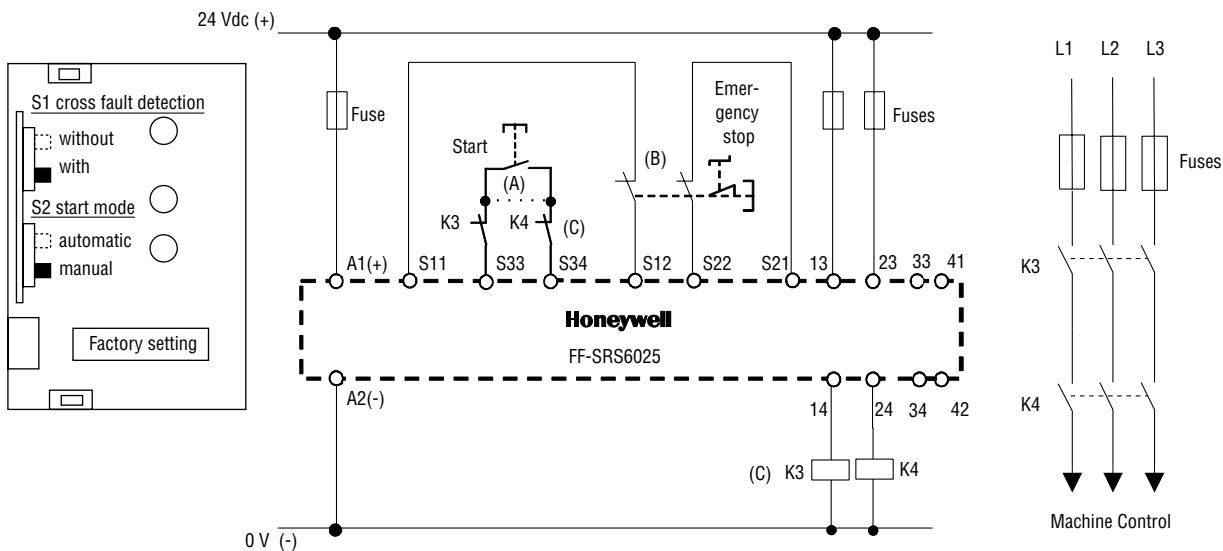


Line fault Detection on Start push-button

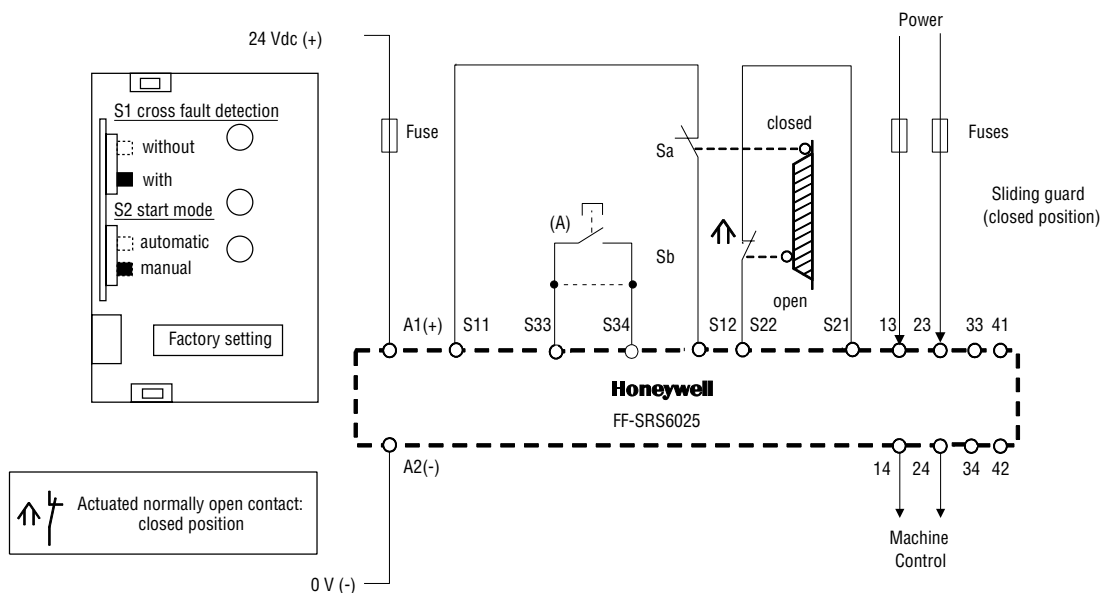
If the start push-button is closed before voltage is applied to S12 and S22 the safety contacts of the module cannot close. This additional feature ensures the detection of a line fault via the start push-button or a blocked start push button. In case of a push-button failure the module can not be restarted.

APPLICATION EXAMPLES

Dual-channel emergency stop circuitry (with cross fault monitoring, external contactors)



Dual-channel safety door monitoring (with cross fault monitoring, without external contactors)



FUNCTIONAL DESCRIPTION

In the case of an **emergency stop condition**, the safety device (see "Application note "B") is actuated and opens its normally closed contacts connected to the dual input channels S11/S12 and S21/S22. The internal safety relays K1 and K2 de-energise. The normally open safety relay contacts (13/14, 23/24, 33/34) will open and the normally closed contact (41/42) will close. The emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to stop the hazard. When removing the emergency stop condition, the normally closed safety device contacts close again and the module is ready to be restarted.

In the **manual start mode**, a push-button needs to be pushed and released, to energise the internal safety relays K1 and K2. The normally open safety contacts (13/14, 23/24, 33/34) will close and the normally closed contact (41/42) will open, allowing the machine to operate. In the **automatic start mode**, the internal safety relays K1 and K2 energise automatically.

Application notes:

Note (A): Start modes:

Manual start mode: Insert start push-button into the start loop S33/S34 and select internal switch to manual start mode

Automatic start mode: Insert jumper into the start loop S33/S34 and select internal switch S2 to automatic start mode

Note (B): Dual channel safety devices:

Emergency stop push-buttons, safety light curtains, safety mats, safety limit or interlock switches.

Note (C): External contactors:

The proper operation of external safety contactors and FF-SRE extension modules must be monitored by using the External Device Monitoring (EDM) function of the FF-SRS6025 module. Connect one normally closed contact of each safety contactor (or the FF-SRE Extension module) into the start loop between S33/S34.

FF-SRS6025

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products Asia Pacific Headquarters

Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
FAX: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax 1300-36-04-70

China - PRC - Beijing

Honeywell China Inc.
Phone: +(86-10) 8458-3280
FAX: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6237-0237
FAX: +(86-21) 6237-1237

China - Hong Kong SAR

Honeywell Ltd.
Phone: +(852) 2953-6412
FAX: +(852) 2953-6767

India

Tata Honeywell Ltd.
Phone: +(91) 20 6870 445/446
FAX: +(91) 20 681 2243/687 5992

Indonesia

Honeywell Indonesia Pte Ltd
Phone: +(62) 21 535-8833
FAX: +(62) 21 5367-1008

Japan

Honeywell Inc
Phone: +(81) 3 5440 1425
FAX: +(81) 3 5440 1368

South Korea

Honeywell Korea Co. Ltd
Phone: +(822) 799-6167
FAX: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
FAX: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
FAX: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
FAX: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
FAX: +(886-2) 2245 3241

Thailand

Honeywell Systems Ltd.
Phone: +(662) 693 3099
FAX: +(662) 693 3085

NORTH AMERICA

USA/Canada

Sensing and Control
Phone: 1-800-537-6945
1-815-235-6847
FAX: 1-815-235-6545
E-mail: info.sc@honeywell.com

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
FAX: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
FAX: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 979 00 23
FAX: +(359) 2 979 00 24

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 242 442 111
FAX: +(420) 242 442 182

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
FAX: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
FAX: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
FAX: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(361) 451 43 00
FAX: +(361) 451 43 43

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/456
FAX: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
FAX: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
FAX: +(47) 66 76 20 90

Poland

Honeywell Sp. zo.o
Phone: +(48) 606 09 64
FAX: +(48) 606 09 01

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
FAX: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 21 231 64 37/38
FAX: +(40) 21 231 64 39

Commonwealth of Independent States (CIS)

ZAO Honeywell
Phone: +(7 095) 796 98 36
FAX: +(7 095) 797 99 06

Slovak Republic

Honeywell s.r.o.
Phone: +(421 2) 58 247 403
FAX: +(421 2) 58 247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 695 8000
FAX: +(27) 11 805 1504

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
FAX: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
FAX: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
FAX: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 5756620
FAX: +(90) 216 5756637

Ukraine

Honeywell
Phone: +(380) 44 201 44 74
FAX: + (380) 44 201 44 75

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481 481
FAX: +(44) 1698 481 676

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
FAX: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 443 2119
FAX: +(9712) 443 2536

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
FAX: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 4166 1900
FAX: +(55-11) 4166 1901

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
FAX: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1
FAX: +(593-2) 981-562

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5259-1966
FAX: +(52) 55 5570-2985

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2004 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

www.honeywell.com/sensing

FF-SR25933 Two-hand Safety Control Module

FEATURES

- Complies with the Machinery Directive 98/37/EC and UL 508
- Type III C per EN 574, Category 4 per EN 954-1
- Inputs for two dual-contact push-buttons
- 0,5 s simultaneity check between inputs
- 45 mm / 1.77 in width (120 Vac or 230 Vac versions) with 3 NO and 1 NC outputs
- 22,5 mm / 0.88 in width (24 V version) with 2 NO and 1 NC outputs
- Gold plated, 5 µm contacts allow low current down to 1 mA
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Switching current up to 5 A
- Voltage drop protection
- Overvoltage and short-circuit protection
- Final switching device monitoring loop
- LED indicators for power and outputs

TYPICAL APPLICATIONS

- Manual load or unload stations for machines
- Designed for press two-hands safety controls



FF-SR25933

Two-hand safety controls ensure protection against injury due to machine movement. They are cost effective solutions for machine guarding, when the upper limbs of a single operator are exposed to a hazard. A two-hand safety control system is made of two elements: a control panel and a safety control module. The control panel has two push-buttons which force the operator to use both hands. The safety control module is a device like the FF-SR25933 module which controls the simultaneity of action between both push-buttons.

The module accepts input from two NO and NC contacts delivered by each of the two push-buttons. When both push-buttons are activated within half a second and maintained, the normally open safety contacts of the module switch on. Otherwise an other activation is required.

When one of the push-buttons is released, the normally open safety contacts of the FF-SR25933 module switch off immediately.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SR25933 Two-hand Safety Control Module

Suitable for interfaces up to
CATEGORY 4
per EN 954-1



TYPE IIIC
per EN 574

SPECIFICATIONS

- Two-hand Safety Control for single operation protection

Input	Nominal voltage	120 Vac (-15 %, +10 %), 230 Vac (-15 %, +10 %), 24 Vdc (-10 %, +10 %) and 24 Vac (-15 %, +10 %)
	Nominal consumption	120 Vac or 230 Vac: 4 VA; 24 V: 2,3 W
	Nominal frequency	50 Hz to 60 Hz
	Nominal input current through S11/S12, S11/S13, S21/S22 and S21/S23	50 mA (NO contact), 20 mA (NC contact) (cable length must not exceed 30 m / 98 ft and must be routed separately from power cables)
	Time required for simultaneous contact closure S11/S12 and S21/S22	0,5 s
	Recovery time	1 s
Output	Contact complement	2 NO, 1 NC contacts (24 Vdc version); 3 NO, 1 NC contacts (120 Vac or 230 Vac versions)
	Contact type	Safety relay, positive-guided
	ON response time	40 ms (to energize relays)
	OFF response time	15 ms (to de-energize relays)
	Switching Capability	Power factor = 1 with resistive load
	Current Range (min. to max.)	1 mA to 5 A (See Note 1)
	Voltage Range (min. to max.)	0,1 to 250 Vac/dc
	Switching capability (per AC15: EN 60947-5-1)	NO contact: 5 A / 250 Vac
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (See Note 2)
	1 A	2 000 000 operations
	2 A	1 000 000 operations
	5 A	220 000 operations
	Typical Power Factor (cos φ)	Limitation Factor (See Note 3)
	0,3	0,45
	0,5	0,70
	0,7	0,85
	1	1
	Mechanical life	Ten million switching operations
	Fuse Rating	6 A time delayed
General	Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at max. 90 % humidity
	Sealing	Housing: IP 40 • Terminals: IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0,35 mm; Frequency 10 Hz to 55 Hz
	Conductor connection	1 x 4 mm ² solid (max.) [12 AWG] or 2 x 1,5 mm ² (max.) [16 AWG] Stranded wire with sleeve DIN 46288
	Conductor attachment	M 3,5 screws terminals; wire contacts are enclosed to prevent electrical shock
	Mounting	Quick install rail mounting EN 50022-35
	Indication	LED "power supply": ON when operating voltage applied LED K1: ON when relay K1 active LED K2: ON when relay K2 active
	Weight	200 g / 0.44 lb (24 V version) ; 400 g / 0.88 lb (120 Vac or 230 Vac versions)

ORDERING INFORMATION

FF-SR25933

Voltage:
2 = 24 Vdc/24 Vac
E = 120 Vac
G = 230 Vac

Note 1: To ensure the 1 mA capability during the lifetime of the contact, NEVER exceed 300 mA and 60 V.

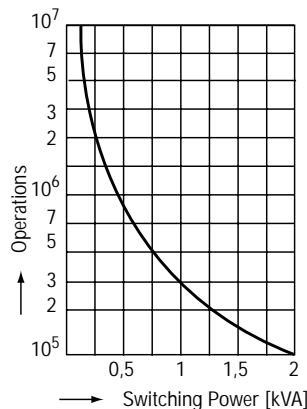
Note 2: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 2 A (1 000 000 operations), the limitation factor is 0,70.

Total operations: 1 000 000 x 0,70 = 700 000.

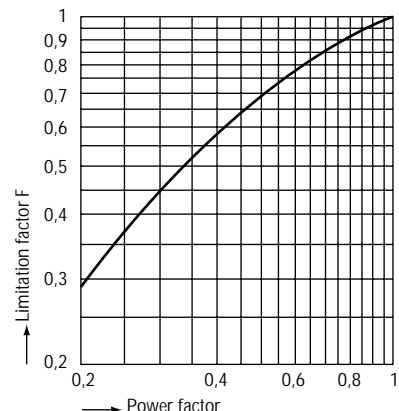
CONTACT LIFE FOR 100 % RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ)



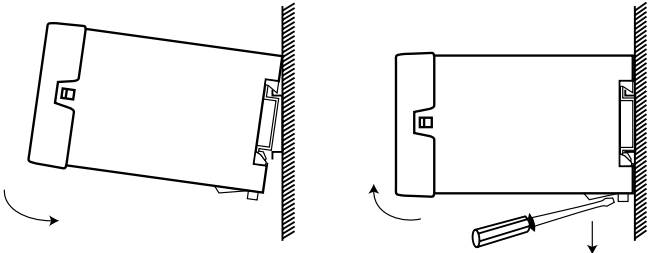
LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ)



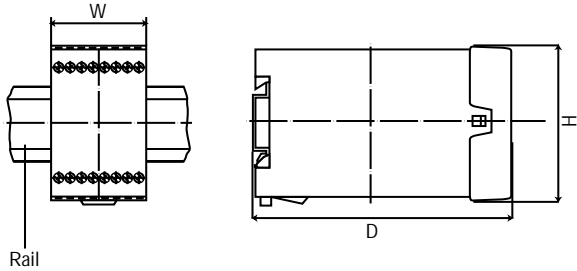
FF-SR25933

INSTALLATION DIAGRAM



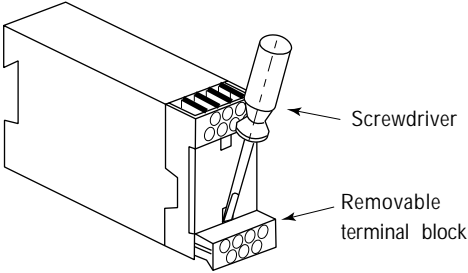
MOUNTING DIMENSIONS

Width (W): 45 mm / 1.77 in (120 Vac or 230 Vac version) or 22,5 mm / 0.88 in (24 V version); Height (H): 84 mm / 3.3 in; Depth (D): 118 mm / 4.64 in

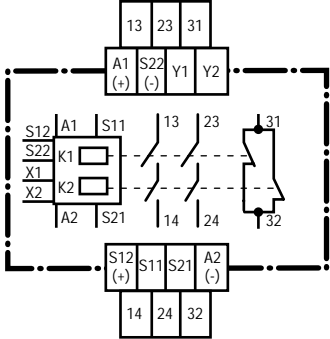


FF-SR25933

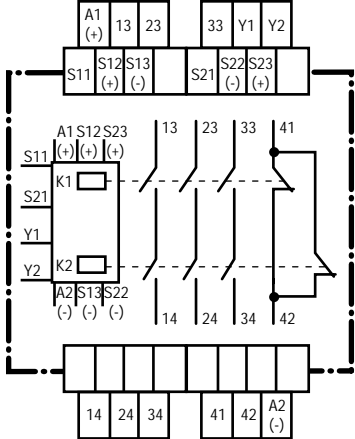
REMOVABLE TERMINAL BLOCKS



TERMINAL BLOCK CONFIGURATION

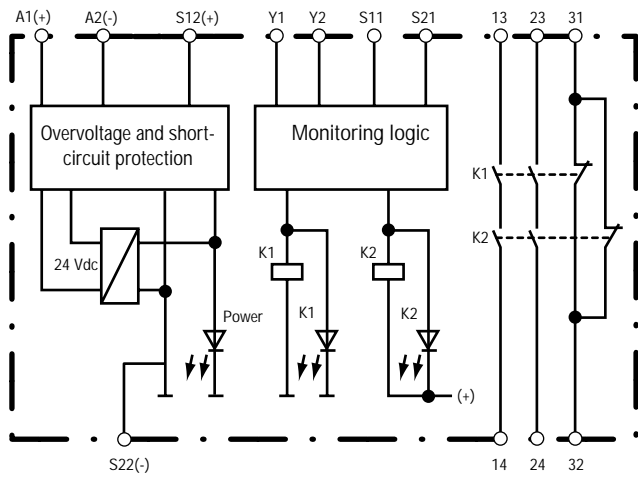


FF-SR259332 (24 V version)

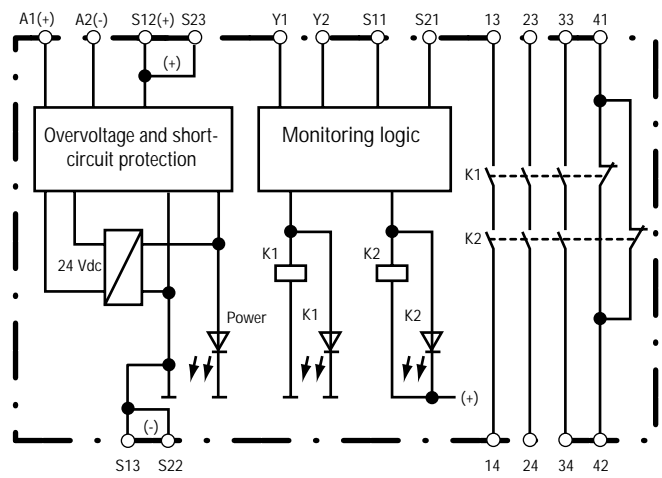


FF-SR25933E (120 Vac version)
FF-SR25933G (230 Vac version)

INTERNAL CIRCUITRY



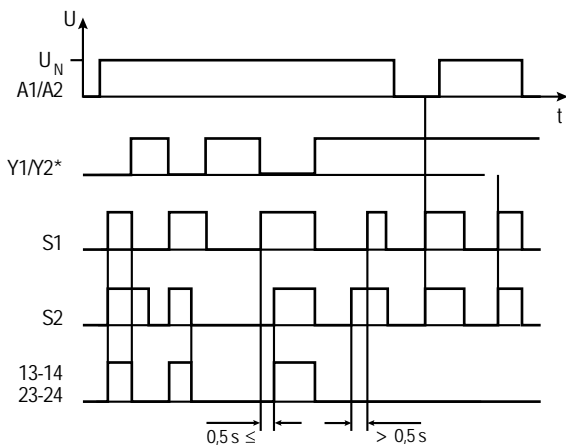
FF-SR259332 (24 V version)



FF-SR25933E (120 Vac version)

FF-SR25933G (230 Vac version)

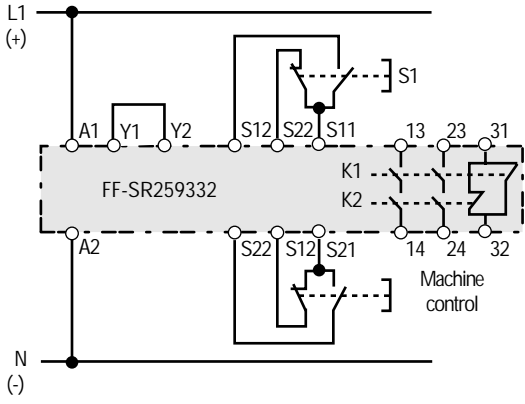
FUNCTIONAL DIAGRAM



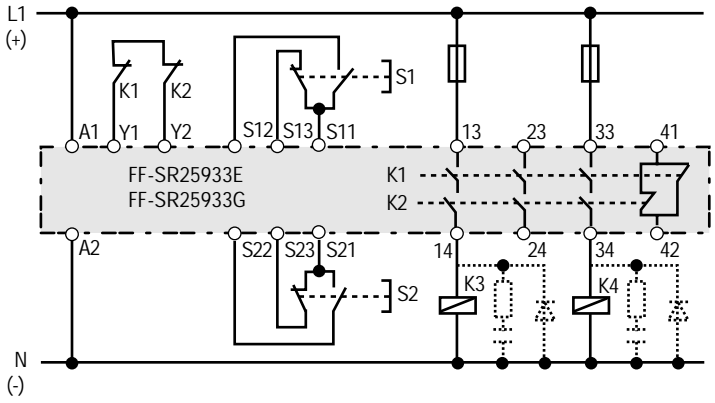
*when final switching devices are connected to Y1/Y2

TYPICAL WIRING DIAGRAMS

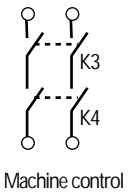
FF-SR25933



Two-hand control (24 V version)



Two-hand control with contact reinforcement via external positive guided safety contacts (120 Vac or 230 Vac versions)



Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products Asia Pacific Headquarters

Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
FAX: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax 1300-36-04-70

China - PRC - Beijing

Honeywell (Tianjin) Ltd.
Phone: +(86-10) 8458-3280
FAX: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6237-0237
FAX: +(86-21) 6237-1237

China - Hong Kong SAR

Honeywell Ltd.
Phone: +(852) 2953-6412
FAX: +(852) 2953-6767

India

Tata Honeywell Ltd
Phone: +(91) 20 687 0445/
0446
FAX: +(91) 20 681 2243/
687 5992

Indonesia

Honeywell Indonesia Pte Ltd
Phone: +(62-21) 535-8833
FAX: +(62-21) 5367 1008

Japan

Honeywell Inc.
Phone: +(81) 3 5440 1425
FAX: +(81) 3 5440 1368

South Korea

Honeywell Korea Co. Ltd
Phone: +(822) 799-6167
FAX: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
FAX: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
FAX: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
FAX: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
FAX: +(886-2) 2245 3242

Thailand

Honeywell Systems Ltd.
Phone: +(662) 693 3099
FAX: +(662) 693 3085

NORTH AMERICA

Canada

Honeywell LTD
Phone: 1-800-737-3360
FAX: 1-800-565-4130

USA

Control Products,
International Headquarters
Phone: 1-800-537-6945
1-815-235-6847
FAX: 1-815-235-6545
E-mail: info.sc@honeywell.com

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
FAX: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
FAX: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 79 40 27
FAX: +(359) 2 79 40 90

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 2 6112 3469/
3424
FAX: +(420) 2 6112 3461

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
FAX: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
FAX: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
FAX: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(36 1) 451 4300
FAX: +(36 1) 451 4343

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/
456
FAX: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
FAX: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
FAX: +(47) 66 76 20 90

Poland

Honeywell Sp. zo o.
Phone: +(48) 22 606 0900
FAX: +(48) 22 606 0901

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
FAX: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 1 2110076
FAX: +(40) 1 2103375

Commonwealth of Independent States (CIS)

ZAO Honeywell
Phone: +(7 095) 796 98 36
FAX: +(7 095) 796 98 93

Slovak Republic

Honeywell s.r.o.
Phone: +(421 7) 58247403/400
FAX: +(421 7) 58247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 695 8000
FAX: +(27) 11 805 1504

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
FAX: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
FAX: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
FAX: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 575 6620
FAX: +(90) 216 575 6637

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481 481
FAX: +(44) 1698 481 276

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
FAX: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 443 2119
FAX: +(9712) 443 2536

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
FAX: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 7266 1900
FAX: +(55-11) 7266 1905

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
FAX: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1
FAX: +(593-2) 981-562

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5259-1966
FAX: +(52) 55 5570-2985

Peru

Honeywell Peru
Phone: +(511) 445-2136-1891
FAX: +(511) 348-3552

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Trinidad

Honeywell Inc.
Phone: +(868) 624-3964
FAX: +(868) 624-3969

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2003 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

www.honeywell.com/sensing

FF-SR25980 Two-hand Safety Module

FEATURES

- Complies with the Machinery Directive 98/37/EC and UL 508
- Type 3 A per EN 574
- Gold plated, 5 µm contacts 3 A allow low current
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Switching current up to 10 A
- Voltage drop protection
- 45 mm / 1.77 in width

TYPICAL APPLICATIONS

- Secondary protection for robotics



FF-SR25980

Two-hand safety controls ensure protection against hand injury due to dangerous machine movement. A two-hand safety control system is made up of two elements: a control board and a safety control module. The control board has two control devices that force the use of two-hand activation simultaneously. The safety control element is a device like the FF-SR25980 two-hand safety module. This control module relay is linked to the control board and is located in an enclosure.

The module will accept input from the two control devices (between S13/S14 and S23/S24) if Y1/Y2 are jumpered (or closed). When both input contacts close within half a second and remain closed, the two normally open safety contacts (13/14 and 23/24) will close. If these input contacts fail to close within half a second, or if power has been removed, another activation is required.

When one of the input contacts opens, the two normally open safety contacts of the FF-SR25980 module will open immediately.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SR25980 Two-hand Safety Module

SPECIFICATIONS

- Two-hand Safety Control for hand injury protection



FF-SR25980

Input	Nominal voltage	120 Vac (-15%, +10%), 230 Vac (-20%, +10%), 24 Vdc (-10%, +10%)
	Nominal consumption	120 and 230 Vac: 4 VA; 24 Vdc: 2,5 W
	Nominal frequency	50 to 60 Hz
	Nominal voltage between S13/S14 and S23/S24	24 Vdc with 35 mA current; control line length must not exceed 30 m / 98 ft and must be routed separately from power cables
	Time required for simultaneous contact closure S13/S14 and S23/S24	0,5 s
Output	Contact complement	2 NO contacts
	Contact type	Safety relay, positive-guided
	Response time	Activation/deactivation by inputs S13/S14 and S23/S24: 30 ms
	Switching Capability	Power factor = 1 with resistive load
	Current Range (min. to max.)	1 mA to 10 A (See Note 1)
	Voltage Range (min. to max.)	0,1 to 250 Vac/dc
	Switching capability (per ac15: EN 60947-5.1)	NO contact: 5 A / 250 Vac
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac/dc (See Note 2)
	3 A	1 000 000 operations
	5 A	500 000 operations
	10 A	220 000 operations
	Typical Power Factor (cos φ)	Limitation Factor (See Note 3)
	0,3	0,45
	0,5	0,70
	0,7	0,85
	1	1
	Mechanical life	Ten million switching operations
	Fuse Rating	6 A time delayed
General	Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at max. 90% humidity
	Sealing	Housing: IP 40 • Terminals: IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz
	Conductor connection	1 x 4 mm ² solid (max.) [12 AWG] or 2 x 1,5 mm ² (max.) [16 AWG] stranded wire with sleeve DIN 46288
	Conductor attachment	M 3,5 screws terminals; wire contacts are enclosed to prevent electrical shock
	Mounting	Quick install rail mounting EN 50022-35
	Weight	410 g / 0.90 lb

ORDERING INFORMATION

FF-SR25980 □

Voltage:
2 = 24 Vdc
E = 120 Vac
G = 230 Vac

Note 1: To ensure the 1 mA capability during the lifetime of the contact, NEVER exceed 300 mA or 60 V.

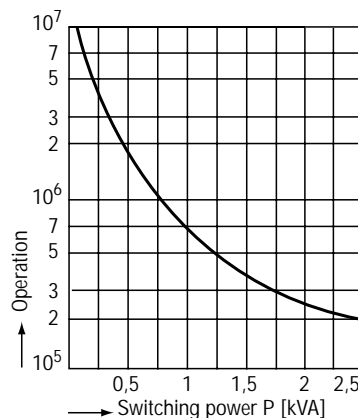
Note 2: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 3 A (1 000 000 operations), the limitation factor is 0,70.

1 000 000 x 0,70 = 700 000 total operations.

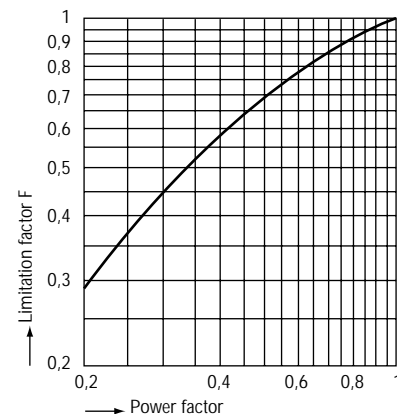
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ)

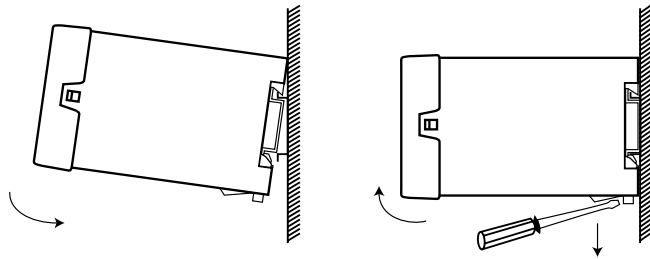


LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ)

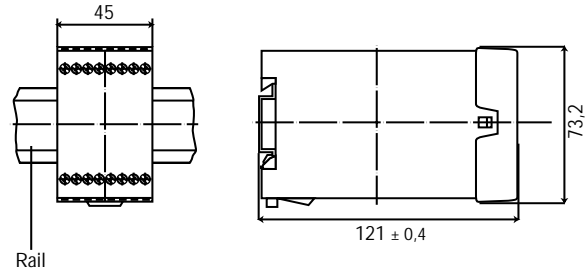


INSTALLATION DIAGRAM



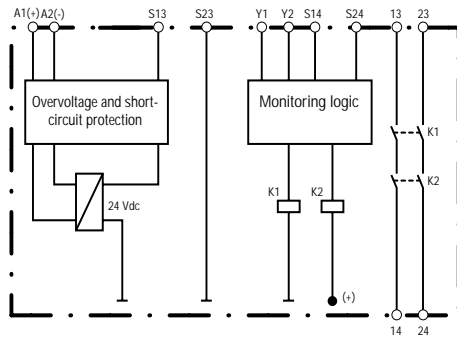
MOUNTING DIMENSIONS

Width: 45 mm / 1.77 in; Height: 74 mm / 2.9 in; Depth: 121 mm / 4.76 in

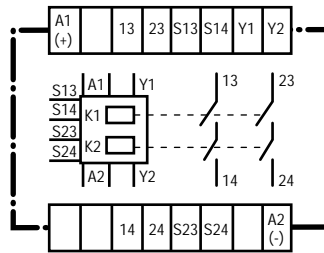


FF-SR25980

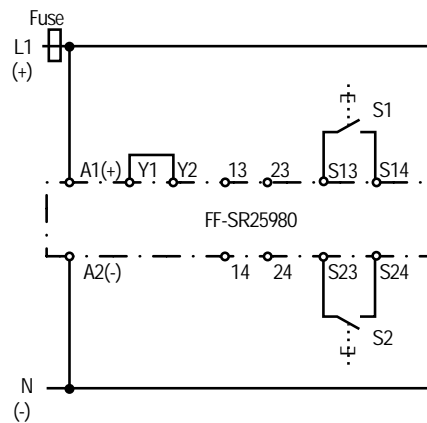
INTERNAL CIRCUITRY



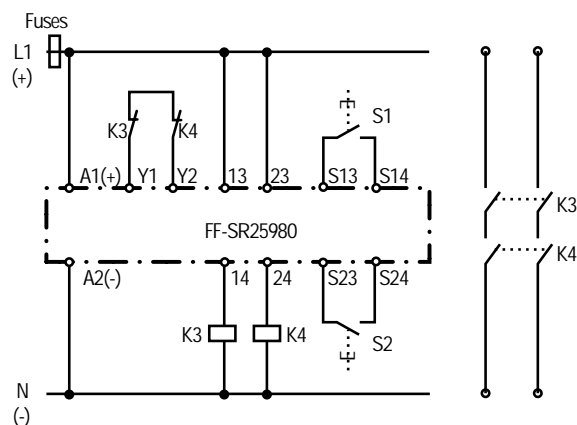
WIRING DIAGRAM



TYPICAL APPLICATION SCHEMATICS

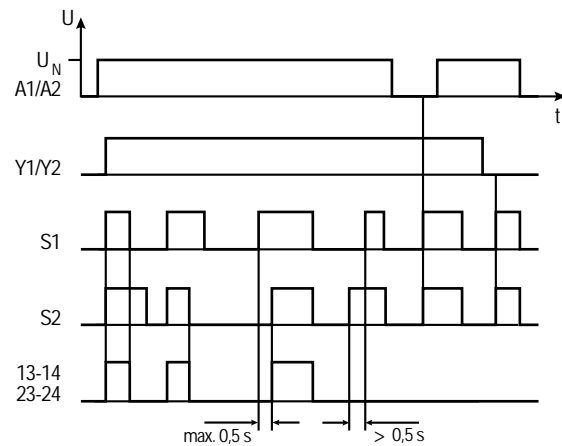


Two-hand control



Two-hand control with contact reinforcement via external positive guided safety contacts

FUNCTIONAL DIAGRAM



FF-SR05932 Standstill and Low Speed Monitor

FEATURES

- Complies with the Machinery Directive 98/37/EC, IEC 204, EN 60204, DIN 0113 and UL 508
- Category 3 per EN 954-1
- Control reliable
- Designed for Category 1 Emergency Stop functions per EN 418 and NFPA79
- 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 for 250 Vac
- 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
- 45 mm / 1.77 in width housing
- Removable terminal blocks

TYPICAL APPLICATIONS

- Stopped motor monitor or low speed monitor for any kind of rotating devices
- Used to unlock a door guarding a rotating machine only when the hazardous movement is stopped
- 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



(Pending)



FF-SR05932

The FF-SR05932 standstill / low speed monitor 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 standstill / low speed monitor module will energise its safety relay outputs. Then, the two normally open contacts (13/14, 23/24) of the module will close and the normally closed contact 31/32 will open.

The detection threshold of the rotation frequency is programmable in four ranges using internal DIP switches. A fine adjustment selector helps to fine adjust the threshold frequency within the selected frequency range.

The FF-SR05932 standstill / low speed monitor module is designed to be connected to proximity sensors with PNP or NPN static outputs. Both proximity sensors must detect that rotation frequency is below the programmed frequency threshold, in order to energise both internal safety relays. Both internal safety relays K1 and K2 need to be energised to close the normally closed contacts (13/14, 23/24) of the module and to open the normally open contact 31/32.

The sensors are powered by the module. Two sensors must be connected to the module in order to have redundant inputs.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SR05932 Standstill and Low Speed Monitor

SPECIFICATIONS

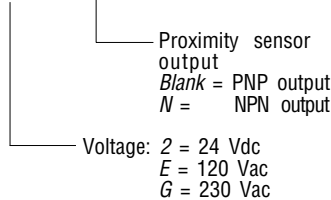
- Safety low speed monitor for rotating devices



Supply voltage	Nominal voltage	24 Vdc/ac (ac:-20 %, +10 %; dc:-10 %, +10 %), 120 Vac (-20 %, +10 %), 230 Vac (-20 %, +10 %)	
	Nominal power consumption	ac: approx. 4 VA; dc: approx. 4 W	
	Nominal frequency	50 Hz to 60 Hz	
Proximity sensors (see Note 1)	Nominal voltage	24 Vdc (provided by the module)	
	Sensor type	3-wire type, PNP 0 V NPN solid state output	
	Current consumption	max. 20 mA per sensor	
	Switching frequency	max. 20 kHz per sensor	
	Pulse duration	min. 2 ms	
	Simultaneity condition (between two proximity sensor outputs)	max. 0,5 s (falling edge)	
	Selectable detection frequency	0,12 Hz - 312,5 Hz (DIP switch selectable in four ranges)	
Relay outputs	Response time tv	Detection frequency fd	tv=1/ fd
	Examples:	0,25 Hz	4 s
		0,5 Hz	2 s
		1 Hz	1 s
		2 Hz	0,5 s
		40 Hz	0,25 s
	Relay type	Safety relay with positive-guided contacts	
	Contact complement	2 NO contacts, 1 NC contact	
	Current range (min. to max.)	1 mA to 4 A (see Caution)	
	Voltage range (min. to max.)	0,1 to 250 Vac/dc	
	Switching capability per AC15 (EN 60947-5-1)	3 A / 250 V for NO contact • 2 A / 250 V for NC contact	
	Typical electrical life expectancy	Power factor = 1 at 230 Vac (see Note 2)	
	1 A	2 000 000 operations	
	2 A	1 000 000 operations	
	4 A	300 000 operations	
	Typical power factor (cos φ)	Limitation factor (see Note 3)	
	0,3	0,45	
	0,5	0,70	
	0,7	0,85	
	1	1	
	Fuse rating	4 A time delayed	
	Mechanical life	50 000 000 switching operations	
General	Temperature range	-25 °C to 60 °C / -13 °F to 140 °F	
	Sealing	Housing: IP 40 • Terminals: IP 20	
	Housing material	Thermoplastic	
	Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz	
	Connector connection (max.)	2 x 2,5 mm ² solid wire [14 AWG]	
	Connector attachment	1 x 2,5 mm ² [14 AWG] / 2 x 1,5 mm ² [16 AWG] stranded wire with sleeve DIN 46288	
	Mounting	Removable block terminals with M3,5 screws; wire contacts are enclosed to prevent electrical shock	
	Weight	Quick install rail mounting EN 50022-35, width: 35 mm x 15 mm / 1.38 in x 0.59 in size 410 g / 0.9 lb	

ORDERING INFORMATION

FF-SR05932 □ - □



Note 1: Ensure the selected proximity sensors comply with the specified proximity sensor features.

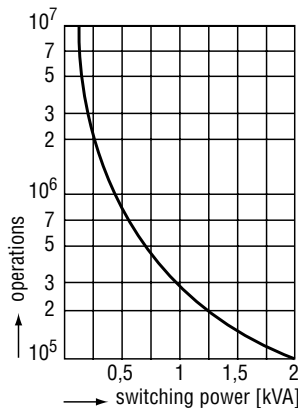
Note 2: Install arc suppressors across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 2 A (1 000 000 operations), the limitation factor is 0,70.

Total operations: 1 000 000 x 0,70 = 700 000.

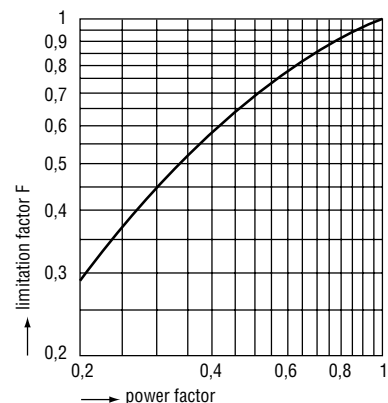
CONTACT LIFE FOR 100 % RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ) (see Note 2)



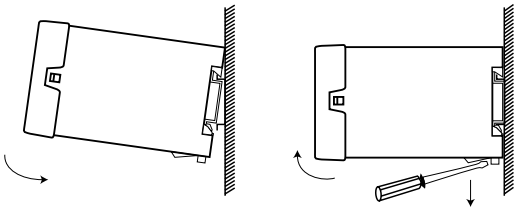
LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ) (see Note 3)



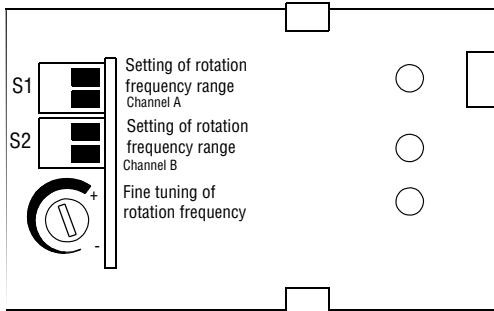
FF-SR05932

INSTALLATION DIAGRAM



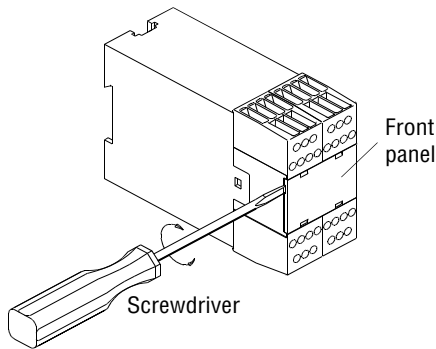
SETTING OF DETECTION FREQUENCY

Two DIP switches are used to select one of the four different ranges for the detection frequency. The fine tuning can be done using the fine adjustment selector. The DIP switches and the fine selectors are located behind the front panel.

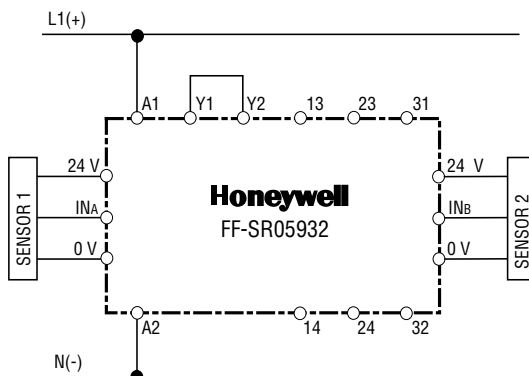


Range Hz	0.12-1.2	1.0-9.7	7.8-78	31-312
S1				
S2				

FRONT PANEL REMOVAL

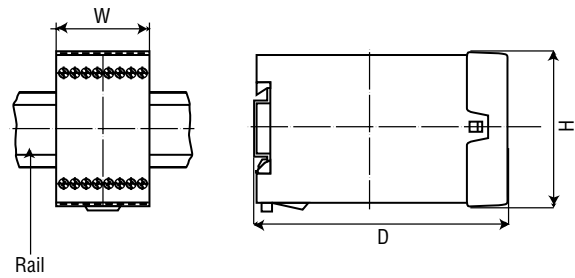


APPLICATION EXAMPLES

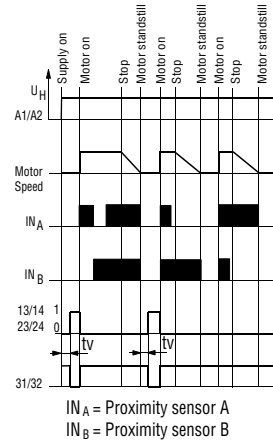


MOUNTING DIMENSIONS

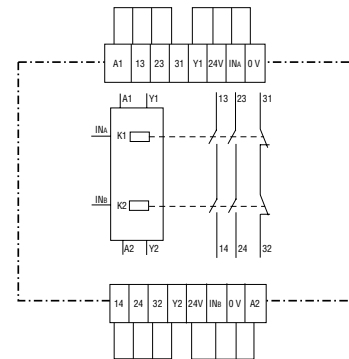
Width: 45 mm / 1.8 in; Height: 85 mm / 3.3 in; Depth: 118 mm / 4.6 in



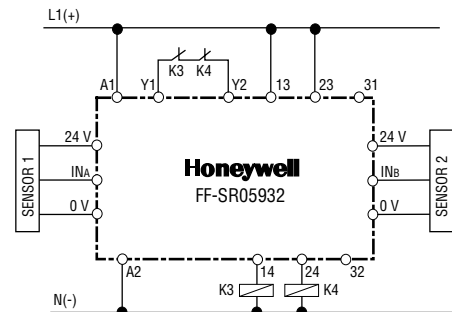
FUNCTIONAL DIAGRAM



WIRING DIAGRAM



APPLICATION EXAMPLES (with external contactors)

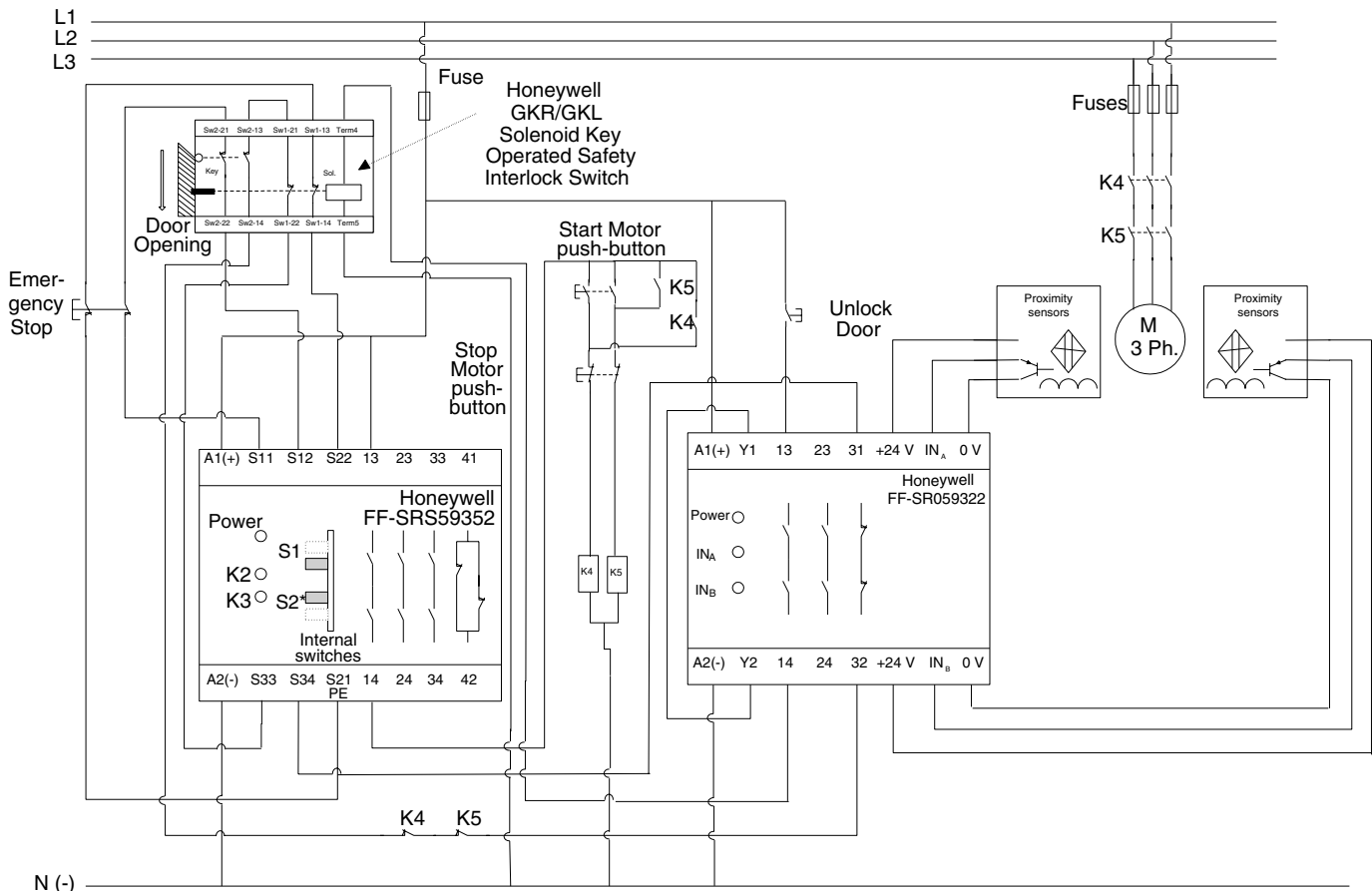


External contactors: When switching currents are higher than 4 A, the output contacts should be reinforced by external contactors with positive guided contacts (K3 and K4).

The proper operation of the external contactors must be monitored by looping their normally closed contacts into the FSD-loop between terminals Y1/Y2 (FSD = Final Switching Device monitoring). If K3 or K4 is welded, the FSD loop will not close, preventing further operation of the module.

APPLICATION EXAMPLE

Door protection using a solenoid key operated safety interlock switch (GKR/GKL Series) and a standstill / low speed monitor module FF-SR05932



FUNCTIONAL DESCRIPTION

Start sequence

Initially, the motor is not operating and the door is open. To initiate the start sequence, close the door. This action will close the two normally closed contacts of the key operated interlock switch. It will also automatically restart the FF-SRS5935 emergency stop module. As the Unlock push-button is not actuated, the solenoid coil of the key operated interlock switch is de-energized and the door is locked.

The motor may now be started. To start the motor, press the Start Motor push-button. This action will energize the self-maintained external relays K4 and K5, and will start the motor.

Stop Sequence

Initially, the motor is operating and the door is closed and locked. To initiate the stop sequence, press the Stop push-button. This action will de-energize the external safety relays K4 and K5 and stop the motor. When the FF-SR05932 standstill / speed monitor detects the rotation frequency is below the programmed threshold level, it is possible to unlock the door. The threshold levels can be programmed by internal DIP switches and a selector for fine tuning.

In order to unlock the door, press the Unlock push-button. This action will energize the coil of the solenoid of the GKL/GKR key operated interlock switch and unlock the door. The door may now be opened. No hazardous motor motion is present anymore.

