HONEYWELL

FF-SRE60292

See full Datasheet below...

Honeywell

FF-SRE6029

Extension Module

Instructions for use

(pending)

(pending)

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

⚠ WARNING

IMPROPER INSTALLATION

- Consult with US, Canadian and/or European safety agencies and their requirements when designing a machine control, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

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

PRODUCT DESCRIPTION

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 safety 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.

APPROVALS

CE	The product, packaging and documentation of FF-SR Series products carry the CE mark; the CE declaration of conformity is attached on the last page.
cURus (pending)	This product is currently being assessed by Underwriters Laboratories Inc. according to Canadian and U.S. safety requirements.

DIRECTIVE COMPLIANCE

Machinery Directive 98/37/EC
Low Voltage Directive 73/23/EC
Electromagnetic Compatibility Directive 89/336/EC

REGULATION COMPLIANCE

Regulation	Title
OSHA 29 CFR 1910.217	Requirements and Safeguarding of Mechanical Power Presses

STANDARD COMPLIANCE

Standard	Title
EN 292	Safety of Machinery - Basic Concepts, General Principles for Design
EN 60204-1	Safety of Machinery - Electrical Equipment of Machines
EN 954-1	Safety of Machinery - Safety related parts of control system
ANSI B11.1	Construction, Care and Use of Mechanical Power Presses
ANSI B11.2	Construction, Care and Use of Hydraulic Power Presses
ANSI B11.19	Safeguarding Performance Criteria for the Design, Construction, Care and Use
ANSI/RIA R15.06	Safety Requirements for Industrial Robots and Robot Systems
UL 508	Industrial Control Equipment
NFPA79	Electrical Standard for Industrial Machinery

SPECIFICATIONS

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)			
	current	*operations*	*current*	*operations*
	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)			
	cos φ	*F*	*cos φ*	*F*
	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)			

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 = , 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)

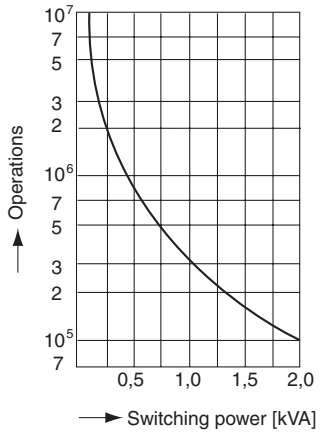

FIGURE 2. LIMITATION FACTOR FOR INDUCTIVE LOADS
(power factor cos φ < 1, note 2)

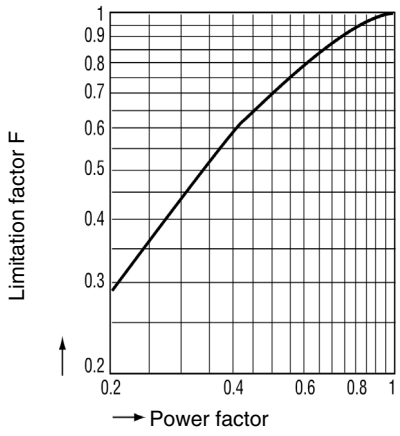

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FIGURE 3. QUADRATIC TOTAL CURRENT LIMIT

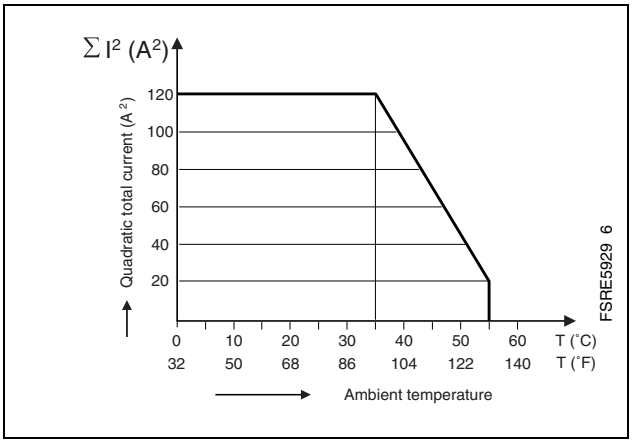


Figure 3 shows the maximal recommended safety contact currents at a certain ambient temperature to avoid overheating of the safety module.