Emergency Stop Sequence

In case of an emergency stop situation, the two channel inputs of the FF-SRS5935 emergency stop control module will open. This action de-energizes the external safety relays K4 and K5, stopping the motor. All other steps remain the same as described above (Stop Sequence).

APPLICATION NOTE:

Proximity sensors with the following specifications are compatible with the FF-SR05932 standstill / low speed monitor module:

- 3-wire 24 Vdc
- PNP solid state output (for FF-SR05932□ version)
- NPN solid state output (for FF-SR05932□-N version)
- Current consumption < 20 mA.
- Maximum switching frequency: 20 kHz
- Minimum pulse duration: 2 ms

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products

Asia Pacific Headquarters
Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
Fax: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax: 1300-36-04-70

China - PRC - Beijing

Honeywell China Inc.
Phone: +(86-10) 8458-3280
Fax: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6237-0237
Fax: +(86-21) 6237-1237

China - Hong Kong S.A.R.

Honeywell Ltd.
Phone: +(852) 2953-6412
Fax: +(852) 2953-6767

Indonesia

Honeywell Indonesia Pte Ltd.
Phone: +(62) 21-535-8833
Fax: +(62) 21-5367-1008

India

TATA Honeywell Ltd.
Phone: +(91) 20 687 0445/0446
Fax: +(91) 20 681 2243/687 5992

Japan

Honeywell Inc
Phone: +(81) 3 5440 1425
Fax: +(81) 3 5440 1368

South Korea

Honeywell Korea Co Ltd
Phone: +(822) 799-6167
Fax: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
Fax: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
Fax: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
Fax: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Thailand

Honeywell Systems (Thailand) Ltd.
Phone: +(662) 693-3099
Fax: +(662) 693-3085

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
Fax: +(886-2) 2245-3242

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
Fax: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
Fax: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 979 00 23
Fax: +(359) 2 979 00 24

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 242 442 111
Fax: +(420) 242 442 182

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
Fax: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
Fax: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
Fax: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
Fax: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(36 1) 451 4300
Fax: +(36 1) 451 4343

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/456
Fax: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
Fax: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
Fax: +(47) 66 76 20 90

Poland

Honeywell Sp. zo.o
Phone: +(48)606 0964
Fax: +(48)606 0901

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
Fax: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 21 231 64 37/38
Fax: +(40) 21 231 6439

Commonwealth of Independent States (CIS)

Z.A.O. Honeywell
Phone: +(7 095) 796 98 36
Fax: +(7 095) 796 98 93

Slovak Republic

Honeywell s.r.o.
Phone: +(421 2) 58 247 403
Fax: +(421 2) 58 247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 805 1201
Fax: +(27) 11 805 1504

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
Fax: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
Fax: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
Fax: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 575 6620
Fax: +(90) 216 575 6637

Ukraine

Honeywell
Phone: +(380) 44 201 44 74
Fax: +(380) 44 201 44 75

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481481
Fax: +(44) 1698 481676

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
Fax: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 443 2119
Fax: +(9712) 443 2536

NORTH AMERICA

USA/Canada

Honeywell
Control Products, International
Headquarters
Phone: 1-800-537-6945
1-815-235-6847
Fax: 1-815-235-6545
E-mail: info.sc@honeywell.com

LATIN AMERICA

Honeywell Latin America Headquarters

Phone: 1-305-805-8188
Fax: 1-305-883-8257

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
Fax: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 4166-1900
Fax: +(55-11) 4166-1901

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 425-8400
Fax: +(56-2) 425-8410

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5081-0200
Fax: +(52) 55 5081-0202

Puerto Rico, Caribbean

Honeywell Inc.
Phone: +(809) 792-7075
Fax: +(809) 792-0053

Venezuela

Honeywell CA
Phone: +(58-212) 273-0511
Fax: +(58-212) 273-0599

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request.

© 2002 - 2004 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

FF-SRD5985 Safety Door Monitor

FEATURES

- Complies with the Machinery Directive 98/37/EC, IEC 204, EN 60204, DIN VDE 0113, ZH1-457 and UL 508
- Input for two position switches
- Output for two NO contacts ac 250 V
- Gold plated, 5 µm contacts allow low current input
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Switching current up to 10 A
- Voltage drop protection
- Monitors external contactors for contact multiplication and reinforcement via feedback circuit
- 45 mm / 1.77 in width

TYPICAL APPLICATIONS

- Dual channel safety door monitoring



FF-SRD5985

Protective gates are designed to limit or block access to the moving parts of dangerous machinery. These gates can be equipped with locking or interlocking devices, usually limit switches or any other safety sensors.

The FF-SRD5985 Safety Door Monitor module monitors the status of these safety sensor positions. When the protective gate is open, the initiation of dangerous motion is prevented. When the door is closed again, the next machine cycle can start, but only after initiating a manual restart sequence.

If the module receives input (between S13/S14 and S23/S24) from two safety position switches that are monitoring door closure, and this occurs in less than three seconds (assuming the external monitoring loop circuitry (Y1/Y2) is closed), the two normally open contacts of the module (13/14 and 23/24) will close.

When the door opens, the two normally open contacts (13/14 and 23/24) will open relaying the emergency stop condition to the machine control circuitry.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRD5985 Safety Door Monitor

SPECIFICATIONS

- Dual channel monitoring of a safety door



Input	Nominal voltage	120 Vac (-15%, +10%); 230 Vac (-20%, +10%), 24 Vdc (-10%, +20%)	
	Nominal consumption	120 Vac, 230 Vac: 4 VA; 24 Vdc: 2.5 W	
	Nominal frequency	50 to 60 Hz	
	Control contacts	Two NO contacts	
	Nominal voltage between S13/S14 and S23/S24	24 Vdc with 35 mA current (ensure 10 mA switching capability with sensors connected to two inputs)	
	Time required for simultaneous contact closure S13/S14 and S23/S24	3 s (max)	
Output	Contact complement	2 NO contacts	
	Contact type	Safety relay, positive-guided	
	Response time	Activation/deactivation by inputs S13/S14 and S23/S24: 30 ms	
	Switching Capability	Power factor = 1 with resistive load	
	Current Range (min. to max.)	1 mA to 10 A (See Note 1)	
	Voltage Range (min. to max.)	0,1 to 250 Vac/dc	
	Switching capacity per ac15 (EN 60947-5.1)	NO contact: 5A / 250 Vac	
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac/dc (See Note 2)	
		3 A	1 000 000 operations
		5 A	500 000 operations
	10 A	220 000 operations	
Typical Power Factor (cos φ)		Limitation Factor (See Note 3)	
	0,3	0,45	
	0,5	0,70	
	0,7	0,85	
	1	1	
Fuse Rating		6 A, time delayed	
Mechanical life		Ten million switching operations	
General	Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at 90% humidity (max.)	
	Sealing	Housing: IP 40 • Terminals: IP 20	
	Housing material	Thermoplastic	
	Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz	
	Conductor connection	1 x 4 mm ² solid (max.) [12 AWG] or 2 x 1,5 mm ² (max.) [16 AWG] stranded wire with sleeve DIN 46288	
	Conductor attachment	M 3,5 screws terminals; wire contacts are enclosed to prevent electrical shock	
	Mounting	Quick install rail mounting EN 50022-35	
Weight		450 g / 0.99 lb	

ORDERING INFORMATION

FF-SRD5985 □

Voltage:

- 2 = 24 Vdc
- E = 120 Vac
- G = 230 Vac

Note 1: To ensure the 1 mA capability during the lifetime of the contact, NEVER exceed 300 mA or 60 V.

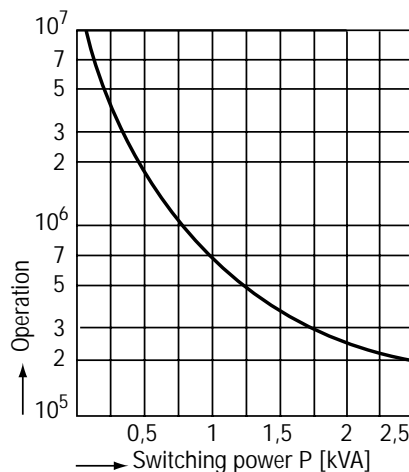
Note 2: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 3 A (1 000 000 operations), the limitation factor is 0,70.

1 000 000 x 0,70 = 700 000 total operations.

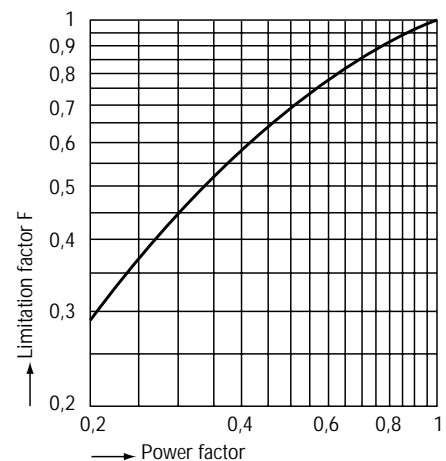
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ)

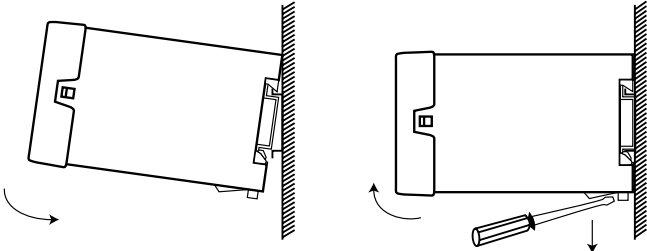


LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ)

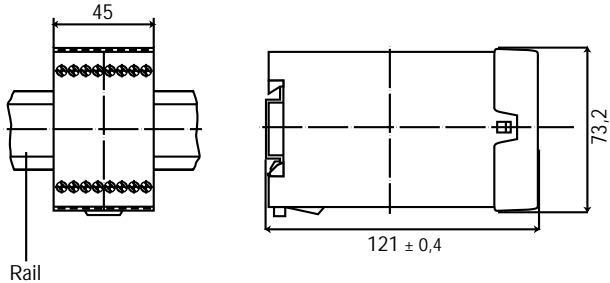


INSTALLATION DIAGRAM

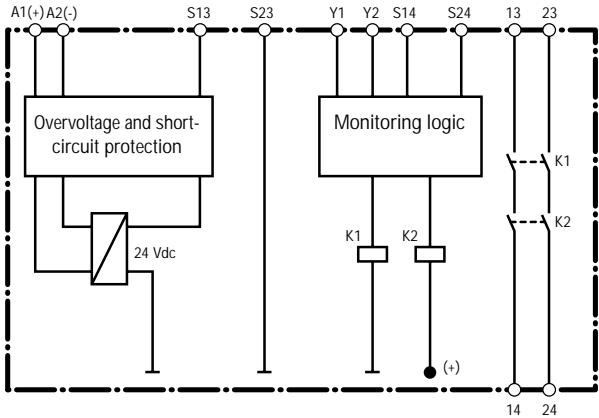


MOUNTING DIMENSIONS

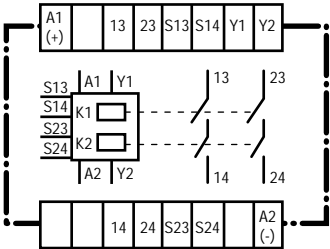
Width: 45 mm / 1.77 in; Height: 74 mm / 2.91 in; Depth: 121 mm / 4.76 in



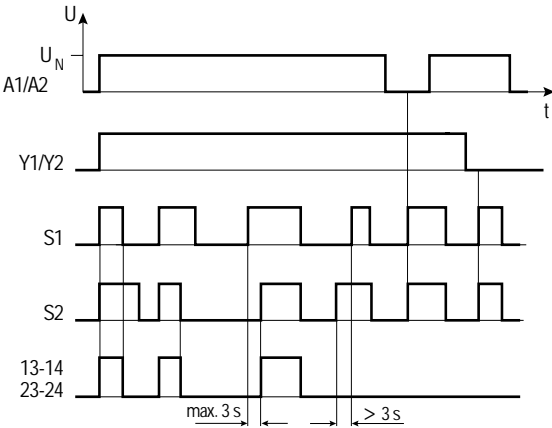
INTERNAL CIRCUITRY



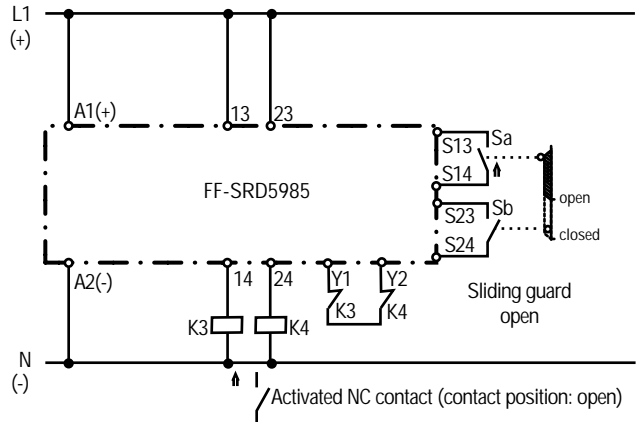
WIRING DIAGRAM



FUNCTIONAL DIAGRAM



APPLICATION SCHEMATICS



Dual channel safety door monitoring

FF-SRD5985

FF-SRE3081 Extension Module

FEATURES

- Complies with the Machinery Directive 98/37/EC, IEC 204, EN 60204, DIN VDE 0113, and UL 508
- Redundant and positive-guided contacts
- Output: seven NO contacts and one NC contact
- LEDs indicate channel one and two status
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Switching current up to 10 A
- Removable terminal strips for easy maintenance
- 100 mm / 3.94 in width

TYPICAL APPLICATIONS

Extension for:

- Emergency stop modules
- Safety door monitors
- Safety light curtains
- Other safety devices



FF-SRE3081

The FF-SRE3081 Extension Module provides contact multiplication of emergency stop modules, safety door modules and other safety devices with external relay monitoring capability (safety light curtain, safety mat, etc.).

This module receives two safety inputs between A1/A2 and A3/A4 from a connected safety device.

Immediately, the normally open safety contacts (13...73/14...74) will close and the normally closed safety contacts (81/82) 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 (81/82) 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.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRE3081 Extension Module

SPECIFICATIONS

- Contact multiplication of safety modules and safety devices



Input	Nominal voltage	120 Vac (-15%, +10%), 230 Vac (-20%, +10%), 24 Vdc (-10%, +20%)
	Nominal consumption	24 Vdc: 2,8 W; 230 Vac: 5 VA
	Nominal frequency	50 to 60 Hz
Output	Contacts	7 NO, 1 NC contacts
	Contact type	Safety relay, positive-guided
	Response time	15 ms
	Switching Capability	Power factor = 1 with resistive load
	Current Range (min. to max.)	1 mA to 10 A (See Note 1)
	Voltage Range (min. to max.)	0,1 to 250 Vac/dc
	Switching capability per ac15 (EN 60947-5.1)	NO contact: 5 A / 250 Vac - NC contact: 2A / 250 Vac
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac/dc (See Note 2)
	3 A	1 000 000 operations
	5 A	500 000 operations
	10 A	220 000 operations
	Typical Power Factor (cos φ)	Limitation Factor (See Note 3)
	0,3	0,45
	0,5	0,70
	0,7	0,85
	1	1
	Operating frequency	6000 operating cycles/h
	Fuse Rating	10 A time delayed
	Mechanical life	Ten million operating cycles
General	Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at 90% humidity (max.)
	Sealing	Housing: IP 40 • Terminals: IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0,35 mm / Frequency 10 to 55 Hz
	Wire connection	2 x 2,5 mm ² [14 AWG] solid or 2 x 1,5 mm ² [16 AWG] stranded wire with sleeve DIN 46288
	Wire attachment	Removable terminal strip: flat terminals with self-lifting wire clamp; DIN 46206 and DIN 57609/ VDE 0609
	Mounting	Quick install rail mounting EN 50022-35
	Weight	510 g / 1.12 lb

ORDERING INFORMATION

FF-SRE3081 □

Voltage:

- 2 = 24 Vdc
- E = 120 Vac
- G = 230 Vac

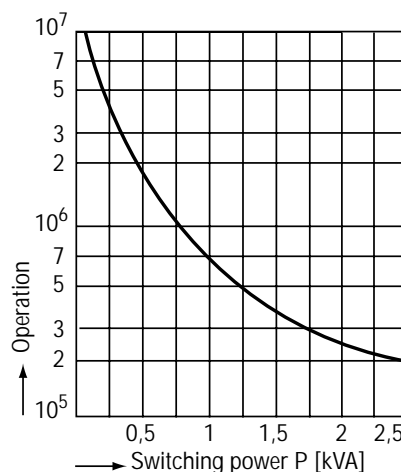
Note 1: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 2: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 3 A (1 000 000 operations), the limitation factor is 0,70.

1 000 000 x 0,70 = 700 000 total operations.

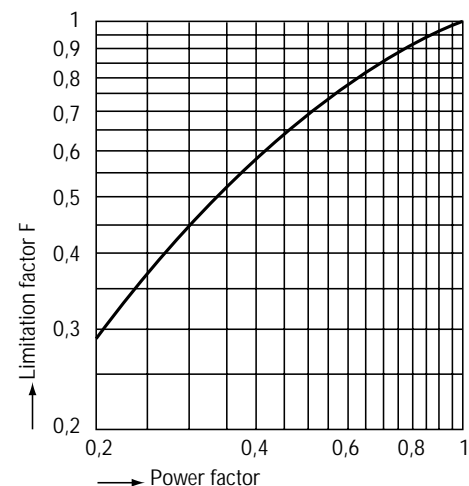
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ)

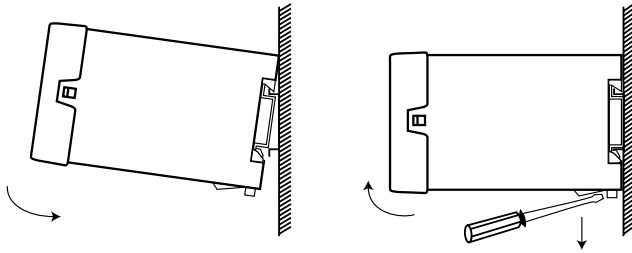


LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ)

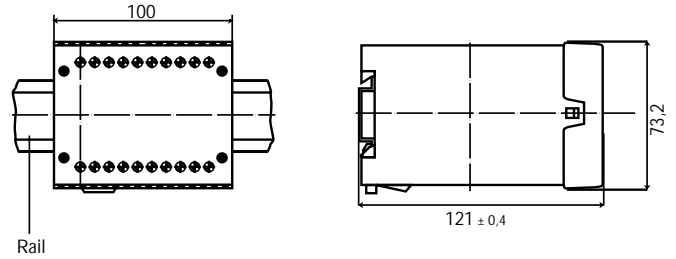


INSTALLATION DIAGRAM

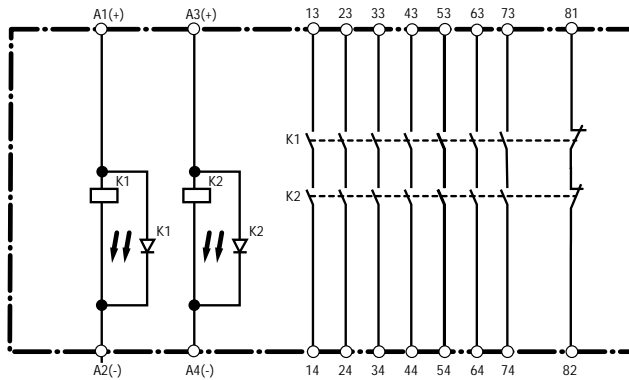


MOUNTING DIMENSIONS

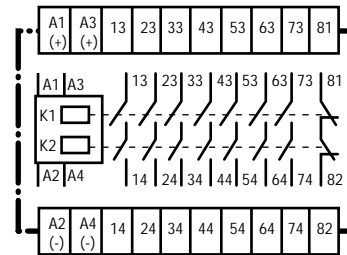
Width: 100 mm / 3.94 in; Height: 74 mm / 2.91 in;
Depth: 121 mm / 4.76 in



INTERNAL CIRCUITRY



WIRING DIAGRAM



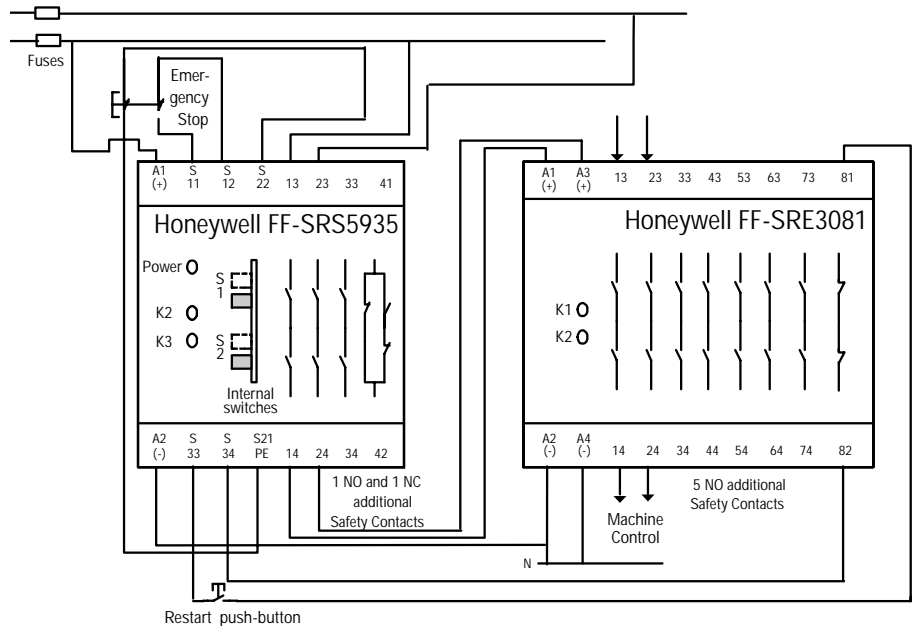
APPLICATION EXAMPLE

The FF-SRE3081 application example above illustrates contact multiplication of an emergency stop module FF-SRS5935 using a two-channel connection. A single-channel connection of a FF-SRE3081 to an emergency stop module is also possible.

One failure in an extension module that is connected to a safety control circuit will switch off all the modules in a control system due to redundant interfacing.

Multiple contacts of FF-SRE, used to switch one load, reduce the current of each contact and improve the life of the device.

When incorporating a FF-SRE3081 device into an installation, observe the applicable local safety regulations.



FF-SRE3081

FF-SRE5929 Extension Module

FEATURES

- Complies with the Machinery Directive 98/37/EC, IEC/EN 60204, UL 508 and NFPA 79
- Redundant and positive-guided contacts
- Output: four NO contacts and one NC contact
- LEDs indication for channel one and two status
- High electrical lifetime
- Switching current up to 5 A
- Removable terminal strips for easy maintenance
- 22,5 mm / 0.89 in slim housing

TYPICAL APPLICATIONS

- Contact multiplication:
- Emergency stop modules
 - Safety door monitors
 - Safety light curtains
 - Other safety sensors



(pending)



(pending)



The FF-SRE5929 Extension Module provides, in a slim housing, contact multiplication of emergency stop modules, safety door modules and other safety sensors with external relay monitoring capability (FF-SB, FF-LS, FF-SCAN, FF-SPS4 or Detector™ 3 safety light curtains).

This module receives two safety inputs between A1/A2 and A3/A4 from dual channel safety sensors.

On actuation of the inputs, the normally open safety contacts (13...43/14...44) will close and the normally closed safety contacts (51/52) will open.

For example: a safety sensor is actuated or an emergency stop condition occurs, the normally open contacts will open immediately and the normally closed contact will close.

When wired correctly to a proper machine control, the emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to stop dangerous motion and/or remove power.

The normally closed contact of the extension module (51/52) must be connected to the final switching device monitoring circuit of the connected safety device. This configuration will ensure that the two safety relays in the extension module are checked by the safety sensor.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRE5929 Extension Module

SPECIFICATIONS

- Contact multiplication for safety control modules and safety sensors



Suitable for interfaces up to **Category 4** per EN 954-1



Input	Nominal voltage	24 Vac (-20 %, + 10 %), 24 Vdc (-10 %, +10 %)
	Nominal consumption	ac: 2,1 VA • dc: 1,5 W
	Nominal frequency	50 Hz to 60 Hz
Output	Contacts	4 NO, 1 NC contacts
	Contact type	Safety relay, positive-guided
	Response time	max. 35 ms
	Switching Capability	Power factor = 1 with resistive load
	Current Range (min. to max.)	1 mA to 5 A (See Note 1)
	Voltage Range (min. to max.)	0,1 to 250 Vac/dc
	Switching capability per AC15 (EN 60947-5-1)	NO contact: 3 A / 250 Vac - NC contact: 2 A / 250 Vac
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (See Note 2)
	1 A	2 000 000 operations
	2 A	1 000 000 operations
	5 A	220 000 operations
	Typical Power Factor (cos φ)	Limitation Factor (See Note 3)
	0,3	0,45
	0,5	0,70
	0,7	0,85
	1	1
	Operating frequency	1200 operating cycles/h
	Fuse Rating	4 A time delayed (max.)
	Mechanical life	Ten million operating cycles
General	Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at 90 % humidity (max.)
	Sealing	Housing: IP 40 • Terminals: IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0,35 mm / Frequency 10 to 55 Hz
	Wire connection	1 x 2,5 mm ² [14 AWG] solid or 2 x 1,5 mm ² [16 AWG] stranded wire with sleeve DIN 46288
	Wire attachment	Removable terminal strip; with M 3,5 screws; wire contacts are enclosed to prevent from electrical shock
	Mounting	Quick install rail mounting EN 50022-35, width: 35 mm / 1.38 in
	Weight	180 g / 0.39 lb

ORDERING INFORMATION

FF-SRE5929 □

Voltage:
2 = 24 Vac/dc (only)

Note 1: Contact damage

To ensure the 1 mA capability during the life time of the contact, never exceed 300 mA or 60 V.

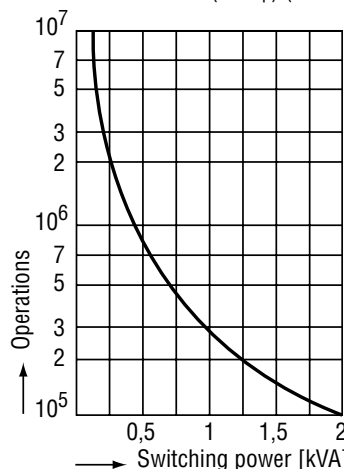
Note 2: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 2 A (1 000 000 operations), the limitation factor is 0,70.

Total operations = 1 000 000 x 0,70 = 700 000.

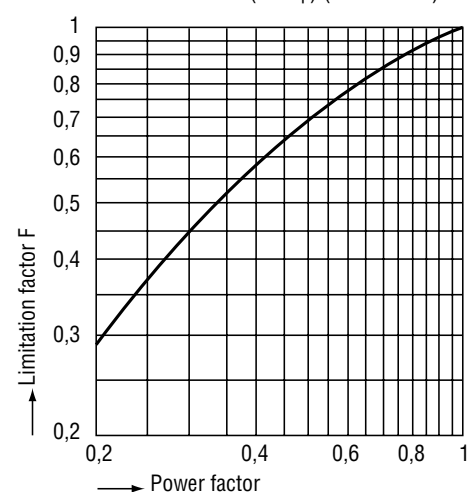
CONTACT LIFE FOR 100 % RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ) (See Note 3)

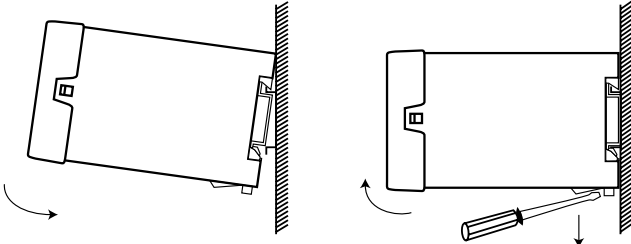


LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ) (See Note 3)

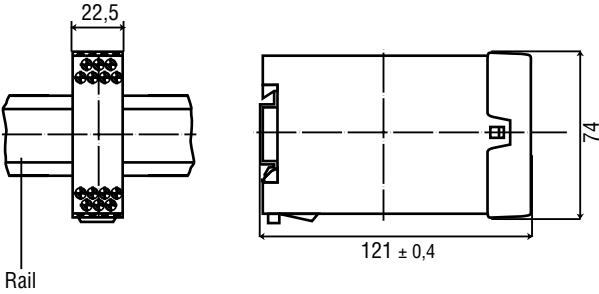


INSTALLATION DIAGRAM

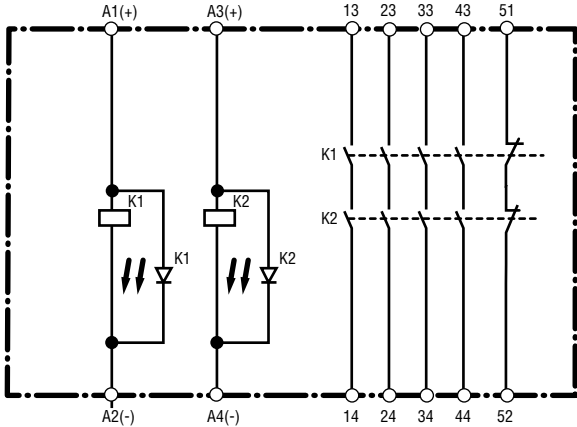


MOUNTING DIMENSIONS

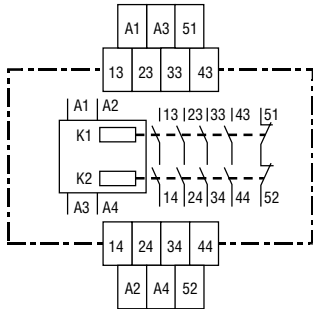
Width: 22,5 mm / 0.89 in; Height: 74 mm / 2.91 in; Depth: 121 mm / 4.76 in



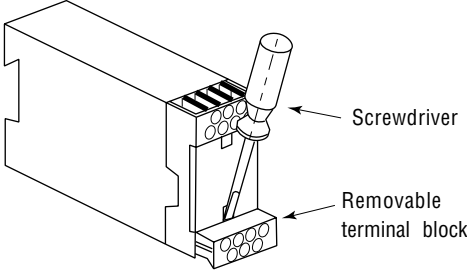
INTERNAL CIRCUITRY



TERMINAL ARRANGEMENT

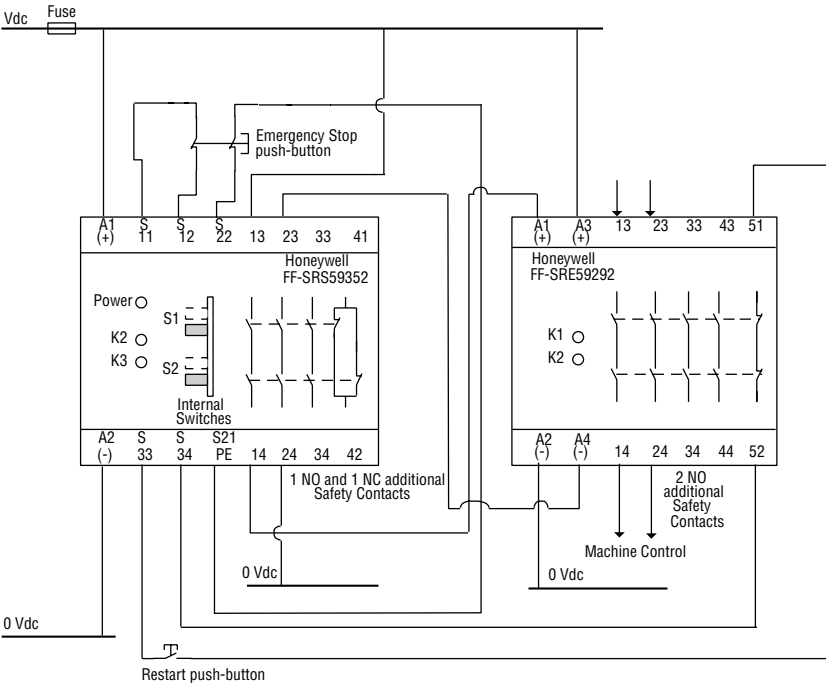


REMOVABLE TERMINAL BLOCKS



APPLICATION EXAMPLE

This application example shows a 24 Vdc Fuse connected to a Honeywell FF-SRE59292 Extension Module providing contact multiplication to a Honeywell FF-SRS59352 Emergency Stop Module. The Extension Module is connected to the Emergency Stop Module with two redundant channels powered with different polarities. A cross-fault between both channels can therefore be detected. The relay contacts of the Extension module must be monitored looping its normally closed contact into the restart circuit of the emergency stop module (Final Switching Device monitoring). A welded relay contact can therefore be detected at the next cycle preventing the emergency stop module from being restarted. Connecting multiple safety contacts in parallel with one load increases the maximum admissible current and the lifetime of the contacts. When incorporating a FF-SRE59292 Extension Module into an electrical interface, observe the applicable local safety regulations.



Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products Asia Pacific Headquarters

Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
FAX: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax 1300-36-04-70

China - PRC - Beijing

Honeywell (Tianjin) Ltd.
Phone: +(86-10) 6561-0208
FAX: +(86-10) 6561-0618

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6354-9181
FAX: +(86-21) 6354-2248

China - Hong Kong SAR

Honeywell Ltd.
Phone: +(852) 2331 9133
FAX: +(852) 2331 9998

China - PRC - Chengdu

Honeywell China Ltd
Phone: +(86-28) 6786-348
FAX: +(86-28) 6787-061

China - PRC - Guangzhou

Honeywell China Inc.
Phone: +(86-20) 3879-1169
FAX: +(86-20) 3879-1269

China - PRC - Shenzhen

Honeywell China Inc.
Phone: +(86) 755-518-1226
FAX: +(86) 755-518-1221

India

Tata Honeywell Ltd
Phone: +(91) 20 6875-532/534
FAX: +(91) 20 6875 992

Indonesia

Honeywell Indonesia Pte Ltd
Phone: +(6221) 521-3330
FAX: +(6221) 521-3735

Japan

Yamatate Corporation
Phone: +(81) 3 5440 1395
FAX: +(81) 3 5440 1314

South Korea

Honeywell Korea Co. Ltd
Phone: +(822) 799-6114
FAX: +(822) 792-9011

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
FAX: +(60-3) 7958-8922

New Zealand

Honeywell Pty Limited
Phone: +(64-9) 623-5050
FAX: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1649
FAX: +(63-2) 636-1650

Singapore

Honeywell Southeast Asia
Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
FAX: +(886-2) 2245 3242

Thailand

Honeywell Systems Ltd.
Phone: +(662) 693 3099
FAX: +(662) 693 3085

NORTH AMERICA

Canada

Honeywell LTD
Phone: 1-800-737-3360
FAX: 1-800-565-4130

USA

Sensing and Control,
International Headquarters
Phone: 1-800-537-6945
1-815-235-6847
FAX: 1-815-235-6545
E-mail: info.sc@honeywell.com

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
FAX: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
FAX: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 79 40 27
FAX: +(359) 2 79 40 90

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 2 6112 3469/3424
FAX: +(420) 2 6112 3461

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
FAX: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
FAX: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
FAX: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(36 1) 451 4300
FAX: +(36 1) 451 4343

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/456
FAX: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
FAX: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
FAX: +(47) 66 76 20 90

Poland

Honeywell Sp. zo.o
Phone: +(48) 22 606 0900
FAX: +(48) 22 606 0901

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
FAX: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 1 2110076
FAX: +(40) 1 2103375

Commonwealth of Independent States (CIS)

ZAO Honeywell
Phone: +(7 095) 796 98 36
FAX: +(7 095) 796 98 93

Slovak Republic

Honeywell s.r.o.
Phone: +(421 7) 58247403/400
FAX: +(421 7) 58247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 805 1211
FAX: +(27) 11 805 1354

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
FAX: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
FAX: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
FAX: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 464 4764
FAX: +(90) 216 464 4794

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481 481
FAX: +(44) 1698 481 276

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
FAX: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 443 2119
FAX: +(9712) 443 2536

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
FAX: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 7266 1900
FAX: +(55-11) 7266 1905

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
FAX: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1
FAX: +(593-2) 981-562

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5259-1966
FAX: +(52) 55 5570-2985

Peru

Honeywell Peru
Phone: +(511) 445-2136-1891
FAX: +(511) 348-3552

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Trinidad

Honeywell Inc.
Phone: +(868) 624-3964
FAX: +(868) 624-3969

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2002 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell Control Products

21 Chemin du Vieux Chêne
38240 Meylan Cedex

France

Honeywell Control Products

11 West Spring Street
Freeport, Illinois 61032

USA



www.honeywell.com/sensing

107085-10-EN FR26 GLO 202 Printed in France

FF-SRE6029 Extension Module



FEATURES

- Complies with the Machinery Directive 98/37/EC
- Meets the applicable parts of the US & Canadian regulations and standards ANSI/RIA/OSHA
- Redundant and positive-guided contacts
- Output: four NO contacts and two NC contacts
- LED indicates status of internal relays
- Very high mechanical and electrical lifetime
- Switching current from 10 mA to 5 A
- Slim housing width 22,5 mm / 0.89 in

TYPICAL APPLICATIONS

- Contact multiplication of safety devices with the External Device Monitoring capability, like
 - FF-SYB and FF-SB safety light curtains
 - FF-SR safety control modules
 - FF-SM safety mats



(pending)



(pending)



The FF-SRE6029 Extension Module provides contact multiplication for safety devices with External Device Monitoring (EDM) capability (e.g. FF-SRS e-stop modules, FF-SYB, and FF-SB light curtains, FF-SM safety mats).

This product has two safety relays with positive-guided contacts to ensure redundancy and offers four NO and one NC safety contact.

Its slim housing of only 22,5 mm (0.89 in) width allows this safety control module to fit into most cabinets and even helps to keep the overall cabinet size small.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRE6029 Extension Module

SPECIFICATIONS

- Contact multiplication of safety devices with EDM capability



Input	Nominal voltage	24 Vdc (-10 %, +10 %)			
	Nominal consumption	dc: 1,5 W			
Output	Contacts	4 NO, 1 NC (plus 1 NC for External Device Monitoring Loop)			
	Contact type	Safety relay, positive-guided			
	Response time	max. 15 ms (delay on de-energisation)			
	Delay on energisation	Typ. 25 ms			
	Switching capability	Power factor = 1 with resistive load			
	Current range (min. to max.)	10 mA to 5 A			
	Voltage range (min. to max.)	0,1 to 250 Vac			
	Switching capability per EN 60947-5-1	AC15: NO contact: 3 A / 230 Vac, NC contact: 2 A / 250 Vac DC13: NO contact, NC contact: 8 A/24 Vdc			
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (see Figure 1, note 1)			
		<i>Current</i>	<i>Operations</i>	<i>Current</i>	<i>Operations</i>
		0,5 A	5 500 000	2 A	1 000 000
		1 A	2 000 000	5 A	250 000
	Typical Power Factor (cos φ)	Limitation factor F (see Figure 2, note 2)			
		<i>Cos φ</i>	<i>F</i>	<i>Cos</i>	<i>F</i>
		0,3	0,45	0,7	0,85
		0,5	0,7	1	1
	Operating frequency	1200 operating cycles/h			
	Fuse rating	6 A time delayed (max.)			
	Mechanical life	20 000 000 operating cycles			
General					
	Temperature range	- 15° C to + 55° C (5° F to 131° F) at 90% humidity (max.)			
	Sealing	Housing: IP 40 • Terminals: IP 20			
	Housing material	Thermoplastic			
	Vibration resistance (IEC/EN 60 068-2-6)	Amplitude: 0,35 mm • Frequency: 10 to 55 Hz			
	Wire connection	Solid wire: 1 x 4 mm ² [12 AWG] or 2 x 2,5 mm ² [14 AWG] Stranded wire with sleeve: 1 x 2,5 mm ² [14 AWG] or 2 x 1,5 mm ² [16 AWG]			
	Wire/conductor attachment	M3,5 screw terminals			
	Mounting	Quick install rail mounting IEC/EN 60715 (width: 35 mm/1.38 in)			
	Weight	205 g / 0.45 lb			

ORDERING INFORMATION

FF-SRE6029 □
□ = 2 = 24 Vac/dc

Note 1: Install arc suppressors across load to avoid module contact arcing and ensure specified contact life expectancy.

Note 2: Total operations = operations (power factor 1) x limitation factor F.

Example:

U = 230 Vac, I = 1 A, power factor cos φ = 0,5
Switching power P = U x I = 230 VA
Contact life (cos φ = 1, P = 230 VA) = 2 000 000 operations (see Figure 1)
Limitation factor F (cos φ = 0,5) = 0,7 (see Figure 2)
Contact life (cos φ = 0,5, P = 230 VA) = F x contact life (cos φ = 0,5, P = 230 VA) = 2 000 000 x 0,7 = 1 400 000 operations.

FIGURE 1. TYPICAL CONTACT LIFE FOR 100 % RESISTIVE LOAD

(power factor cos φ = 1, note 1)

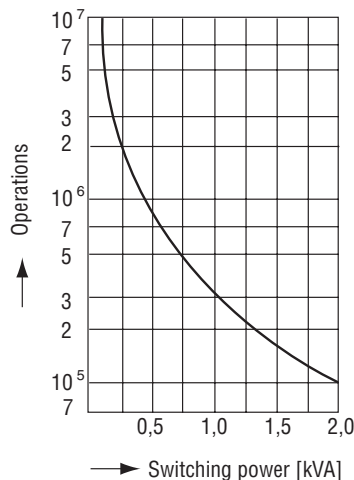
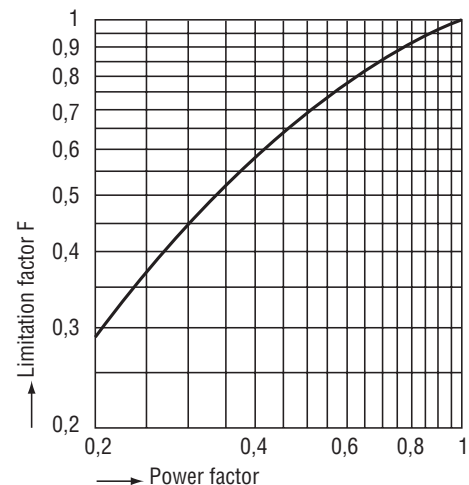
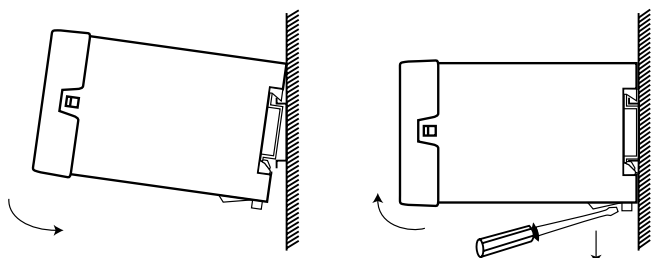


FIGURE 2. LIMITATION FACTOR FOR INDUCTIVE LOADS

(power factor cos φ < 1, note 2)



INSTALLATION DIAGRAM

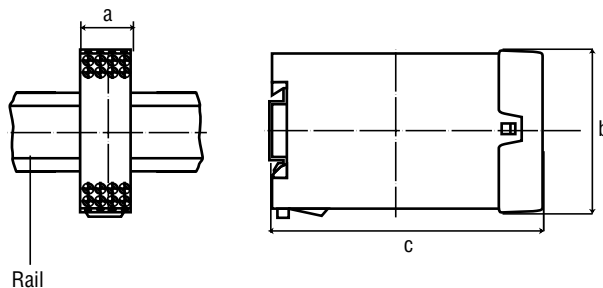


MOUNTING DIMENSIONS

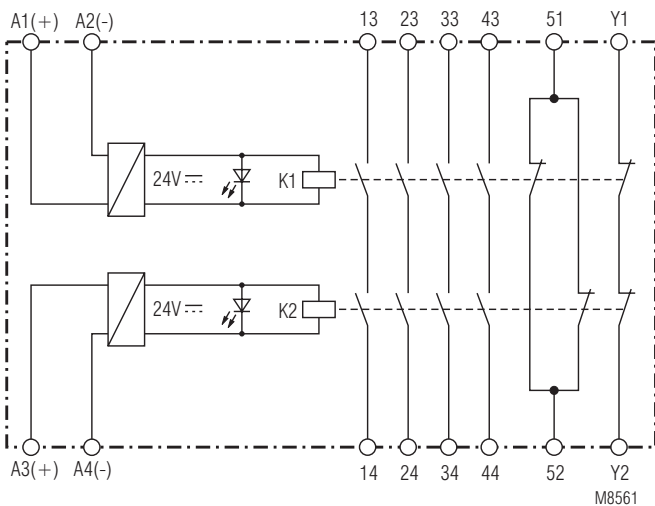
Width: 22,5 mm / 0.89 in;

Height: 90 mm / 3.55 in

Depth: 121 mm / 4.76 in



INTERNAL CIRCUITRY

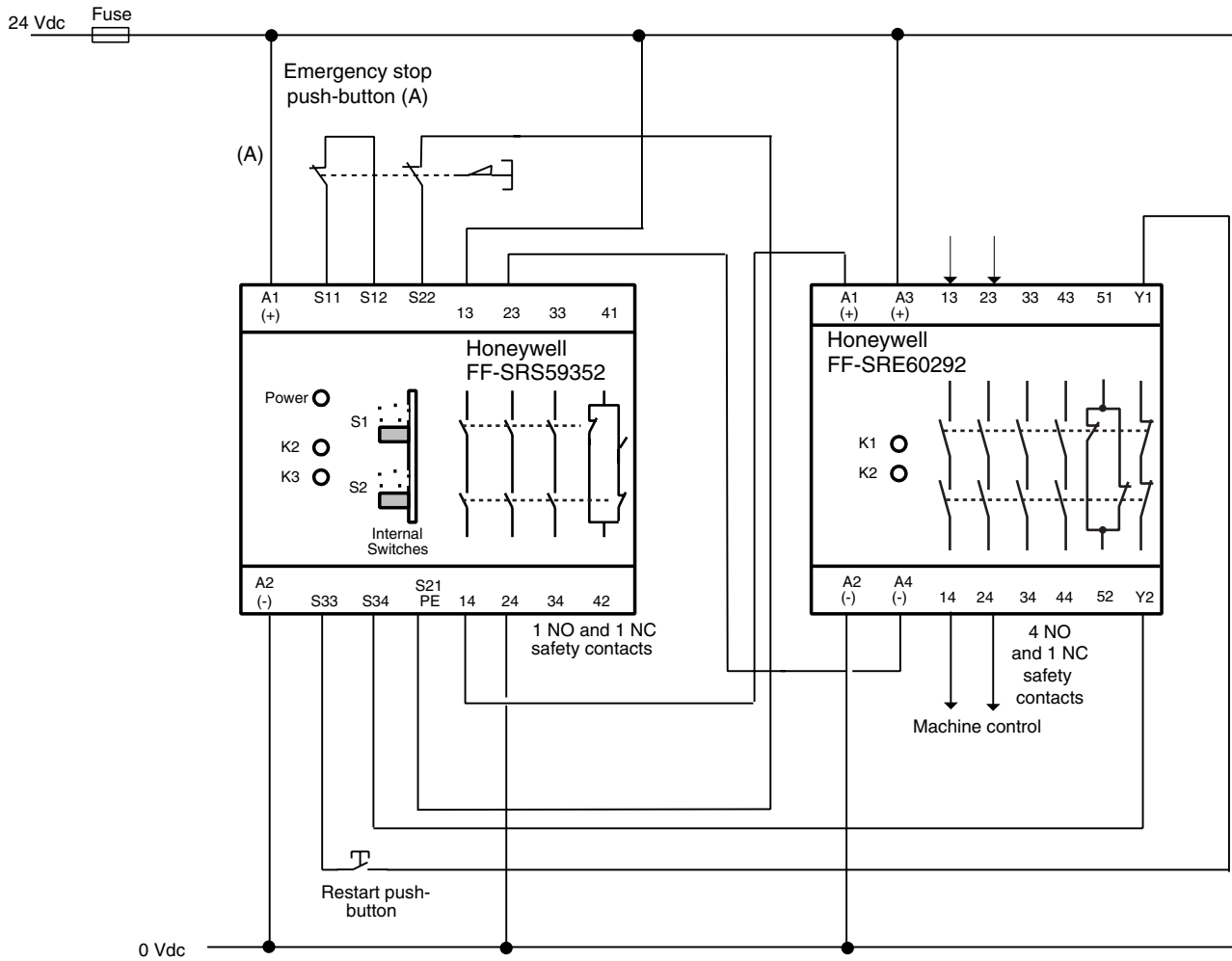


TERMINAL ARRANGEMENT

13	23	33	43
A1 (+)	A2 (-)	51	52
Honeywell FF-SRE60292			
A3 (+)	A4 (-)	Y1	Y2
14	24	34	44

APPLICATION EXAMPLES

Connection of an FF-SRS59352 emergency stop module



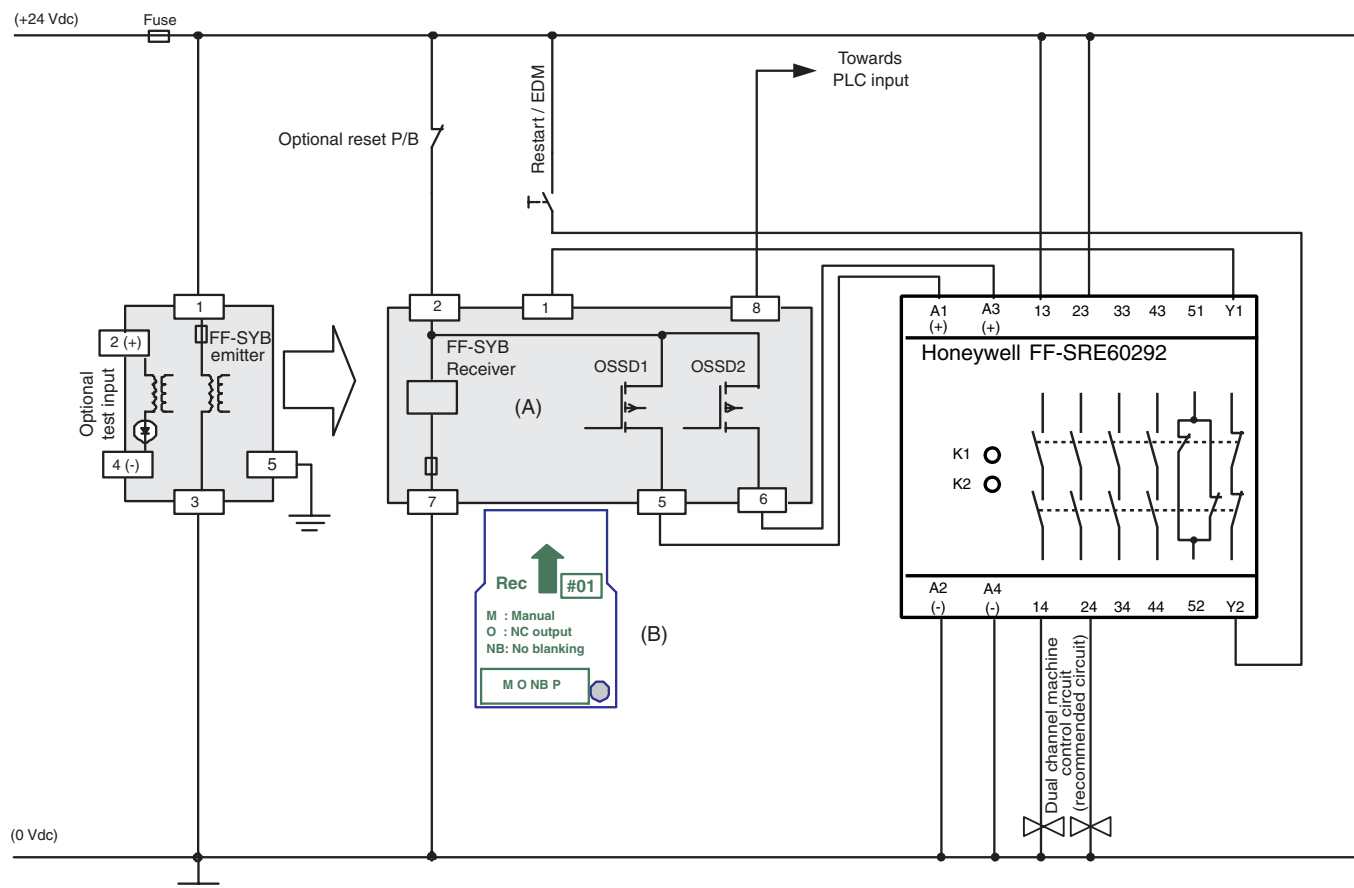
After activation of the safety device (see application note (A)), the normally open safety contacts of the FF-SRS59352 dual channel emergency stop module (13/14 to 33/34) and the connected FF-SRE6029 extension module (13/14, 23/24, 33/34, 43/44) will open. The normally closed contacts (41/42, 51/52) will close. The LED relay output indicators (K2, K3 and K1, K2) of both modules go off indicating that the internal safety relays are de-energized. After removing the emergency stop condition, press and release the restart push-button to restart the FF-SRS59352 emergency stop module. If the FF-SRE6029 extension module is operating properly, the normally closed contact (Y1/Y2) for the External Device Monitoring is closed and both safety modules are energising their internal safety relays. The normally open contacts will close and the normally closed contacts will open. The LED relay output indicators all illuminate. This action will allow the machine to operate.

APPLICATION NOTES:

Note (A): Dual channel output safety devices with relay outputs or safety switches (examples)

- emergency stop push-button
- safety light curtains (FF-SB, FF-LS), single beam (FF-SPS4), modular safety light curtains (FF-SCAN),
- safety mats (FF-SM)
- safety limit or interlock switches (e.g. CPS, GK, GSS)

Connection of an FF-SYB type 4 safety light curtain



After interrupting the sensing field of the FF-SYB safety light curtain, both static safety outputs (5, 6) of the receiver switch off. Then, the normally open contacts of the connected FF-SRE6029 extension module (13/14, 23/24, 33/34, 43/44) will open and the normally closed contacts (51/52, Y1/Y2) will close. The LED relay output indicators (K1, K2) of the module go off indicating that the internal safety relays K1 and K2 are de-energized.

After clearing the sensing field of the FF-SYB safety light curtain, press and release the restart push-button to restart the receiver. If the FF-SRE6029 extension module is operating properly, the normally closed contact (Y1/Y2) for the External Device Monitoring (EDM) is closed and the static safety outputs of the FF-SYB receiver are energising. The normally open contacts of the FF-SRE6029 module will close and the normally closed contacts will open. The LED relay output indicators K1 and K2 illuminate. This action will allow the machine to operate.

APPLICATION NOTES:

Note (A): Dual channel output safety devices with static safety outputs AND External Device Monitoring (EDM) function (e.g. FF-SYB safety light curtains).

Note (B): CONFIGURATION CARDS

Various mode settings are possible with the FF-SYB safety light curtain (e. g. start / restart, muting, floating blanking) using configuration cards. The example above uses the factory setting configuration card for the receiver (#1: manual start, no muting, no blanking). Refer to the FF-SYB installation manual for more information.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products

Asia Pacific Headquarters

Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
Fax: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax: 1300-36-04-70

China - PRC - Beijing

Honeywell China Inc.
Phone: +(86-10) 8458-3280
Fax: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: (86-21) 6237-0237
Fax: (86-21) 6237-1237

China - Hong Kong S.A.R.

Honeywell Ltd.
Phone: +(852) 2953-6412
Fax: +(852) 2953-6767

Indonesia

Honeywell Indonesia Pte Ltd.
Phone: +(62) 21-535-8833
Fax: +(62) 21-5367-1008

India

TATA Honeywell Ltd.
Phone: +(91) 20 687 0445/0446
Fax: +(91) 20 681 2243/687 5992

Japan

Honeywell Inc
Phone: +(81) 3 5440 1425
Fax: +(81) 3 5440 1368

South Korea

Honeywell Korea Co Ltd
Phone: +(822) 799-6167
Fax: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
Fax: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
Fax: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
Fax: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Thailand

Honeywell Systems (Thailand) Ltd.
Phone: +(662) 693-3099
Fax: +(662) 693-3085

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
Fax: +(886-2) 2245-3242

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
Fax: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
Fax: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 979 00 23
Fax: +(359) 2 979 00 24

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 242 442 111
Fax: +(420) 242 442 182

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
Fax: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
Fax: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
Fax: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
Fax: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(36 1) 451 4300
Fax: +(36 1) 451 4343

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/456
Fax: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
Fax: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
Fax: +(47) 66 76 20 90

Poland

Honeywell Sp. z o.o.
Phone: +(48)606 0964
Fax: +(48)606 0901

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
Fax: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 21 231 64 37/38
Fax: +(40) 21 231 6439

Commonwealth of Independent States (CIS)

Z.A.O. Honeywell
Phone: +(7 095) 796 98 36
Fax: +(7 095) 796 98 93

Slovak Republic

Honeywell s.r.o.
Phone: +(421 2) 58 247 403
Fax: +(421 2) 58 247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 805 1201
Fax: +(27) 11 805 1504

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
Fax: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
Fax: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
Fax: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 575 6620
Fax: +(90) 216 575 6637

Ukraine

Honeywell
Phone: +(380) 44 201 44 74
Fax: +(380) 44 201 44 75

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481481
Fax: +(44) 1698 481676

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
Fax: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 443 2119
Fax: +(9712) 443 2536

NORTH AMERICA

USA/Canada

Honeywell
Control Products, International
Headquarters
Phone: 1-800-537-6945
1-815-235-6847
Fax: 1-815-235-6545
E-mail: info.sc@honeywell.com

LATIN AMERICA

Honeywell Latin America Headquarters

Phone: 1-305-805-8188
Fax: 1-305-883-8257

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
Fax: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 4166-1900
Fax: +(55-11) 4166-1901

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 425-8400
Fax: +(56-2) 425-8410

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5081-0200
Fax: +(52) 55 5081-0202

Puerto Rico, Caribbean

Honeywell Inc.
Phone: +(809) 792-7075
Fax: +(809) 792-0053

Venezuela

Honeywell CA
Phone: +(58-212) 273-0511
Fax: +(58-212) 273-0599

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2004 - 2005 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

www.honeywell.com/sensing

FF-SRT Time Delay Module

FEATURES

- Complies with the Machinery Directive 98/37/EC, IEC 255, VDE 0435, and UL 508
- Provides a delay after module is de-energized
- Output: one NC, one NO positive-guided contacts
- Available with one or two time delay circuits (channels)
- Available with fixed or selectable delay up to 30 seconds
- LED status indication
- Mechanical life up to ten million operations
- Electrical life up to 300,000 operations
- Switching current up to 8A
- Voltage drop protection
- 45 mm (1.77 in.) width

APPLICATIONS

- Time delay required before disconnection of safety interface circuit



The FF-SRT Time Delay module provides a time delay before safety contacts are opened.

If a two-channel version is used, 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 other contacts is welded.

When power is applied to the module (A1/A2), the normally closed contact (15/16) will open immediately and the normally open contact (27/28) will close.

After power is removed from the module (A1/A2), the normally closed contact (15/16) will close and the normally open contact (27/28) will open after the fixed or 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.

FF-SRT

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRT Time Delay Module

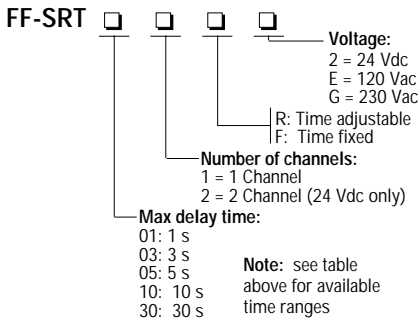
SPECIFICATIONS

- Time delay before disconnection of safety interface circuits



General technical data		
Available time ranges		Adjustable 1 channel: SRT __ 1R: 0.1 to 1 sec; 0.3 to 3 sec; 0.5 to 5 sec; 1 to 10 sec; 3 to 30 sec. Fixed 1 channel: SRT __ 1F: 1; 5, 10, and 30 sec. Adjustable 2 channels: SRT __ 2R: 0.1 - 1 sec, 0.5 - 5 sec, 1 - 10 sec. Fixed 2 channels: SRT __ 2F: 1, 5, 10 sec
Repeatability precision		± 15 % from selected value
Input	Nominal voltage	120 Vac (-15%, +10%), 230 Vac (-20%, +10%), 24 Vdc (-10%, +20%)
	Nominal consumption	One channel model: 0.85 W, 4.5 VA; Two channel model: 1.7 W, 4.5 VA
	Nominal frequency	50 to 60 Hz
Output	Contact complement	1 NO contact, 1 NC contact
	Contact type	Safety relay, positive-guided
	Switching Capability	Power factor = 1 with resistive load
	Current Range (min. to max.)	30 mA to 8A
	Voltage Range (min. to max.)	
	DC	10 to 110 Vdc
	AC	10 to 250 Vac
Switching capability (per AC15: EN 60947-5.1)		NO contact: 3A / 250 Vac - NC contact: 1 A / 250 Vac
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac/dc
	3A	300,000 operations
	5A	150,000 operations
	10A	100,000 operations
	Typical Power Factor (cos φ)	Limitation Factor (Note 1, Note 2)
	0.3	0.45
	0.5	0.70
	0.7	0.85
	1.0	1.00
	Operating frequency	2000 switching cycles/hour (max.)
	Fuse rating	6 A time delayed
	Mechanical life	Ten million switching operations
General		
	Temperature range	-20°C to +60°C (-4°F to 140°F) at max. 90% humidity
	Sealing	Housing IP 40; Terminals IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0.35 mm; Frequency 10 to 55 Hz
	Conductor connection	2 x 2.5 mm ² solid (max.) [12 AWG] or 2 x 1.5 mm ² [16 AWG] (max.) stranded wire with sleeve DIN 46288
	Conductor attachment	Flat terminal according to DIN 46206 and DIN 57609/VDE
	Mounting	Quick install rail mounting EN 50022-35
	Weight	200 g (0.44 lb.) for Vdc / 350 g (0.77 lb) for Vac

ORDERING INFORMATION

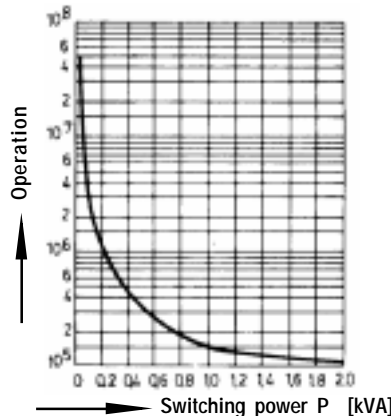


Note 1: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0.5 at 230 Vac, 2A (300,000 operations), the limitation factor is 0.70. 300,000 x 0.70 = 210,000 total operations.

Note 2: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

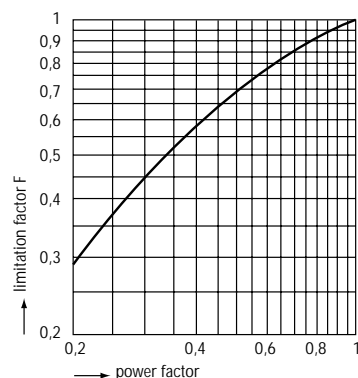
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

power factor = 1 (cos φ)

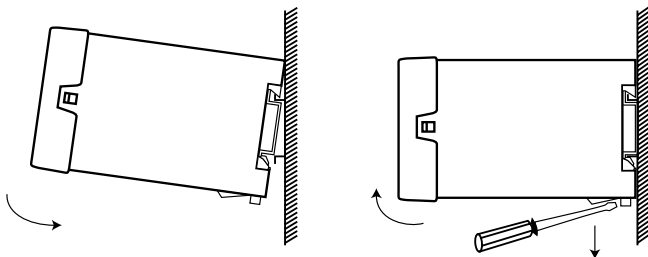


LIMITATION FACTOR FOR INDUCTIVE LOADS

power factor < 1 (cos φ)

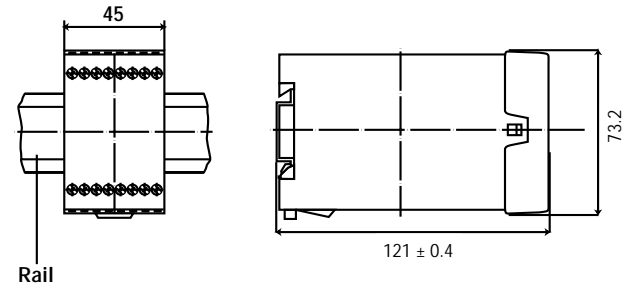


INSTALLATION DIAGRAM



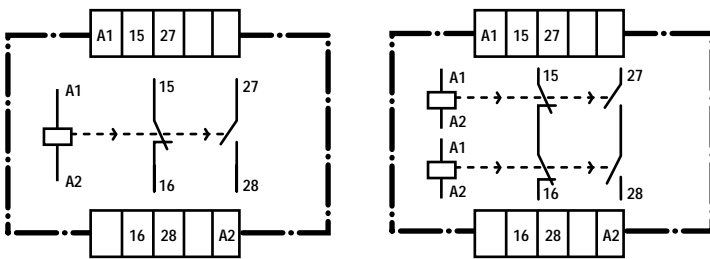
MOUNTING DIMENSIONS

Width: 45 mm/1.77 in; Height: 74 mm/2.91 in; Depth: 121 mm/4.76 in

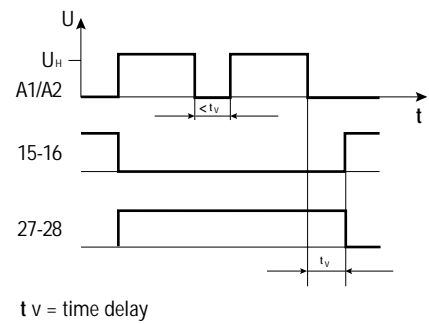


WIRING DIAGRAM

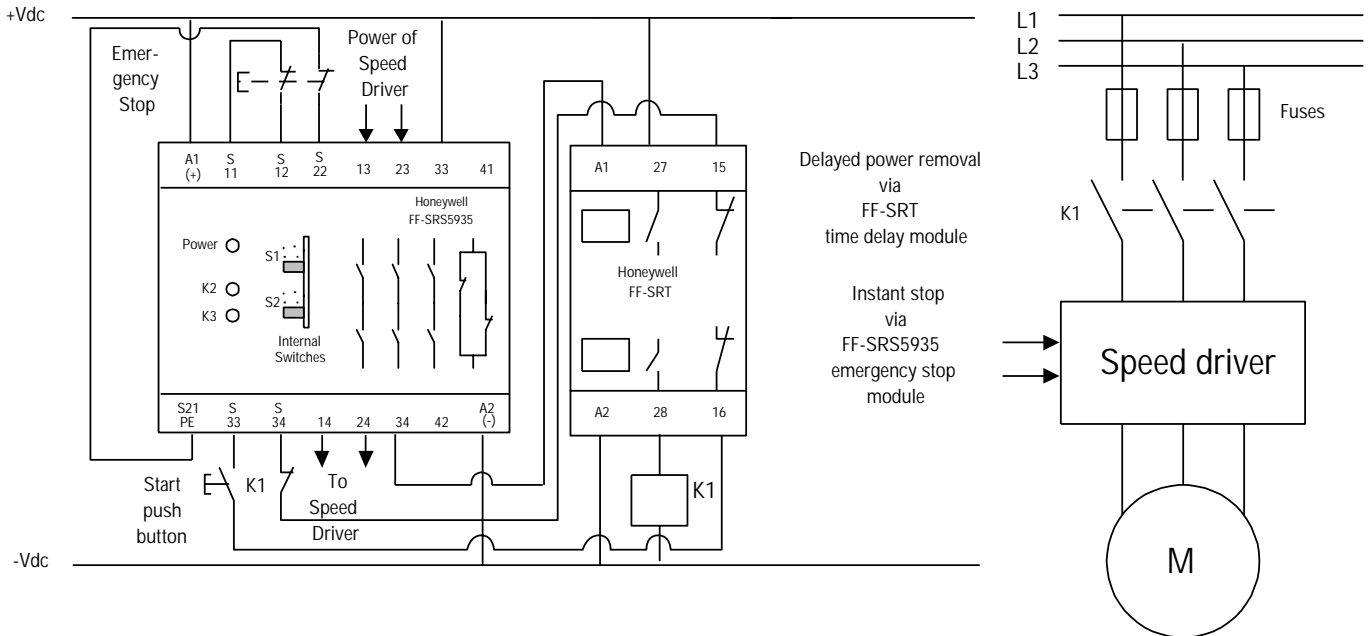
ONE CHANNEL (FF-SRT_1_) TWO CHANNEL (FF-SRT_2_)



FUNCTIONAL DIAGRAM



APPLICATION EXAMPLE



The example shows an emergency stop circuit with a motor using a speed driver. When an emergency stop condition occurs (e. g. the emergency push-button is pressed), the speed driver is shut down immediately via the emergency stop module FF-SRS5935 and the dangerous movement of the motor is stopped. When the delay time has elapsed, the power will be removed via the FF-SRT time delay module. External, positive guided relays have to be monitored in the S33/S34 loop by its normally closed contacts.

FF-SRT

FF-SRST Emergency Stop Module with Timer

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 fixed and adjustable delay times
- Switching current from 1 mA to 5 A
- Automatic start or manual start mode with short-circuit detection on the push-button input
- Selectable cross-fault detection in emergency stop control circuit
- LEDs indicate power and internal relays status
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Overvoltage and short-circuit protection
- Removable terminal strips for ease of maintenance
- 45 mm / 1.77 in width

APPLICATIONS

- Emergency stop circuits on machines
- Category 1 emergency stop circuits per EN 418 and NFPA79: delayed isolation of power after machine stoppage
- Door protection: delayed opening of an interlocked protective gate



(Direct safety contacts)



(Delayed safety contacts)



The FF-SRST Emergency Stop modules with Timer are designed to be used in emergency stop circuits where danger to personnel or machinery is present. This device has four internal standard 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 (safety light curtain, safety mat, safety switches, etc.) between S21/S22 and S31/S32 after activation of the push-button between S33 and S34.

In the **automatic start mode**, the module accepts immediate input from the safety device between S21/S22 and S31/S32.

After restart, the normally open safety contacts (13/14, 23/24, 47/48, 57/58) will close and the normally closed contacts (31/32, 65/66) will open. If an emergency stop condition occurs (safety device is actuated), the normally open contacts (13/14, 23/24) will open and the normally closed contact (31/32) will close immediately. After the selected delay time has elapsed the normally open contacts (47/48, 57/58) will open and the normally closed contact (65/66) will close.

This emergency stop condition is signalled by the direct safety contacts (13/14, 23/24, 31/32) for the machine control circuitry to first stop the dangerous motion and then to remove power after a certain time by the delayed contacts (57/58, 65/66).

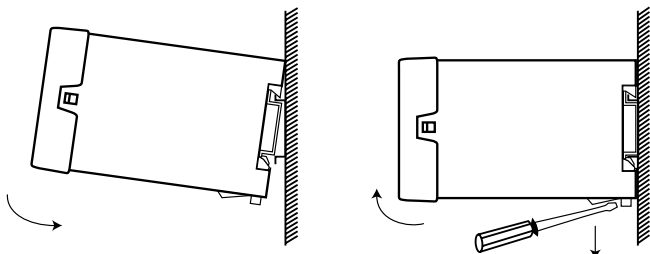
WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

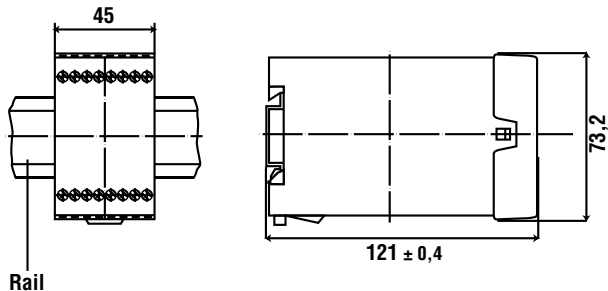
Failure to comply with these instructions could result in death or serious injury.

INSTALLATION DIAGRAM

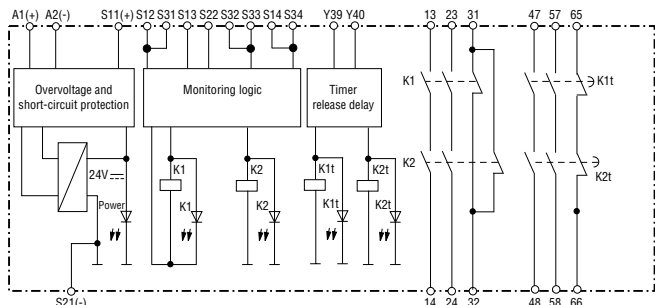


MOUNTING DIMENSIONS

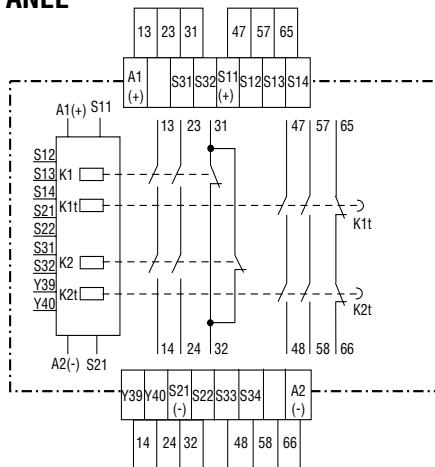
Width: 45 mm/1.7 in; Height: 74 mm/2.91 in; Depth: 121 mm/4.76 in



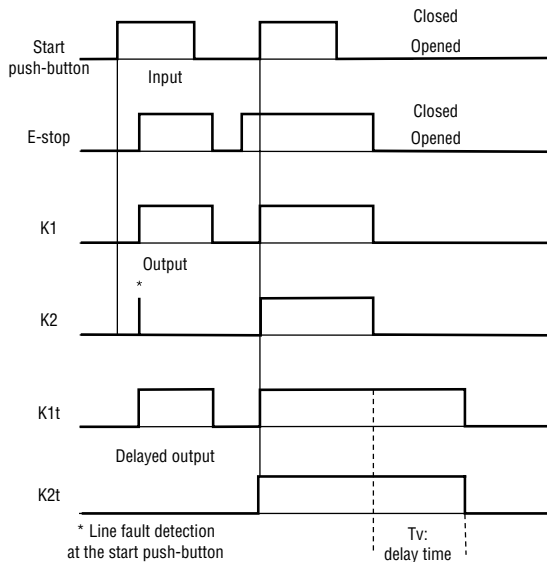
INTERNAL CIRCUITRY



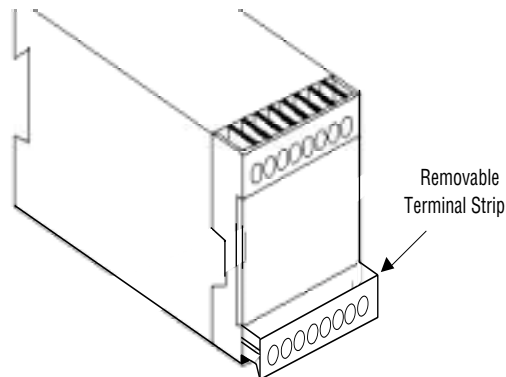
FRONT PANEL



FUNCTIONAL DIAGRAM



REMOVABLE TERMINAL BLOCKS



SETTING OF START MODE

Start Mode	Jumper between S13/S14	Start push-button between S33/S34	
Manual start mode			This module offers the possibility to function in the automatic start mode or manual start mode.
Automatic start mode			Insert the start push-button between terminals S33/S34 for manual start mode .
Automatic start mode			Insert a jumper between S13/S14 for automatic start mode to function.

SETTING OF THE DELAYED CONTACTS

The off-delayed safety relays K1t and K2t (safety contacts 47/48 to 65/66) are only operational, if a jumper is set between Y39/Y40.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Australia

Honeywell Pacific Inc.
Phone: +(61) 2-9370-4500
FAX: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax 1300-36-04-70

China - PRC - Beijing

Honeywell (Tianjin) Ltd.
Phone: +(86-10) 6561-0208
FAX: +(86-10) 6561-0618

China - Hong Kong SAR

Honeywell Ltd.
Phone: +(852) 2331 9133
FAX: +(852) 2331 9998

India

Tata Honeywell Ltd
Phone: +(91) 20 6875-532/534
FAX: +(91) 20 6875 992

Indonesia

PT Honeywell Ltd.
Phone: +(62) 21 521-3330
FAX: +(62) 21 521-3735

Japan

Yamatake Corporation
Phone: +(81) 3 5440 1395
FAX: +(81) 3 5440 1314

South Korea

LG - Honeywell Co. Ltd
Phone: +(822) 799-6114
FAX: +(822) 792-9011

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(603) 758-4988
FAX: +(603) 758-8922

New Zealand

Honeywell Pty Limited
Phone: +(64-9) 623-5050
FAX: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines)
Inc.
Phone: +(632) 636-1649
FAX: +(632) 636-1650

Singapore/SE Asia Regional Office

Honeywell Southeast Asia Pte. Ltd.
Phone: +(65) 355-2828
FAX: +(65) 445-3033

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886) 22245-1000
FAX: +(886) 22245 3242

Thailand

Honeywell Systems Ltd.
Phone: +(662) 693 3099
FAX: +(662) 693 3085

NORTH AMERICA

Canada

Honeywell LTD
Phone: 1-800-737-3360
FAX: 1-800-565-4130

USA

Sensing and Control,
International Headquarters
Phone: 1-800-537-6945
1-815-235-6847
FAX: 1-815-235-6545

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
FAX: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
FAX: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 79 40 27
FAX: +(359) 2 79 40 90

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 2 6112 3469/ 3424
FAX: +(420) 2 6112 3461

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
FAX: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 82 68
FAX: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
FAX: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(36 1) 451 4300
FAX: +(36 1) 451 4343

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/456
FAX: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
FAX: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
FAX: +(47) 66 76 20 90

Poland

Honeywell Sp. zo.o
Phone: +(48) 22 606 0900
FAX: +(48) 22 606 0901

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
FAX: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 1 2110076
FAX: +(40) 1 2103375

Commonwealth of Independent States (CIS)

ZAO Honeywell
Phone: +(7 095) 796 98 00
FAX: +(7 095) 796 98 93

Slovak Republic

Honeywell s.r.o.
Phone: +(421 7) 58247403/400
FAX: +(421 7) 58247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 805 1211
FAX +(27) 11 805 1354

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
FAX: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
FAX: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
FAX: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 4644 764
FAX: +(90) 216 4644 794

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 118 906 2600
FAX: +(44) 118 981 7513

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
FAX: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 272533
FAX +(9712) 269539

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4 383-9282
FAX: +(54-11) 4 325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 7266 1900
FAX: +(55-11) 7266 1905

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
FAX: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1
FAX: +(593-2) 981-562

Mexico

Honeywell S.A. de C.V.
Phone: +(52-5) 259-1966
FAX: +(52-5) 570-2985

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request.

© 2001 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell Sensing & Control

21 Chemin du Vieux Chêne
38240 Meylan Cedex

France

107058-13-EN FR26 GLO 801 Printed in France

Honeywell Sensing & Control

11 West Spring Street
Freeport, Illinois 61032

USA



www.honeywell.com/sensing

FF-SR05936 Standstill Monitor

FEATURES

- Designed for Category 1 Emergency Stop functions per EN 418
- 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 for ac 250 V
- Green LED's indicate stopped motor and power status
- Red LED indicates Z1-Z2 line breakage status
- Mechanical life up to ten million operations
- Electrical life up to one million operations
- Switching current up to 10 A
- Voltage drop protection
- 45 mm / 1.77 in width

TYPICAL APPLICATIONS

- Stopped motor monitor for three phase and single phase asynchronous motors
- Used to unlock a door which is guarding a rotating machine only when the movement is stopped
- Used to activate an emergency brake



If the stopping time of the machinery is unpredictable, use the FF-SR05936 Standstill Monitor.

This module measures (between Z1/Z2) 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 on terminals Z1, Z2.

If an open (line break) is detected, the output relay contacts latch in the de-energized position as if the motor was running. After the break has been repaired, the module is reset by removing power to the module momentarily.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SR05936 Standstill Monitor



SPECIFICATIONS

- Stopped motor monitor for asynchronous motors

Input	Nominal voltage	120 Vac (-15%, +10%), 230 Vac (-20%, +10%), 24 Vdc (-20%, +10%)
	Nominal consumption	120 or 230 Vac: 4 VA; 24 Vdc: 2,5 W
	Nominal frequency	50 to 60 Hz
	Measuring input protection	690 Vac
	Engaging voltage	40 mV
	Release voltage	20 mV
	Output	Contact complement
Contact type		Safety relay, positive-guided
Response time		2 s after EMF drops below 20 mV
Switching Capability		Power factor = 1 with resistive load
Current Range (min. to max.)		10 mA to 10 A
Voltage Range (min. to max.)		10 to 250 Vac/dc
Switching capability per ac15 (EN 60 947-5.1)		NO contact: 3 A / 250 Vac - NC contact: 1 A / 250 Vac
Typical Electrical Life Expectancy		Power factor = 1 at 230 Vac/dc (See Note 1)
3 A		1 000 000 operations
5 A		500 000 operations
10 A		220 000 operations
Typical Power Factor (cos φ)		Limitation Factor (See Note 2)
0,3		0,45
0,5	0,70	
0,7	0,85	
1	1	
General	Fuse Rating	6 A time delayed
	Mechanical life	Ten million switching operations
General	Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at max. 90% humidity
	Sealing	Housing: IP 40 • Terminals: IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz
	Conductor connection	1 x 4 mm ² solid (max.) [12 AWG] or 2 x 1,5 mm ² (max) [16 AWG] stranded wire with sleeve DIN 46288
	Conductor attachment	M 3,5 screw terminals; wire contacts are enclosed to prevent electrical shock
	Mounting	Quick install rail mounting EN 50022-35
Weight	325 g / 0.72 lb	

ORDERING INFORMATION

FF-SR05936 □

Voltage:
 2 = 24 Vdc
 E = 120 Vac
 G = 230 Vac

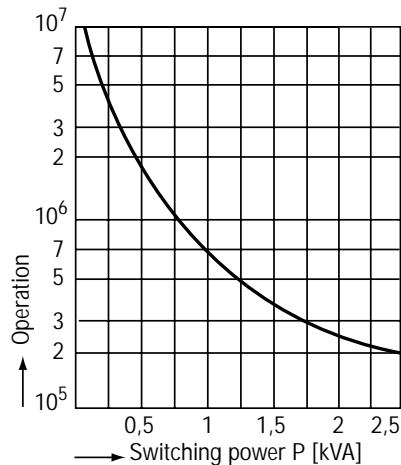
Note 1: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 2: Total operations = Operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 3 A (1 000 000 operations), the limitation factor is 0,70.

1 000 000 x 0,70 = 700 000 total operations.

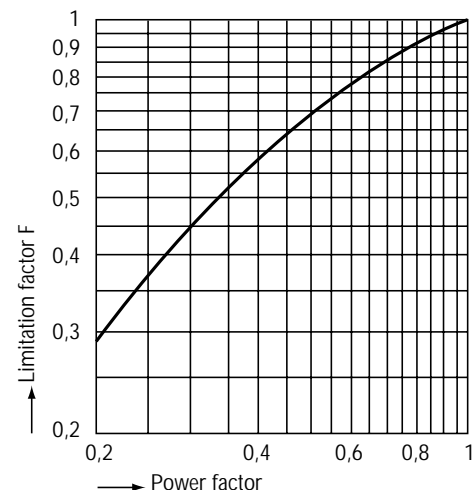
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ)

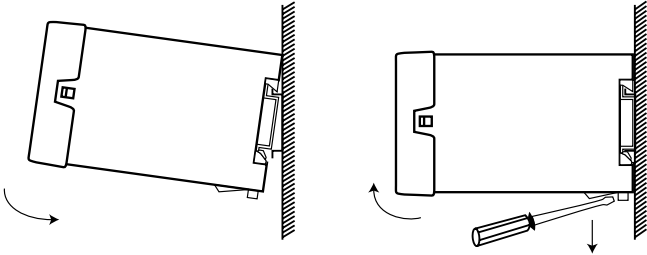


LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ)

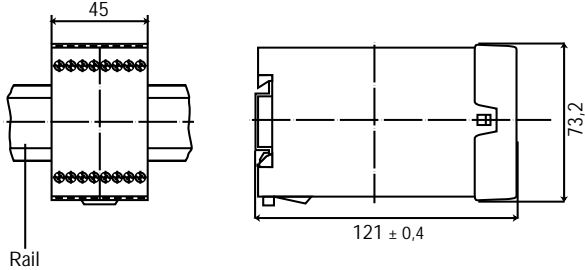


INSTALLATION DIAGRAM

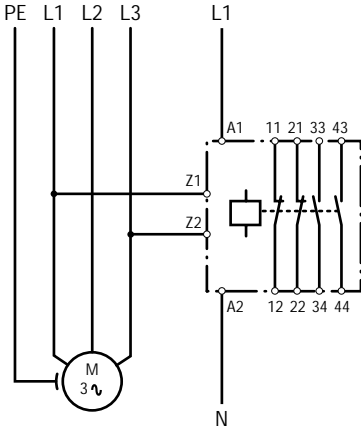


MOUNTING DIMENSIONS

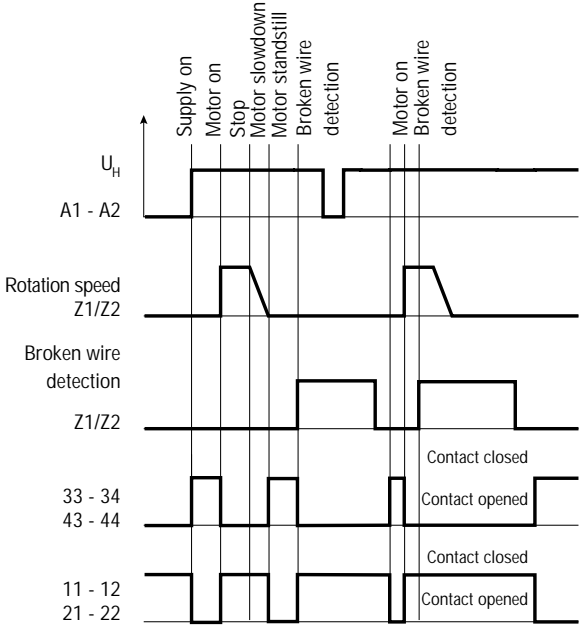
Width: 45 mm / 1.77 in; Height: 74 mm / 2.91 in;
Depth: 121 mm / 4.76 in



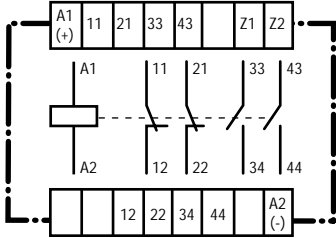
TYPICAL CONNECTION DIAGRAM



FUNCTIONAL DIAGRAM

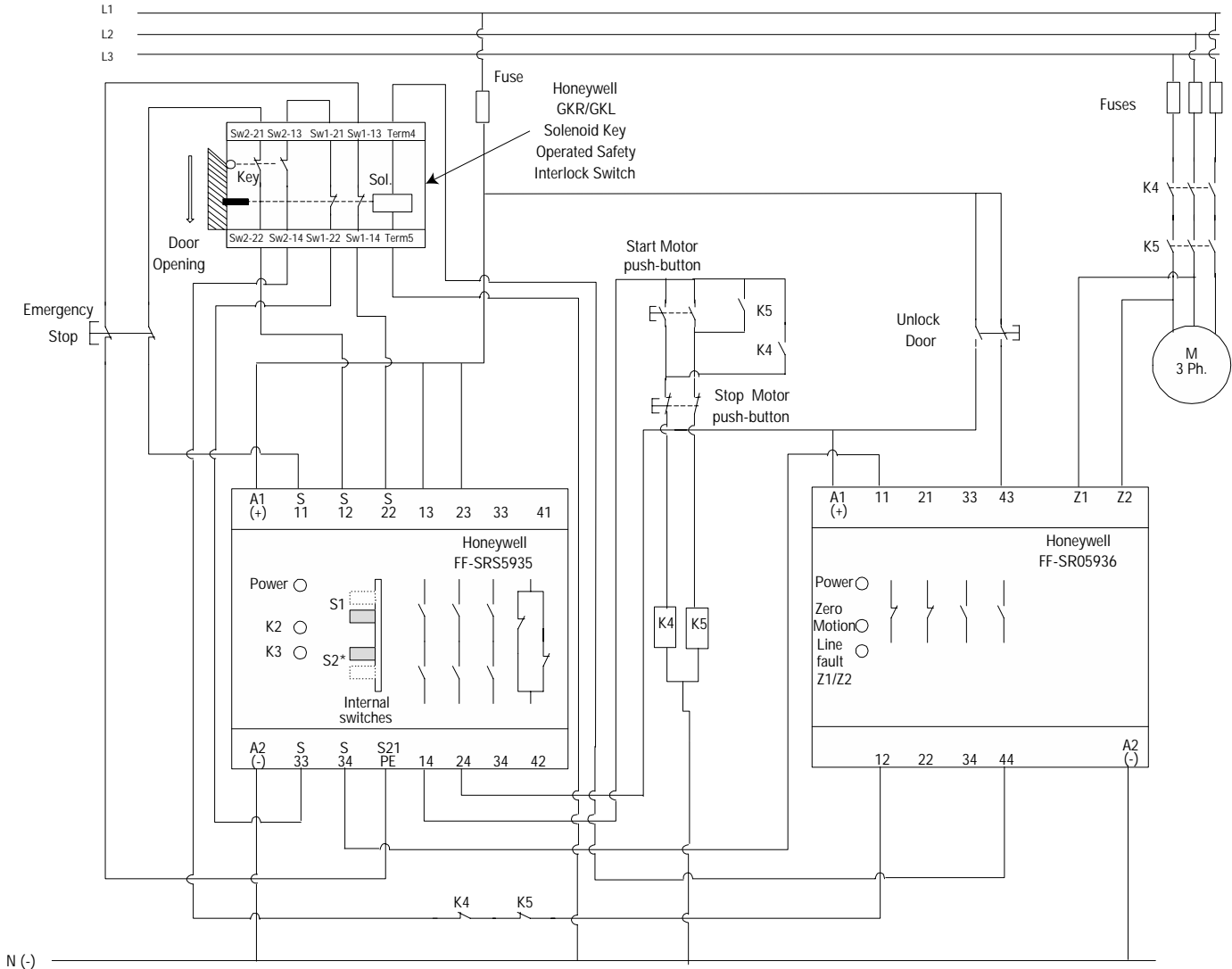


WIRING DIAGRAM



APPLICATION EXAMPLE

Door protection using key operated interlock switch (GKR/GKL Series) and standstill monitor module (FF-SR05936)



FUNCTIONAL DESCRIPTION

Start Sequence

Initially, the motor is not operating and the door is open. To initiate the start sequence, close the door. This action will close the two normally closed contacts of the key operated interlock switch. It will also automatically restart the emergency stop modules. As the Unlock push-button is open, the solenoid coil of the key operated interlock switch is de-energized and the door is locked.

The motor may now be started.

To start the motor, press the Start push-button. This action will energize the self-maintained external relays K4 and K5, and will start the motor.

Stop Sequence

Initially, the motor is operating and the door is closed and locked.

To initiate the stop sequence, press the Stop push-button. This action will de-energize the external safety relays K4 and K5 and immediately stop the motor.

To unlock the door when the motor has reached zero motion, press the Unlock push-button. This action will energize the coil of the solenoid of the key operated interlock switch and unlock the door. The door may now be opened safely. No hazardous motor motion is present.

Emergency stop Sequence

In case of an emergency stop situation, the two channel inputs of the FF-SRS5935 emergency stop control module will open. This action de-energizes the external safety relays K4 and K5, stopping the motor. All other steps remain the same as described above (Stop Sequence).

FF-SRS5939 Dual Channel Interface Control Module for Electrosensitive Protective Equipment

FEATURES

- Complies with EU Directive for machines 98/37/EC, IEC 204, EN 60204, DIN VDE 0113
- Supply voltage: 24 Vdc
- Dual input compatible with the fail-safe solid state outputs of Honeywell Electrosensitive protective Equipment
- Two cross-monitored relays with guided contacts delivering two N.O. contacts and one N.C. contact
- Switching current from 1 mA to 6 A (gold plated 5 µm contacts allow low current)
- Response time: 15 ms
- Selectable automatic or manual restart modes (with permanent short-circuit detection)
- Selectable Final Switching Devices monitoring loop for the control of external relays or contactors
- LEDs indicates inputs and outputs status, and restart condition
- Removable terminal strips for ease of maintenance
- 45 mm/1.77 in. width housing

APPLICATIONS

To be used with the FF-SYA safety light curtain in point-of operation protection or zone guarding protection such as:

- Metal-forming, milling and drilling machines
- Spot-welding machines and fine-boring machines
- Pressing, moulding and thermoforming machines
- Conveyors/transfer lines



The FF-SRS5939 Interface Control Module is designed to be used with the FF-SYA Safety Light Curtain in emergency stop circuits when danger to personnel or machinery is present. Its slim 45 mm/1.77 in. width housing is ideal for space restricted areas. This module provides a Control Reliable interface between the FF-SYA Light Curtain and the machine control circuitry. A single fault does not prevent the normal stopping action from taking place but will prevent the next machine cycle to start until the fault is corrected. This is accomplished by the use of redundant circuitry, self-checking capability and positive guided safety relay outputs. These redundant safety relay outputs are rated for 6 amps to directly operate with the machine control actuators using 2 NO and 1 NC output contacts. These output contacts are also gold plated to ensure compatibility with very low current requirements (such as a monitoring circuit).

The FF-SRS5939 Module 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. The FF-SRS5939 is equipped with LED indicators that provide diagnostic information and is equipped with removable wiring strips to make replacement fast and easy.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

MISUSE OF PRODUCT

- The FF-SRS5939 module is designed to be used with the Honeywell FF-SYA safety light curtain equipped with fail-safe solid state outputs. The FF-SYA performs cross-fault detection between its outputs. The FF-SRS5939 module does not perform the cross-fault detection between its inputs. To ensure the highest safety category, do NOT use the FF-SRS5939 with any other equipment. For other equipment, use the FF-SRS5935 or FF-SRS5925 dual channel emergency stop module. Both modules perform the cross-fault detection between the safety device outputs.

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

FF-SRS5939

FF-SRS5939

• Dual Channel Interface Control Module - Electrical interface for Electrosensitive protective equipment



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Supply voltage	
Nominal voltage (A1/A2)	24 Vdc (-15 %, +15 %)
Power consumption	3.5 W
Fuse protection	315 mA, time delayed
Restart functions	
Restart push-button input (S33/S34)	For the connection of a N.O. contact, 0.1 to 1.5 s closing time, permanent short-circuit detection, 20 Vdc min. voltage (without pressing the push-button), 10 mA/24 Vdc min. current, 470 Ω max. cable resistance
Restart mode input (X1/X3)	For setting the manual or automatic restart mode, voltage presence
Restart time	100 ms after the ESPE inputs are energized (automatic restart) or push-button release (manual restart)
FSD monitoring loop	
FSD contacts input (Y1/Y2)	For the connection in series of the FSDs N.C. contacts (FSDs reaction time: 250 ms), permanent short-circuit detection, 20 Vdc min. voltage, 30 mA/24 Vdc min. current, 150 Ω max. cable resistance
FSD monitoring input (X1/X2)	For setting the FSD monitoring loop, voltage presence
ESPE inputs	
Input current	30 mA/24 Vdc (relays energized), 5 mA/24 Vdc (relays de-energized)
Input voltage	19 to 27.6 Vdc
Protection	Reversed polarity, over-voltages up to 32 Vdc
Outputs	
Contacts available	2 N.O., 1 N.C. (2 safety relays with guided contacts)
Response time	15 ms max. (see timing diagrams)
Start time at power up	100 ms (automatic restart mode)
Current range	1 mA min., 6 A max. (see note 1)
Voltage range	0.1 Vac/dc min., 250 Vac/dc max.
Switching capability per AC15 (EN 60947-5-1)	N.O. contact: 3 A / 230 Vac, N.C. contact: 2 A / 230 Vac
Typical electrical life expectancy	Power factor = 1 at 230 Vac (see fig. 1, note 3) 1A : > 2.000.000 AC / > 400.000 DC ; 3A : > 500.000 AC / > 300.000 DC 5A : > 300.000 AC / > 200.000 DC ; 6A : > 200.000 AC / > 150.000 DC
Typical power factor (see fig. 2, note 2 and 3)	Limitation factor: 0.45 (cos φ = 0.3), 0.70 (cos φ = 0.5), 0.85 (cos φ = 0.7), 1.00 (cos φ = 1.0)
Operating frequency	1200 switching cycles / h (max.)
External fuse rating	6 A max. time delayed
Mechanical life	10 million switching operations
Environmental specifications	
Temperature range	Operation: 0 to 55°C/32 to 131°F / Storage: -20 to 70°C/-4 to 170°F, at 90 % humidity max.
Sealing	Housing IP 40, Terminals IP 20
Housing material	Thermoplastic
Vibration resistance	Amplitude 0.35 mm/0.014 in., frequency 10 to 55 Hz
Connection	Removable terminal strips, one ø2.5 mm ² (14 AWG) or two ø1.5 mm ² (16 AWG) stranded wires per terminal
Mounting	Quick install rail mounting EN 50022-35, 35 x 15 mm/1.38 x 0.59 in. size
Weight	280 g/0.61 lb

Ordering information

FF-SRS59392 (24 Vdc)

NOTE 1: To ensure the 1 mA capability during the life-time of the contact, NEVER exceed 300 mA and 60 V.

NOTE 2: Install arc suppression device across loads to avoid module contact arcing and ensure specified relay life expectancy.

NOTE 3: Total operations = operations at power factor 1 multiplied by the limitation factor. If the power factor is 0.5 at 3 A/230 Vac, the limitation factor is 0.70 and the number of operations is 500,000 x 0.70 = 350,000.