To use this curve, do the following:
1. Square the currents in each safety contact branch and sum the square currents to obtain the total square limit (in A²).
2. Determine the maximal recommended external temperature at the total square current limit:

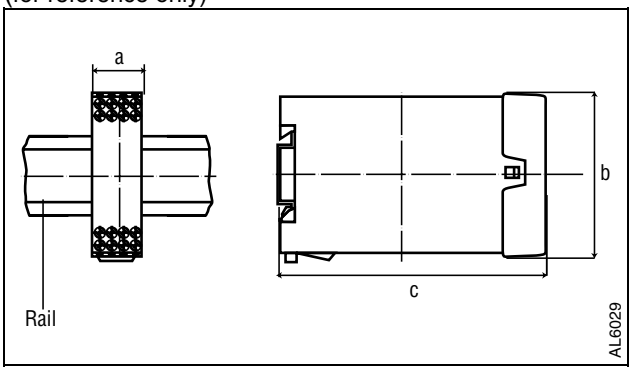
Example: 5 A current per normally open contact:
Total square current limit :
$\sum I^2 = (5A)^2 + (5A)^2 + (5A)^2 + (5A)^2 = 100\ A^2$
Max. external temperature: T = 39 °C (102 °F).

If the module is located in a higher temperature environment, the lifetime of the electronic components may be reduced. Ventilation of the cabinet may be required.

MECHANICAL INSTALLATION

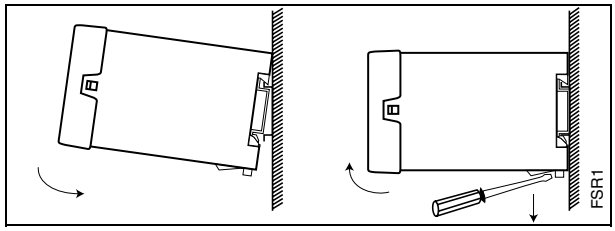
The FF-SRE6029 must be installed inside an IEC IP 54 (NEMA 3) rating enclosure or better. The module can be clipped easily onto a 35 mm (1.38 in.) width rail (see figure 5 for installation and removal).

FIGURE 4. MOUNTING DIMENSIONS
(for reference only)



a Width: 22,5 mm / 0.89 in.
b Height: 90 mm / 3.55 in.
c Depth: 121 mm 4.77 in.

FIGURE 5. INSTALLATION DIAGRAM



CONTROL RELIABILITY

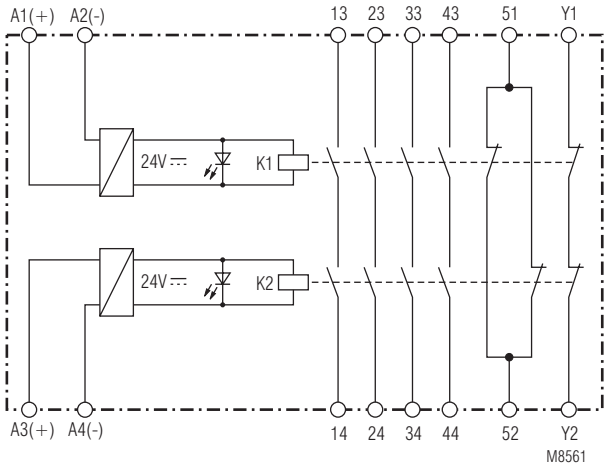
"Control Reliability" essentially means that "the device, system or interface shall be designed, constructed and interfaced such that any single component failure within the device, interface or system shall not prevent normal stopping action from beeing applied but shall prevent the initiation of a successive operation until the failure is corrected".
OSHA 29 CFR 1910.217 states that "the device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent initiation of a successive stroke until the failure is corrected. The failure shall be indicated by the system."

SAFETY CATEGORY OF INTERFACES

The safety category of the interface is depending on the safety category of the main safety device (emergency stop module, safety light curtain, safety mat, etc.) and the way of interconnecting it to the FF-SRE6029 Extension module.

Refer to the important application warnings (page 5) for more details concerning safety.