Figure 1 - Contacts life for a 100 % resistive load

(typical) - note 1
power factor = 1 (cos φ)

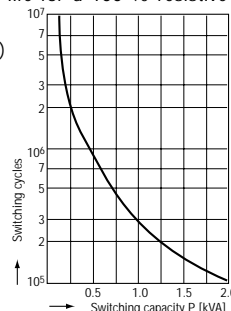
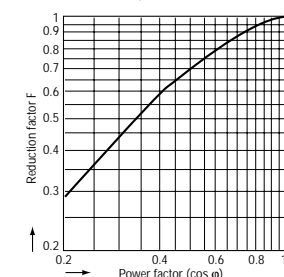


Figure 2 - Limitation factor inductive loads

- note 2- power factor < 1 (cos φ)

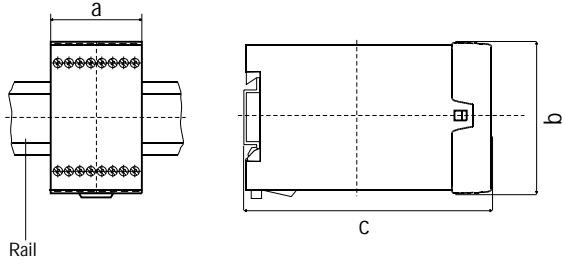


Courtesy of Steven Engineering, Inc. • 200 E. Van Ness, South San Francisco, CA, 94080-6370 • Main Office: (650) 588-9200 • Outside Local Area: (800) 258-9200 • www.stevenengineering.com

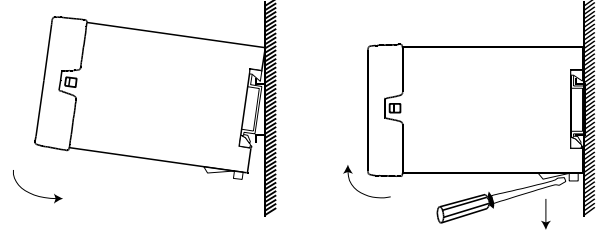
FF-SRS5939

Mounting dimensions

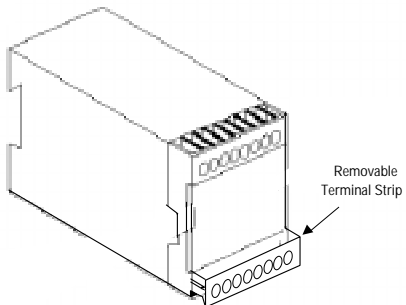
- a Width: 45 mm / 1.77 in
- b Height: 74 mm / 2.91 in
- c Depth: 121 mm / 4.76 in



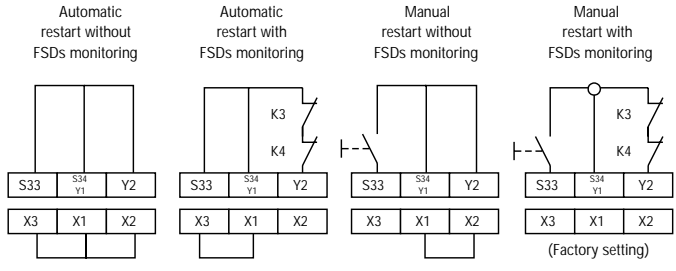
Mounting procedure



Removable terminal strips



Jumper links setting diagram



Module front panel

Honeywell

FF-SRS59392

Yellow

Green S12

Green S22

Green

Green

Red

Selected Restart Mode

Automatic restart selected Manual restart selected Press and release the restart push-button

ESPE Inputs Status

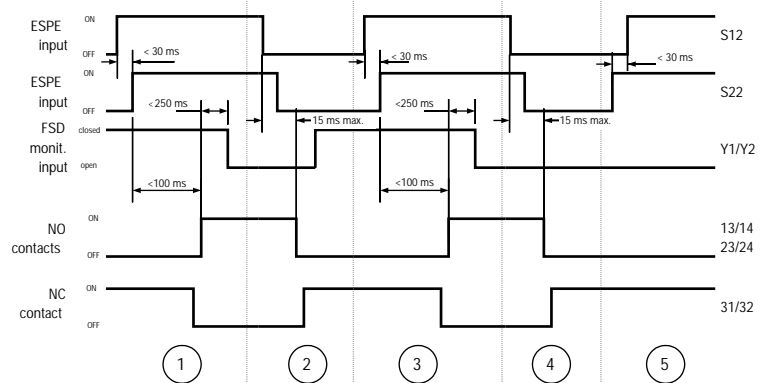
Both safety device outputs are closed Both safety device outputs are open

Relay Outputs Status

Internal relays are energized, NO contacts are closed, NC contact is open. Internal relays are de-energized, NO contacts are open, NC contact is closed.

light off light on blinking light

Automatic restart functional diagram (with Final Switching Devices monitoring)



1. Normal operation: emergency stop condition is removed and the FSDs monitoring loop opens.
2. Normal operation: emergency stop condition occurs and the FSDs monitoring loop closes.
3. Normal operation: emergency stop condition is removed and the FSDs monitoring loops opens.
4. Failure on the FSDs: emergency stop condition occurs and the FSDs monitoring loop remains open.
5. Failure on the FSDs: emergency stop condition is removed but the machine cannot restart.

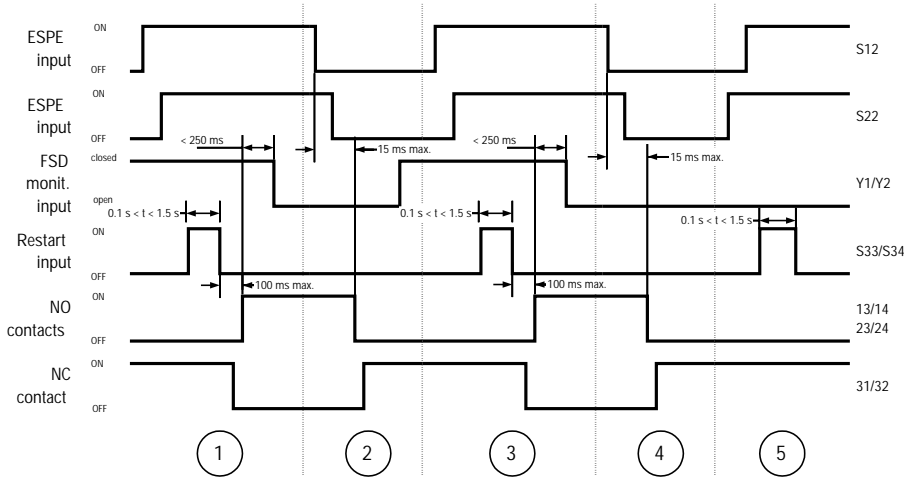
In the automatic restart mode, the Normally Open (N.O.) contacts (13/14, 23/24) will close and the Normally Closed (N.C.) contact (31/32) will open if the two input signals from the FF-SYA light curtain are present, provided these signals are coincident and the external relays reaction time is within the specification (if the Final Switching Devices monitoring loop is set). If the emergency stop condition occurs the N.O. contacts will open within the 15 ms response time and the normally closed contact will close. This

FF-SRS5939

Courtesy of Steven Engineering, Inc. • 230 Ryan Way, South San Francisco, CA, 94080-6370 • Main Office: (650) 588-9200 • Outside Local Area: (800) 258-9200 • www.stevenengineering.com

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 module will not restart if the FSD monitoring loop remains permanently open, or remains closed for more than 250 ms or permanently.

Manual restart functional diagram (with Final Switching Devices monitoring)



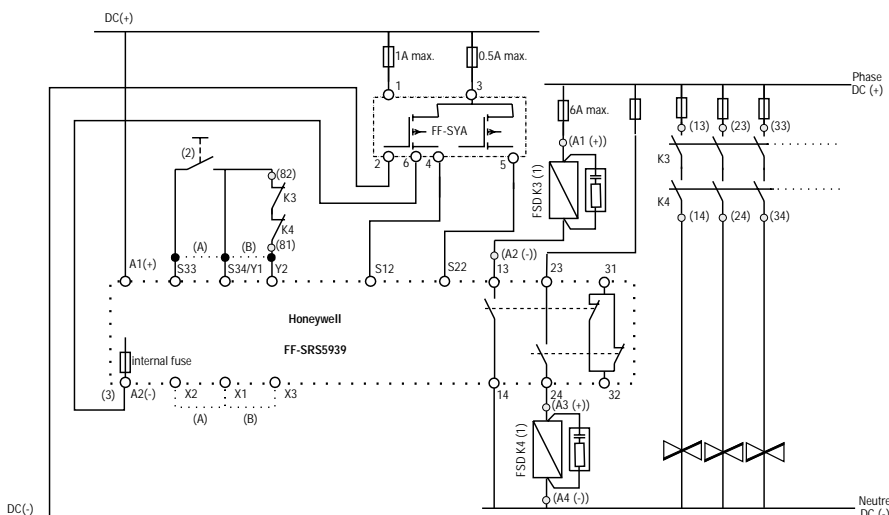
1. Normal operation: emergency stop condition is removed and the FSDs monitoring loop opens after the push-button is pressed and released.
2. Normal operation: emergency stop condition occurs and the FSDs monitoring loop closes.
3. Normal operation: emergency stop condition is removed and the FSDs monitoring opens after the push-button is pressed and released.
4. Failure on the FSDs: emergency stop condition occurs and the FSDs monitoring loop remains open.
5. Failure on the FSDs: emergency stop condition is removed but the machine cannot restart after the push-button is pressed and released.

In the manual restart mode, the N.O. contacts (13/14, 23/24) will close and the N.C. contact (31/32) will open after the push-button is pressed and released, provided the two input signals are available and provided the Final Switching Devices monitoring loop is closed (if is set). If the emergency stop condition occurs the N.O. contacts will open within the 15 ms response time 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 module will not restart:

- if the push-button is actuated for more than 1.5 s, or if a permanent short-circuit of the restart push-button input occurs,
- if the FSD monitoring loop remains permanently open, or remains closed for more than 250 ms or permanently.

Wiring diagram (using 2 N.O. contacts): Manual restart with FSD monitoring



- (1) Always install arc suppressors across the coils of external safety relays (these arc suppressors are not necessary, if the FSDs relays K3 & K4 are supplied by the FF-SRE3081 extension module for which correct wiring is also indicated).
 - (2) Use a 120 or 230 Vac electrically insulated push-button.
 - (3) The module and the ESPE must be connected to the same 0 V.
ESPE: Electrosensitive Protective Equipment.
FSD: Final Switching Device.
- (A) Jumpered if the manual restart mode is not used.
(B) Jumpered if the FSDs K3 and K4 are not used.

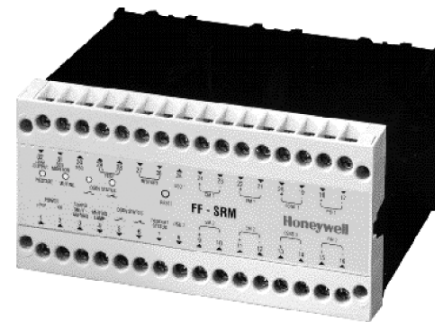
FF-SRM100P2 muting module for safety light curtains

FEATURES

- Category 4 muting module as per the EN 954-1 European standard
- Meets the applicable parts of the US & Canadian regulations and standards ANSI/RIA/OSHA
- Response time: 5 ms
- 2 fail-safe static outputs to be connected to the machine control system
- Alarm static output to be connected to the machine secondary control element; maintains the muting module in a lock-out condition after an internal fault detection
- Static output for the muting lamp permanently monitored as requested by the IEC/EN 61496-1 standard
- Inputs for 2 or 4 auxiliary sensors used to start and interrupt the muting sequences
- Override facility to evacuate an object after it accidentally came to a stop in the protective equipment sensing field
- Integrated start and restart interlock facility preventing the automatic machine start after a man intrusion beyond muting sequences
- FSDs monitoring loop for the control of Final Switching Devices

TYPICAL APPLICATIONS

- Any machines automatically fed by a conveyor belt: palletizers and depalletizers, automotive transfer lines, packaging and wrapping machines
- Any machines where manual operations must be carried out beyond dangerous phases of the machine cycle: mechanical or hydraulic presses, press-brakes, welding robots



The FF-SRM module is an interface between a safety device (i.e. light curtain, laser scanner, mat...) and the control circuitry of a dangerous machine on which the muting of the protective equipment outputs is necessary at certain steps of the process. On a machine automatically fed by a conveyor, parts must often be fed through the detection field of the safety light curtain towards the dangerous zone without causing the machine to stop. Similarly, manual loading and unloading of a mechanical or hydraulic press may be required during the opening stroke of the press. In these applications, it is necessary to safely "mute" or deactivate the safety device during a controlled sequence. The FF-SRM100P2 module will accomplish this.

The FF-SRM module is a permanently self-checked electrical interface which complies with the requirements of the EN 954-1 European standard for Category 4 protective devices: any failure is immediately detected and prevents any muting sequence from being activated. Connected with any of the safety light curtains from the Honeywell range, the FF-SRM module reliably controls muting sequences.

When the protective equipment is not muted, the FF-SRM module output status are identical to the light curtain output status, and the intrusion of an object or a person in the light curtain detection field immediately stops the machine. The machine can only restart after pressing a restart push-button connected to the FF-SRM module terminals.

FF-SRM

▲ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

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

The muting sequence is controlled by two or four sensors (such as photoelectric controls, limit switches or inductive proximity sensors) which reliably identify the events initiating and interrupting the muting sequence. When muting conditions are achieved, the FF-SRM module allows the machine to operate during the muting sequence without taking into account the signal delivered by the light curtain. Correct operation of the sensors is controlled at each muting sequence and any sensor failure prevents the muting from being performed.

When used in the "conveyor" mode of operation, two push-buttons allow the override of the light curtain if manufactured parts remain in the light curtain detection field during a muting sequence. Restart of the machine is then easily achieved.

A Final Switching Device monitoring loop is available for the control of the two relays commanded by the two fail-safe static outputs of the module. The module also integrates an alarm output (or "Secondary Switching Device - SSD") which switches off in case of internal failure. This SSD output can be connected to the machine secondary control element to shutdown the machine and performs a back-up safety function.

A white lamp informs the operator of each muting sequence. Correct operation of this lamp is monitored by the module in accordance with IEC/EN 61496-1 European standard, and any muting lamp failure prevents the muting from being performed. The muting module is equipped with additional static outputs providing remote information given by LEDs status indicators located on the module cover. These LEDs status indicators provide the operator with information on the output status, on a possible internal failure and when a manual restart of the module is necessary.

Applications

In the "conveyor" mode of operation, the muting solution operates as follows: the intrusion of an authorized object in the protective equipment sensing field is not taken into account at any time of the working cycle of a machine fed by a conveyor. When set in this mode, the FF-SRM muting module eases the integration of a safety light curtain on the following types of machines:

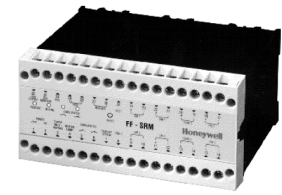
- Palletisers / depalletisers,
- Handling, wrapping and packaging machines,
- Robotic zones on a automotive transfer line,
- Automotive paint-shops.

In the "press" mode of operation, the muting solution operates as follows: the intrusion of an operator in the protective equipment sensing field is not taken into account during non dangerous phases of the machine working cycle. When set in this mode, the FF-SRM muting module eases the integration of a safety light curtain on the following types of machines:

- Work stations where the operator needs to load parts as soon as the tool starts rising such as on a mechanical or hydraulic presses,
- Work stations where the operator needs to carry out manual operations while the machine is working such as on a press-brakes,
- Dual work stations where the operator loads parts on one station while the robot works on the other station such as on welding robots.

FF-SRM

- Category 4 muting module as per the EN 954-1 European standard
- Meets the applicable parts of the US & Canadian regulations and standards ANSI/RIA/OSHA
- Suitable for machines fed by a conveyor or for machines with working cycle including manual operations



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features	Power supply voltage	24 Vdc, ±15 %
	Power consumptions	6 W for the module and all inputs, 6 to 60 W for the module and all outputs
	Response time	0.005 s
	Operating temperature	0 °C to 55 °C / 32 °F to 131 °F
	Relative humidity	25 to 75 %
	Sealing	IP 20 (needs to be installed in IP 54 enclosure)
Outputs	OSDs ⁽¹⁾	For machine shutdown: 2 fail-safe static outputs (switching capacity: 0,5 A/24 Vdc)
	SSD ⁽²⁾	For failure alarm: 1 static output tested at power up (switching capacity: 0,5 A/24 Vdc)
	MUTING LAMP	For the muting lamp: 1 self-checked static output (switching capacity: 0,5 A/ 24 Vdc)
	TEST	For testing the light curtain connection: 1 programmable N.O./N.C. static output (switching capacity: 16 mA/24 Vdc)
Inputs	OSSDs ⁽³⁾	For the light curtain N.O. contacts: 2 inputs with optocoupler (consumption: 30 mA/24 Vdc)
	SMs & EMs ⁽⁴⁾	For the sensors N.O./N.C. contacts: 4 inputs with optocoupler (consumption 10 mA/24 Vdc)
	P/Bs ⁽⁵⁾	Push-button N.O. contacts: 2 inputs with optocoupler (consumption: 10 mA/24 Vdc)
	RESTART	For the module restart and the FSDs monitoring ⁽⁷⁾ : 1 input with optocoupler (50 mA current pic)
	SSD MONITOR ⁽⁶⁾	For the SSD monitoring: 1 input with optocoupler (consumption: 10 mA/24 Vc)
	LEDs status	OSDs output status, restart condition muting sequence, unwanted condition
	Connection	Removable terminal strips (2 ø 1,5 mm ² / AWG 16 wires per screw terminal)
	Mounting	Omega rail DIN 50 0022-35 (35 mm x 15 mm / 1.38 in x 0.59 in)
	Dimensions	152 mm x 118,2 mm x 73,2 mm / 5.98 in x 4.65 in x 2.88 in (overall size)
	Weight	600 gr / 1.32 lb without packaging • 1,10 kg / 2.42 lbs with packaging

Ordering information

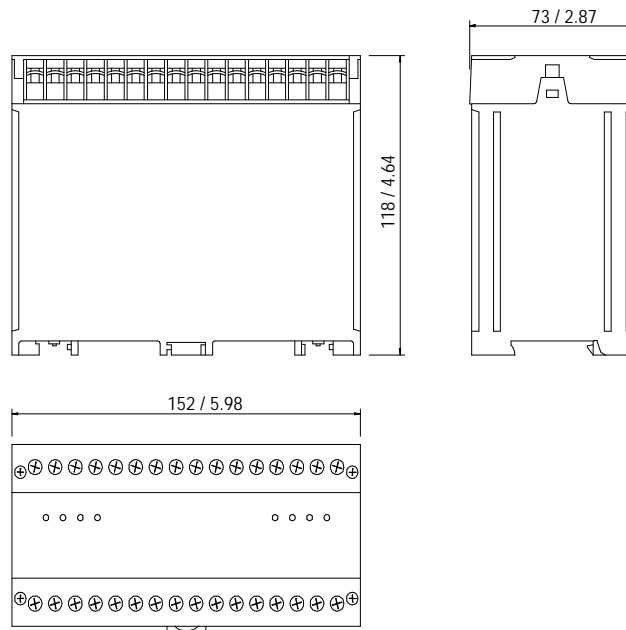
FF-SRM100P2

Note

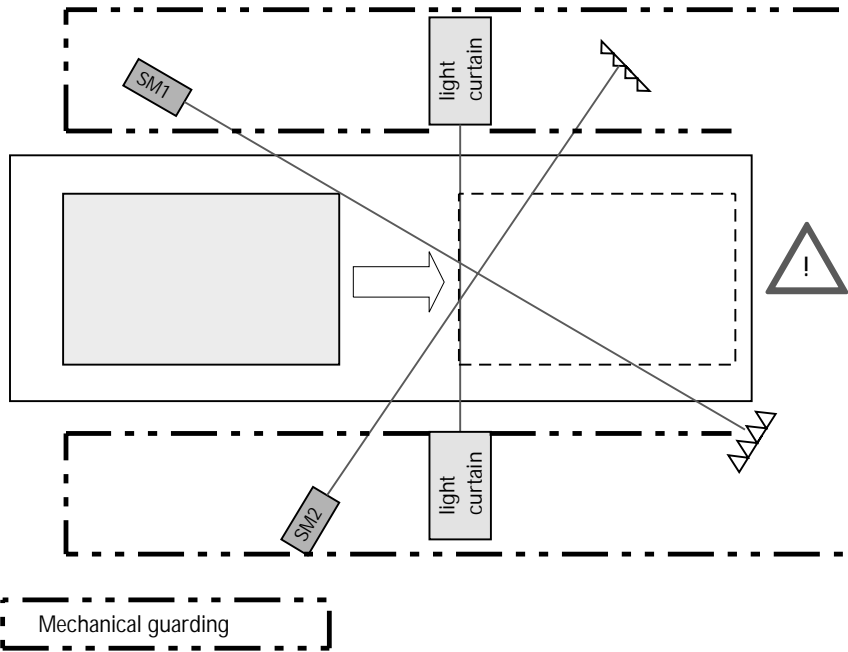
Honeywell provides a wide range of sensors such as photoelectric controls, ultrasonic sensors, limit switches and inductive proximity sensors which can be used to control the muting sequences. Also refer to the enclosed components lists.

- (1) Output Switching Devices
- (2) Secondary Switching Devices
- (3) Output Signal Switching Devices
- (4) Start Muting and End Muting Sensors
- (5) Override Push-Buttons
- (6) Secondary Switching Devices monitoring loop
- (7) Final Switching Devices monitoring loop

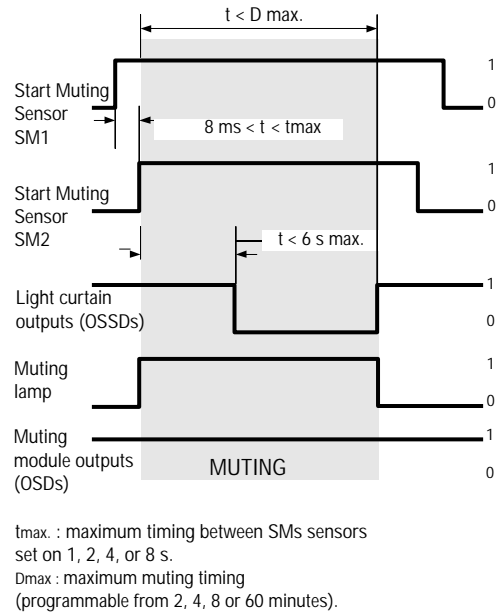
Dimensions (mm/in)



Example 1: Conveyor mode, two-direction muting
Application sketch



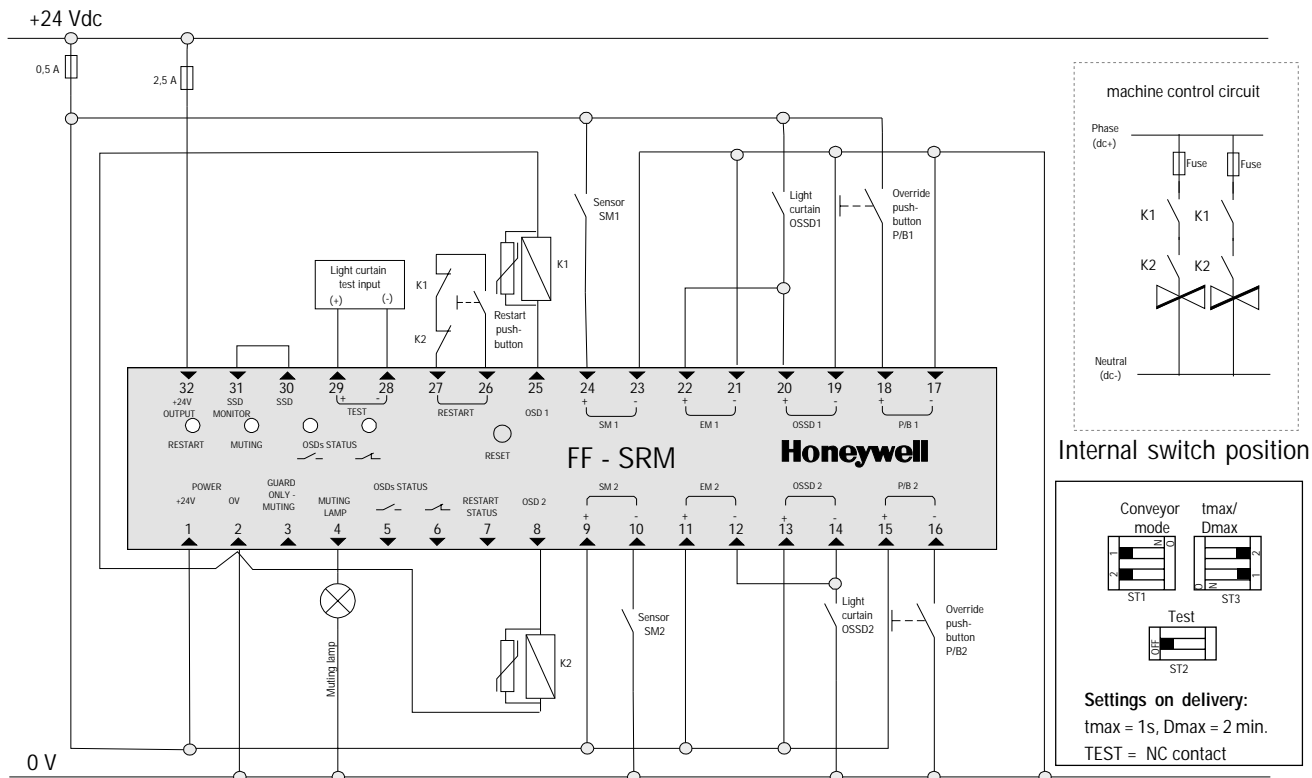
Timing diagram



Description

Two through-scan or retro-polarised photoelectric controls SM1 & SM2 can be used to start and end the muting sequence (correct operation of these photoelectric controls is monitored by the muting module). The interruption of the photoelectric control beams starts the muting sequence while the release of the safety light curtain beams stops the muting sequence. **This installation is recommended on applications where the entry and exit points of the material into the dangerous zone are the same.** The whole muting sequence shall not last more than 60 minutes.

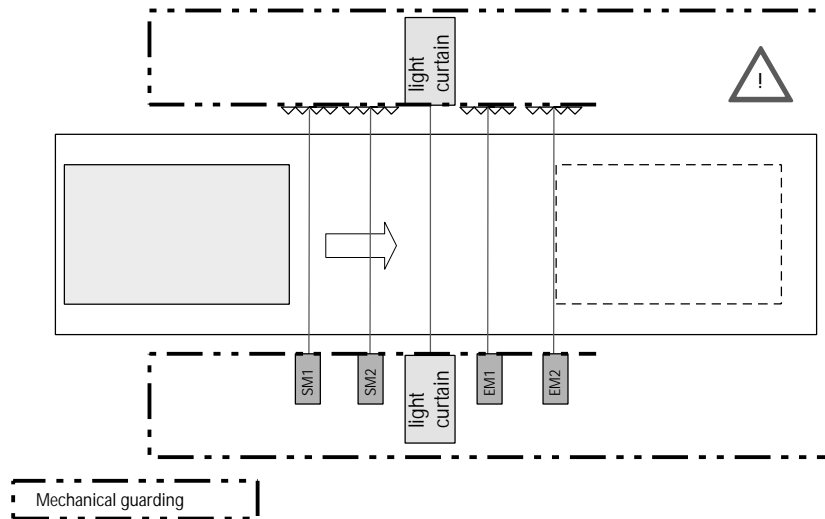
Wiring diagram



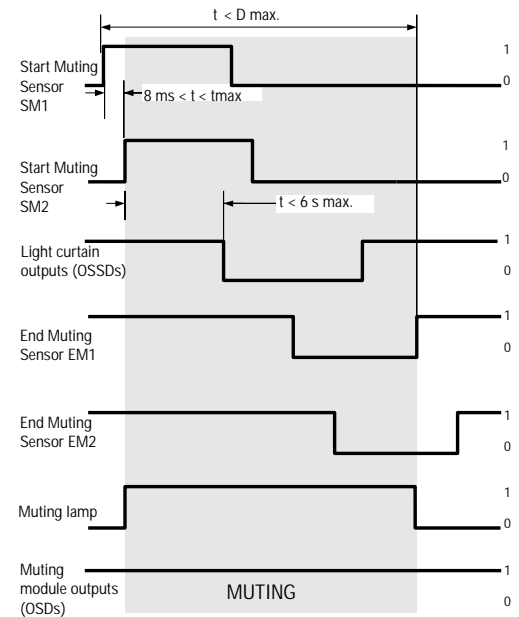
FF-SRM

Example 2: Conveyor mode, one-direction muting

Application sketch



Timing diagram

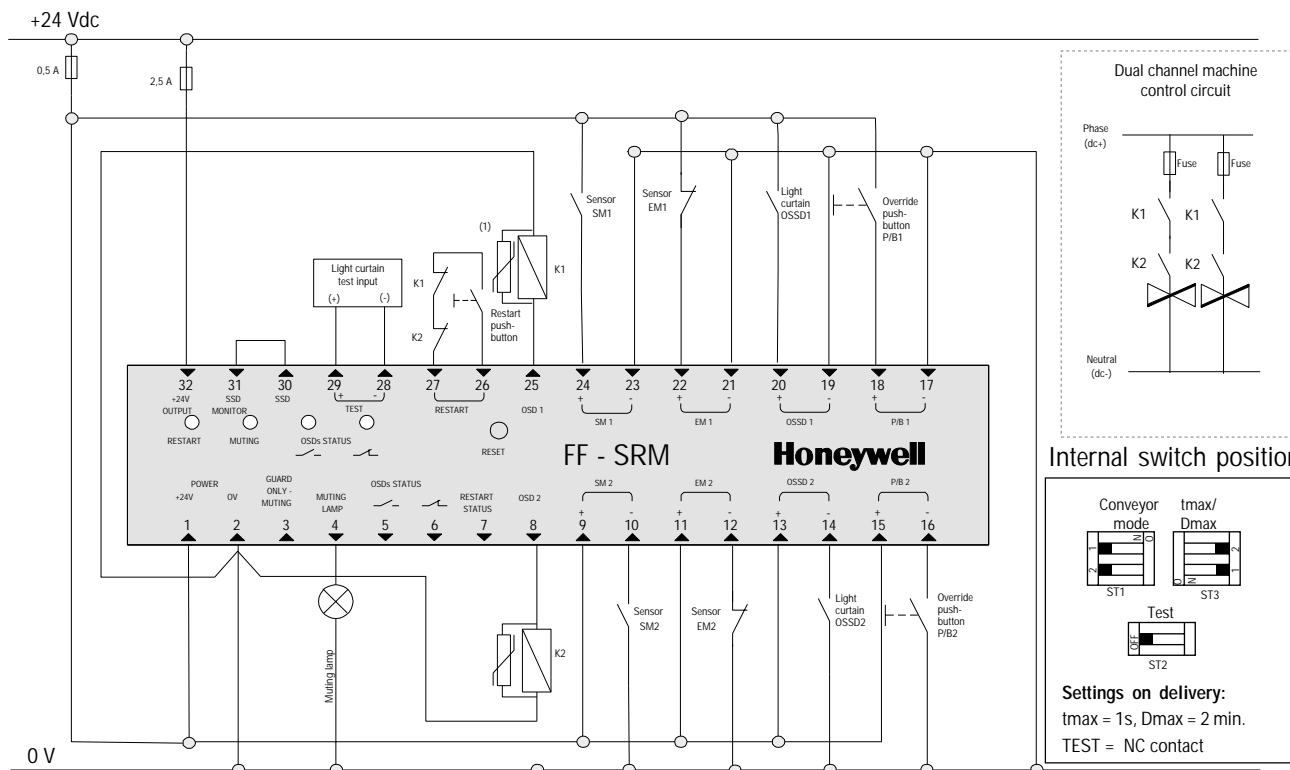


t_{max} : maximum timing between SMs sensors set on 1, 2, 4, or 8 s.
 D_{max} : maximum muting timing (programmable from 2, 4, 8, or 60 minutes).

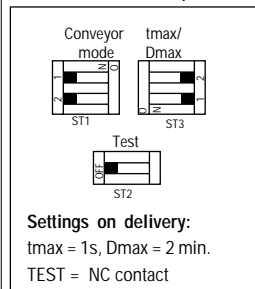
Description

Two sensors SM1 & SM2 are used to start the muting sequence, and two additional sensors EM1 & EM2 are used to stop it. These sensors may be inductive proximity sensors, photoelectric controls or limit switches (correct operation of these sensors is monitored by the muting module). This installation enables the muting of the protective equipment in one direction only. **This installation is recommended on applications where entry and exit points of the material into the dangerous zone are different. The use of 4 sensors to perform a muting sequence provides a high level of safety.** The whole muting sequence shall not last more than 60 minutes.

Wiring diagram

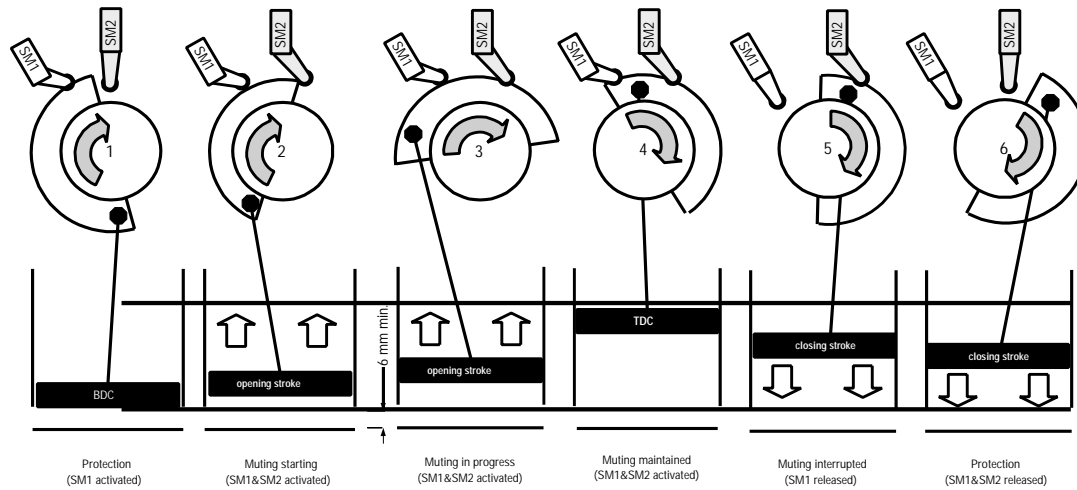


Internal switch position



FF-SRM

Example 3: Press mode, muting on a mechanical press

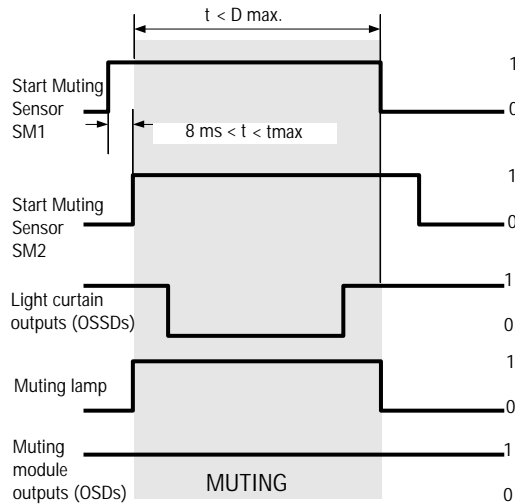


- SM1 Start muting 1
- SM2 Start muting 2
- EM1 End muting 1
- EM2 End muting 2

Application sketch

BDC (Bottom Dead Center) point at which the tool is closest to the die.
TDC (Top Dead Center) point at which the tool is furthest to the die.

Timing diagram

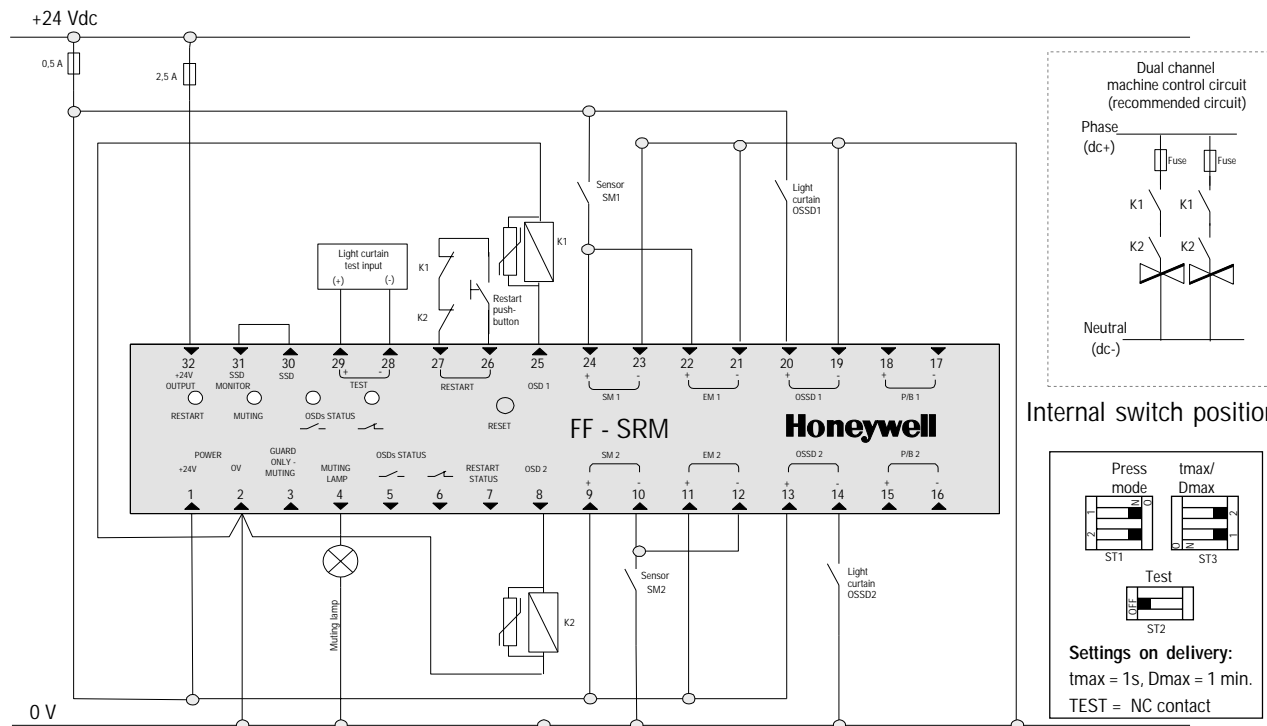


Description

Two limit switches SM1 & SM2 are used to start and stop a muting sequence. As soon as the press tool reaches its lowest position, the SM sensors are actuated by the rotation of the rotating disk cam and start the muting sequence (correct operation of these sensors is monitored by the module muting). The limit switches keep their position until the press tool reaches its uppermost position. The rotation of the rotating disk cam releases both limit switches and interrupt the muting sequence. The muting sequence must last 60 minutes maximum.

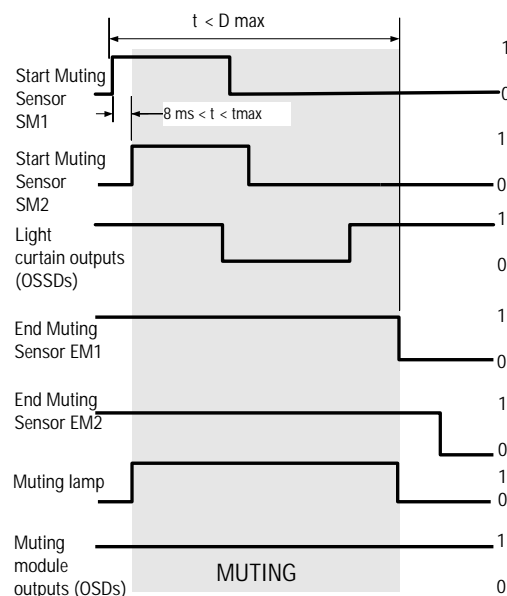
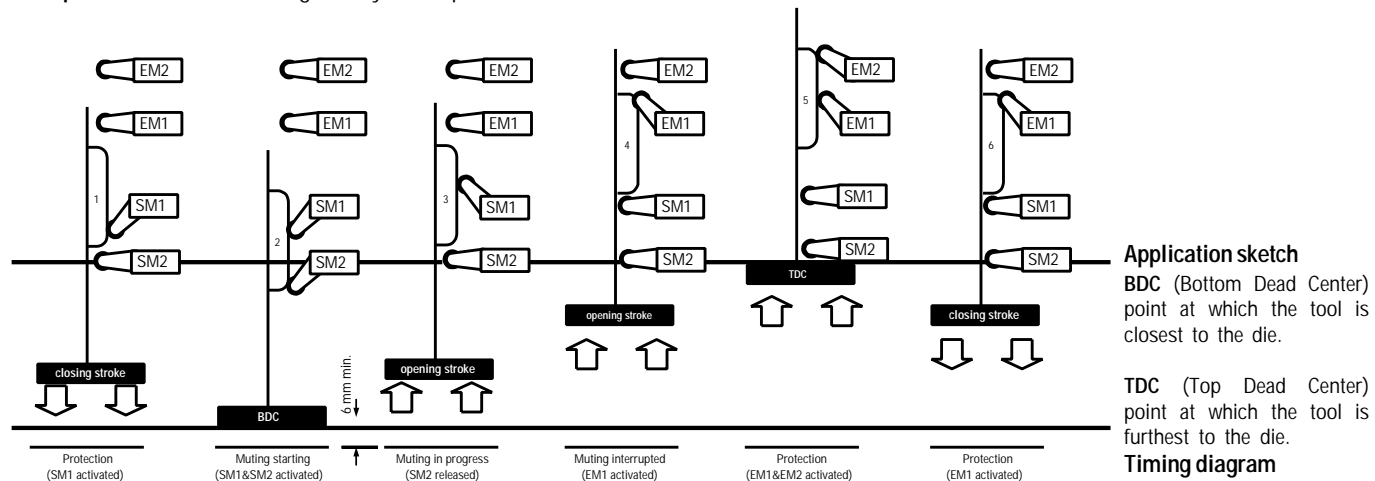
dmax.: maximum muting timing (programmable from 1, 2, 4 or 60 minutes.)
 tmax.: maximum timing between SMS sensors set on 1, 2, 4 or 8 seconds.

Wiring diagram



FF-SRM

Example 4: Press mode, muting on a hydraulic press

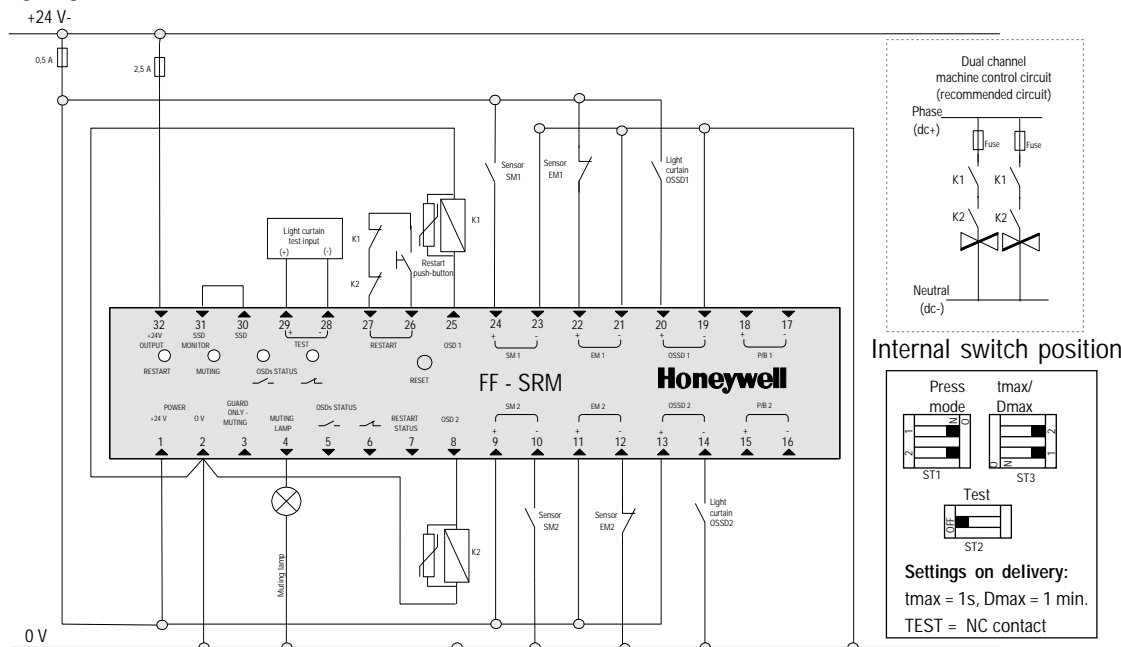


Description

A pair of sensors SM1 & SM2 is used start the muting sequence, and another pair of sensors EM1 & EM2 is used to stop the muting sequence (correct operation of these sensors is monitored by the module muting). The sensors used to detect the tool position should be either limit switches or inductive proximity sensors. The muting sequence must last 60 minutes maximum.

d_{max} : maximum muting timing (programmable from 1, 2, 4 or 60 minutes)
 t_{max} : maximum timing between SMs sensors set on 1, 2, 4 or 8 seconds.

Wiring diagram



Components list

Components	Typical supplies	Conveyor	Press
ESPE Protective equipment	Safety light curtain (1) or Modular light curtain (1) or Single safety beam or access control systems (1) or Safety laser scanner (1)	• • • •	•
Sensors (choose 2 to 4 sensors among the following) <i>Photoelectric control</i>	Through-scan, LO/DO, relay SPDT or static PNP/NPN (2) Retro-polarized, LO/DO, relay SPDT or static PNP/NPN (2) Diffuse, LO/DO, relay SPDT or static PNP/NPN (2)	• • •	
<i>Ultrasonic sensor</i>	NO/NC contact, static PNP/NPN (3)	•	
<i>Limit switches</i>	NO/NC limit switch (4) or (1)	•	•
<i>Inductive proximity sensor</i>	NO/NC contact, static PNP/NPN (5)	•	•
FSD relays	2 safety relays with guided contacts	•	•
SSD relays	1 safety relay with guided contacts	•	•
Arc suppressors	3 varistors 31 Vdc (recommended for cable length longer than 1 m)	•	•
Muting lamp	Colourless incandescent filament lamp	•	•
Restart visual indicator	Yellow indicator	•	•
OSDs status visual indicators	Red and green indicators	•	•
Restart push-button	Key selector switch (1 position with return movement)	•	•
Override push-button	Key selector switch (2 positions, 1 with return movement)	•	•
Guard only mode selector	Key selector switch (2 fixed positions)	•	•
Power supply 24 Vdc	Power supply (power greater than 120 W)	•	•
Power section switch	Selector switch (2 fixed positions)	•	•

FF-SRM

- (1) refer to the Honeywell Industrial Safety Products catalog
- (2) refer to the Honeywell Photoelectric Products catalog
- (3) refer to the Honeywell Ultrasonic Distance Sensors catalog
- (4) refer to the Honeywell Switches catalog
- (5) refer to the Honeywell Proximity Sensors catalog
or Honeywell Consolidated Sensors Catalog

FF-SRM200P2 muting module

FEATURES

- Category 4 muting module as per the EN 954-1 and EN 61496-1 European standards
- Meets the applicable parts of the US & Canadian regulations and standards ANSI/RIA/OSHA
- Multi-functional module programmable through internal selectors : muting functions, mutual exclusion mode
- Compatible with many type 2, type 3 or type 4 safety devices (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
- Max. 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

TYPICAL APPLICATIONS

- Conveyor lines, palletizers and depalletizers, automotive transfer lines
- Packaging and wrapping machines
- Machines where manual operations must be carried out outside of hazardous phases of the machine cycle: mechanical or hydraulic presses, press-brakes, welding robots, double transfer lines
- Hazardous areas being mutually accessed by material handling robots or operators carrying out manual operations (mutual exclusion mode)



The **FF-SRM200P2** is a programmable safety control module offering **various muting modes** and an **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-energisation of its safety relay outputs.

Mode depending, **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 to this module. 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 an easy troubleshooting in muting applications.

In the **muting mode**, the module is an interface between one or two safety devices (i.e. 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 can monitor up to two safety devices (typically light curtains, switches) protecting hazardous areas accessible by operators and machines. The operators access to the area is only allowed during the safe period of the machine cycle without stopping the hazardous movement.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

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

FF-SRM

Applications

Muting means that the safety outputs of a mutable safety device are "muted" **during the non-hazardous portion of a machine cycle**. In a conveyor fed machine area, for example, an object is allowed to enter the machine area even when intruding the sensing field of the mutable safety device. However, the machine must stop when an operator is intruding the sensing field of the safety device. In order to distinguish an operator from an object the muting module evaluates the validity of a muting sequence via auxiliary start and end muting sensors.

Common applications:

- Palletisers / depalletisers,
- Handling, wrapping and packaging machines,
- Robotic zones on automotive transfer lines,
- Automotive paint-shops.

Muting may also be used on workstations manually loaded or unloaded by an operator. The intrusion of an operator in the sensing field of the safety device is not taken into account **during the non-hazardous portion** of the machine cycle (e.g. the opening stroke of a press).

Common applications:

- Mechanical or hydraulic presses,
- Press brakes,
- Dual work stations where the operator loads parts on one station while a robot works on the other station.

Mutual exclusion may be used in hazardous areas that can be accessed by a machine (e.g. a handling robot) and an operator carrying out operations. The mutual exclusion principle consists in **avoiding that the operator and the machine are entering or are located together inside the hazardous area at the same time**. Every time the operator is leaving the hazardous area, he needs to acknowledge his exit with a push-button, allowing the handling robot to enter the area again.

Common applications:

- Palletisers
- Handling / Welding robots

Product description

The **muting** sequence is controlled by two or four sensors (like photoelectric sensors, limit switches or proximity sensors) and the muting module. The sensors must be installed so that only an object is able to validate a muting sequence but not a person.

When a start muting sequence is valid, the output relay contacts of the FF-SRM200P2 remain energised even if the protection field of the muted safety devices is intruded by an object. An external white muting lamp indicates that the safety device is actually muted. Correct operation of this lamp is monitored by the module in accordance with the IEC/EN 61496-1 European standard.

The following **muting modes** can be programmed using internal selectors of the FF-SRM200P2:

- Bi-directional or uni-directional muting,
- With 2 start muting sensors and up to 2 muted safety devices,
- With 4 start / end muting sensors and 1 muted safety device.

When a program for one muted and one non-muted safety device is selected, intruding the non-muted safety device will always de-energise the module's safety relay outputs.

The **maximum time for muting** the connected safety devices is programmable in a wide range (10 s to unlimited) and can therefore be adapted to the application.

External indicators provide information on the relay output status, restart status, muting phase status and on diagnostics.

After power up of the module or after the intrusion of the safety device outside a valid muting sequence, the module can be restarted manually via a **restart push-button**.

When necessary, the connected safety devices can be tested using the **test** output of the FF-SRM200P2.

The **inputs** of the safety devices and the auxiliary sensors are floating allowing the connection of devices with static outputs (PNP or NPN) or relay outputs.

An **External Device monitoring (EDM)** loop is available in order to monitor external safety contactors driven by the safety relay outputs of the module.

Trouble shooting an application using the FF-SRM200P2 muting module is easy through internal and external diagnostic indicators. The connected muting lamp starts to flicker when an error has been detected.

FF-SRM200P2 Muting module

SPECIFICATIONS



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Nominal supply voltage (A1(+), A2(-))	24 Vdc (±15 %, power line disturbance: max. 5 ms)
Nominal power consumption	4,1 W
Fuse protection	Internal PTC
Inputs	
Safety devices	1 or 2 redundant floating inputs with optocoupler (S11/S12, S13/S14) and (S21/S22, S23/S24)
Auxiliary sensors	2 or 4 floating inputs with optocoupler (S21/S22, S23/S24, S31/S32, S33/S34)
Restart input type (S43/S44)	Normally open (restart on push-button release within max. 3 s)
Restart loop and External Device Monitoring (EDM)	Modes 20 to 79 (muting modes): 1 common input (S43/S44)
	Modes 90 to 93 (mutual exclusion modes): 2 separate inputs (restart: S43/S44, EDM: S41/S42)
Restart delay time	Manual start: 65 ms
Input voltage at S12,S14,S22,S24,S32,S34	23 Vdc at nominal voltage
Switching on min. voltage / off max. voltage at S12,S14,S22,S24,S32,S34,S44	16 Vdc / 7 Vdc
Input current at S12,S14,S22,S24,S32,S34,S44	4,5 mA at nominal voltage
Coincidence time between safety device inputs S12/S14 and S22/S24 (if muting with 2 sensors is selected)	max. 2,5 s
Coincidence time between start muting inputs S32/S34	max. 10 s
Max. muting time (selector programmable)	10 s, 20 s, 30 s, 1 mn, 5 mn, 10 mn, 30 mn, 1 h, 3 h, unlimited (> 3 days)
Safety outputs	
Contact type	Internally redundant positive guided safety relay contacts
Contact complement	3 NO (13/14, 23/24, 33/34)
Response time	25 ms (between safety device input and module relay outputs)
Switching capability	Power factor = 1 (see Note 1 and Figure 1)
Output Current (min. to max.)	1 mA to 5 A (see Note 1)
Output Voltage (min. to max.)	0,1 to 230 Vac/dc
Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (see Note 2 and Figure 1)
	1 A: 2 000 000 operations; 2 A: 1 000 000 operations; 5 A: 300 000 operations; 6 A: 200 000 operations
Typical Power Factor (cos φ)	Limitation Factor (see Note 3 and Figure 2)
0,3	0,45
0,5	0,70
0,7	0,85
1	1
Operating frequency	1200 switching cycles/h (max.)
Fuse rating	6 A time delayed (max.)
Mechanical life	Ten million switching operations
Auxiliary outputs	
Relay status / test output	PNP static output (58) (23 Vdc / max. 100 mA)
Test output	Normally closed characteristics (test active: 0 Vdc, test inactive: 24 Vdc) response of safety device on test signal < 200 ms
Muting lamp / diagnostic output	PNP static output (48) (23 Vdc / max. 100 mA / min. 10 mA)
General	
Temperature range	0 °C to +50 °C / 32 °F to 122 °F
Sealing	Housing IP 40; Terminals IP 20
Housing material	Thermoplastic
Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz
Connector connection (max.)	1 x 4 mm ² solid [12 AWG], 1 x 2,5 mm ² [14 AWG], 2 x 1,5 mm ² [16 AWG] stranded wire with sleeve DIN 46288
Connector attachment	Removable block terminals with M3,5 screws; wire contacts are enclosed to prevent electrical shock
Mounting	Quick install rail mounting EN 50022-35, 35 mm x 15 mm / 1.38 in x 0.59 in. size
Weight	320 g / 0.70 lb

ORDERING INFORMATION

FF-SRM200P2

Note 1: Contact damage: To ensure the 1 mA capability during the lifetime of the contact, never exceed 300 mA or 60 V.

Note 2: Install arc suppression devices across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = operations at power factor 1 multiplied by the limitation factor.
 Example: U = 230 Vac, I = 2 A, power factor cos φ = 0,7
 Switching power P = U x I = 460 Vac
 Contact life (cos φ = 1, P = 460 Vac) = 1 000 000 operations (see Figure 1)
 Limitation factor F (cos φ = 0,5) = 0,7 (see Figure 2)
 Contact life (cos φ = 0,5, P = 460 Vac) = F x contact life (cos φ = 1, P = 460 Vac) = 700 000 operations.

FIG. 1 CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ) (see Note 3)

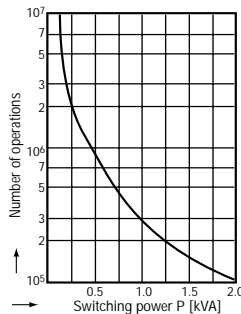
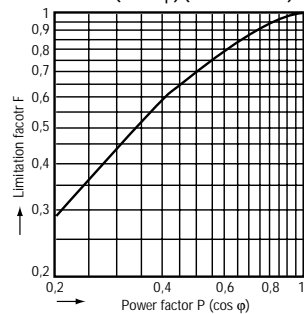
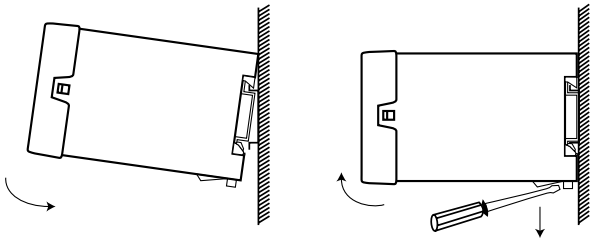


FIG. 2 LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ) (see Note 3)

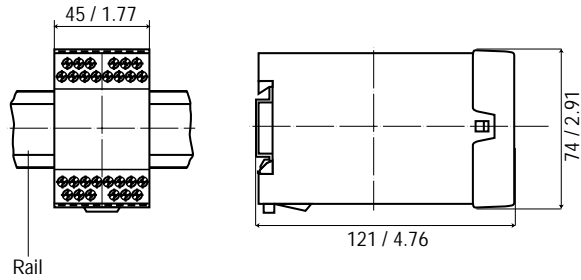


Installation diagram

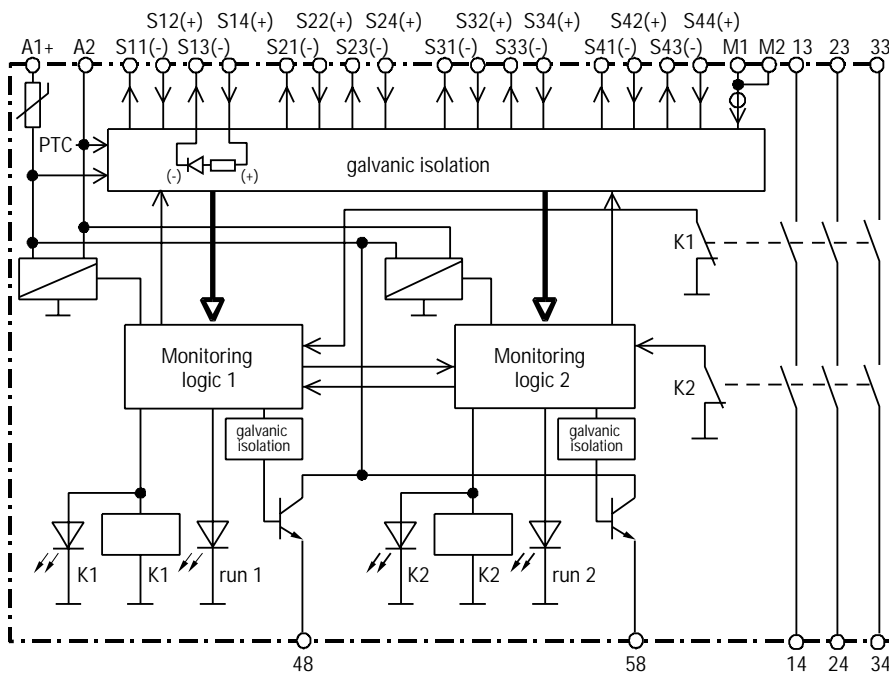


Mounting Dimensions

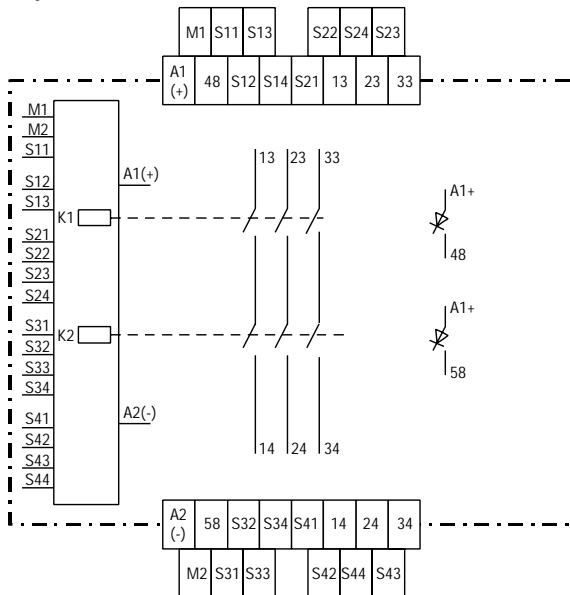
Width: 45 mm / 1.77 in ; Height: 74 mm / 2.91 in ;
Depth: 121 mm / 4.76 in



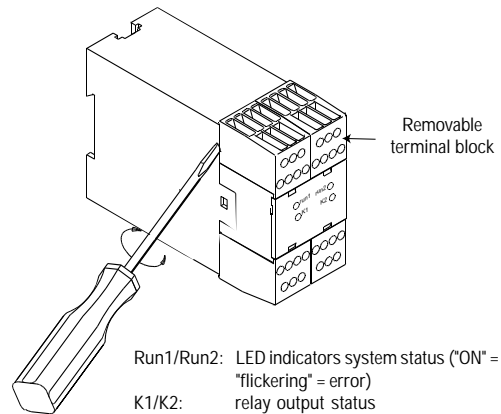
Internal circuitry



Front panel



Removable terminal blocks



FF-SRM

Mode setting

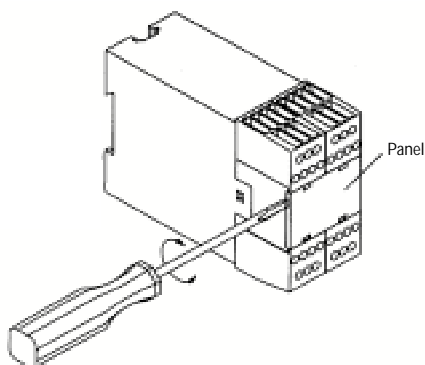
The operating modes of the FF-SRM200P2 module are set using 4 selectors located behind the removable front panel.

60 different programs are available allowing to adapt the muting mode and the max. muting time to the application.

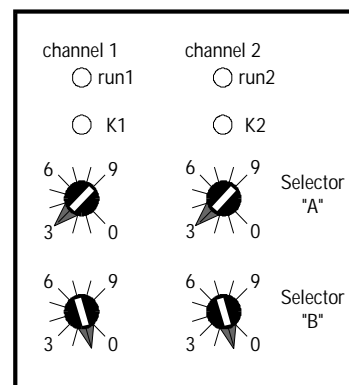
The FF-SRM200P2 module has two redundant microprocessor channels. The mode setting of each channel is done by two selectors "A" and "B".

The position of the corresponding selector "A" or "B" for channel 1 and channel 2 must be identical (see example).

Front panel removal



Mode selector "A" and "B" for channel 1 and channel 2



Internal view

▶ example "31"

Example: Selecting mode "31"

Selector	Channel 1	Channel 2	Description
"A"	3	3	Muting with 2 auxiliary sensors
"B"	1	1	Maximum muting time: 20 s

MUTING MODES

		Inputs	Selector "B": Max. muting time										
			0	1	2	3	4	5	6	7	8	9	
Selector "A": Muting modes	Safety device without test input	1	Not valid (Note (3))										
		2	Not valid										
		3	Not valid										
	Safety device with test input	Safety device without test input	4	10 s	20 s	30 s	1 mn	5 mn	10 mn	30 mn	1 h	3 h	> 3 days
			5	Not valid									
			6	Not valid									
		Safety device with test input	7	Not valid									

Note (1): Activation of the mutable safety device(s) is (are) NOT necessary during muting sequence.

Note (2): Activation of the mutable safety device is necessary during muting sequence.

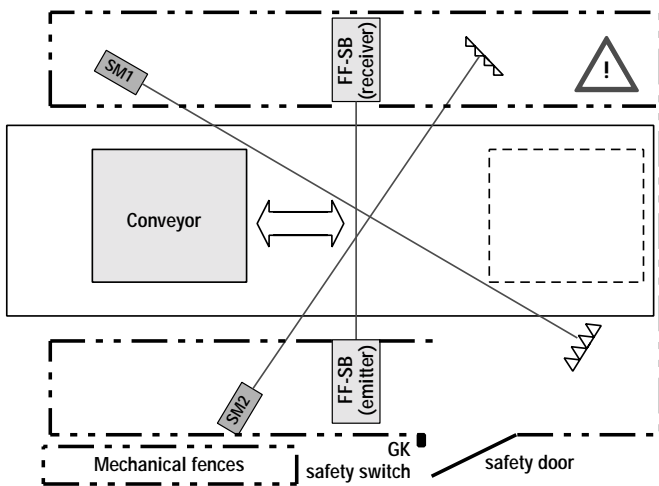
Note (3): If a not valid mode has been selected, fatal error 5 is displayed (see "Diagnostic Information" for details).

Note (4): The 2 mutable safety devices are muted simultaneously.

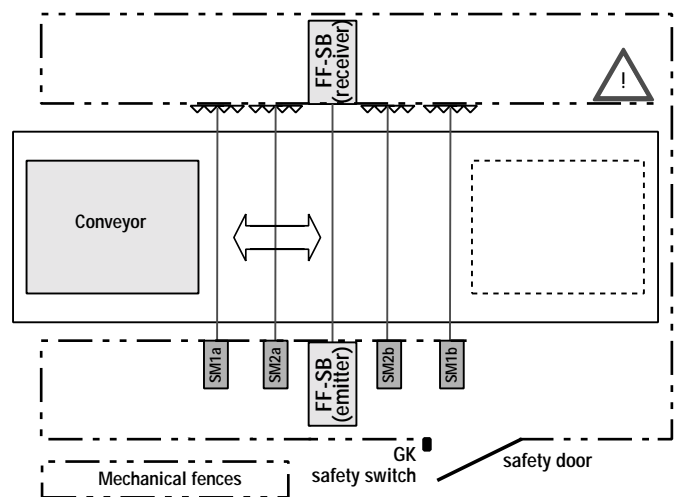
MUTUAL EXCLUSION MODES		Inputs			Selector "B": Test input and External Device Monitoring (EDM) functions								
		Robot detection	Operator detection	Position sensor	Safety device without test input		Safety device with test input						
					0	1	2	3	4	5	6	7	8
Selector "A": Mutual exclusion	9	(S11/S12, S13/S14)	(S21/S22, S23/S24)	(S31/S32)	With EDM	Without EDM	With EDM	Without EDM	Not valid				

Application example 1: Bi-directional muting on a conveyor

1A - Bi-directional muting with 2 muting sensors, 1 mutable and 1 non-mutable safety device



1B - Bi-directional muting with 4 muting sensors, 1 mutable and 1 non-mutable safety device



Description

A conveyor is loading and unloading a hazardous zone protected by one or two safety devices (e.g. safety light curtain, safety key interlock switch). As the conveyor enters and exits the zone passing by the same point, the movement is bi-directional.

The muting system is composed of the following elements:

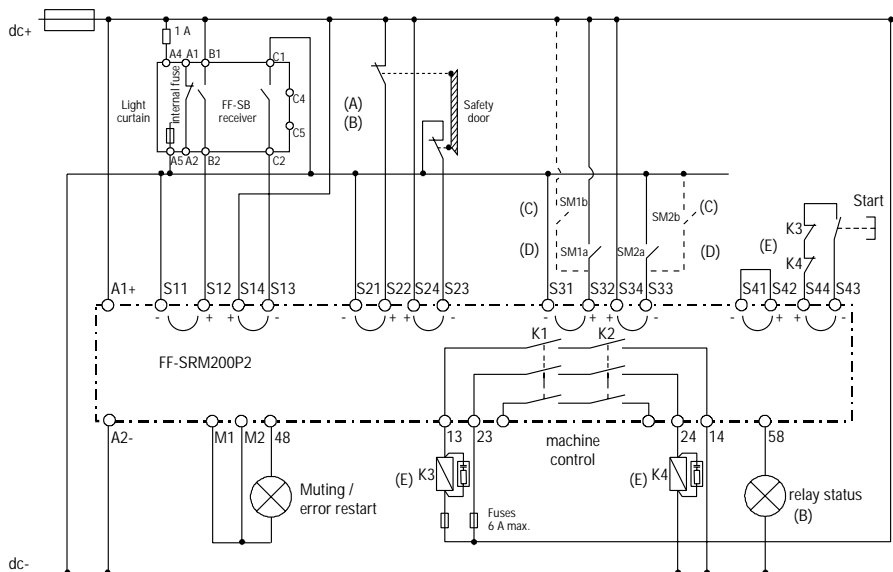
- the FF-SRM200P2 muting module,
- 1 mutable safety device (e.g. FF-SB safety light curtain) detecting access through the opening for the conveyor,
- 1 non-mutable safety device (e.g. GK safety key interlock) to monitor the safety door ("guard only"),
- example 1A: 2 auxiliary muting sensors SM1 and SM2 to start and end the muting sequence (crossed through scan or retro-reflective-polarised photoelectric sensors),
- example 1B: 4 auxiliary muting sensors SM1a, SM2a, SM1b and SM2b to start and end the muting sequence (e.g. limit switches, proximity sensors, through scan or retro-reflective-polarised photoelectric sensors).

The use of the second non-mutable safety device connectable to the same FF-SRM200P2 module is optional.

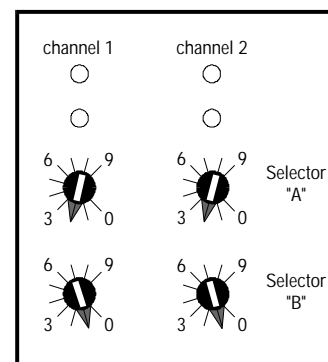
In order to start a **muting sequence**, the muting sensors SM1 and SM2 must be activated within a time frame of maximum 10 s. The muting sequence is stopped after de-activating the first of the two muting sensors.

In any case, the muting sequence will be interrupted after the **maximum selected muting time** has elapsed. If an object remains accidentally in the detection field of the muted safety device and the muting time has elapsed, an external Temporary Manual Muting (TMM, customer supplied) may be used to evacuate the detection field.

Wiring diagram



Mode selector

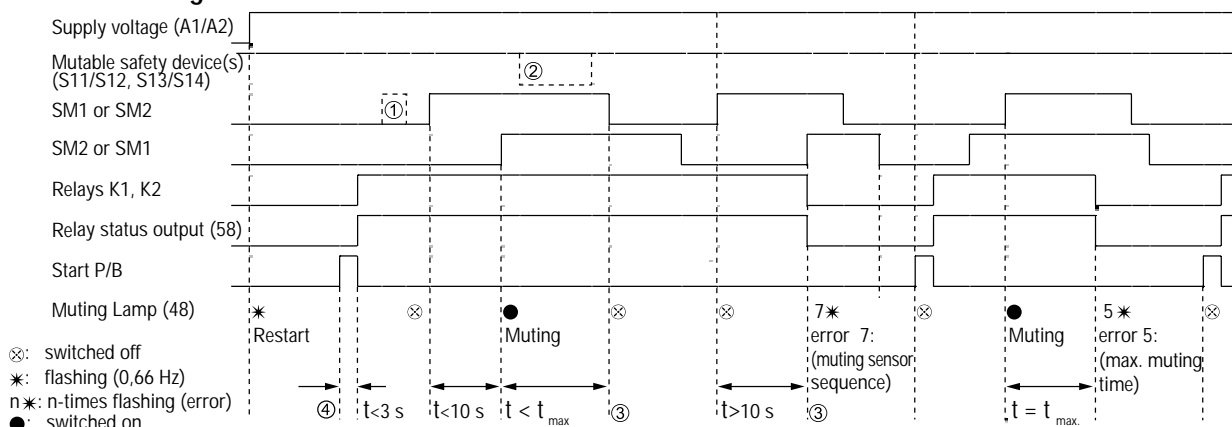


Internal view

Mode 20 to 29: muting with 2 muting sensors, 1 mutable and 1 non-mutable safety device (not tested).
 Example: mode 21: max. muting time: 20 s.

- Note (A):** Connect mutable safety device to S11/S12 and S13/S14. Connect non-mutable safety device to S21/S22 and S23/S24. Signals between redundant safety device inputs S11 to S14 or S21 to S24 must be applied within a max. time of 2,5 s.
Modes 20 to 39: muting using safety devices without test input: unused safety device inputs must be connected to power: S21 and S23 to (dc-); S22 and S24 to (dc+).
- Note (B):** **Modes 50 to 69: muting using safety devices with test input:** terminal 58 is used as test output that must be connected to the test input of each safety device. Unused safety device inputs must be connected to power and to the test output: S21 and S23 to (dc-); S22 and S24 to 58 (refer to Chapter "Test input").
Modes 50 to 59 (only): 1 non-mutable and 1 mutable safety device AND safety devices with test input: the mutable safety device needs to be activated during the muting sequence.
- Note (C):** **Bi-directional muting with 4 SM muting sensors (example 1B):** connect SM1b and SM2b as shown in parallel to SM1a and SM2a.
- Note (D):** **Sensors contact type:** this can be voltage free dry contacts or static outputs. When using sensors with static outputs, use 1 PNP and 1 NPN sensor to allow cross fault detection between the input channels.
- Note (E):** **External contactors:** when external contactors are used, connect one normally closed contact of each contactor (or the normally closed contact of the FF-SRE extension module) in series into the combined restart loop and External Device Monitoring (EDM) loop S43/S44. Install arc suppressors across the coils of external safety relays.

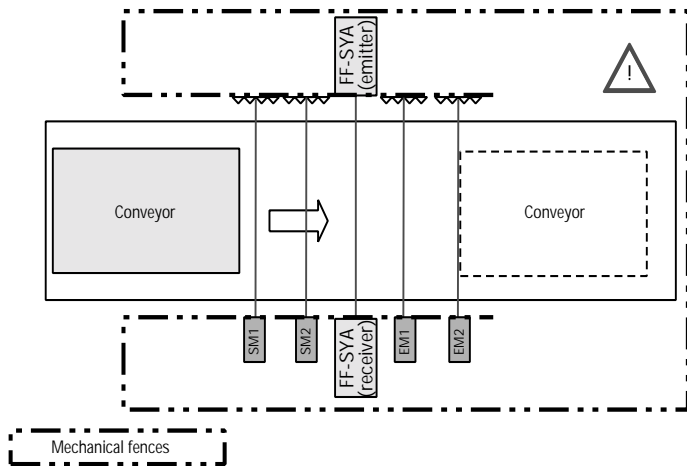
Functional diagram



Notes:

- Maximum coincidence time between activation of muting sensors SM1 / SM2: 10 s (only the raising signal edge is taken into account).
- Muting sensors can be activated in any order (SM1 then SM2 or SM2 then SM1).
- All muting sensors SM1 and SM2 must remain activated during a muting sequence. In the case of 2 pairs of muting sensors at least one of each parallel sensor (SM1a or SM1b, SM2a or SM2b) must remain activated.
- The de-activation of the first muting sensor SM1 or SM2 will stop the muting sequence (only the falling signal edge is taken into account). In the case of 2 pairs of muting sensors, the de-activation of the first muting sensor group (SM1a / SM1b or SM2a / SM2b) will stop the muting sequence.
- t_{max}: max. muting time programmable with the internal selector "B".
- The activation of only one sensor SM is ignored (see ①).
- The activation of the mutable safety device is not necessary during a muting sequence (except modes 50 to 59) (see ②).
- Muting sensors SM1 and SM2 must be inactive before starting a new muting sequence (see ③).
- The restart push-button must be pushed AND released within 3 s to start the module (see ④).
- Activating the non mutable safety device leads to the de-energisation of the safety relay outputs of the module.

Application example 2: Uni-directional muting with 1 mutable safety device and 4 muting sensors



Description

A conveyor is loading and unloading a hazardous zone protected by one mutable safety device (e.g. safety light curtain). As the conveyor enters and exits the zone at two different points, the movement is uni-directional.

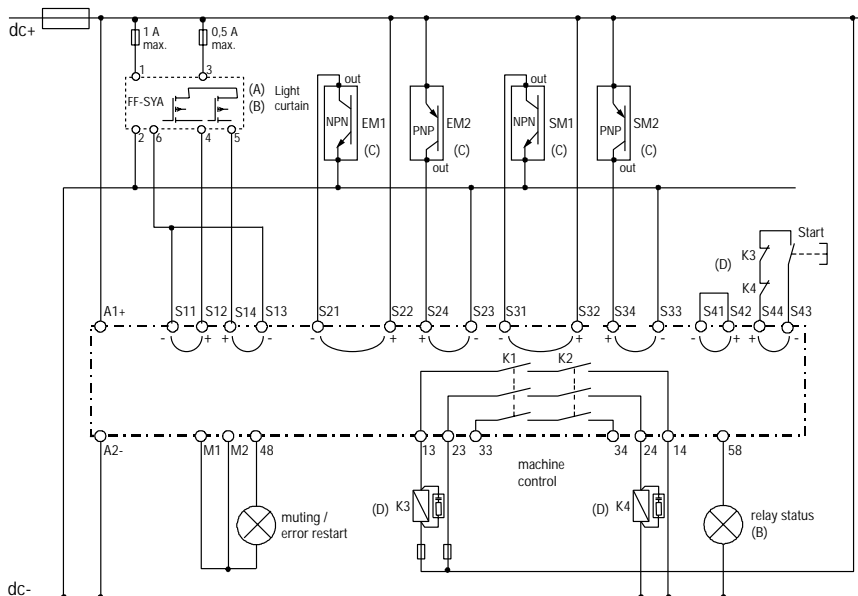
The muting system is composed of the following elements:

- the FF-SRM200P2 muting module,
- 1 mutable safety device (e.g. FF-SYA safety light curtain) detecting access through the opening for the conveyor,
- 2 start muting sensors SM1, SM2 and 2 end muting sensors EM1, EM2 (e.g. limit switches, proximity sensors, through scan or retro-reflective-polarised photoelectric sensors).

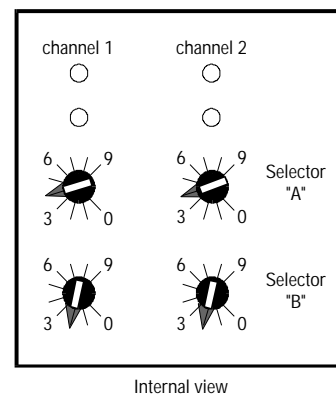
In order to start a **muting sequence**, the muting sensors SM1 and SM2 must be activated within a time frame of maximum 10 s. The muting sequence is stopped after de-activating the first of the two end muting sensors EM1 or EM2.

In any case, the muting sequence will be interrupted after the **maximum selected muting time** has elapsed. If an object remains accidentally in the detection field of the muted safety device and the muting time has elapsed an external Temporary Manual Muting (TMM, customer supplied) may be used to evacuate the detection field.

Wiring diagram



Mode selector



Modes 40 to 49: muting with 2 start muting sensors SM1, SM2, 2 end muting sensors EM1, EM2 and 1 mutable safety device without test input.
Example: mode 42: max. muting time 30 s.

Note (A): Signals between redundant safety device inputs S11 to S14 must be applied within a max. time of 2.5 s.

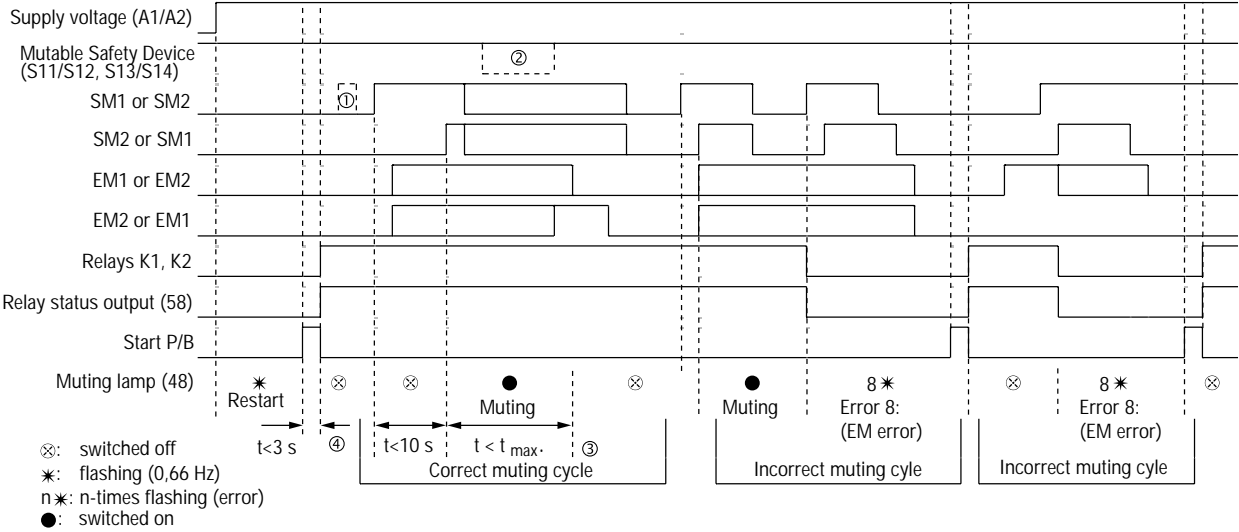
Note (B): Modes 70 to 79: muting using safety devices with test input: Terminal 58 is used as test output that must be connected to the test input of the safety device (refer to chapter "Test input").

Note (C): Sensors contact type: this could be voltage free dry contacts or static contacts. When using sensors with static outputs, use 1 PNP and 1 NPN sensor to allow cross fault detection between the input channels. Use sensors with open outputs when no object is detected.

Note (D): External contactors: When external contactors are used, connect one normally closed contact of each contactor (or the normally closed contact of the FF-SRE extension module) in series into the combined restart loop and External Device Monitoring (EDM) loop S43/S44. Install arc suppressors across the coils of external safety relays.

FF-SRM

Functional diagram

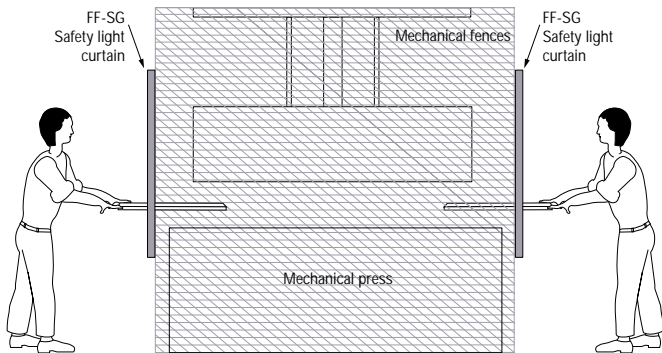


Notes:

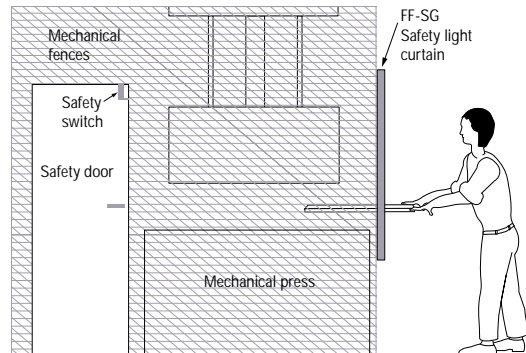
- Maximum coincidence time between activation of muting sensors SM1 / SM2: 10 s (only the raising signal edge is taken into account).
- No timing constraints between EM1 / EM2.
- Muting sensors can be activated in any order within the pair (SM1 then SM2 or vice-versa, EM1 then EM2 or vice-versa).
- Once a valid muting sequence is started, both muting sensors SM1 and SM2 may be de-activated the muting sequence without stopping the muting sequence in progress.
- The de-activation of the first end muting sensor EM1 or EM2 will stop the muting sequence (only the falling signal edge is taking into account).
- t_{max} : max. muting time programmable with the internal selector "B".
- The activation of only one sensor SM is ignored (see ①).
- The activation of the mutable safety device is not necessary during a muting sequence (except modes 50 to 59) (see ②).
- All SM and EM sensors must be inactive before starting a new muting sequence (see ③).
- The restart push-button must be pushed AND released within 3 s to start the module (see ④).
- Activating the not mutable safety device leads to the de-energisation of the safety relay output of the module.

Application example 3: Muting on a mechanical press

3A - Muting on a mechanical press with 2 muting sensors and 2 mutable safety devices



3B - Muting on a mechanical press with 2 muting sensors, 1 mutable and 1 non-mutable safety device



Description

On a mechanical press, the mutable safety device(s) (e.g. safety light curtain) can be muted as soon as the press tool reaches the bottom dead centre (BDC), allowing the operator to unload the press during the opening stroke without stopping the press movement.

As soon as the press tool reaches the BDC, muting sensors SM1 and SM2 are activated by the rotating disk cam. A **muting sequence** will be started, when muting sensors SM1 and SM2 are activated within a time frame of 10 s.

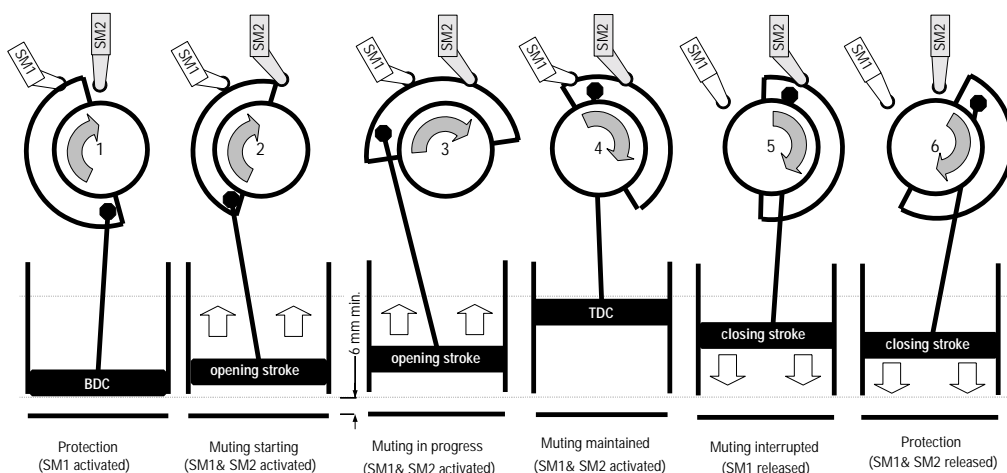
The muting sensors must remain activated till the press tool initiates its closing stroke. When the first of the two muting sensors is de-activated by the rotating disk cam, the muting sequence will be stopped.

The muting system is composed of the following elements:

- the FF-SRM200P2 muting module,
- example 3A: up to 2 mutable safety devices (e.g. FF-SG safety light curtains),
- example 3B: 1 mutable (e.g. FF-SG safety light curtain) and up to 1 non-mutable safety device (e.g. GK safety key interlock) to monitor the safety door ("guard only"),
- 2 muting sensors SM1 and SM2 to start and end the muting sequence.

The use of the second mutable or non-mutable safety device connectable to the same FF-SRM200P2 module is optional.

In any case, the muting sequence will be interrupted after the **maximum selected muting time** has elapsed. If an object remains accidentally in the detection field of the muted safety device and the muting time has elapsed, an external Temporary Manual Muting (TMM, customer supplied) must be used to evacuate the detection field.



SM1: muting sensor 1

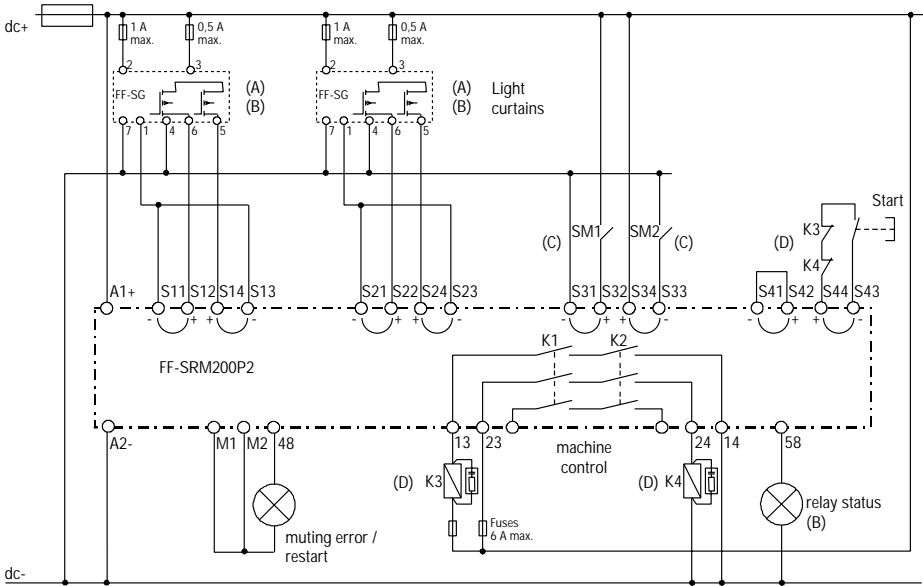
SM2: muting sensor 2

BDC (Bottom Dead Center): point at which the tool is closest to the die.

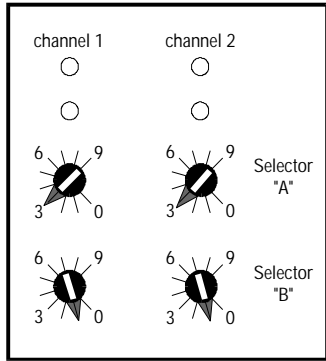
TDC (Top Dead Center): point at which the tool is furthest to the die.

FF-SRM

Typical wiring diagram application example 3A



Mode selector



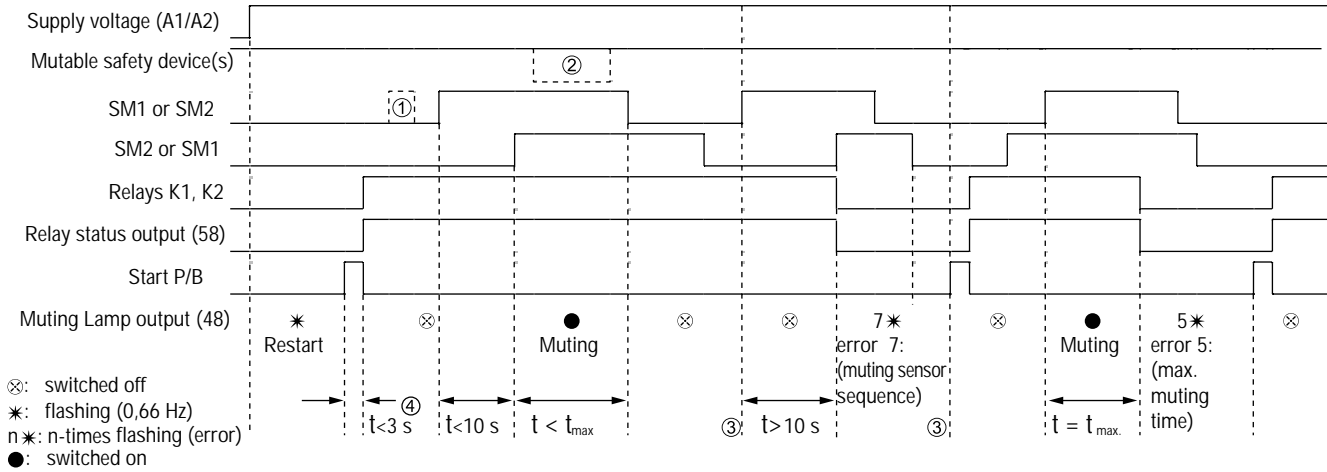
Internal view

Modes 30 to 39: muting with 2 muting sensors and 2 mutable safety devices.

Example: mode 31: max. muting time 20 s.

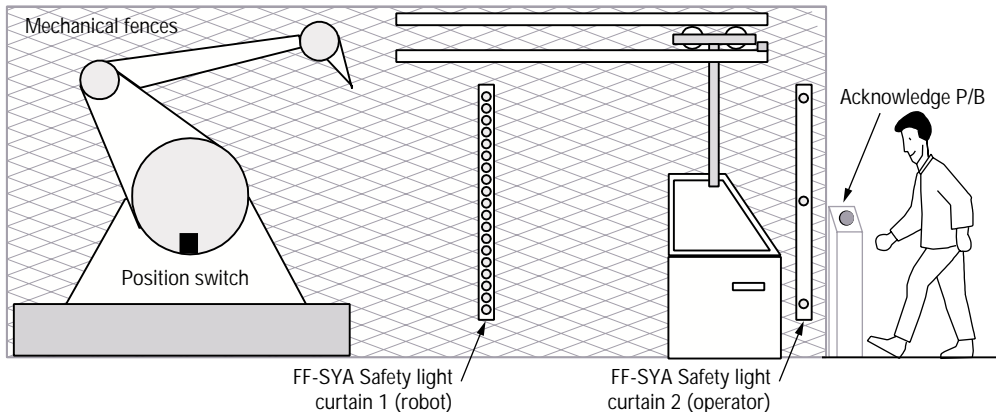
- Note (A):** Signals between redundant safety device inputs S11 to S14 or S21 to S24 must be applied within a max. time of 2.5 s.
Modes 20 to 39: muting using safety devices without test input: Unused safety device inputs must be connected to power: S21 and S23 to (dc-); S22 and S24 to (dc+).
- Note (B):** **Modes 50 to 69: muting using safety devices with test input:** Terminal 58 is used as test output that must be connected to the test input of each safety device (refer to chapter "Test input").
Modes 50 to 59 (only): 1 non-mutable and 1 mutable safety device AND safety devices with test input: the mutable safety device needs to be activated during the muting sequence.
- Note (C):** **Sensors contact type:** Safety switch contacts are preferred for press applications.
- Note (D):** **External contactors:** when external contactors are used, connect one normally closed contact of each contactor (or the normally closed contact of the FF-SRE extension module) in series into the combined restart loop and External Device Monitoring (EDM) loop S43/S44. Install arc suppressors across the coils of external safety relays.

Functional diagram



- Notes:
- Maximum coincidence time between activation of muting sensors SM1 / SM2: 10 s (only the raising signal edge is taken into account).
 - Muting sensors can be activated in any order (SM1 then SM2 or SM2 then SM1).
 - All muting sensors SM1 and SM2 must remain activated during a muting sequence.
 - The de-activation of the first muting sensor SM1 or SM2 will stop the muting sequence (only the falling signal edge is taking into account).
 - t_{max}: max. muting time programmable with the internal selector "B".
 - The activation of only one sensor SM is ignored (see ①).
 - The activation of the mutable safety device is not necessary during a muting sequence (except for modes 50 to 59) (see ②).
 - Muting sensors SM1 and SM2 must be inactive before starting a new muting sequence (see ③).
 - The restart push-button must be pushed AND released within 3 s to start the module (see ④).
 - Activating the not mutable safety device leads to the de-energisation of the safety relay output of the module.

Application example 4: Mutual exclusion function in a robot area
Mutual exclusion function with 2 safety devices and an enabling contact



Description

A robot and an operator regularly access the same hazardous area in order to carry out operations.

The mutual exclusion principle consists in:

- allowing the operator access to the hazardous area only when the robot is outside of it,
- allowing the robot access to the hazardous area only when the operator is outside of it and has acknowledged exiting the area.

The mutual exclusion system is composed of the following elements:

- the FF-SRM200P2 muting module,
- safety device 1 (e.g. FF-SYA safety light curtain 1) monitoring the access of the robot into the area,
- safety device 2 (e.g. FF-SYA safety light curtain 2) monitoring the access of the operator into the area,
- an optional safety device (e.g. safety switch) monitoring the robot position, before it is detected by safety light curtain 1,
- an acknowledge push-button located outside of the area.

The functional principle of the mutual exclusion consists in not allowing the activation of the safety devices for the operator and the robot at the same time. When the operator is entering the area activating safety light curtain 2, the access is memorised in the module. After leaving the area the operator needs to push the acknowledge push-button to confirm his exit. This push-button must be located outside the area with a clear view to the hazard.

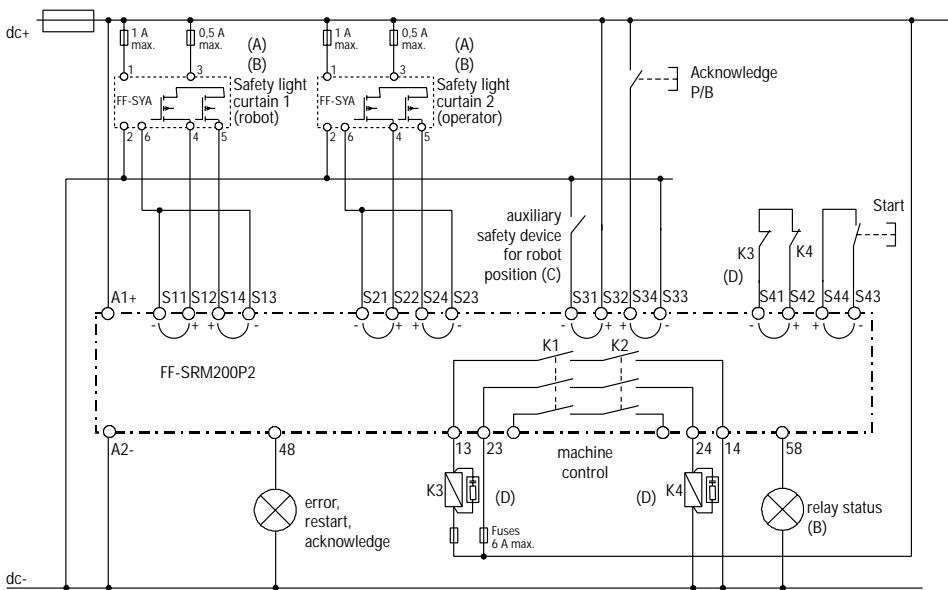
If the robot activates safety light curtain 1 before the operator has pushed the acknowledge push-button, the hazard will be stopped through the safety relay outputs of the FF-SRM200P2 muting module.

The hazard will also be stopped if safety light curtain 1 is activated and the operator attempts to enter the area actuating safety light curtain 2.

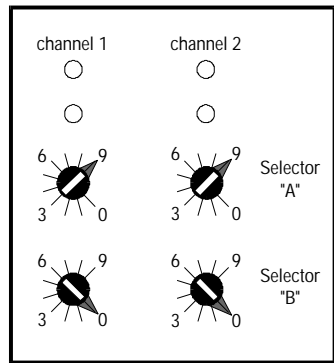
In order to increase safety (especially when the operator is likely to work close to safety light curtain 1 (robot) without keeping the required safety distance), safety may be increased by installing an additional safety sensor (e.g. safety switch) to monitor and anticipate the robot position.

If used, both the auxiliary safety device AND the safety light curtain 1 must have their sensing fields free (= voltage is applied to the module inputs S11 to S14, S31 and S32), in order to allow the operator to enter the hazardous area. As soon as the robot is detected by AT LEAST ONE of the robots safety devices (light curtain 1 or additional safety switch), the operator is not allowed to enter the hazardous area without stopping the hazard.

Typical wiring diagram



Mode selector

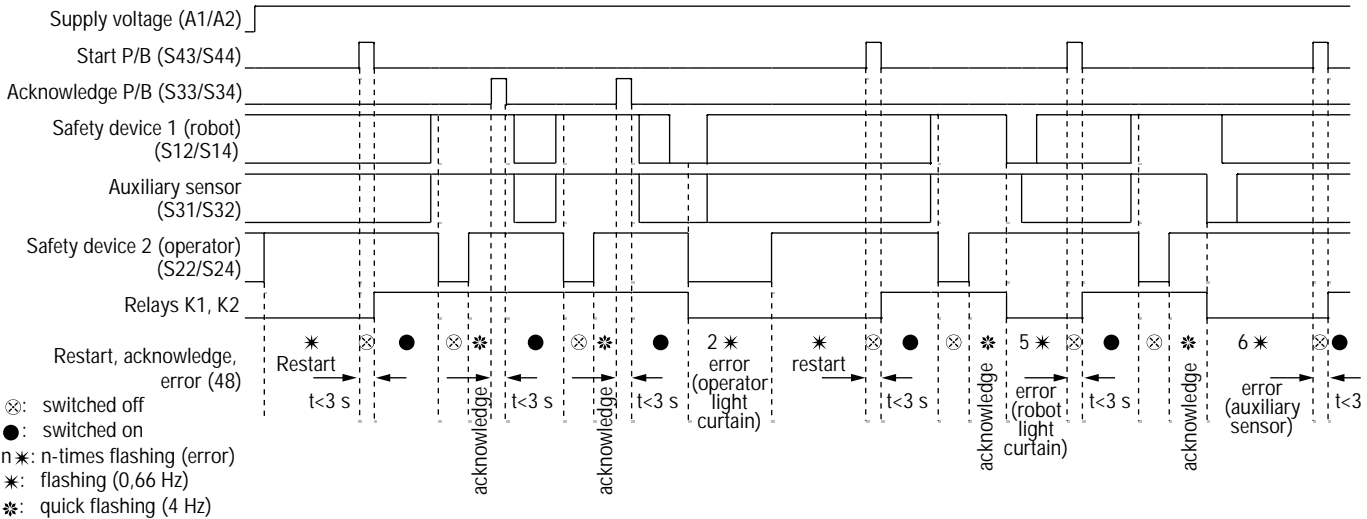


Internal view

Modes 90 to 93: mutual exclusion.
 Example: mode 90 (safety device without test input and with EDM).

- Note (A):** Signals between redundant safety device inputs S11 to S14 or S21 to S24 must be applied within a max. time of 2.5 s.
- Note (B): Modes 92 and 93: mutual exclusion using safety devices with test input:** Terminal 58 is used as test output that must be connected to the test input of each safety device (included auxiliary safety device, see chapter "Test input").
- Note (C): Auxiliary safety device for robot position (use is application depending and optional):**
Modes 90 to 91: mutual exclusion using safety devices without test input: if used, connect the auxiliary safety device between (dc-) and S31 and S32 to (dc+). Unused robot position inputs must be connected to power: S31 to (dc-) and S32 to (dc+).
Modes 92 to 93: mutual exclusion using safety devices with test input: terminal 58 is used as test output that must be connected to the test input of each safety device (including the auxiliary safety device, see chapter "Test input").
- Note (D): External contactors:** when external contactors are used, connect one normally closed contact of each contact (or the normally closed contact of the FF-SRE extension module) in series into the External Device Monitoring (EDM) loop S41/S42 and select the modes with EDM (modes 90 or 92). In these modes, the muting module also checks, whether the normally closed contacts of the external safety relays have opened max. 250 ms after energising the internal safety relays K1 and K2. Install arc suppressors across the coils of external safety relays.

Functional diagram

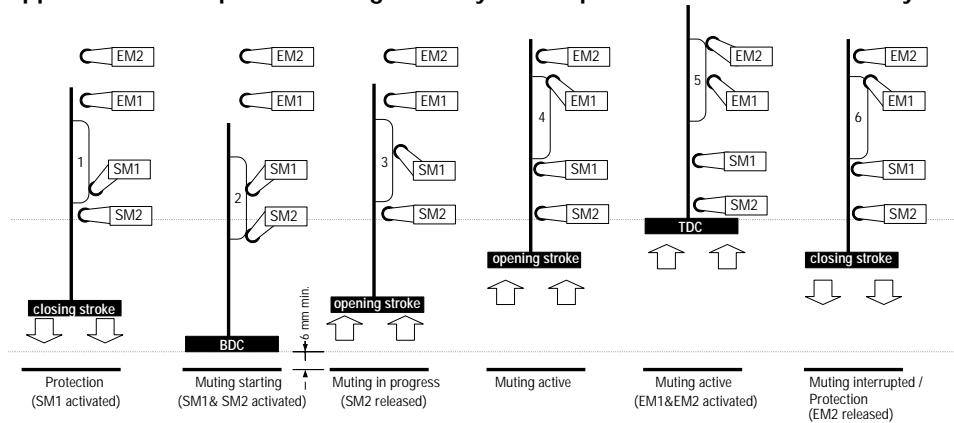


- Notes:
- ⊗: switched off
 - : switched on
 - n*: n-times flashing (error)
 - *: flashing (0,66 Hz)
 - *: quick flashing (4 Hz)
- Safety device 1 (robot) and the auxiliary safety device for the robot position are permanently muted (allowing the robot to enter the hazardous area):
 - If safety device 2 (operator) is not activated OR
 - If safety device 2 has been activated, but the operator has pushed the acknowledge push-button, to confirm that he has left the hazardous area.
 - The start push-button must be pushed AND released within 3 s, to energise the safety output contact of the module.
 - The acknowledge push-button must be pushed for acknowledgment during less than 3 s. The module de-energises its safety output contacts, when the push-button is pushed longer than 3 s.
 - Pushing the start push-button with one or both of the robot's safety devices activated leads to the energisation of the module output contacts:
 - If safety device 2 (operator) is not activated OR
 - If safety device 2 has been activated, but the operator has pushed the acknowledge push-button, to confirm that he has left the hazardous area.

OTHER EXAMPLES

The following application examples are detailed in the installation manual of the FF-SRM200P2 muting module.

Application example 5: Muting on a hydraulic press with 1 mutable safety device and 4 muting sensors



SM1 Start muting sensor 1
 SM2 Start muting sensor 2
 EM1 End muting sensor 1
 EM2 End muting sensor 2

BDC (Bottom Dead Center):
 point at which the tool is
 closest to the die.

TDC (Top Dead Center):
 point at which the tool is fur-
 thest to the die.

Description

On a hydraulic press, the safety device (e.g. safety light curtain) can be muted as soon as the press tool reaches the bottom dead centre (BDC), allowing the operator to unload the press during the opening stroke without stopping the movement of the press.

The muting system is composed of the following elements:

- the FF-SRM200P2 muting module,
- 1 mutable safety device (e.g. a safety light curtain)
- 2 start muting sensors and 2 end muting sensors (e.g. cam operated safety switches)

As soon as the press tool reaches the BDC, the start muting sensors SM1 and SM2 are activated. When activated within a time frame of maximum 10 s, a new muting sequence will be started. The end muting sensors EM1 and EM2 must get de-activated when the press tool starts its closing stroke. The muting sequence gets terminated as soon as the first of the end muting sensors is de-activated.

In any case, the muting sequence will be interrupted after the maximum selected muting time has elapsed. If an object remains accidentally in the detection field of the muted safety device and the muting time has elapsed, an external Temporary Manual Muting (TMM, customer supplied) may be used to evacuate the detection field.

TEST INPUT EXAMPLE

Muting using one FF-SLG18/FF-SLG30 type 2 safety light curtain with test input (modes 50 to 69)

⚠ DANGER

IMPROPER SAFETY PRODUCT USE IN THE US

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

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

When connecting type 2 safety devices to the FF-SRM200P2 muting module, the test function normally must be used to check the safety integrity of the safety device.

However, the type 2 safety light curtains of the FF-SLG18 and FF-SLG30 Series are permanently self-checked internally making the use of the test input NOT compulsory and optional.

Safety devices compatible with the FF-SRM200P2 test output

- FF-SLG18 and FF-SLG30 type 2 safety light curtains (all models with the exception of FF-SLG18147B2 and FF-SLG30147B2)
- Safety switches (e.g. for safety door monitoring).

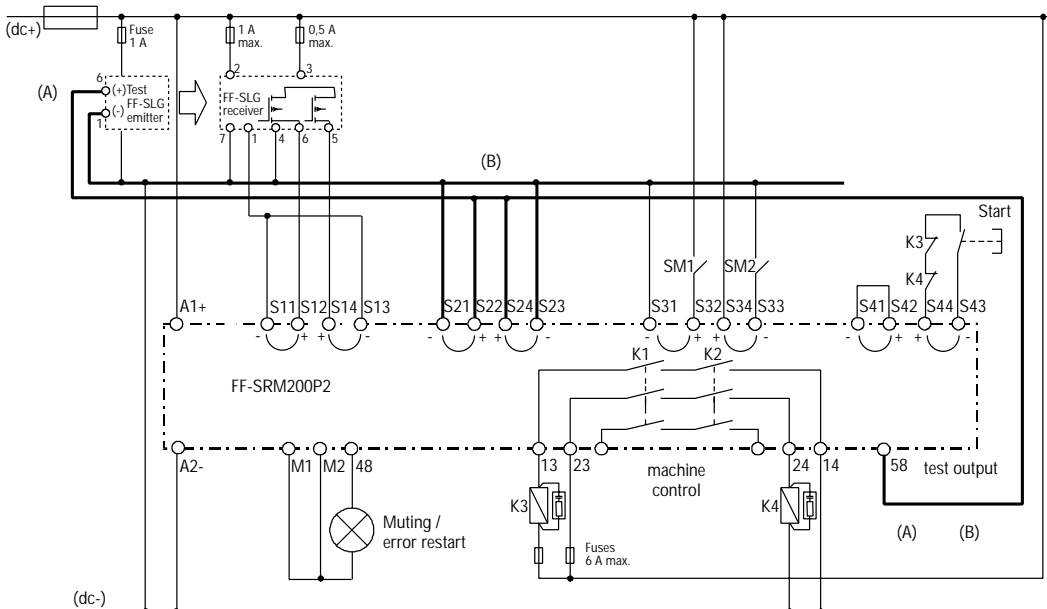
Modes with test

- Muting modes 50 to 79
- Mutual exclusion modes 92 to 93.

In these modes the output terminal 58 is used as test output and it must be connected to the test inputs of **all** connected safety devices, that are tested simultaneously.

A test signal is generated

- At each activation of the start push-button and each activation of the acknowledge push-button
- At each new and valid muting sequence (muting lamp light on).



Note (A): Connect test output terminal 58 to the test input of each FF-SLG18/FF-SLG30 emitter as shown in the wiring diagram above while respecting the polarity of the test input terminals (test input (+) = terminal 6, test input (-) = terminal 1).

Note (B): Unused safety device inputs must be connected to power and to the test output: S21 and S23 to (dc-); S22 and S24 to 58.

Modes 50 to 59 (only): 1 non-mutable and 1 mutable safety device AND safety devices with test input: the mutable safety device needs to be activated during the muting sequence.

TEMPORARY MANUAL MUTING EXAMPLE

Uni-directional muting with 1 mutable safety device and 4 muting sensors

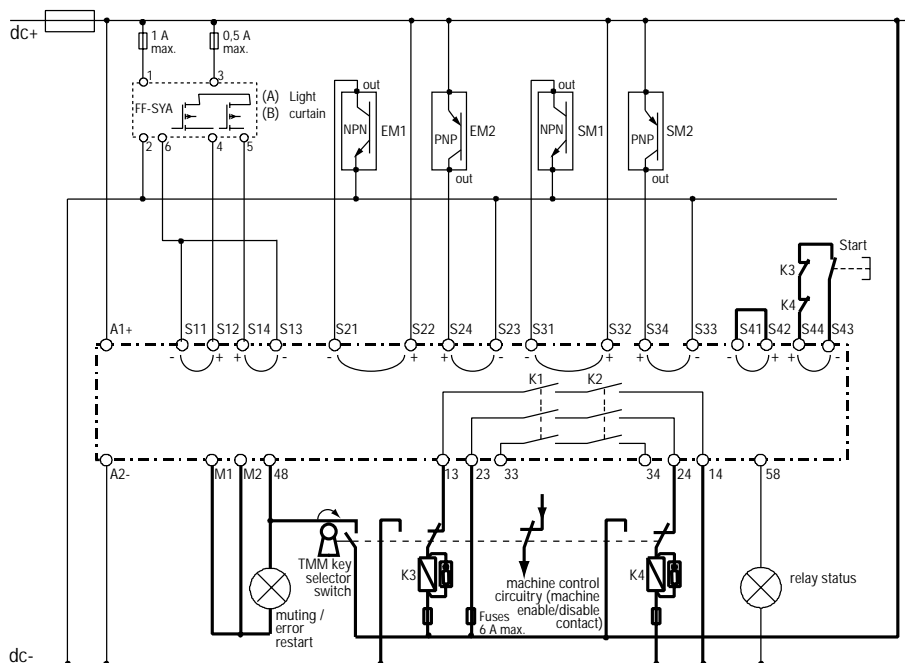
An external Temporary Manual Muting (TMM) may be necessary, in order to evacuate an object (e.g. a palette with goods in a conveyor application) accidentally remaining in the detection field of a safety device.

The use of a TMM may be necessary in the following cases:

- An object remains in the detection field of a safety device.
- The selected maximum muting time has elapsed.
- Loss of power.
- An application error or a fatal error occurred on the module (e.g. muting lamp failure).

The external TMM system shall be composed by the following components (customer supplied):

- One dual contact key selector switch with two positions or two separate key selector switches with two positions (alternative: two-hand control).
- Two external safety contactors (with mechanically guided contacts and a normally closed EDM monitoring contact).
- The muting lamp (already connected to terminal 48 of the module).



Diagnostic informations

Detailed diagnostic information for an easy troubleshooting of your muting application is available using the following indicators:

- internal indicators: LED "RUN1" and "RUN2" located on the module front panel,
- external indicators: muting lamp connected to terminals 48.

In the case of a failure the indicators are indicating a flashing code. There exist two types of errors:

- **FATAL ERRORS** are only indicated by flashing internal LED's "RUN1" and /or "RUN2". The muting lamp connected to terminal 48 remains permanently off.

The normally open safety contacts (13/14, 23/24, 33/34) are de-energised and the module needs to be reset by taking the power off and on after resolving the error cause.

- **APPLICATION AND INSTALLATION ERRORS** are indicated by flashing internal LED "RUN1" and the muting lamp connected to terminal 48. LED "RUN2" is permanently on.

The normally open safety contacts (13/14, 23/24, 33/34) are de-energised, but the module can be restarted pushing the start push-button after resolving the error cause.

FATAL ERRORS				
Error code	LED RUN 1	LED RUN 2	Muting lamp (48)	Error type
0	⊗	⊗	⊗	Internal module error
5	5 ✱ (1)	5 ✱ (1)	⊗	Mode selector error
6	6 ✱	⊗	⊗	Under-voltage error
	⊗	6 ✱	⊗	Over-voltage error
7	7 ✱ (1)	7 ✱ (1)	⊗	Input error
8	8 ✱ (1)	8 ✱ (1)	⊗	Internal relay contact error
9 10 11 12 13	9-13 ✱ (1)	9-13 ✱ (1)	⊗	Internal module error

Note (1): It is possible that

- LED "RUN1" and "RUN2" are indicating different error codes or,
- only one LED "RUN1" or "RUN2" is indicating an error code and the second LED "RUN1" or "RUN2" is switched off.

APPLICATION AND INSTALLATION ERRORS				
Error code	LED RUN 1	LED RUN 2	Muting lamp (48)	Error type
1	1 ✱	●	1 ✱	Safety device error
2	2 ✱	●	2 ✱	Safety device activated (e.g. beam interruption of a safety device light curtain)
3	3 ✱	●	3 ✱	Restart P/B error, external device monitoring (EDM) error
4	4 ✱	●	4 ✱	External device monitoring (EDM) error (mutual exclusion mode only)
5	5 ✱	●	5 ✱	Max. muting time error (muting modes)
				Safety device 1 (robot) error (mutual exclusion modes)
6	6 ✱	●	6 ✱	Muting lamp error (muting modes)
				Robot position sensor error (mutual exclusion modes)
7	7 ✱	●	7 ✱	Start muting sensor (SM) error
8	8 ✱	●	8 ✱	End muting sensor (EM) error

⊗ : switched off n ✱ : n-times flashing ● : switched on

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to

determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products Asia Pacific Headquarters
Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
FAX: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax 1300-36-04-70

China - PRC - Beijing

Honeywell China Inc.
Phone: +(86-10) 8458-3280
FAX: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6237-0237
FAX: +(86-21) 6237-1237

China - Hong Kong SAR

Honeywell Ltd.
Phone: +(852) 2953-6412
FAX: +(852) 2953-6767

India

Tata Honeywell Ltd
Phone: +(91) 20 6870 445/446
FAX: +(91) 20 681 2243/
687 5992

Indonesia

Honeywell Indonesia Pte Ltd
Phone: +(62) 21 535-8833
FAX: +(62) 21 5367 1008

Japan

Honeywell Inc
Phone: +(81) 3 5440 1425
FAX: +(81) 3 5440 1368

South Korea

Honeywell Korea Co. Ltd
Phone: +(822) 799-6167
FAX: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
FAX: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
FAX: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
FAX: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
FAX: +(886-2) 2245 3241

Thailand

Honeywell Systems Ltd.
Phone: +(662) 693 3099
FAX: +(662) 693 3085

NORTH AMERICA

USA/Canada

Sensing and Control
Phone: 1-800-537-6945
1-815-235-6847
FAX: 1-815-235-6545
E-mail: info.sc@honeywell.com

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
FAX: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
FAX: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 979 00 23
FAX: +(359) 2 979 00 24

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 242 442 111
FAX: +(420) 242 442 182

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
FAX: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
FAX: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
FAX: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(361) 451 43 00
FAX: +(361) 451 43 43

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/
456
FAX: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
FAX: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
FAX: +(47) 66 76 20 90

Poland

Honeywell Sp. zo.o
Phone: +(48) 606 09 64
FAX: +(48) 606 09 01

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
FAX: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 21 231 64 37/38
FAX: +(40) 21 231 6439

Commonwealth of Independent States (CIS)

ZAO Honeywell
Phone: +(7 095) 796 98 36
FAX: +(7 095) 797 99 06

Slovak Republic

Honeywell s.r.o.
Phone: +(421 2) 58 247 403
FAX: +(421 2) 58 247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 695 8000
FAX +(27) 11 805 1504

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
FAX: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
FAX: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
FAX: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 575 6620
FAX: +(90) 216 575 6637

Ukraine

Honeywell
Phone: +(380) 44 201 44 74
FAX: +(380) 44 201 44 75

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481 481
FAX: +(44) 1698 481 676

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
FAX: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 443 2119
FAX +(9712) 443 2536

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
FAX: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 4166 1900
FAX: +(55-11) 4166 1901

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
FAX: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1
FAX: +(593-2) 981-562

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5259-1966
FAX: +(52) 55 5570-2985

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2002 - 2004 Honeywell International Inc. All rights reserved.

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

Type 2 muting interface

For personnel/material discrimination in dangerous zones

FEATURES

- Muting interface with safeguarding function based on a cyclic performance test
- Approved as a Type 2 safety control unit per IEC/EN 61496-1 when used with a light curtain from the FF-SLC range (FF-SLC35, FF-SLC55 or FF-SLC18)
- Replaces the FF-SLU100R2 control unit
- Input: 3 muting sensors: 2 start muting, 1 end muting (optional)
- Output: 2 safety relays with guided contacts (2 A / 125 Vac)
- Response time 0,015 s
- Supply voltage 24 Vdc

TYPICAL APPLICATIONS

- Automatic palletizing / depalletizing systems
- Material handling and storage systems
- Packaging and wrapping machines
- Assembly lines



The FF-SLM200R2 muting interface is a module designed to work with the light curtains from the FF-SLC range. It replaces the FF-SLU100R2 as the system's control unit to build a Type 2 electrosensitive protective equipment (ESPE) in compliance with the International standard IEC/EN 61496-1. When combined with an FF-SLC light curtain and connected to specific muting sensors that complete the system for this type of application, the FF-SLM200R2 control unit provides an efficient solution to the problem of personnel/material discrimination at dangerous access points characterised by transit of pallets.

The FF-SLM200R2 control unit checks safe functioning of the sensing device by sending a test signal and assessing its response time. Correct functioning of external auxiliary relays or contactors is also checked at each test cycle, with permanent automatic monitoring of the muting and override function circuits. Control unit status is provided continuously through LEDs while the self-diagnostic output permits remote management of information regarding correct functioning of the device.

According to safety regulations, the muting function can be activated only if two signals are present. Muting sensors are therefore required, which provide the control unit with information (muting signals) regarding transit of the material "authorised" to access the dangerous zone. The FF-SLM200R2 control unit manages the muting function using 2 or 3 inputs to which sensors with relay output or sensors with PNP static type output can be connected. In particular, switching must be of the DARK ON type.

The control unit activates and de-activates the muting function only with the correct muting sequence, characterised by a specific signal timing, at its inputs. To activate the muting function, the material that passes through the dangerous access point must be detected by both sensor 1 or sensor 2 (within four seconds). During the period in which the function is active, the FF-SLM200R2 control unit is in muting status, indicated externally by a white indicator light located close to the dangerous zone and which is permanently checked by the unit.

An end-muting sensor (sensor 3) can be used to check the distance between two consecutive pallets.

If the machine stops with the material in the area controlled by the light curtain, a manual operation is required to restart the system: the override function. This function, which sets the control unit to override status, must be carried out through simultaneous activation of two manual controls.

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SLM

FF-SLM Type 2 muting interface

- Type 2 according to IEC/EN 61496-1
- 3 inputs: 2 start muting, 1 end muting (optional)
- Replaces the FF-SLU100R2 control unit when used with FF-SLC light curtains



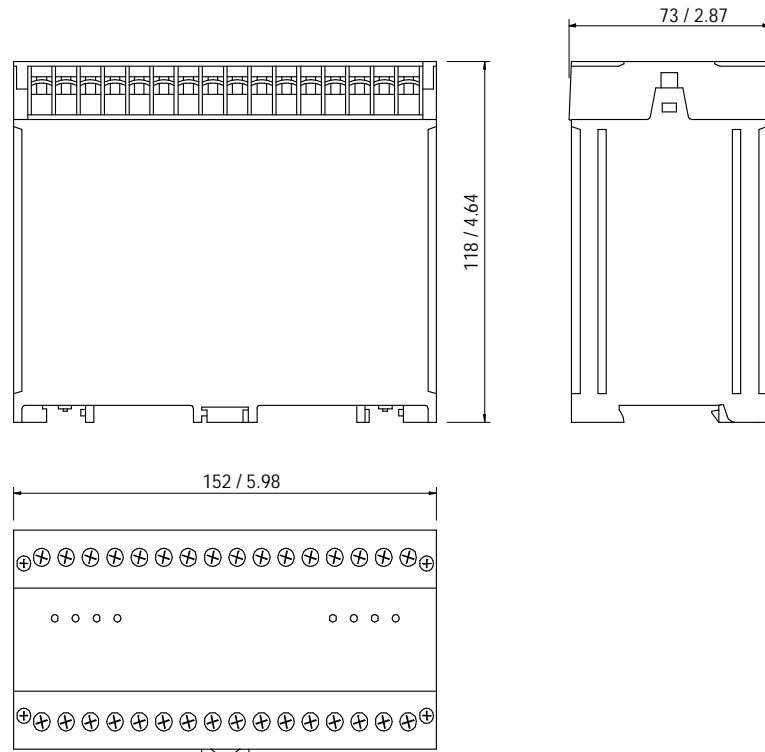
Dimensions in meters / feet, millimeters / inches, weights in kg / lbs

Features	Power supply	24 Vdc ± 20%
	Power consumption	8 W
	Output relays	2 N.O. contacts 2 A, 125 Vac / 1 N.C. contact 2 A, 125 Vac
	Self-diagnostic output	1 N.O. contact 0,5 A, 25 Vac - 60 Vdc / contact open in case of faulty operation
	Muting sensors	DARK ON, relay output 1 N.O. contact or PNP static output
	Muting sensors output feature	100 mA, 24 Vdc
	Muting signaling external lamp	24 Vdc, 0,5...5 W
	Response time (1)	≤15 ms
	Minimum duration of the test command	10 ms
	Reset time from start of the test	150 ms
	Muting signal response time	300 ms
	Electrical connections (2)	Terminal blocks
	Cable length (3)	100 m max. / 328 ft max.
	Operating temperature	0 °C to 55 °C / 32 °F to 131 °F
	Sealing (housing)	IP 40
	Sealing (terminal blocks)	IP 20
	Mechanical mounting	Quick mounting on rail according to EN 50022-35
	Dimensions	152 mm x 73 mm x 118 mm / 5.98 in x 2.87 in x 4.64 in
	Weight	800 g / 1.76 lb

Ordering information:
FF-SLM200R2

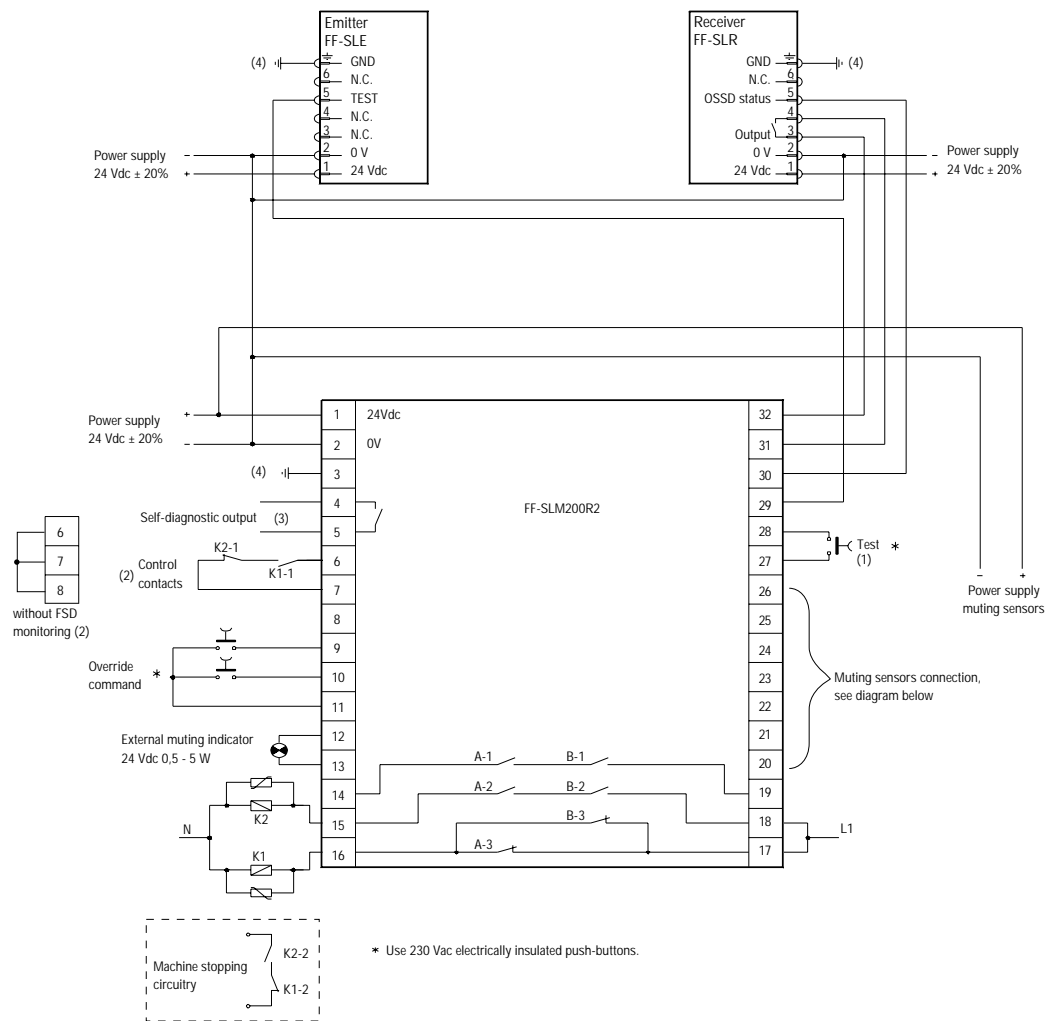
Notice:

- (1) Output circuit de-energization delay in case of field interrupted.
- (2) Use isolating plugs.
- (3) We recommend shielded cable where the level of electrical disturbances is higher than the specified IEC 801-4 level IV.



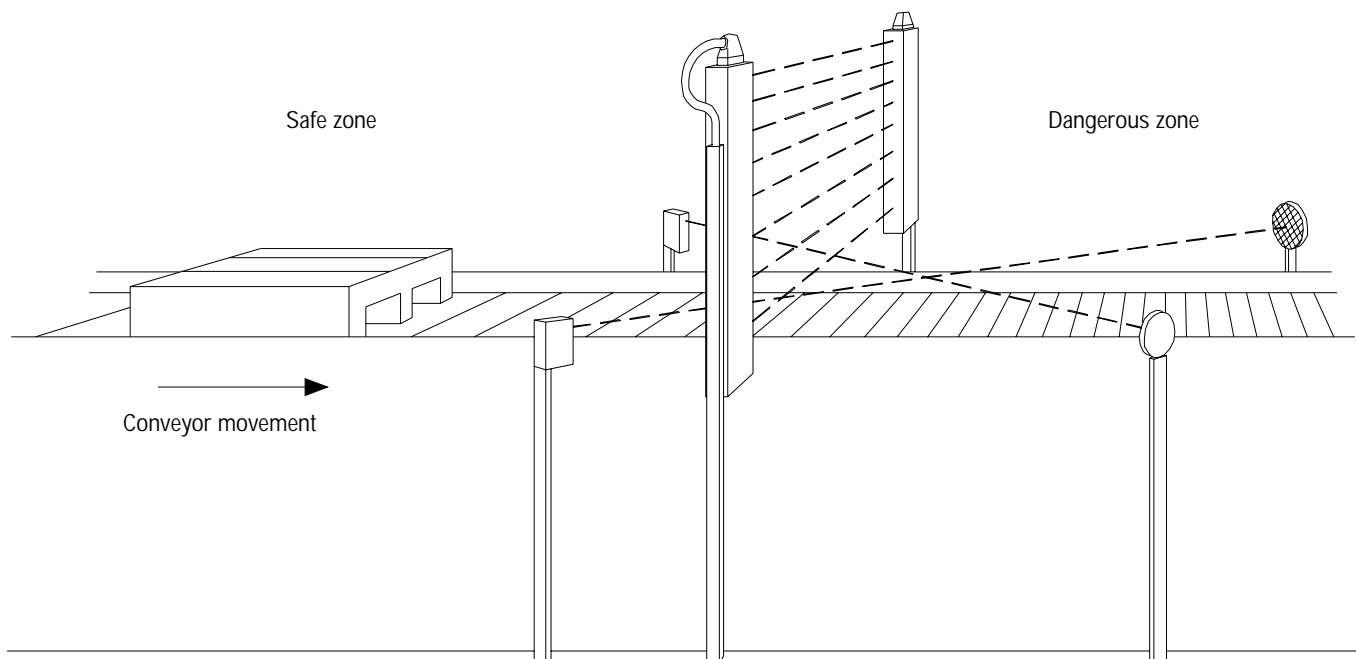
FF-SLM

Connection diagram

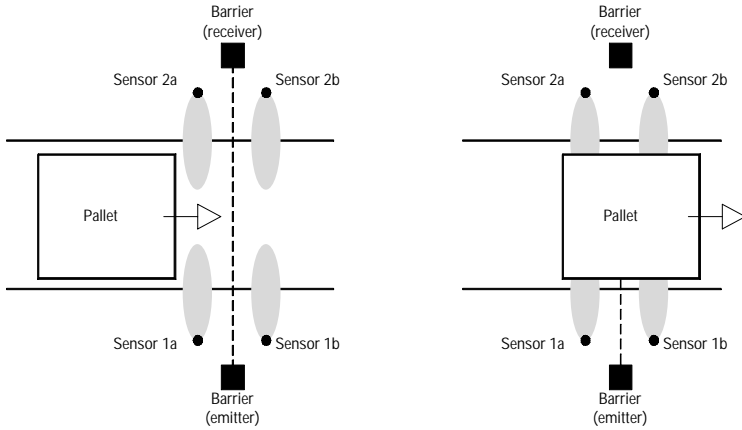


- (1) Test input: the safeguarding function of the system relies on the use of this input. This input enables the cyclic activation of the test and the reset of the system at power on or after each intrusion in the detection field (the contact should be maintained during 10 ms/test duration: 150 ms).
- (2) FSD monitoring: the setting of this feedback control allows the monitoring of the external relays K1 and K2. In case of failure of one relay, the control unit remains in a stop condition until the failure cause is removed.
- (3) Self-diagnostic output: this output provides an alarm signal when a drop of synchronism is detected between the two inner relays A and B (if the feedback connection is set, the alarm signal is also provided in case of drop of synchronism between the two external relays K1 and K2).
- (4) All the ground terminals must be connected to the same potential.

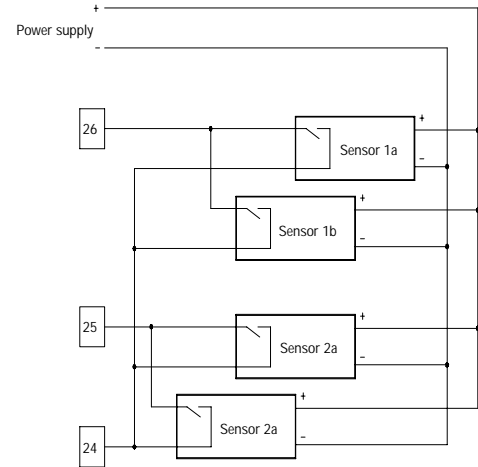
Muting sensors and light curtain positioning



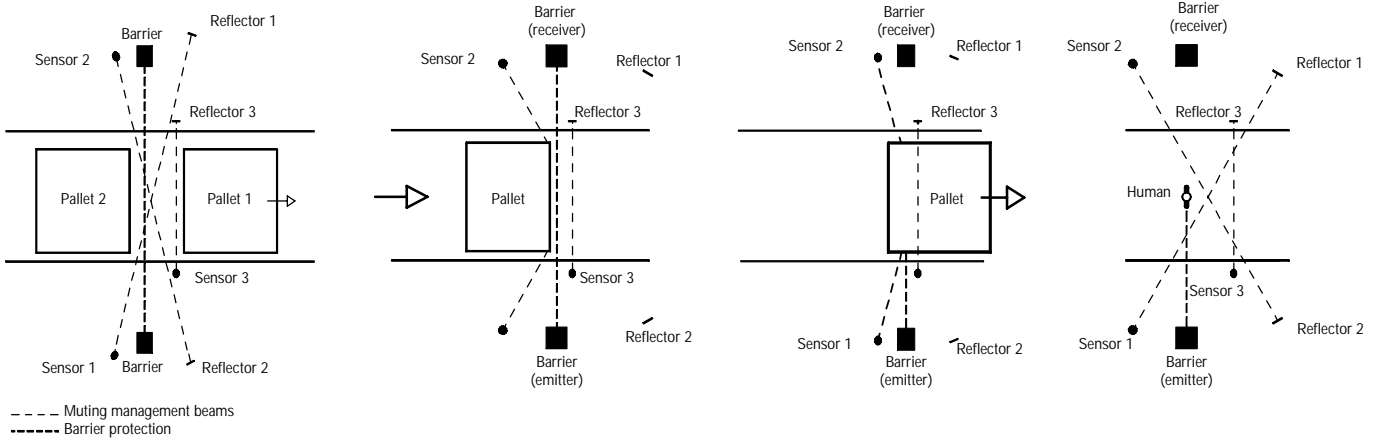
Muting sensor positioning when using inductive sensors



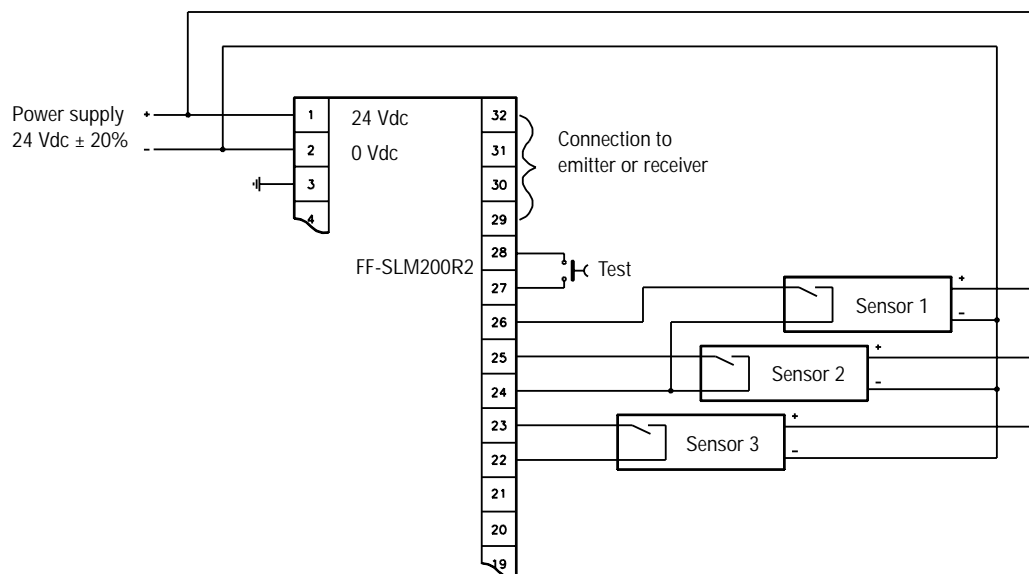
Corresponding connection diagram



Muting sensor positioning when using photoelectric sensors



Corresponding connection diagram

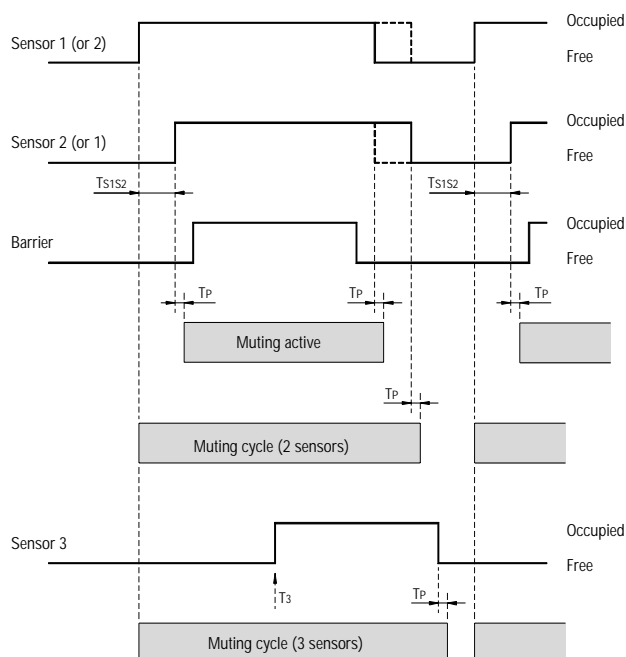


Status tables

		FF-SLM200R2 control unit status						
		GUARD	CLEAR	BREAK	FAIL		FAIL (FAIL K1-K2)	
Barrier output					area free 	area occupied 	area free 	area occupied
FF-SLM200R2 output	14-19							
	15-18							
	16-17							
Self-diagnostic output								
Relay K1	K1-1							
	K1-2							
Relay K2	K2-1							
	K2-2							

		Sensor status	
		Object presence	Object absence
Sensor 1			
Sensor 2			
Sensor 3			
		Control unit in MUTING status	
		Area controlled free	Area controlled occupied
Barrier output			
FF-SLM200R2 outputs	14-19		
	15-18		
	16-17		
Relay K1	K1-1		
	K1-2		
Relay K2	K2-1		
	K2-2		

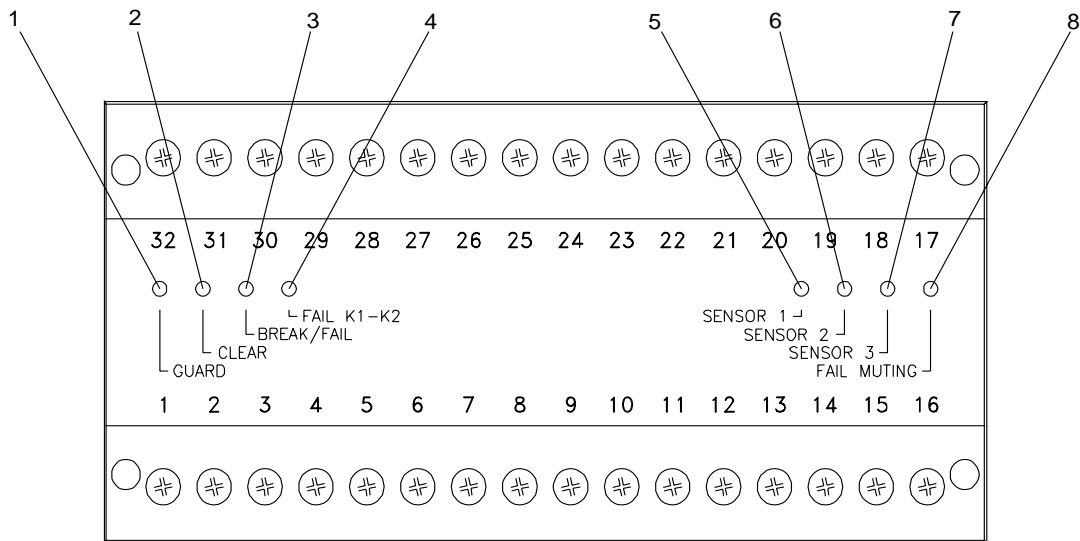
Muting sequence



Note: The signals represent the voltage logical levels at the inputs of the control unit. TS1S2 is the time between detection of the material in transit by sensor 1 (or 2) and detection by sensor 2 (or 1). If TS1S2 is less than 4 seconds, the FF-SLM200R2 activates muting. TP = 300ms is the response time of the control unit on switching of the muting signals. Delay time introduced by the unit to filter switching bounce-back. T3 is the moment of occupation of sensor 3. Interception may take place when the muting function is active or after de-activation of this.

LED indicators

LED N°	Colour	State	Indications	FF-SLM200R2
1	Green	On	Barrier free FF-SLM200R2 output relays energised	GUARD
2	Yellow	On	Barrier free FF-SLM200R2 output relays de-energised	CLEAR
3	Red	On	Barrier occupied FF-SLM200R2 output relays de-energised	BREAK
3	Red	Alternately flickering	Failure of the external relays K1 and K2, FF-SLM200R2 output relays de-energised	FAIL (FAIL K1-K2)
4	Red			
5	Yellow	On	Muting function, Sensor 1 occupied	
6	Yellow	On	Muting function, Sensor 2 occupied	
7	Yellow	On	Muting function, Sensor 3 occupied	
3	Red	Flickering	Incorrect muting sequence	FAIL MUTING
8	Red	On	FF-SLM200R2 output relays de-energised	
1	Green	On	Muting function active	MUTING
External indicator		On	FF-SLM200R2 output relays energised	



FF-SRL59022 multi-safety device relay module with PSDI

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 & Canadian regulations and standards
- Multi-functional module programmable through internal selectors: serial modes, Presence Sensing Device Initiation mode (PSDI or single / double intrusion)
- Compatible with many type 2, type 3 or type 4 safety devices with static outputs or relay outputs (safety light curtains, single beams, laser scanners, safety mats, safety switches)
- Safety relay outputs: 3 NO contacts
- Response time: 26 ms
- Integrated start and restart interlock facility
- 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

SERIAL MODES

- Inputs for up to 3 safety devices

PRESENCE SENSING DEVICE INITIATION MODES (PSDI)

- Single and double intrusion applications
- Input for 1 safety light curtain
- Input for external key operated switch for selection of number of intrusions and intrusion time

TYPICAL APPLICATIONS

- Safeguarding of machines with up to 3 safety devices (serial modes: cascading, L-shape safe-guarding, with light curtains)
- 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, rotating working tables



The **FF-SRL59022** is a programmable safety relay module offering various serial modes (L-shape protection) and 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-energisation of its safety relay outputs.

If needed, the correct functioning of the connected safety devices may be monitored by the module through its **test output**. The FF-SRL59022 module offers an **extensive diagnostic** through indicator that allow for an easy troubleshooting of the application.

In the **serial modes safety devices** (e.g. light curtains, laser scanners, safety mats, safety switches, etc.) protecting a hazardous area can be connected to this module. In the serial modes up to three safety devices can be connected to the same module.

In the **Presence Sensing Device Initiation modes (PSDI) or single intrusion / double intrusion modes**, the FF-SRL59022 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.

⚠ DANGER

IMPROPER PSDI USE IN NORTH AMERICA

Presence Sensing Device Initiation (PSDI) is NOT allowed for use with some applications in North America. Do not use PSDI in North America if the applicable standard(s) prohibit its use. Consult with local safety agencies before installing a PSDI capability.

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

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

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

Product description and applications

In the **serial modes** up to three safety devices can be monitored by a single FF-SRL59022 safety relay module. As soon as one of the connected safety device is actuated (e.g. an object is detected inside the sensing field of a safety light curtain), the normally open safety relays contacts (13/14, 23/24 and 33/34) of the module will open. Different start/restart modes can be set on the module independently for each safety device input. Depending on the mode settings, the module need to be started or restarted using the start push-button or it restarts automatically each time the safety device has been de-activated.

Common applications:

- L-shape safeguarding of presses with vertically and horizontally mounted light curtains for access detection and additional presence detection to avoid an operator being undetected in front of the machine.
- Safeguarding access to a hazardous area on two sides with one safety light curtain on each side and a third side access with a maintenance door monitored by 2 safety switches.

In **single intrusion / double intrusion applications (Presence Sensing Device Initiation (PSDI) modes)**, an operator needs to intrude a safety light curtain once or twice during the non-hazardous portion of a machine cycle, in order to carry out manual operations on the machine.

A **machine contact** (e.g. a safety switch) monitors the machine cycle and authorizes the intrusions to take place during the non-hazardous phase only.

The **number of intrusions** (1 or 2) and the **maximum intrusion time** (15 s, 30 s) can be selected by the user using an external key switch, in order to adapt the settings to the machine process.

Material loading and unloading operations typically require 2 intrusions of the safety device, whereas **loading operations** require one intrusion only.

The module closes its normally closed safety relay contacts (13/14, 23/24 and 33/34) and the machine starts again automatically, after the selected number of intrusions have been performed during the max. allowed time.

Common applications:

- Loading and unloading of presses, carousels, rotating plates, robot areas.

External indicators provide information on safety relay output status, restart status, intrusion phase status and diagnostics.

After power up of the module or after the intrusion of the safety device, the module can be restarted manually via a **restart push-button**.

When necessary, the connected safety devices can be tested using the **test** output of the FF-SRL59022.

The **inputs** of the safety devices are floating allowing the connection of devices with static outputs (PNP or NPN) or safety relay outputs.

An **External Device Monitoring (EDM)** loop is available in order to monitor external safety contactors driven by the safety relay outputs of the module.

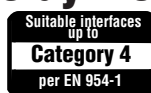
Troubleshooting an application using the FF-SRL59022 module is easy through internal and external diagnostic indicators.

FF-SRL59022 multi-safety device relay module with PSDI



SPECIFICATIONS

Dimensions in millimeters/inches, meters/feet, weights in kg/lbs



Nominal supply voltage (A1(+), A2(-))	24 Vdc (±15 %, power line disturbance: max. 5 ms)
Nominal power consumption	4,1 W
Fuse protection	Internal PTC
Inputs	1, 2 or 3 redundant floating inputs with optocoupler (S11/S12, S13/S14), (S21/S22, S23/S24), (S31/S32, S33/S34)
Key switch selector inputs (PSDI modes)	3 floating inputs with optocoupler (S21/S22), (S23/S24), (S31/S32)
Machine contact input (PSDI modes)	1 floating input with optocoupler (S33/S34)
Restart input (S43/S44)	Normally open (restart on push-button release within max. 3 s)
External Device Monitoring (EDM) (S41/S42)	Normally closed contacts (monitored opening time at restart: max. 230 ms)
Restart delay time	Manual start: 65 ms / Automatic start: 71 ms (cascading modes), 58 ms (PSDI modes)
Input voltage at S12, S14, S22, S24, S32, S34	23 Vdc at nominal voltage
Switching on min. voltage / off max. voltage at S12, S14, S22, S24, S32, S34, S44	16 Vdc / 10 Vdc
Input current at S12, S14, S22, S24, S32, S34, S44	4,5 mA at nominal voltage
Coincidence time between redundant safety device inputs (S12/S14), (S22/S24, S32/S34 cascading modes only)	max. 2,5 s
Max. intrusion time (PSDI, key switch programmable)	1 or 2 intrusions: 15 s or 30 s
Safety outputs	Internally redundant positive guided safety relay contacts
Contact complement	3 NO (13/14, 23/24, 33/34)
Response time	26 ms (between safety device input and module relay outputs)
Switching capability	Power factor = 1 (see Note 1 and Figure 1)
Output Current (min. to max.)	1 mA to 5 A (see Note 1)
Output Voltage (min. to max.)	0,1 to 230 Vac/dc
Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (see Note 2 and Figure 1)
Typical Power Factor (cos φ)	1 A: 2 000 000 operations; 2 A: 1 000 000 operations; 5 A: 300 000 operations; 6 A: 200 000 operations Limitation Factor (see Note 3 and Figure 2)
	0,3
	0,5
	0,7
	1
Operating frequency	1200 switching cycles/h (max.)
Fuse rating	6 A time delayed (max.)
Mechanical life	Ten million switching operations
Auxiliary outputs	Relay status / test output
	PNP static output (58) (23 Vdc/thermal current: max. 100 mA/peak current (max. 0.5 s): 400 mA)
	Test output
	Normally closed characteristics (test active: 0 Vdc, test inactive: 24 Vdc) response of safety device on test signal < 200 ms
	External indicator / diagnostic output
	PNP static output (48) (23 Vdc/thermal current: max. 100 mA/peak current (max. 0.5 s): 400 mA)
General	Temperature range
	0 °C to +50 °C / 32 °F to 122 °F
	Sealing
	Housing IP 40; Terminals IP 20
	Housing material
	Thermoplastic
	Vibration resistance
	Amplitude 0,35 mm; Frequency 10 to 55 Hz
	Connector connection (max.)
	1 x 4 mm ² solid [12 AWG], 1 x 2,5 mm ² [14 AWG], 2 x 1,5 mm ² [16 AWG] stranded wire with sleeve DIN 46288
	Connector attachment
	Removable block terminals with M3,5 screws; wire contacts are enclosed to prevent electrical shock
	Mounting
	Quick install rail mounting EN 50022-35, 35 mm x 15 mm / 1.38 in x 0.59 in size
	Weight
	320 g / 0.70 lb

ORDERING INFORMATION

FF-SRL59022

Note 1: Contact damage: To ensure the 1 mA capability during the lifetime of the contact, never exceed 300 mA or 60 V.

Note 2: Install arc suppression devices across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = operations at power factor 1 multiplied by the limitation factor.
 Example: U = 230 Vac, I = 2 A, power factor cos φ = 0,7
 Switching power P = U x I = 460 Vac
 Contact life (cos φ = 1, P = 460 Vac) = 1 000 000 operations (see Figure 1)
 Limitation factor F (cos φ = 0,5) = 0,7 (see Figure 2)
 Contact life (cos φ = 0,5, P = 460 Vac) = F x contact life (cos φ = 1, P = 460 Vac) = 700 000 operations.

Fig. 1 Contact life for 100% resistive load (typical)

Power factor = 1 (cos φ)(see Note 3)

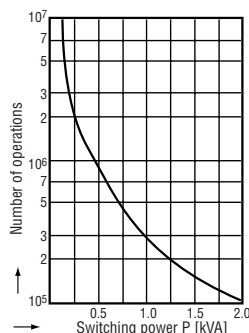
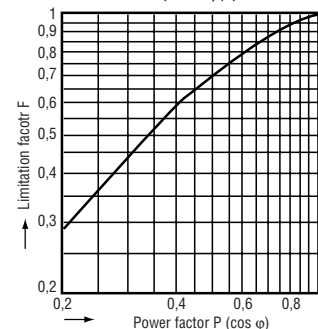


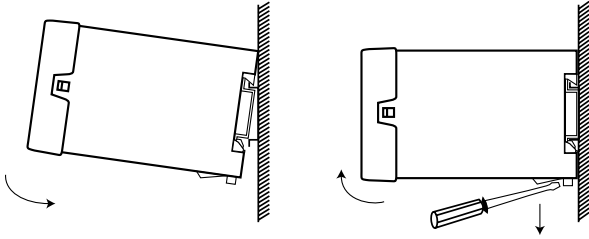
Fig. 2 Limitation factor for inductive loads

Power factor < 1 (cos φ)(see Note 3)



FF-SRL

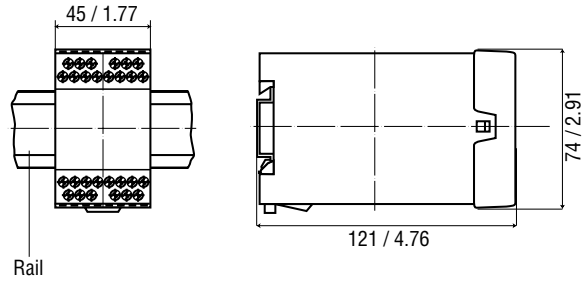
Installation diagram



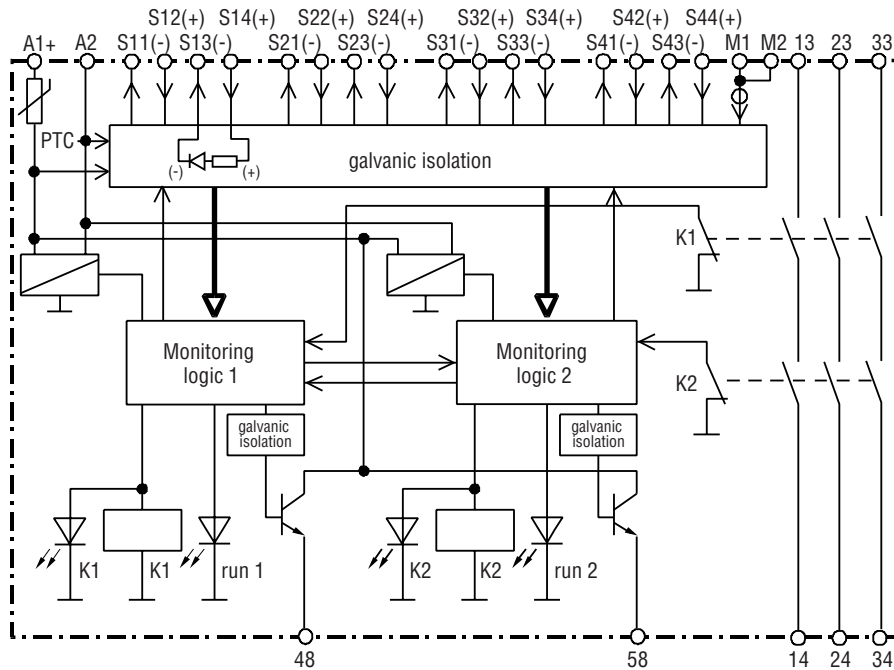
Mounting Dimensions

Width: 45 mm / 1.77 in ; Height: 74 mm / 2.91 in ;

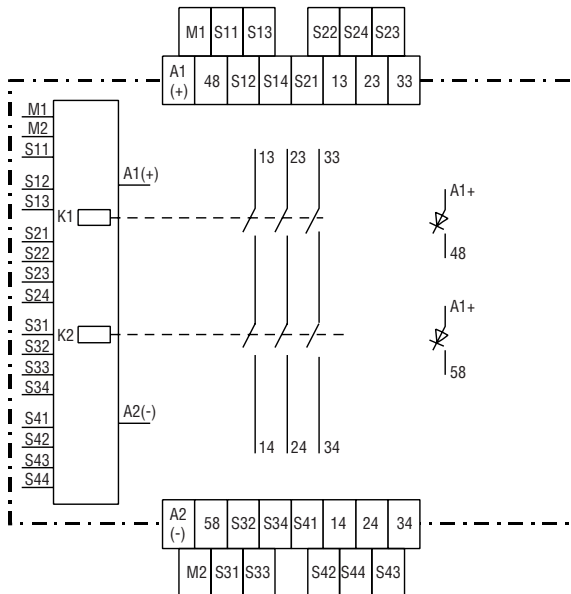
Depth: 121 mm / 4.76 in



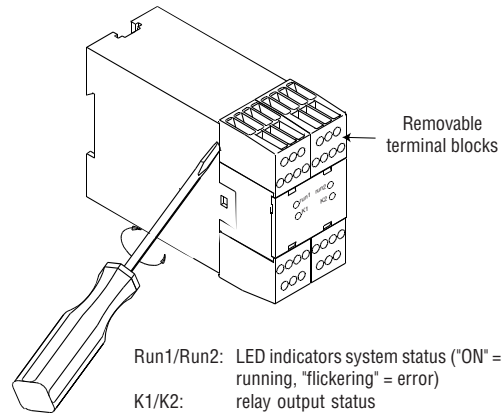
Internal circuitry



Front panel



Removable terminal blocks



FF-SRL

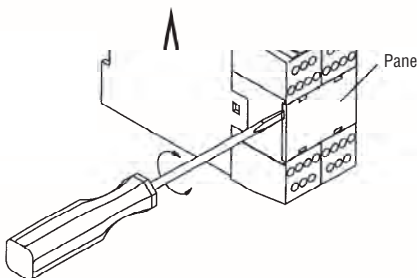
Mode setting

The operating modes of the FF-SRL59022 module are set using 4 selectors located behind the removable front panel. 28 different programs are available allowing to adapt the serial modes and the Presence Sensing Device Initiation (PSDI, single / double intrusion) modes to the application.

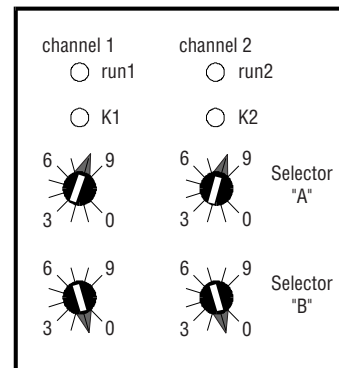
The FF-SRL59022 module has two redundant microprocessor channels. The mode setting of each channel is done by two selectors "A" and "B".

The position of the corresponding selector "A" or "B" for channel 1 and channel 2 must be identical (see example).

Front panel removal



Mode selector "A" and "B" for channel 1 and channel 2



Internal view

▶ example "81"

Example: Selecting mode "81"

Selector	Channel 1	Channel 2	Description
"A"	8	8	single / double intrusion mode
"B"	1	1	without EDM and without test input

SERIAL MODES

Selector "A": External Device Monitoring (EDM) modes		Selector "B": Start and test input modes										
		Safety Device Inputs	Safety device without test input				4	Safety device with test input				9
			0	1	2	3		5	6	7	8	
0	with EDM	(S11/S12, S13/S14)	SD1 start/restart interlock	SD1 automatic restart	SD1 automatic restart	SD1 automatic restart	Not valid	SD1 start/restart interlock	SD1 automatic restart	SD1 automatic restart	SD1 automatic restart	Not valid
		(S21/S22, S23/S24)	SD2 start/restart interlock	SD2 start/restart interlock	SD2 automatic restart	SD2 automatic restart		SD2 start/restart interlock	SD2 start/restart interlock	SD2 automatic restart	SD2 automatic restart	
1	without EDM	(S31/S32, S33/S34)	SD3 start/restart interlock	SD3 start/restart interlock	SD3 start/restart interlock	SD3 automatic restart		SD3 start/restart interlock	SD3 start/restart interlock	SD3 start/restart interlock	SD3 automatic restart	

Note:

Safety device (SD) in "start/restart interlock" means that the module must be restarted using the start push-button after activating and releasing this safety device.

Safety device (SD) is in "automatic restart" means that the module restarts again automatically after releasing all safety devices assigned to automatic start. If a not valid mode has been selected, fatal error 5 is displayed (see chapter "Diagnostic Information" for details).

**PSDI
(SINGLE / DOUBLE
INTRUSION) MODES**

Selector "A": PSDI modes		Selector "B": External Device Monitoring (EDM)										
		Safety device Inputs	Safety device without test input		Safety device with test input		4	5	6	7	8	9
			0	1	2	3						
8	(S11/S12, S13/S14)	with EDM	without EDM	with EDM	without EDM	Not valid						

Note:
The **number of intrusions** (1 or 2) and the **maximum intrusion time** (15 s or 30 s) can be selected by the operator using an **external key selector** connected to module inputs (S21/S22, S23/S24, S31/S32). For details, see application example 2.

LED indicators

The FF-SRL59022 module has 4 LED indicators: two green LED relay status indicators (K1, K2) and two yellow LED status indicator (Run 1, Run 2) on the front panel.

Relay outputs status (K1, K2)

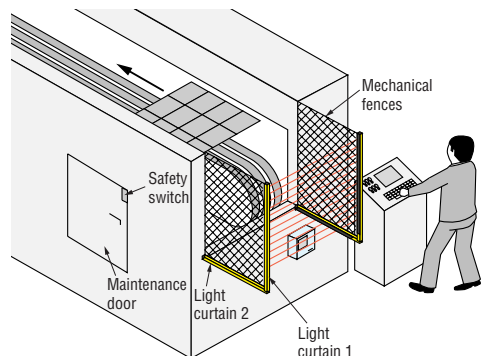
- | | | | |
|---|---|--|---|
| <input type="checkbox"/> Internal relays are de-energized
NO contacts are open | <input type="checkbox"/> NC contact is closed | <input type="checkbox"/> Internal relays are energized
NO contacts are closed | <input type="checkbox"/> NC contact is open |
|---|---|--|---|

Diagnostic information (Run 1, Run 2)

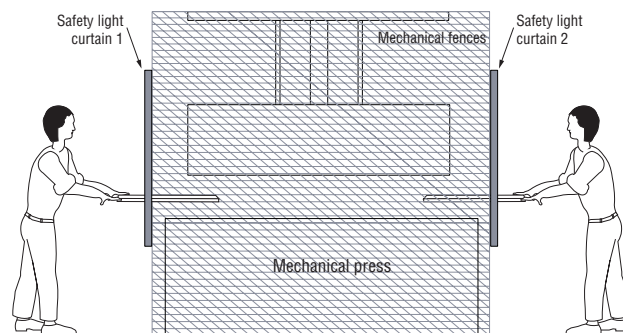
- | | | |
|-------------|------------|--------------------------|
| Run 1 | Run 2 | |
| ● | ● | Normal operating |
| * | * | Waiting for restart |
| n * | ● | Application error |
| n * | ⊗ or n * | Fatal error |
| ⊗ light off | ● light on | * flashing (0,66 Hz) |
| n * | | n-times flashing (error) |

Application example 1: Serial modes

1A - Safeguarding with 2 FF-SYA safety light curtains and 1 maintenance door



1B - Safeguarding of double work station with 2 FF-SG safety light curtains



Description

Example 1A: an operator carries out manual operations on a machine work station safeguarded by light curtains and a maintenance door. When a gap between the vertical safety light curtain and the hazardous zone allows the operator to stand in between without being detected, an additional safety device for presence detection (e.g. a horizontal safety light curtain) shall be installed to ensure proper detection. An access through a door monitored by a safety switch is possible for maintenance or machine settings.

The serial mode system of this example is composed of the following elements:

- FF-SRL59022 safety relay module,
- 2 FF-SYA safety light curtains,
- 1 safety switch (e.g. GK Series).

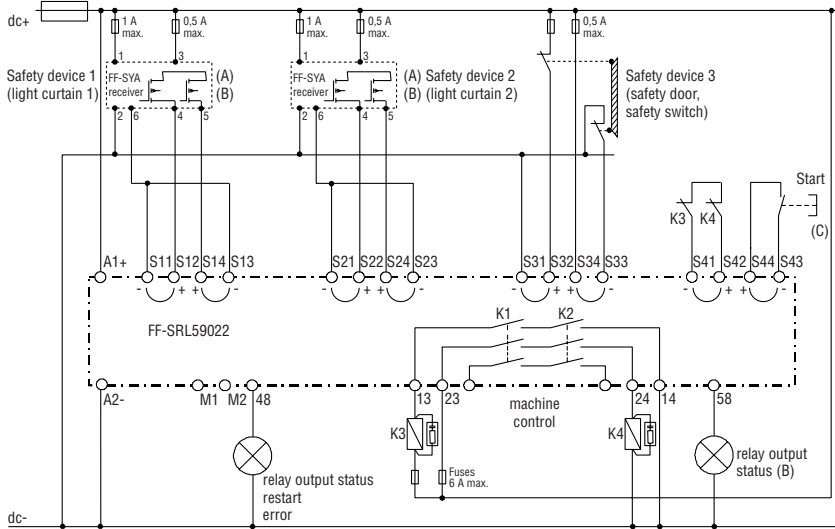
Example 1B: two operators carry out operations on the same machine work station through two different openings safeguarded by two safety light curtains.

The serial mode system of this example is composed of the following elements:

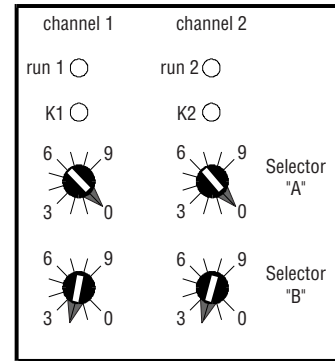
- FF-SRL59022 safety relay module,
- 2 FF-SG safety light curtains.

Depending on the selected start/restart mode for the three safety device inputs (see chapter "Mode setting"), the module may start/restart automatically or need to be started/restarted manually using the start push-button after the safety device has been released. In these examples, the module inputs for safety light curtain 1 and safety light curtain 2 are assigned to "automatic start/restart mode" and those for safety device 3 (safety switch, example 1A only) are assigned to "start/restart interlock mode". This means, that the module closes its normally open safety relay outputs (13/14, 23/24, 33/34) automatically, as soon as both safety light curtains have been released. However, the start push-button needs to be pushed, after the maintenance door has been opened and closed.

Wiring diagram application example 1A



Mode selector

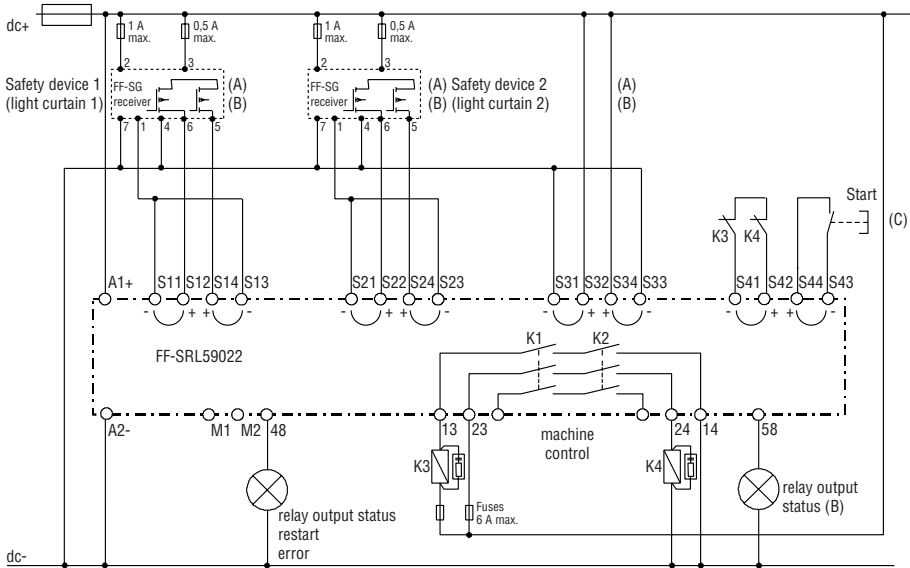


Internal view

Mode "02":

safety devices 1 and 2 in automatic restart mode,
safety device 3 in start/restart interlock mode,
with EDM.

Wiring diagram application example 1B



Note (A): Signals between redundant safety device inputs S11 to S14 or S21 to S24 or S31 to S34 must be applied within a max. time of 2,5 s.

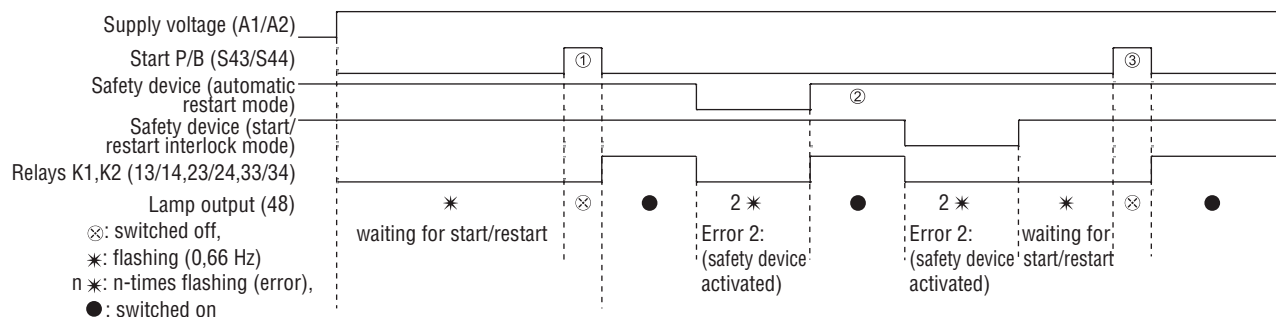
Modes 00 to 03 and 10 to 13: safety devices without test input: unused safety device inputs must be connected to power: S11, S13, S21, S23, S31, S33 to (dc-); S12, S14, S22, S24, S32, S34 to (dc+).

Note (B): Modes 05 to 08 and 15 to 18: safety devices with test input: terminal 58 is used as test output that must be connected to the test input of each safety device. Unused safety device inputs must be connected to power and to the test output: S11, S13, S21, S23, S31, S33 to (dc-); S12, S14, S22, S24, S32, S34 to 58 (refer to chapter "Test input").

Note (C): A start push-button needs to be connected for all modes (even if all safety devices are assigned to automatic start/restart modes), in order to reset an error (e.g. a safety device in automatic mode is activated at power-up, the start push-button is pushed with a safety device activated).

FF-SRL

Functional diagram



Notes:

Safety device(s) in start/restart interlock mode

The module must be started / restarted using the the start push-button:

- at power-up, if at least one safety device is in start/restart interlock mode (see ①)
- after activation of a safety device in start/restart interlock mode (see ③)
- if an error has been detected or if the test of a safety device has failed

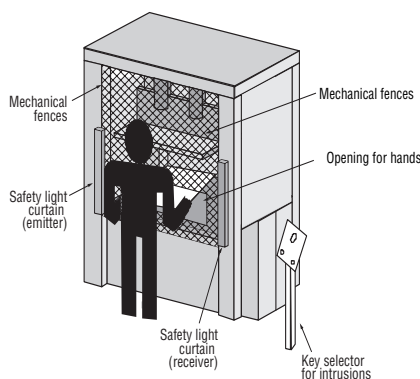
Safety device(s) in automatic start/restart mode

The module starts/restarts automatically:

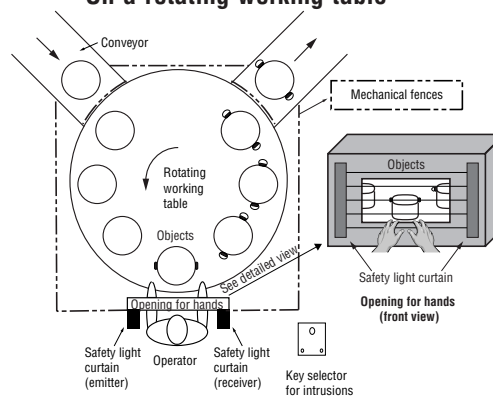
- at power-up, if all safety devices are in automatic start mode and released
- after activation and release of the last safety device in automatic start/restart mode, if no safety device in start/restart mode has been activated or if no safety device in start/restart interlock mode is existing (see ②).

Application example 2: Presence Sensing Device Initiation (PSDI with single / double intrusion)

On a hydraulic press



On a rotating working table



⚠ DANGER

IMPROPER PSDI USE IN NORTH AMERICA

Presence Sensing Device Initiation (PSDI) is NOT allowed for use with some applications in North America. Do not use PSDI in North America if the applicable standard(s) prohibit its use. Consult with local safety agencies before installing a PSDI capability.

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

Description

An operator carries out manual loading / unloading operations on a machine work station (e.g. a hydraulic press or a rotating working table) safeguarded by a safety light curtain. Therefore, the operator needs to intrude the safety light curtain once or twice during the non-hazardous portion of a machine cycle. The machine restarts automatically after the programmed number of intrusions have been effectuated. This allows the operator to work continuously.

A PSDI system is composed of the following elements:

- the FF-SRL59022 safety relay module,
- a safety light curtain (e.g. FF-SB safety light curtain),
- a safety switch as machine contact,
- an external key operated selector for setting of
 - number of intrusions (1 or 2) and
 - maximum intrusion time (15 s or 30 s),
- an external indicator (connected to terminal 48) for safety relay outputs status (on/off), waiting for start push-button status (slow flickering), waiting for intrusion status (quick flickering).

Normal working sequence

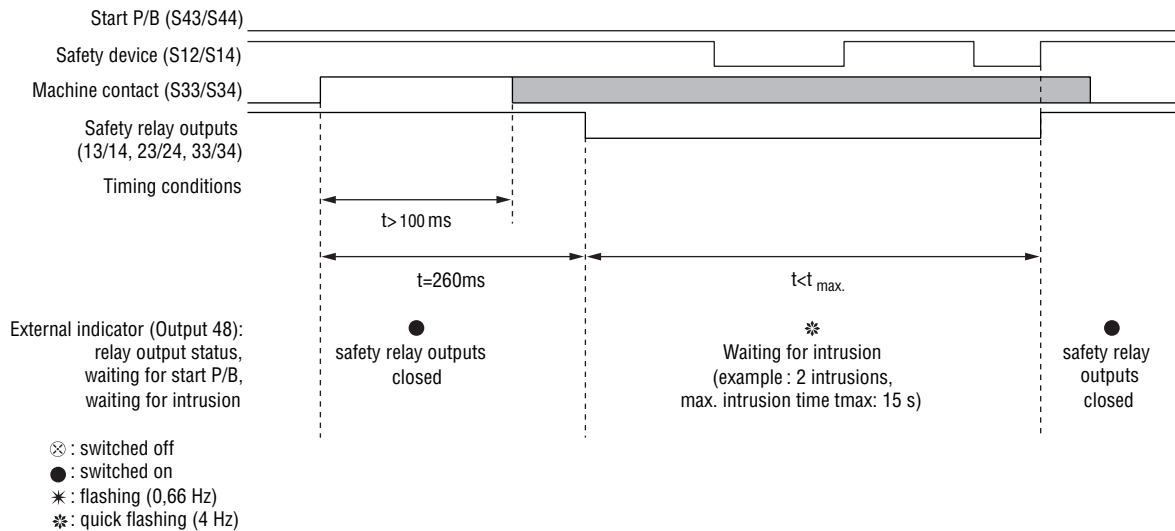
A successful start sequence must have been performed before, in order to validate the settings for the number of intrusions and the max. intrusion time (refer to the installation manual for details).

A safety switch (machine contact) is used to monitor the machine cycle. The machine contact must be installed, so that it closes (and opens again) when the non-hazardous portion of the machine cycle has been reached. Then, the normally open safety contacts 13/14, 23/24 and 33/34 will open, disabling the machine. A quick flickering external indicator invites the operator to carry out the selected number of intrusions within the selected max. intrusion time. The module closes its safety contacts restarting the machine process automatically.

The module opens its normally open safety relay contacts (13/14, 23/24 and 33/34) stopping the hazard, when

- the maximum number of intrusions has been exceeded OR,
- the selected max. intrusion time has elapsed OR,
- an intrusion has been made during the hazardous portion of the machine cycle.

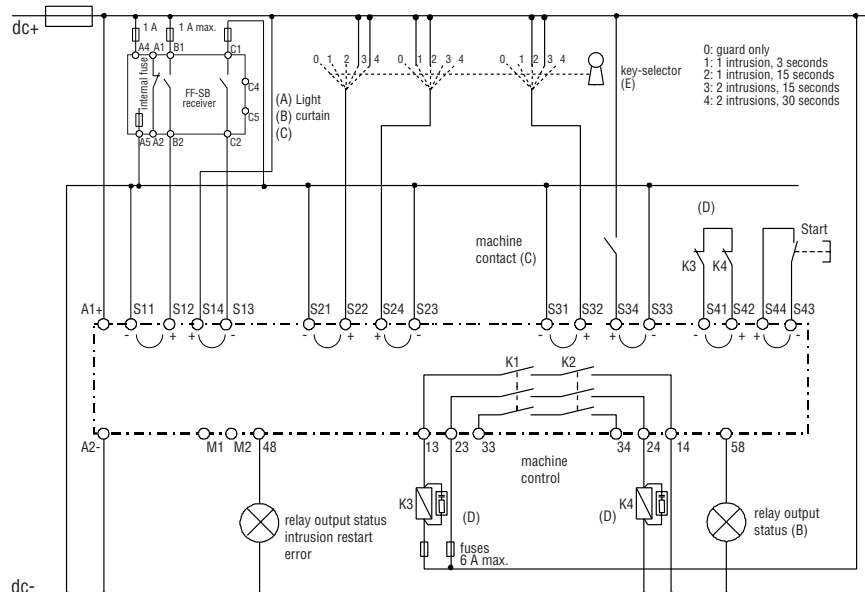
In these cases, the module needs to be restarted manually using the start push-button.



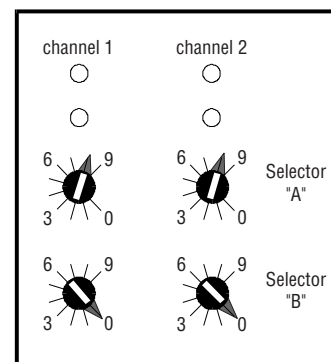
Notes:

- The restart push-button must be pushed AND released within 3 s to start / restart the module.
- The normally open machine contact needs to close for at least 100 ms with the safety relay outputs (13/14, 23/24, 33/34) closed, in order to detect the non-hazardous-phase of the machine cycle and authorize the intrusions to take place. Normally open machine contact closures of less than 100 ms are ignored by the module.
- The FF-SRL59022 will open its safety relay contacts and a PSDI error will be displayed (see chapter "Diagnostic Information"), if
 - an incorrect number of intrusions has been performed,
 - the max. muting time has elapsed,
 - intrusions have been made without the machine contact has detected the non-hazardous phase,
 - no or a not successful start sequence has been performed at power up or after changing the position of the key selector for the intrusions.

Wiring diagram



Mode selector



Internal view

Mode 80:

PSDI for safety light curtains without test input and with External Device Monitoring (EDM).

Note (A): Signals between redundant safety device inputs S11 to S14 must be applied within a max. time of 2,5 s.

Note (B): Modes 82 to 83: PSDI using safety devices with test input: terminal 58 is used as test output that must be connected to the test input of the safety device (refer to chapter "Test input").

Note (C): Safety device and machine contact type: this can be voltage free dry contacts or static outputs.

Note (D): External contactors: when external contactors are used, connect one normally closed contact of each contactor (or the normally closed contact of the FF-SRE extension module) in series into the External Device Monitoring (EDM) loop S43/S44. Install arc suppressors across the coils of external safety relays.

Note (E): External key selector: The position of the external key selector for the selection of the number of intrusions and the max. intrusion time can be changed at any moment of the working cycle. However, the changes are only taken into account, when the machine is stopped (normally open safety relay contacts 13/14, 23/24, 33/3 are open). A successful start sequence must be performed then in order to validate the changes.

External key selector

Key selector position	Modes	Max. intrusion time	Number of intrusions			Max. intrusion time	Inputs			
			External key selector inputs				S11/S12, S13/14	S33/S34	S41/S42	S43/S44
			S21/S22	S23/S24	S31/S32					
0	Guard only (0 intrusion)	not applicable	0	0	0 or 1	Safety device	Machine contact	EDM loop	Start P/B	
1	1 intrusion	30 seconds	0	1	0					
2	1 intrusion	15 seconds	0	1	1					
3	2 intrusions	15 seconds	1	0	1					
4	2 intrusions	30 seconds	1	0	0					
	Not valid	not applicable	1	1	0 or 1					

0: contact opened
1: contact closed

Diagnostic informations

Detailed diagnostic information for an easy troubleshooting of your application is available using the following indicators:

- internal indicators: LED "RUN1" and "RUN2" located on the module front panel,
- external indicators connected to terminal 48.

In the case of a failure the indicators are indicating a flashing code. There exist two types of errors:

- **FATAL ERRORS** are indicated by flashing internal LED's "RUN1" and /or "RUN2". The external indicator (48) remains permanently off. The normally open safety contacts (13/14, 23/24, 33/34) are de-energised and the module needs to be reset by taking the power off and on after resolving the error cause.
- **APPLICATION AND INSTALLATION ERRORS** are indicated by flashing internal LED "RUN1" and the external indicator (48). LED "RUN2" is permanently on. The normally open safety contacts (13/14, 23/24, 33/34) are de-energised, but the module can be restarted pushing the start push-button after resolving the error cause.

FATAL ERRORS				
Error code	LED RUN 1	LED RUN 2	External indicator (48)	Error type
0	⊗	⊗	⊗	Internal module error, no power
5	5 * (1)	5 * (1)	⊗	Mode selector error
6	6 *	⊗	⊗	Under-voltage error
	⊗	6 *	⊗	Over-voltage error
7	7 * (1)	7 * (1)	⊗	Input error
8	8 * (1)	8 * (1)	⊗	Internal relay error
9 10 11 12 13	9-13 * (1)	9-13 * (1)	⊗	Internal module error

APPLICATION AND INSTALLATION ERRORS				
Error code	LED RUN 1	LED RUN 2	External indicator (48)	Error type
1	1 *	●	1 *	Safety device error
2	2 *	●	2 *	Safety device activated (e.g. beam interruption of a safety device light curtain)
3	3 *	●	3 *	Restart P/B error
4	4 *	●	4 *	External device monitoring (EDM) error
5	5 *	●	5 *	Intrusion error (PSDI modes)
6	6 *	●	6 *	Machine contact error (PSDI modes)
7	7 *	●	7 *	Key switch selector error (PSDI modes)
8	8 *	●	8 *	Not allowed position of key switch selector error (PSDI modes)

Note (1): It is possible that

- LED "RUN1" and "RUN2" are indicating different error codes or,
- only one LED "RUN1" or "RUN2" is indicating an error code and the second LED "RUN1" or "RUN2" is switched off.

⊗ : switched off n * : n-times flashing ● : switched on

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products Asia Pacific Headquarters

Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
FAX: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax 1300-36-04-70

China - PRC - Beijing

Honeywell China Inc.
Phone: +(86-10) 8458-3280
FAX: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6237-0237
FAX: +(86-21) 6237-1237

China - Hong Kong SAR

Honeywell Ltd.
Phone: +(852) 2953-6412
FAX: +(852) 2953-6767

India

Tata Honeywell Ltd
Phone: +(91) 20 6870 445/446
FAX: +(91) 20 681 2243/687 5992

Indonesia

Honeywell Indonesia Pte Ltd
Phone: +(62) 21 535-8833
FAX: +(62) 21 5367-1008

Japan

Honeywell Inc
Phone: +(81) 3 5440 1425
FAX: +(81) 3 5440 1368

South Korea

Honeywell Korea Co. Ltd
Phone: +(822) 799-6167
FAX: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
FAX: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
FAX: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
FAX: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
FAX: +(886-2) 2245 3241

Thailand

Honeywell Systems Ltd.
Phone: +(662) 693 3099
FAX: +(662) 693 3085

NORTH AMERICA

USA/Canada

Sensing and Control
Phone: 1-800-537-6945
1-815-235-6847
FAX: 1-815-235-6545
E-mail: info.sc@honeywell.com

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
FAX: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
FAX: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 979 00 23
FAX: +(359) 2 979 00 24

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 261 123 457
FAX: +(420) 261 123 461

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
FAX: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
FAX: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
FAX: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(361) 451 43 00
FAX: +(361) 451 43 43

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/
456
FAX: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
FAX: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
FAX: +(47) 66 76 20 90

Poland

Honeywell Sp. zo.o
Phone: +(48) 606 09 64
FAX: +(48) 606 09 01

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
FAX: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 21 231 64 37/38
FAX: +(40) 21 231 64 39

Commonwealth of Independent States (CIS)

ZAO Honeywell
Phone: +(7 095) 796 98 36
FAX: +(7 095) 797 99 06

Slovak Republic

Honeywell s.r.o.
Phone: +(421 2) 58 247 403
FAX: +(421 2) 58 247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 695 8000
FAX +(27) 11 805 1504

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
FAX: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
FAX: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
FAX: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 5756620
FAX: +(90) 216 5756637

Ukraine

Honeywell
Phone: +(380) 44 201 44 74
FAX: +(380) 44 201 44 75

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481 481
FAX: +(44) 1698 481 676

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
FAX: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 443 2119
FAX +(9712) 443 2536

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
FAX: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 4166 1900
FAX: +(55-11) 4166 1901

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
FAX: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1
FAX: +(593-2) 981-562

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5259-1966
FAX: +(52) 55 5570-2985

Peru

Honeywell Peru
Phone: +(511) 445-2136-1891
FAX: +(511) 348-3552

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Trinidad

Honeywell Inc.
Phone: +(868) 624-3964
FAX: +(868) 624-3969

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2003 - 2006 Honeywell International Inc. All rights reserved.

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

FF-SRL59192 Dual Channel Relay Module

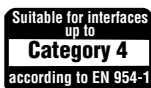


FEATURES

- Complies with EU Directive for machines 98/37/EC, IEC/EN 60204, DIN VDE 0113, EN 954-1
- Supply voltage: 24 Vdc
- Dual input compatible with Honeywell Electro-sensitive Protective Equipment with static safety outputs (FF-SYA, FF-SLG and FF-SG Series)
- Dual input compatible with safety devices with relay outputs, e-stop push-buttons and safety switches
- Two cross-monitored relays with guided contacts (internally redundant): three NO contacts and one NC contact
- Switching current from 1 mA to 6 A (gold plated 5 µm contacts allow low current)
- Response time: 15 ms
- Selectable automatic or manual restart modes (with permanent short-circuit detection)
- Selectable Final Switching Devices monitoring loop for the control of external relays or contactors
- LED indicators for power inputs and outputs status, and restart condition
- Removable terminal strips for ease of maintenance
- 45 mm / 1.77 in width housing



Pending



Pending



The FF-SRL59192 Dual Channel Relay Module is designed to be used with Honeywell Electro-sensitive Protective Equipments (ESPE) with static safety outputs, e-stops push-buttons or safety switches in emergency stop circuits when danger to personnel or machinery is present. Its slim 45 mm / 1.77 in width housing is ideal for space restricted areas. When correctly installed, this module provides a Control Reliable interface between the safety device and the machine control circuitry. A single fault does not prevent the normal stopping action from taking place but will prevent the next machine cycle to start until the fault is corrected. This is accomplished by the use of redundant circuitry, self-checking capability and positive guided safety relay outputs. These redundant safety relay outputs are rated for 6 amps to directly operate with the machine control actuators using 3 NO and 1 NC output contacts. These 3 NO output contacts are internally redundant (two contacts in series) allowing to control up to 3 separate single channels. In addition, the contacts are gold plated to ensure compatibility with very low current loads (such as PLC inputs).

The FF-SRL59192 Module can be wired for either Automatic or Manual Restart modes of operation and also provides Final Switching Device (FSD) monitoring if interfaced with external relaying devices. The FF-SRL59192 is equipped with LED indicators that provide diagnostic information and has removable wiring strips to make replacement fast and easy.

FF-SRL59192

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRL59192 Dual Channel Relay Module



(pending)



(pending)



SPECIFICATIONS

Dimensions in millimeters/inches, meters / feet, weights in kg / lbs

Supply voltage		
Nominal voltage		24 Vdc (± 15 %)
Nominal power consumption		2,3 W
Fuse protection		Internal PTC
Restart input	Restart delay time	Manual start mode: 25 ms; Automatic start mode: 250 ms
Emergency stop inputs		
	Input voltage at S11	22,5 Vdc at nominal voltage (provided by Relay Module)
Switching on min./max. voltage at in S12 and at S32		19 Vdc / 27,6 Vdc
Switching off min. voltage at S12 and at S32		7 Vdc
	Input current at S12 / S32	35 mA / 55 mA at nominal voltage
Relay outputs		
	Relay type	Safety relay with positive-guided contacts (internally redundant)
	Safety contacts	3 NO, 1 NC
	Switching capability	Power factor = 1 (see Note 1 and Fig. 1)
	Current range (min. to max.)	1 mA to 6 A (see Note 1)
	Voltage range (min. to max.)	0,1 to 250 Vac/dc
	Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (see Note 2 and Fig. 1) 1 A: 2 000 000 operations ; 2 A: 1 000 000 operations 4 A: 300 000 operations ; 6 A: 200 000 operations
	Typical Power Factor (cos φ)	Limitation Factor (see Note 3 and Fig. 2)
	0,3	0,45
	0,5	0,70
	0,7	0,85
	1	1
	Operating frequency	1200 switching cycles /h (max)
	Fuse rating	6 A time delayed (max.)
	Mechanical life	Ten million switching operations
General		
	Temperature range	-15 °C to + 55 °C (5 °F to 131 °F)
	Sealing	Housing IP 40; Terminals IP 20
	Housing material	Thermoplastic
	Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz
	Connector connection (max.)	1 x 4 mm ² solid [12 AWG], 1 x 2,5 mm ² [14 AWG] 2 x 1,5 mm ² [16 AWG] stranded wire with sleeve DIN 46288
	Connector attachment	Removable block terminals with M3.5 screws; wire contacts are enclosed to prevent electrical shock
	Mounting	Quick install rail mounting EN 50022-35, 35 mm x 15 mm / 1.38 in x 0.59 in. size
	Weight	470 g / 1,02 lb

FF-SRL59192

ORDERING INFORMATION

FF-SRL59192

2: 24 Vdc

Note 1: Contact damage: To ensure the 1 mA capability during the lifetime of the contact, never exceed 300 mA or 60 V

Note 2: Install arc suppression devices across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 3: Total operations = operations at power factor 1 multiplied by the limitation factor. If the power factor is 0,5 at 230 Vac, 2 A (1 000 000 operations), the limitation factor is 0,70. The number of total operations is:
1000000 x 0,70 = 700.000.

Figure 1
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ) (see Note 3)

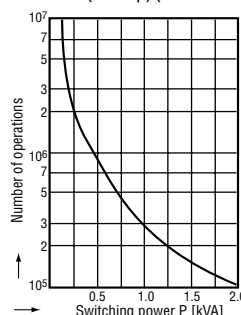
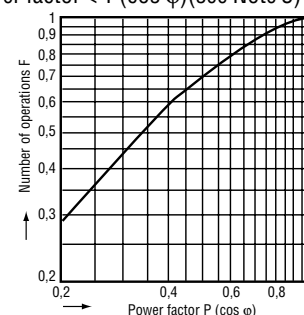
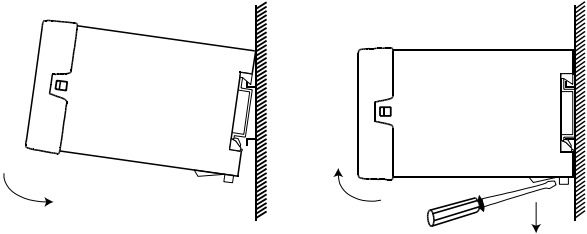


Figure 2
LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ) (see Note 3)

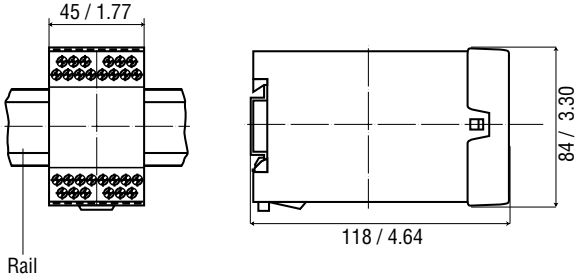


INSTALLATION DIAGRAM

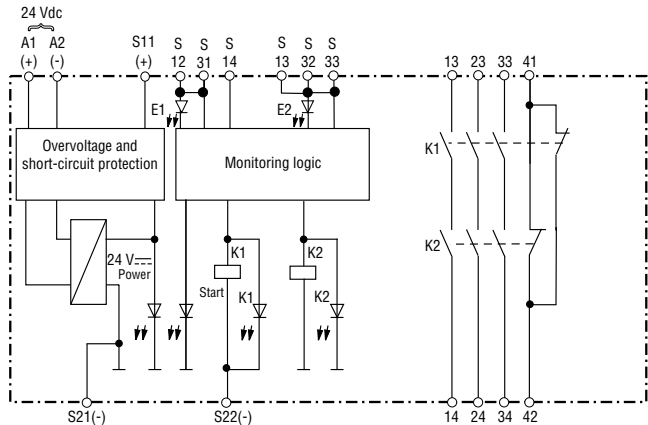


MOUNTING DIMENSIONS

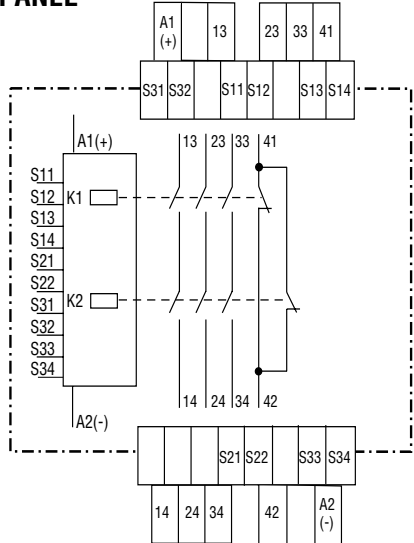
Width: 45 mm/1.77 in ; Height: 84 mm/3.30 in ;
Depth: 118 mm/4.64 in



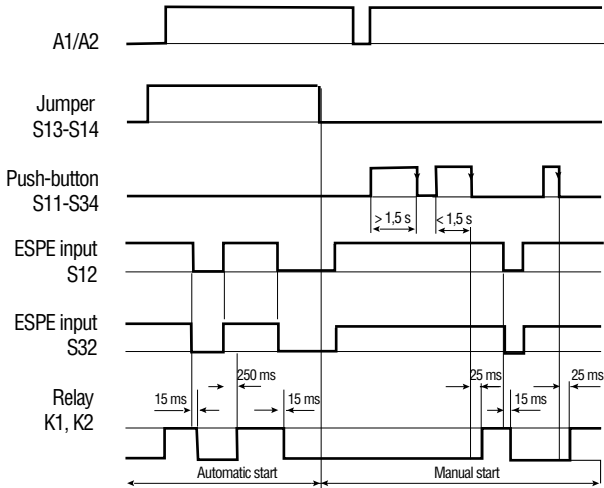
INTERNAL CIRCUITRY



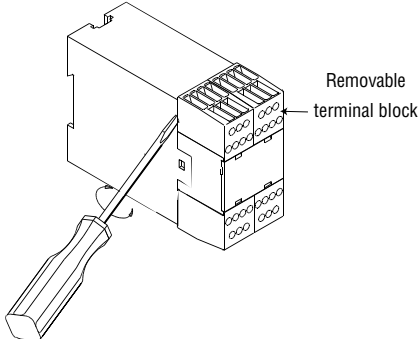
FRONT PANEL



FUNCTIONAL DIAGRAM



REMOVABLE TERMINAL BLOCKS



SETTING OF START MODE AND FSD MONITORING MODE

Start mode	Jumper between S13/S14	Start push-button between S11/S34
Manual (without FSD monitoring)	Not connected • •	
Automatic (without FSD monitoring)	Connected —	• •
Manual (with FSD monitoring)	Not connected • •	
Automatic (with FSD monitoring)	Connected 	• •

*FSD: NC contacts of external safety contactors or an extension module of the FF-SRE Series.

FF-SRL59192

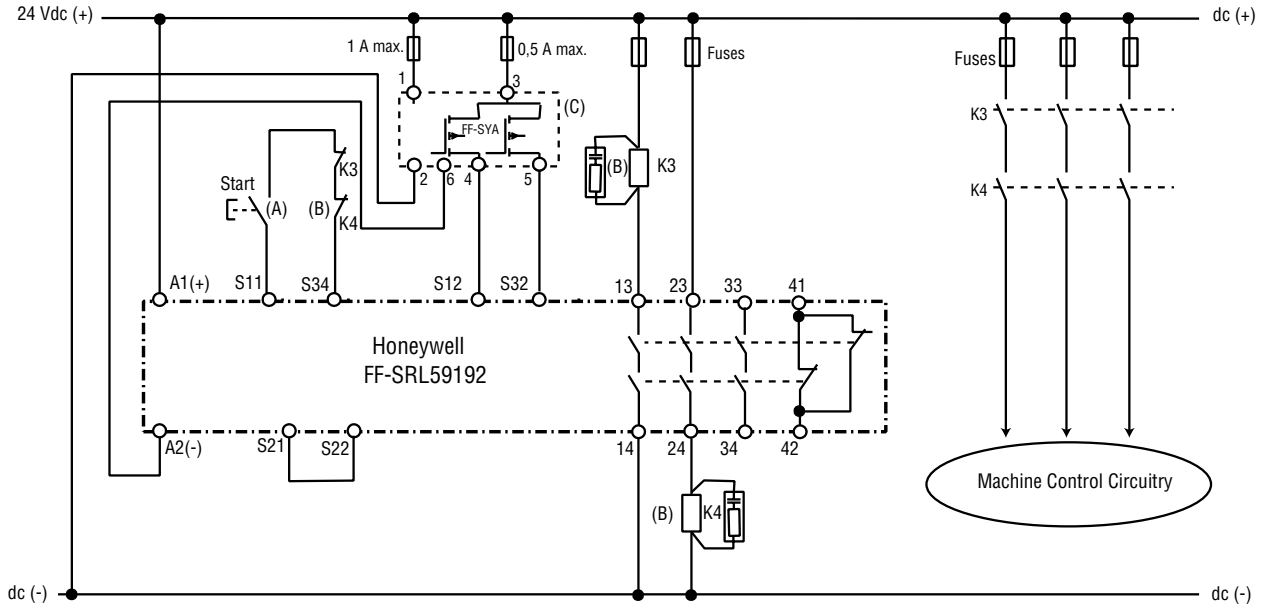
APPLICATION EXAMPLES:

1/ Manual restart mode with FSD monitoring: Connection of a FF-SYA safety light curtain (cross-fault monitoring by the safety light curtain)

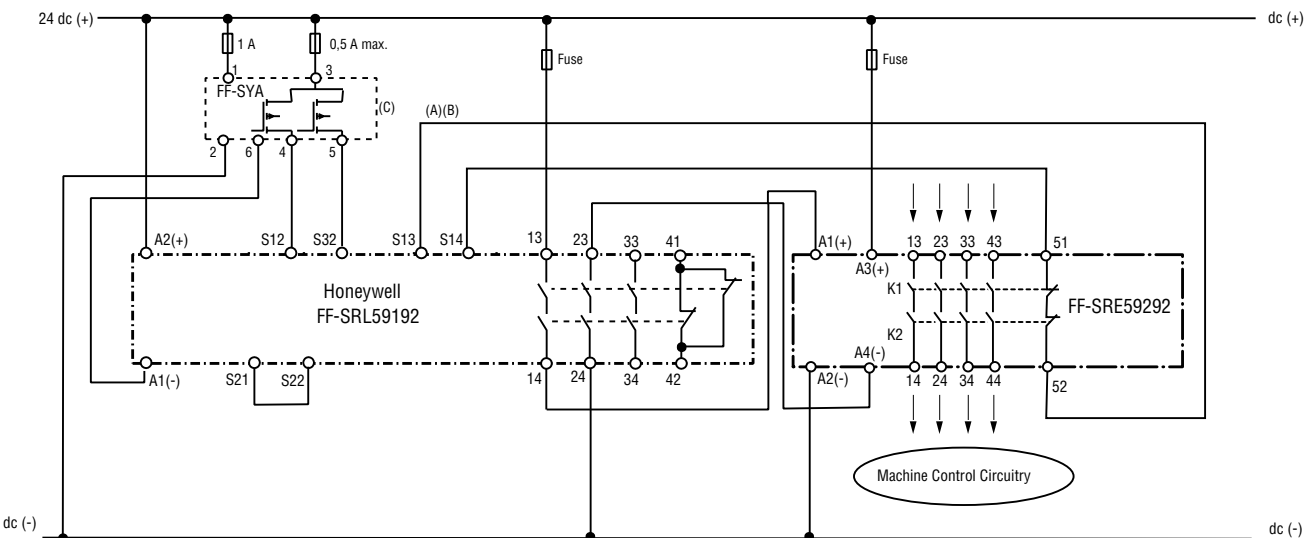
In the manual restart mode, the NO contacts (13/14, 23/24, 33/34) will close and the NC contact 41/42 will open after the push-button is pressed and released, provided the two input signals (E1, E2) are available and provided the Final Switching Device (FSD) monitoring loop is closed (when using external safety contactors). If an emergency stop condition occurs the NO contacts will open within the 15 ms response time and the NC contact will close. This emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to stop dangerous motion and/or remove power.

When correctly installed, the module will not restart:

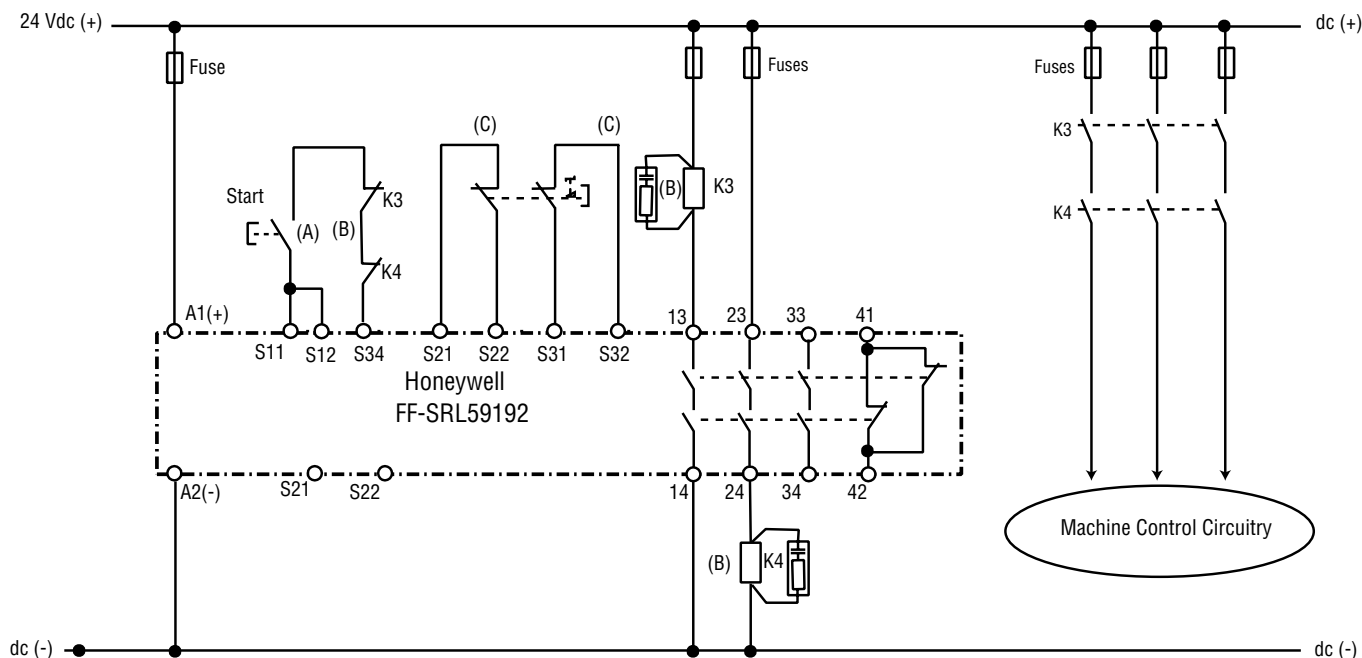
- if the push-button is actuated for more than 1,5 s or if a permanent short-circuit of the restart push-button input occurs,
- if the FSD monitoring loop remains permanently open (failure of an external contactor).



2/ Automatic restart mode with FSD monitoring: Connection of a FF-SYA safety light curtain (cross-fault monitoring by the safety light curtain)



3/ Manual restart: Connection of an emergency stop push-button



APPLICATION NOTES

NOTE (A): Start modes

Manual start mode: Insert start push-button between S11/S34; no jumper must be set between S13/S14.

Automatic start mode: Insert jumper between S13/S14. The start push-button between S11/S34 is omitted.

NOTE (B): External contactors

If contact reinforcement via external safety contactors (or the FF-SRE Extension module) is necessary, their proper operation must be monitored looping their normally closed contacts into the restart loop (manual start mode: S11/S34; automatic start mode: S13/S14).

Install arc suppressors across the coils of external relays (these arc suppressors are not necessary, if the FSDs relays K3 and K4 are supplied by one of the FF-SRE extension modules).

NOTE (C): Dual channel safety devices

Application example 1/ and 2/: Safety light curtains with static safety outputs (FF-SYA, FF-SG or FF-SLG Series) may be connected. Cross-fault is not monitored by the FF-SRL59192.

Application example 3/: Safety devices with relay outputs (e.g. FF-SB, FF-LS, FF-SM, FF-SE), emergency stop push-buttons or safety switches may be connected. Cross-fault is monitored by the FF-SRL59192.

FF-SRL59192

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

ASIA PACIFIC

Control Products Asia Pacific Headquarters

Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
FAX: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax 1300-36-04-70

China - PRC - Beijing

Honeywell China Inc.
Phone: +(86-10) 8458-3280
FAX: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6237-0237
FAX: +(86-21) 6237-1237

China - Hong Kong SAR

Honeywell Ltd.
Phone: +(852) 2953-6412
FAX: +(852) 2953-6767

India

Tata Honeywell Ltd
Phone: +(91) 20 6870 445/446
FAX: +(91) 20 681 2243/687 5992

Indonesia

Honeywell Indonesia Pte Ltd
Phone: +(62) 21 535-8833
FAX: +(62) 21 5367-1008

Japan

Honeywell Inc
Phone: +(81) 3 5440 1425
FAX: +(81) 3 5440 1368

South Korea

Honeywell Korea Co. Ltd
Phone: +(822) 799-6167
FAX: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
FAX: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
FAX: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
FAX: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
FAX: +(886-2) 2245 3241

Thailand

Honeywell Systems Ltd.
Phone: +(662) 693 3099
FAX: +(662) 693 3085

NORTH AMERICA

USA/Canada

Sensing and Control
Phone: 1-800-537-6945
1-815-235-6847
FAX: 1-815-235-6545
E-mail: info.sc@honeywell.com

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
FAX: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
FAX: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 979 00 23
FAX: +(359) 2 979 00 24

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 261 123 457
FAX: +(420) 261 123 461

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
FAX: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
FAX: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
FAX: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(361) 451 43 00
FAX: +(361) 451 43 43

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/456
FAX: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
FAX: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
FAX: +(47) 66 76 20 90

Poland

Honeywell Sp. zo.o
Phone: +(48) 606 09 64
FAX: +(48) 606 09 01

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
FAX: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 21 231 64 37/38
FAX: +(40) 21 231 64 39

Commonwealth of Independent States (CIS)

ZAO Honeywell
Phone: +(7 095) 796 98 36
FAX: +(7 095) 797 99 06

Slovak Republic

Honeywell s.r.o.
Phone: +(421 2) 58 247 403
FAX: +(421 2) 58 247 415

South Africa (Republic of)

Honeywell Southern Africa
Honeywell S.A. Pty. Ltd
Phone: +(27) 11 695 8000
FAX +(27) 11 805 1504

Spain

Honeywell S.A.
Phone: +(34) 91 313 6100
FAX: +(34) 91 313 6129

Sweden

Honeywell AB
Phone: +(46) 8 775 55 00
FAX: +(46) 8 775 56 00

Switzerland

Honeywell AG
Phone: +(41) 1 855 24 40
FAX: +(41) 1 855 24 45

Turkey

Honeywell Turkey A.S.
Phone: +(90) 216 5756620
FAX: +(90) 216 5756637

Ukraine

Honeywell
Phone: +(380) 44 201 44 74
FAX: +(380) 44 201 44 75

United Kingdom

Honeywell Control Systems Ltd
Phone: +(44) 1698 481 481
FAX: +(44) 1698 481 676

Mediterranean & African Distributors

Honeywell SpA
Phone: +(39) 2 921 46 232
FAX: +(39) 2 921 46 233

Middle East Headquarters

Honeywell Middle East Ltd.
Phone: +(9712) 443 2119
FAX +(9712) 443 2536

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
FAX: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 4166 1900
FAX: +(55-11) 4166 1901

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
FAX: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1
FAX: +(593-2) 981-562

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5259-1966
FAX: +(52) 55 5570-2985

Peru

Honeywell Peru
Phone: +(511) 445-2136-1891
FAX: +(511) 348-3552

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Trinidad

Honeywell Inc.
Phone: +(868) 624-3964
FAX: +(868) 624-3969

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2004 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

www.honeywell.com/sensing

FF-SRL6025 Dual Channel Relay Module for safety devices with safety static outputs



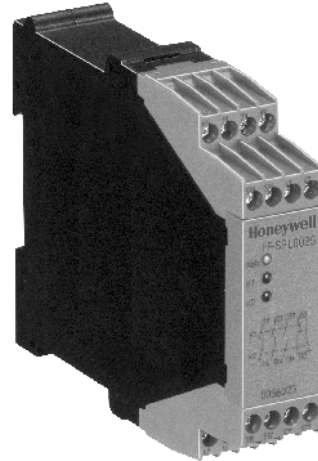
FF-SRL6025

FEATURES

- Complies with EU Directive for machines 98/37/EC
- Meets the applicable parts of the US & Canadian regulations and standards ANSI/RIA/OSHA
- Category 4 as per the EN 954-1 European standard
- Dual channel input
- Output: three NO contacts and one NC contact
- Switching current from 10 mA to 5 A
- Automatic start or manual start modes
- Detection of blocked start push-button
- Selectable cross-fault detection in emergency stop control circuit
- LED indicates power and the status of both internal relays
- Very high mechanical and electrical lifetime
- Overvoltage and short-circuit protection
- Slim housing 22,5 mm / 0.89 in width

TYPICAL APPLICATIONS

- Emergency-stop circuits on machines
- Monitoring of safety devices with safety static outputs, like the safety light curtains of the series
 - FF-SYA
 - FF-SG18, FF-SG30
 - FF-SLG18, FF-SLG30



The FF-SRL6025 module is designed to be used with safety devices with safety static outputs when danger to personnel or machinery is present. This safety control module provides an emergency stop signal to the machine control circuitry. FF-SRL6025 helps to create a control reliable safety solution by providing redundancy and self-checking circuitry.

This device offers two channel inputs and two internal safety relay outputs with positive-guided contacts. This ensures redundancy in its inputs and outputs.

The slim housing of only 22.5 mm (0.89 in.) width allows this safety control module to fit into almost every cabinet or even helps to reduce the overall cabinet size.

Other features include high current capability, an automatic start and manual start mode and external relays monitoring.

WARNING
MISUSE OF DOCUMENTATION

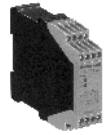
- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

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

FF-SRL6025 Dual channel Relay Module

SPECIFICATIONS

- Dual channel Emergency Stop circuits



Input	
Nominal voltage	24 Vdc (-10 %, +10 %)
Nominal power consumption	1.3 W
Nominal voltage at S11	22 Vdc (provided by control module)
Input current between S11/S12 and S21/S22	25 mA
Minimum voltage at S12	20 Vdc when activated
Start time	Manual START function: 40 ms (falling signal edge) Automatic START function: 300 ms
Output	
Contact complement	3 NO contacts, 1 NC contact
Response time	Opening of inputs (S11/12; S21/22): 20 ms Opening in supply circuit (24 Vac/dc(+)/A1): 25 ms
Contact type	Safety relay, positive-guided
Current Range (min. to max.)	10 mA to 5 A
Voltage Range (min. to max.)	0,1 to 250 Vac
Switching Capability per AC15 (EN 60947-5-1)	NO contacts: 3 A / 230 Vac ; NC contact: 2 A / 230 Vac
Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (See Note 1)
0,5 A	5.500.000 operations
1 A	2 000 000 operations
2 A	1 000 000 operations
5 A	250 000 operations
Typical Power Factor (cos φ)	Limitation Factor (See Note 2)
0,3	0,45
0,5	0,7
0,7	0,85
1	1
Operating frequency	1200 switching cycles/hour (max.)
Output contact fuse rating	Time delay 6 A (max.)
Mechanical life	Twenty million switching operations
General	
Temperature range	-15 °C to +55 °C / 5 °F to 131 °F at 90% humidity (max.)
Sealing	Housing: IP 40 • Terminals: IP 20
Housing material	Thermoplastic
Vibration resistance	Amplitude 0,35 mm; Frequency 10 to 55 Hz (per IEC/EN 60068-2-6)
Wire/conductor connection	Solid wire: 1 x 4 mm ² [12 AWG] or 2 x 2,5 mm ² [14 AWG] Stranded wire with sleeve: 1 x 2,5 mm ² [14 AWG] or 2 x 1,5 mm ² (max.) [16 AWG]
Wire/conductor attachment	M 3,5 screw terminals
Mounting	Quick install rail mounting IEC/EN 60715, width: 35 mm / 1.38 in
Weight	220 g / 0.49 lb

ORDERING INFORMATION

FF-SRL6025□

□ = 2 = 24 Vdc (only)

Note 1: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy.

Note 2: Total operations = operations (power factor 1) x limitation factor F.

Example:

U = 230 Vac, I = 1 A, power factor cos φ = 0,5

Switching power P = U x I = 230 VA

Contact life (cos φ = 1, P = 230 VA) =

2 000 000 operations

Limitation factor F (cos φ = 0,5) = 0,7

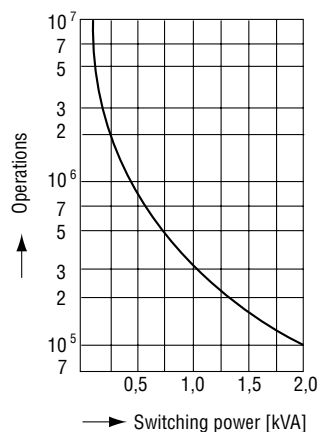
Contact life (cos φ = 0,5, P = 230 VA) =

F x contact life (cos φ = 1, P = 230 VA) =

2 000 000 x 0,7 = 1 400 000 operations.

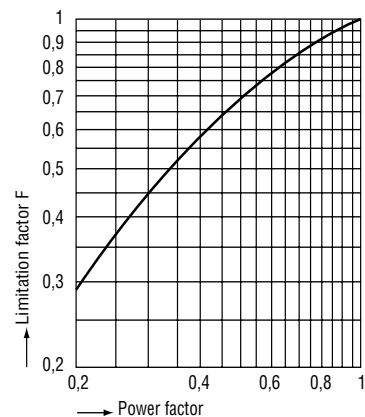
CONTACT LIFE FOR 100% RESISTIVE LOAD (TYPICAL)

(Power factor (cos φ) = 1, see Note 1)

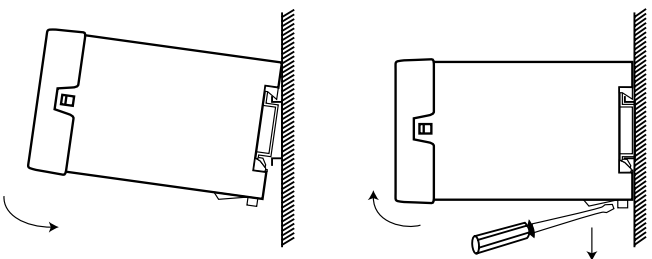


LIMITATION FACTOR F FOR INDUCTIVE LOADS

(Power factor (cos φ) < 1, see Note 2)

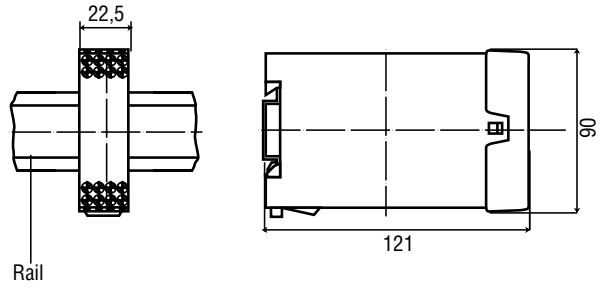


INSTALLATION DIAGRAM

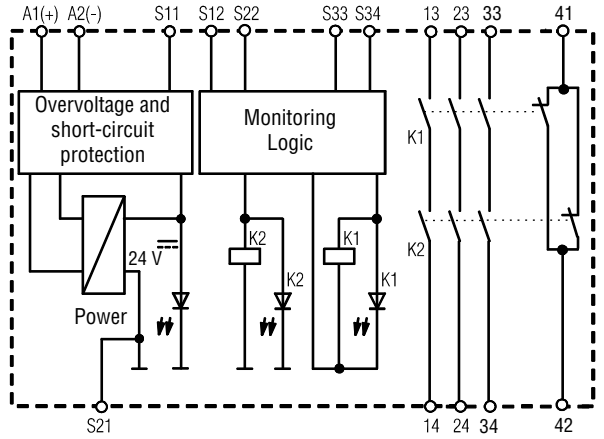


MOUNTING DIMENSIONS

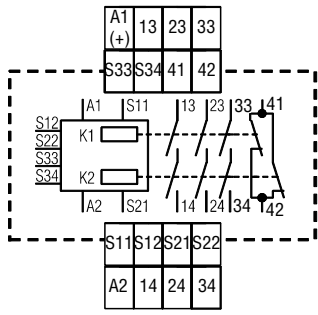
Width: 22,5 mm / 0.89 in; Height: 90 mm / 3.55 in; Depth: 121 mm / 4.77 in



INTERNAL CIRCUITRY



FRONT PANEL



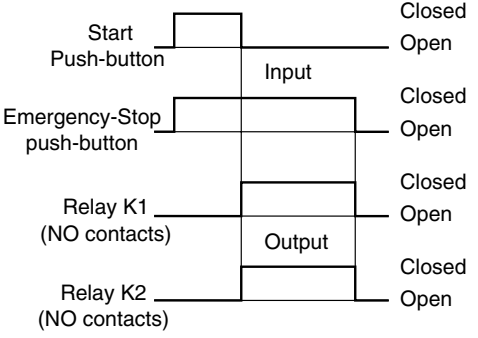
FUNCTIONAL DESCRIPTION

The FF-SRL6025 module is designed to be used with safety light curtains with PNP safety static outputs (e.g. FF-SYA, FF-SYB, FF-SG, FF-SLG18, FF-SLG30).

If the safety device is actuated, the emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to stop the hazard and to remove power.

In the manual start mode, a push-button needs to be pushed and released, to energise the internal safety relays K1 and K2. In the automatic start mode, the internal safety relays K1 and K2 energise automatically.

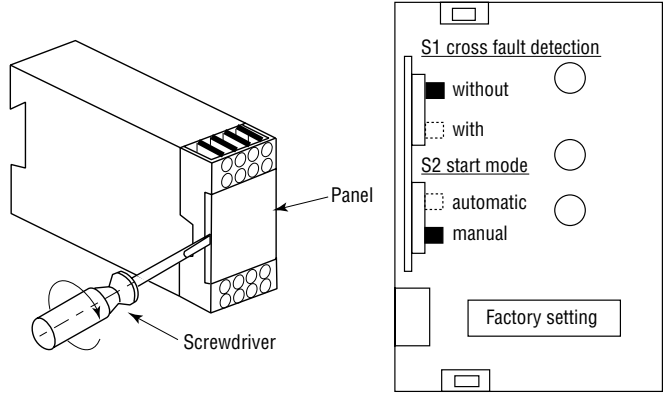
Both relays K1 and K2 must be energized to have the normally open contacts 13/14, 23/24 and 33/34 in a closed position.



Line fault Detection on Start push-button

If the start push-button is closed before voltage is applied to S12 and S22 the safety contacts of the module cannot close. This additional feature ensures the detection of a line fault via the start push-button or a blocked start push-button. In case of a push-button failure the module can not be restarted.

MODE SETTING



The FF-SRL6025 emergency stop module contains two internal switches (S1 and S2) for the mode settings. To access to these switches, remove the front panel using a screwdriver.

Switch S1 is used to select an operating mode for cross fault detection between the two inputs.

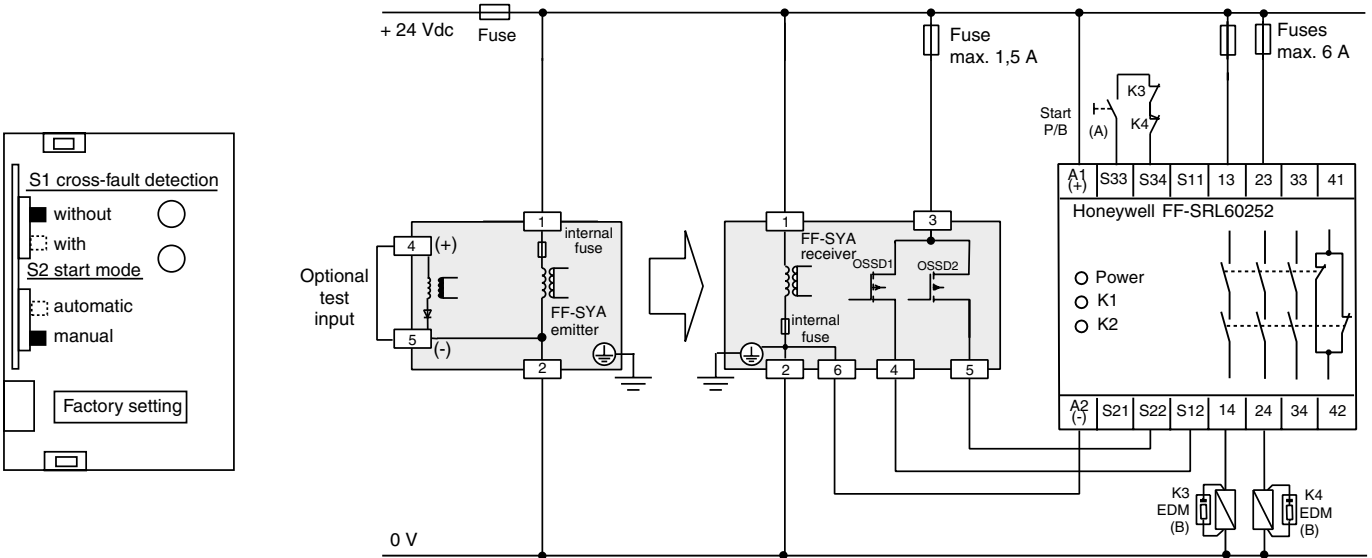
When connecting safety light curtains with PNP static safety outputs (e.g. FF-SYA, FF-SYB, FF-SG, FF-SLG18, FF-SLG30), leave the switch S1 on position "without cross-fault detection" (factory setting), as cross-faults are detected by the light curtain.

Switch S2 is used to select the start /restart modes. In the manual start /restart mode, a start push-button needs to be pushed and released to energise the safety relay contacts. In the automatic start mode, the safety relay contacts energise automatically, after releasing the connected safety device.

APPLICATION EXAMPLES

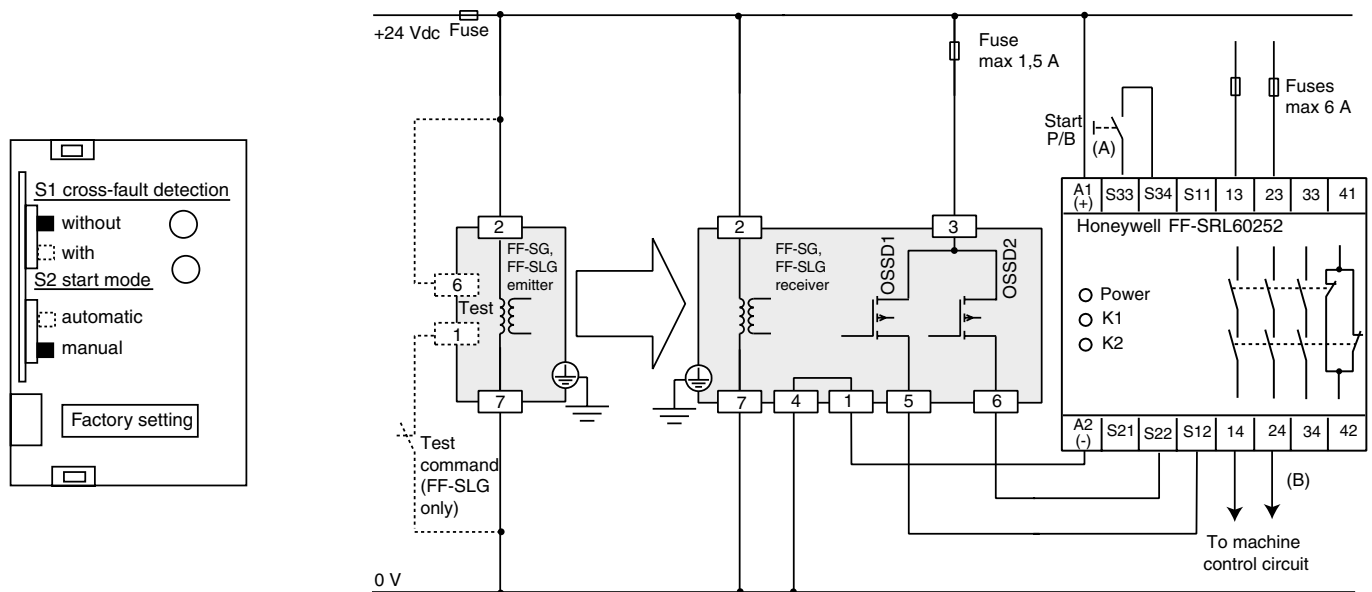
CONNECTION OF AN FF-SYA TYPE 4 SAFETY LIGHT CURTAIN

(WITHOUT CROSS-FAULT MONITORING BY THE MODULE, WITH EXTERNAL CONTACTORS)



CONNECTION OF AN FF-SG TYPE 4 OR FF-SLG18/FF-SLG30 TYPE 2 SAFETY LIGHT CURTAIN

(WITHOUT CROSS-FAULT MONITORING BY THE MODULE, WITHOUT EXTERNAL CONTACTORS)



FUNCTIONAL DESCRIPTION

The FF-SRL6025 safety control module is designed to be used with safety devices with static safety outputs (e.g. FF-SYA, FF-SYB, FF-SG, FF-SLG18 or FF-SLG30 safety light curtains).

In the case of an **emergency stop condition**, the safety device is actuated and opens its normally closed contacts connected to the dual input channels S11/S12 and S21/S22. The internal safety relays K1 and K2 de-energise, indicated by the turned off LED indicators K1 and K2. The normally open safety relay contacts (13/14, 23/24, 33/34) will open and the normally closed contact (41/42) will close. The emergency stop condition is relayed via the safety contacts of the module to the machine control circuitry to stop the hazard and remove the electrical power. When removing the emergency stop condition, the normally closed safety device contacts close again and the module is ready to be restarted.

Two start / restart modes can be set: In the **manual start mode**, a push-button needs to be pushed and released, to energise the internal safety relays K1 and K2 and to illuminate LED indicators K1 and K2. The normally open safety contacts (13/14, 23/24, 33/34) will close and the normally closed contact (41/42) will open, allowing the machine to operate. In the **automatic start mode**, the internal safety relays K1 and K2 energise automatically.

APPLICATION NOTES

Note (A): Manual start mode: Insert start push-button between S33/S34 and select internal switch S2 as illustrated above.

Automatic start mode: Insert jumper between S33/S34 and select internal switch S2 to automatic start mode.

Note (B): External contactors

The proper operation of external safety contactors and FF-SRE extension modules must be monitored by using the External Device Monitoring (EDM) function of the FF-SRL6025 module. In order to do so, connect one normally closed contact of each safety contactor (or the FF-SRE Extension module) into the start loop.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

ASIA PACIFIC

Control Products Asia Pacific Headquarters

Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Australia

Honeywell Limited
Phone: +(61) 2-9370-4500
FAX: +(61) 2-9370-4525
Toll Free 1300-36-39-36
Toll Free Fax 1300-36-04-70

China - PRC - Beijing

Honeywell China Inc.
Phone: +(86-10) 8458-3280
FAX: +(86-10) 8458-3102

China - PRC - Shanghai

Honeywell China Inc.
Phone: +(86-21) 6237-0237
FAX: +(86-21) 6237-1237

China - Hong Kong SAR

Honeywell Ltd.
Phone: +(852) 2953-6412
FAX: +(852) 2953-6767

India

Tata Honeywell Ltd
Phone: +(91) 20 6870 445/446
FAX: +(91) 20 681 2243/687 5992

Indonesia

Honeywell Indonesia Pte Ltd
Phone: +(62) 21 535-8833
FAX: +(62) 21 5367-1008

Japan

Honeywell Inc
Phone: +(81) 3 5440 1425
FAX: +(81) 3 5440 1368

South Korea

Honeywell Korea Co. Ltd
Phone: +(822) 799-6167
FAX: +(822) 792-9013

Malaysia

Honeywell Engineering Sdn Bhd
Phone: +(60-3) 7958-4988
FAX: +(60-3) 7958-8922

New Zealand

Honeywell Limited
Phone: +(64-9) 623-5050
FAX: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines

Honeywell Systems (Philippines) Inc.
Phone: +(63-2) 636-1661/1662
FAX: +(63-2) 638-4013

Singapore

Honeywell South East Asia
Phone: +(65) 6355-2828
FAX: +(65) 6445-3033

Taiwan R.O.C.

Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
FAX: +(886-2) 2245 3241

Thailand

Honeywell Systems Ltd.
Phone: +(662) 693 3099
FAX: +(662) 693 3085

NORTH AMERICA

USA/Canada

Sensing and Control
Phone: 1-800-537-6945
1-815-235-6847
FAX: 1-815-235-6545
E-mail: info.sc@honeywell.com

EUROPE

Austria

Honeywell Austria GmbH
Phone: +(43) 1 727 80 366/246
FAX: +(43) 1 727 80 337

Belgium

Honeywell SA/NV
Phone: +(32) 2 728 2522
FAX: +(32) 2 728 2502

Bulgaria

Honeywell EOOD
Phone: +(359) 2 979 00 23
FAX: +(359) 2 979 00 24

Czech Republic

Honeywell spol. s.r.o.
Phone: +(420) 242 442 111
FAX: +(420) 242 442 182

Denmark

Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland

Honeywell OY
Phone: +(358) 9 3480101
FAX: +(358) 9 34801375

France

Honeywell SA
Phone: +(33) 1 60 19 80 40
FAX: +(33) 1 60 19 81 73

Germany

Honeywell AG
Phone: +(49) 69 8064 444
FAX: +(49) 69 8064 442

Hungary

Honeywell Kft.
Phone: +(361) 451 43 00
FAX: +(361) 451 43 43

Italy

Honeywell S.p.A.
Phone: +(39) 02 92146 450/456
FAX: +(39) 02 92146 490

The Netherlands

Honeywell B.V.
Phone: +(31) 20 565 69 11
FAX: +(31) 20 565 66 00

Norway

Honeywell A/S
Phone: +(47) 66 76 20 00
FAX: +(47) 66 76 20 90

Poland

Honeywell Sp. zo.o
Phone: +(48) 606 09 64
FAX: +(48) 606 09 01

Portugal

Honeywell Portugal Lda
Phone: +(351 21) 424 50 00
FAX: +(351 21) 424 50 99

Romania

Honeywell Bucharest
Phone: +(40) 21 231 64 37/38
FAX: +(40) 21 231 64 39

Commonwealth of Independent States (CIS)

ZAO Honeywell
Phone: +(7 095) 796 98 36
FAX: +(7 095) 797 99 06

Slovak Republic

Honeywell s.r.o.
Phone: +(421 2) 58 247 403
FAX: +(421 2) 58 247 415

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

INTERNET: www.honeywell.com/sensing

E-mail: info.sc@honeywell.com

LATIN AMERICA

Argentina

Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
FAX: +(54-11) 4325-6470

Brazil

Honeywell do Brasil & Cia
Phone: +(55-11) 4166 1900
FAX: +(55-11) 4166 1901

Chile

Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Columbia

Honeywell Columbia, S.A.
Phone: +(57-1) 623-3239/3051
FAX: +(57-1) 623-3395

Ecuador

Honeywell S.A.
Phone: +(593-2) 981-560/1
FAX: +(593-2) 981-562

Mexico

Honeywell S.A. de C.V.
Phone: +(52) 55 5259-1966
FAX: +(52) 55 5570-2985

Puerto Rico

Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Venezuela

Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

This publication does not constitute a contract between Honeywell and its customers. The contents may be changed at any time without notice. It is the customer's responsibility to ensure safe installation and operation of the products. Detailed mounting drawings of all products illustrated are available on request. © 2004 Honeywell International Inc. All rights reserved.

Honeywell

Honeywell

21 Chemin du Vieux Chêne
38240 Meylan Cedex
France

Honeywell

11 West Spring Street
Freeport, Illinois 61032
USA

www.honeywell.com/sensing

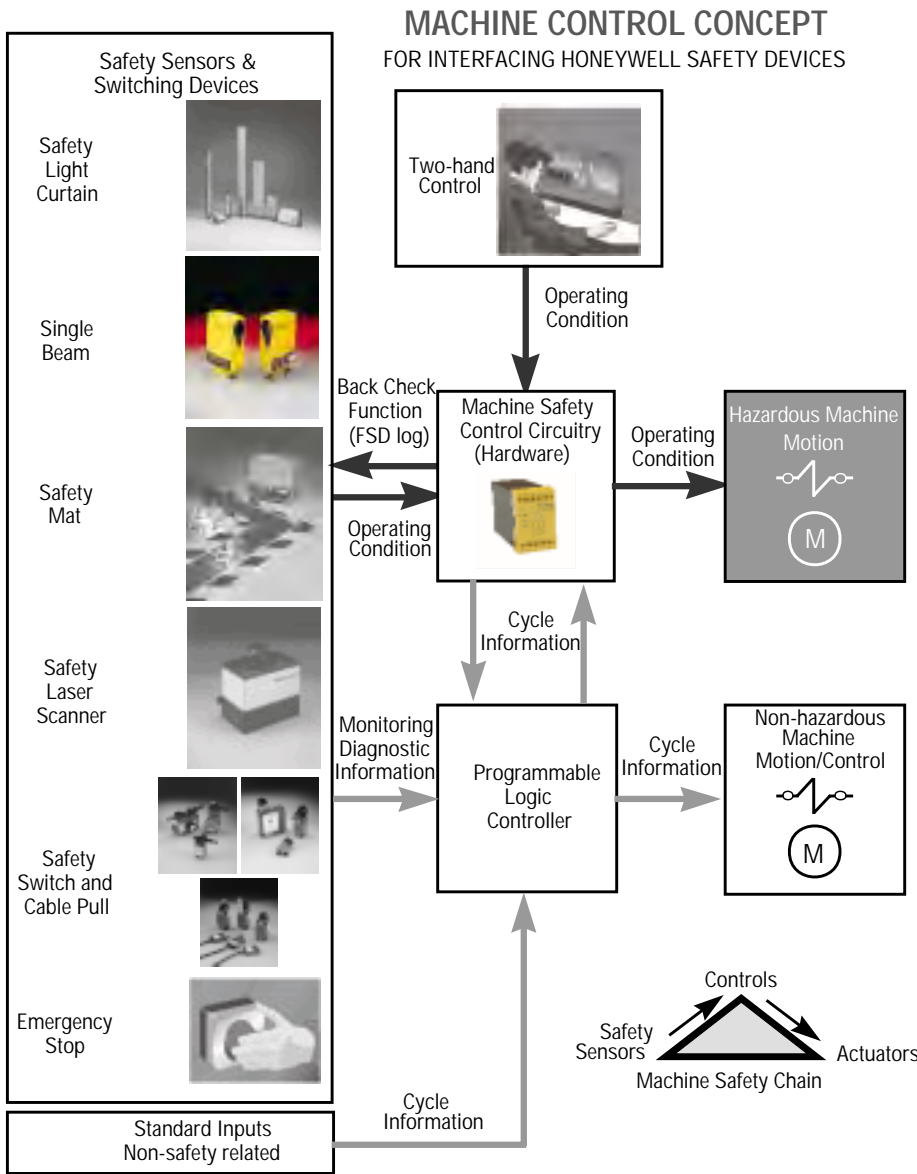
Safety Control Modules

Safety control modules are used to interface safety devices such as safety light curtains, safety mats, safety laser scanners, safety switches, Hall-effect sensors etc. in a safe and reliable manner. The machine safety is not limited to the use of safety sensors alone, but especially relies on the correct design of the safety interface.

The weakest part in the safety chain will determine the overall safety category.



Providing an interface between safety sensors and machine control circuitry is a critical and important part of a control reliable safety solution. Using safety control modules will help you in this task.

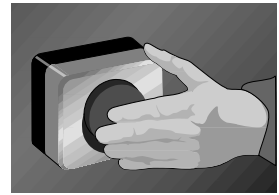


Please refer to the compatibility table page 221, in order to determine which safety device may be connected to which safety control module.

Emergency Stop modules

Emergency Stop modules are designed to be used in emergency stop circuits when danger to personnel or machinery is present.

An emergency stop circuit is made up of one actuator part (Emergency Stop push-button or another safety device) and one control part (emergency stop module). The emergency stop module serves as a logical control unit in an emergency stop circuit. If the safety device is actuated, the 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.



An emergency stop module accepts input from **safety devices** such as

- Emergency stop push-buttons
- Electrosensitive Protective Equipment (ESPE) with relay outputs (according IEC/EN 61496 parts 1 & 2),
- Safety mats with relay outputs
- Safety limit switches

Based on the number of safety device input channels, two types of Emergency stop modules are available:

- Single channel Emergency Stop modules (for interfaces up to Category 2 per EN 954-1)
- Dual channel Emergency Stop modules (for interfaces up to Category 4 per EN 954-1, control reliable per OSHA & ANSI).

The safety category per EN 954-1 ("Safety related parts of control circuits"), which can be achieved in safety control interfaces, is partly depending on the type of Emergency Stop module used.

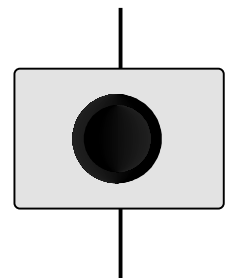
⇒ Single channel Emergency Stop modules:

This kind of Emergency stop module offers a single channel input only and are designed to be connected to safety devices with a single channel output.

However, there is no redundancy in a single channel input and cross faults in the emergency stop input circuits cannot be detected.

Moreover the detection of a line fault at the start push-button or of a blocked start push-button is not available on this kind of module.

These faults may lead to a dangerous situation and safety may not be maintained.



Single channel Emergency stop modules are suitable for interfaces up to Category 2 per EN 954-1.

The following safety devices can be connected to single channel emergency stop modules:

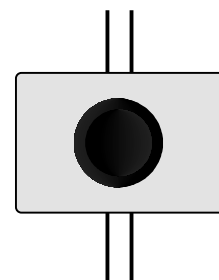
- Single channel emergency stop push-buttons
- Safety limit switches

If a single channel Emergency stop module does not provide the level of safety required, use one of the dual channel safety control modules.

⇒ Dual channel Emergency Stop modules:

Emergency stop modules with two channel input are designed to be connected to safety devices with two channel outputs.

These two channels being powered with a different potential, **any cross faults in the input loop** will be detected and not allow to restart the module.



A line fault at the start push-button or a **blocked start-button** will be detected and the module cannot be restarted: If the Start push-button is already closed before energizing the inputs, it is impossible to energize the output contacts. If a line fault in the start push-button occurs after the machine starts, it will be detected at the next cycle and the output contact will not be energized.

Dual channel Emergency stop modules are suitable to be used for interfaces up to Category 4 per EN 954-1 and meet control reliability per OSHA & ANSI.

It is possible to connect safety devices such as

- Emergency stop push-buttons
- Electrosensitive protective equipment ESPE with relay outputs (following IEC/EN 61496 parts 1 & 2)
- Safety mats with relay outputs
- Safety limit switches

Two-hand safety module

Two-hand safety control systems ensure protection against hand injury due to dangerous movements of machines.

A two-hand safety control system is made up of two parts:

- A control board with two hand control devices
- A two-hand safety module (or command circuit) connected to the control board

The two-hand safety device must be activated simultaneously with both hands in order to make the two hand safety module close his outputs. The two hand safety module is relaying the output signal to the machine control circuit, allowing the machine to work.

The two hand safety device must be located outside the dangerous area, so that the operator cannot reach the dangerous area before the machine has completely stopped. Releasing of one or both of the two hand device gives an immediate stop command of the machine. If only one two hand device has been released, the machine can only be restarted after releasing the other device and reactivation of both devices.

Different types of two-hand controls (Type per EN 574: Two-hand controls)

Features	Type I	Type II	Type IIIA	Type III B	Type IIIC
Use of both hands to initiate cycle	●	●	●	●	●
Both two hand devices need to be activated during the whole dangerous cycle	●	●	●	●	●
Relation between input/output signal	●	●	●	●	●
Release of one or both two hand devices stops the dangerous movement	●	●	●	●	●
Hazardous operation	●	●	●	●	●
Tamper resistant	●	●	●	●	●
Release of both two hand devices for restart		●	●	●	●
Synchronous action (0.5 s max. between signals)			●	●	●
Steps to ensure maintain of safety functions:					
Well tried components following Cat.1 per EN 954-1	●	●	●	●	●
Single fault detection following Cat.3 per EN 954-1		●		●	
Permanent self check Cat.4 per EN 954-1					●
Category according EN 954-1	1	3	1	3	4

Restart the output signal: releasing of one or both safety devices will stop the dangerous movement. Restart is only possible after both safety devices have been released.

Safety on single fault: After a fault, the two-hand system must neither become a one hand system, nor lead to hazardous start. Faults are not all detected and their accumulation can lead to the loss of the safety function.

Automatic self-check: The system will detect the first fault in the circuit and will stop the dangerous movement. Faults will be detected before they could lead to the loss of the safety function.

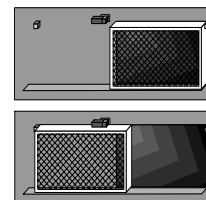
Safety door monitors

Mechanical doors prevent the access to dangerous zones. These doors are designed to limit or block the access to hazardous motion of machinery.

They can be equipped with locking or interlocking devices, usually limit switches, micro switches or any other sensors.

When the locking device is triggered by means of moving the protective door, 2 types of information are created:

- **Door open:** The locking device triggers a stop command.
- **Door closed:** The locking device allows machine restart, but will not trigger the restart by itself.



EN 60204 9.3.1

Closing the protective door shall not initiate a movement or an operation that could create a dangerous situation.

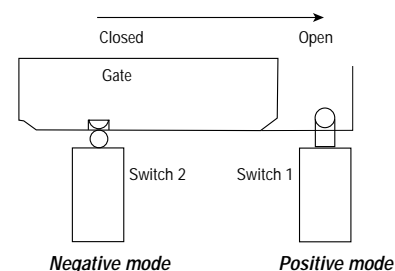
Low safety level (Category 1 or 2 per EN 954-1)

The safety standards require a locking device made up of only one mechanical position switch, triggered in positive mode and with positive opening contact.

High safety level (Category 3 or 4 per EN 954-1)

The safety standard demands a locking device made up of two mechanical position switches, usually working in opposite mode (see figure aside):

- One switch with normally closed contacts triggered by the door according to the positive mode
- One switch with normally open contacts triggered by the door according to the negative mode.



Extension module

The Extension Module provides contact multiplication for safety control modules or other safety devices offering the external relay (FSD) monitoring capability.

The correct operation of the FF-SRE3081 is monitored by the FSD loop of the main safety device.

Time delay modules

The time delay modules may be used together with emergency stop modules. The emergency stop module will immediately signal the emergency stop condition to the machine control circuitry.

The time delay module can be used to keep some non-safety related machinery operating for a short period of time to avoid an unsafe condition or simplify the machine run-down & start-up cycle. This is referred to as a Category 1 emergency stop per EN 418.



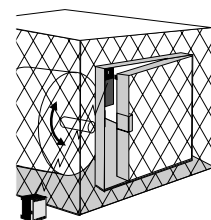
Typical Applications:

- Allowing the opening of a safety door after an elapsed time
- Signals a brake to stop the dangerous movement
- Disconnection of main power from the safety interface circuit after stopping the dangerous movement

Standstill monitors

The Standstill monitor module is detecting the stopping of single or three phase asynchronous motors by measuring the back e.m.f. generated in the stator of the motor. They are often used in conjunction with solenoid key operated switches to latch a door until the dangerous movement has stopped.

Moreover, a broken wire in the measuring circuit can also be detected (by means of DC current injection).



Typical applications:

- Stopped motor monitor for three or single phase asynchronous motors
- Used to unlock a door guarding a rotating machine only when the movement is stopped
- Used to apply an emergency brake

Notice: If the stopping time of the machinery is unpredictable, the use of a time delay module is not advisable. Use the standstill monitor module in order to determine the exact stopping moment.

Specifications FF-SR Series	Single Channel Emergency stop Modules		Dual Channel Emergency stop Modules			Safety module for FF-SYA Safety Light Curtain	Two-hand Safety Module	Safety Door Monitor	Extension Module	Time delay Module	Standstill Monitor Module
Reference	FF-SRS5924	FF-SRS5934	FF-SRS5925	FF-SRS5935	FF-SRS5988	FF-SRS5939	FF-SR25980	FF-SRD5985	FF-SRE3081	FF-SRT	FF-SR05936
Approvals	BG UL/CSA	BG UL/CSA	BG UL/CSA (pending)	BG UL/CSA	BG UL/CSA	BG UL/CSA (pending)	BG UL/CSA	BG UL/CSA	BG UL/CSA	UL/CSA	UL/CSA
Safety Interfaces up to Category ... (per EN 954-1)	2	2	4	4	4	4	1	4	4 ⁽¹⁾	1 ⁽²⁾	1 ⁽²⁾
Input Channels	1	1	2	2	2	2	2	2	2	1 or 2	1
Voltages	24 Vdc	24 Vdc 120 Vac 230 Vac	24 Vac/dc	24 Vdc 120 Vac 230 Vac	24 Vdc/120 Vac 24 Vdc/230 Vac	24 Vdc	24 Vdc 120 Vac 230 Vac	24 Vdc 120 Vac 230 Vac	24 Vdc 120 Vac 230 Vac	24 Vdc 120 Vac 230 Vac	24 Vdc 120 Vac 230 Vac
Safety Contacts	3 NO	2 NO	2 NO	3 NO	6 NO	2 NO	2 NO	2 NO	7 NO 1 NC	1 NO 1 NC	2 NO 2 NC
Auxiliary Contacts	1 NC	-	1 NC	1 NC	1 NC	1 NC	-	-	-	-	-
Switching Current	10 mA to 4 A	10 mA to 10 A	1 mA to 7 A	1 mA to 10 A	1 mA to 10 A	1 mA to 6 A	1 mA to 10 A	1 mA to 10 A	1 mA to 10 A	30 mA to 8 A	10 mA to 10 A
Response Time	35 ms	35 ms	15 ms	25 ms	30 ms	15 ms	30 ms	30 ms	15 ms	-	2 s (after voltage is < 20 mV)
Simultaneity of two Input Signals	-	-	none	none	none	< 30 ms	< 500 ms	< 3 s	-	-	-
Cross fault detection between Input Channels	no	no	yes	yes	yes	no ⁽³⁾	yes	yes	yes ⁽⁴⁾	-	Broken wire detection in measuring input
FSD-Monitoring	yes	yes	yes	yes	yes	yes	yes	yes	-	-	-
Monitoring of Start Push-button	no	no	yes	yes	yes	yes		Automatic start only	-	-	-
Removable Terminal Strips	yes	no	yes	yes	yes	yes	no	no	yes	no	no
Width	22,5 mm / 0.89 in	45 mm / 1.77 in	22,5 mm / 0.89 in	45 mm / 1.77 in	100 mm / 3.93 in	45 mm / 1.77 in	45 mm / 1.77 in	45 mm / 1.77 in	100 mm / 3.93 in	45 mm / 1.77 in	45 mm / 1.77 in

(1) The safety category depends on the category of the main safety control module

(2) A higher safety category may be reached (depending on the interface)

(3) Cross faults between the inputs of the FF-SRS5939 will be detected by the fail safe static outputs of the FF-SYA safety light curtain

(4) Depends on the connection of the FF-SRE

Compatibility between Honeywell Safety Devices and Safety Control Modules	Single Channel Emergency stop Modules		Dual Channel Emergency stop Modules			Safety module for FF-SYA Safety Light Curtain	Two-hand Safety Module	Safety Door Monitor	Extension Module	Time delay Module	Standstill Monitor Module	Category 2 Muting Module	Category 4 Muting Module
	FF-SRS5924	FF-SRS5934	FF-SRS5925	FF-SRS5935	FF-SRS5988								
Reference	FF-SRS5924	FF-SRS5934	FF-SRS5925	FF-SRS5935	FF-SRS5988	FF-SRS5939	FF-SR25980	FF-SRD5985	FF-SRE3081	FF-SRT	FF-SR05936	FF-SLM	FF-SRM100P2
Safety Interfaces up to Category ... (per EN 614-1)	2	2	4	4	4	4	1	4	4 ⁽¹⁾	1 ⁽²⁾	1 ⁽²⁾	2	4
FF-SYA: Type 4 Light Curtains						●							●
FF-SB, FF-LS: Type 4 Light Curtains			●	●	●				● ⁽³⁾				●
FF-SLC: Type 2 Light curtains									●			●	
FF-SM: Safety Mat			●	●	●								●
FF-SE: Safety Laser Scanner			●	●	●								●
GKM, GK: Key operated Safety Switches	●	●	●	●	●			●					
GKR/L: Solenoid Key Operated Safety Switches	●	●	●	●	●			●		●	●		
GSS: Global Safety Switch 24CE/924CE: Miniature Safety Switch	●	●	●	●	●			●					
40FY: Hall Effect Sensors	●			●				●					
FF-SRE3081: Extension Module	●	●	●	●	●	●	●	●	●			●	●
FF-SRT: Time Delay Module	●	●	●	●	●	●	●	●				●	●
FF-SR05936: Standstill Monitor Module	●	●	●	●	●	●	●	●				●	●

● Interconnection possible

(1) The safety category depends on the category of the main safety control module

(2) A higher safety category may be reached (depending on the interface)

(3) Except the FF-SB100ER02□-S2 (no FSD-loop)