FIGURE 6. INTERNAL CIRCUITRY



ELECTRICAL INSTALLATION

⚠ WARNING

ELECTRICAL SHOCK

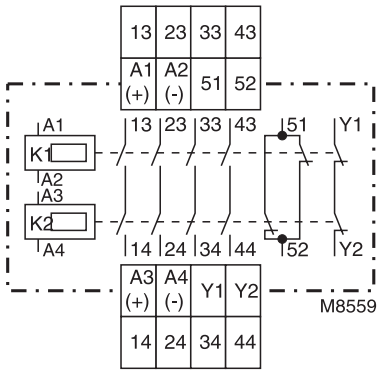
Remove power from FF-SR Series control modules and machine during installation.

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

Multiple wiring configurations are possible for the FF-SRE6029 extension control module and only general guidelines are provided in this installation manual.

Refer to the important application warnings (page 5) and the application examples (pages 6 through 7) for more details.

FIGURE 7. TERMINAL ARRANGEMENT



FUNCTIONAL DESCRIPTION

In the case of an emergency stop condition, the safety device connected to the FF-SRE6029 module is actuated and the internal safety relays K1 and K2 de-energise. The normally open safety contacts (13/14…43/44) will open and the normally closed safety contacts (51/52) will close.

The emergency stop condition is signalled to the machine control circuitry by the module's safety contacts to stop the hazard and remove power.

As soon as the safety device is released, power is applied to A1(+)/A2(-), A3(+)/A4(-) and the relays K1 and K2 energise. The normally open contacts will close and the normally closed contact will open.

Both relays K1 and K2 must be energized to have the normally open contacts in a closed condition. If one of the safety relays de-energizes, the normally open contacts will open.

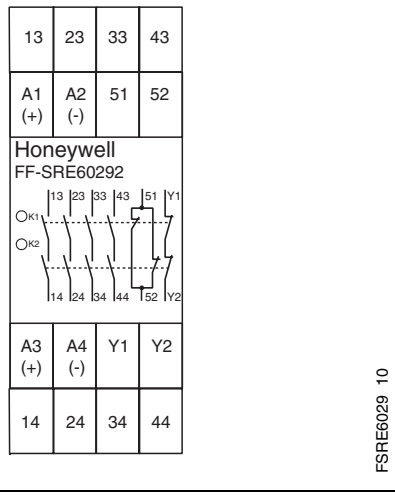
One or more FF-SRE6029 Extension Modules can be cascaded or external contactors with positive guided safety contacts can be used to increase the number of contacts.

If multiple safety contacts are used in parallel with one load, the maximum admissible current can be increased.

LED INDICATORS

The FF-SRE6029 module has two green LED status indicators (K1 and K2) as illustrated in Figure 8.
Illuminated K1 and/or K2 LEDs indicate(s) that the corresponding internal safety relay is energized.

FIGURE 8. MODULE FRONT PANEL



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APPLICATION WARNINGS

⚠ WARNING

IMPROPER INPUT CONNECTIONS

- To ensure the highest level of safety, always connect the two redundant safety device outputs individually to the safety relay inputs A1(+)/A2(-) and A3(+)/A4(-) of the FF-SRE6029 Extension Module.
- When safety devices with relay outputs are used, always connect them using different potentials to A1(+)/A2(-) and A3(+)/A4(-), in order to be able to detect cross-faults.

CONTACT WELDING

Always protect all safety contacts with correctly rated fuses. These fuse ratings must never exceed the max. safety output switching currents of the FF-SRE6029 to prevent contact welding (see specifications page 2).

IMPROPER EXTENSION MODULE MONITORING

- Only connect the FF-SRE6029 extension module to safety devices offering the External Device Monitoring (EDM) capabilities (e.g. FF-SYB, FF-SB, FF-LS safety light curtains, FF-SM safety mats, FF-SRS emergency stop modules).
- Do NOT connect the FF-SRE6029 extension module to safety devices WITHOUT the EDM function (e.g. FF-SYA, FF-SG, FF-SLG or FF-SLG30).
- The External Device Monitoring (EDM) function checks the correct operation of the internal relays before each FF-SRE6029 activation and is able to detect failures of the internal relays (e.g. welded safety relay contacts).
- ALWAYS connect the normally closed contact (Y1/Y2) of the extension module to the External Device Monitoring (EDM) loop of the connected safety device. NEVER use the normally closed contact (51/52) for the EDM.
- If the FF-SRE6029 is not activated often, the customer should perform additional test procedures of the safety components. This testing may be done every day by removing the power from the FF-SRE6029 at machine power up.

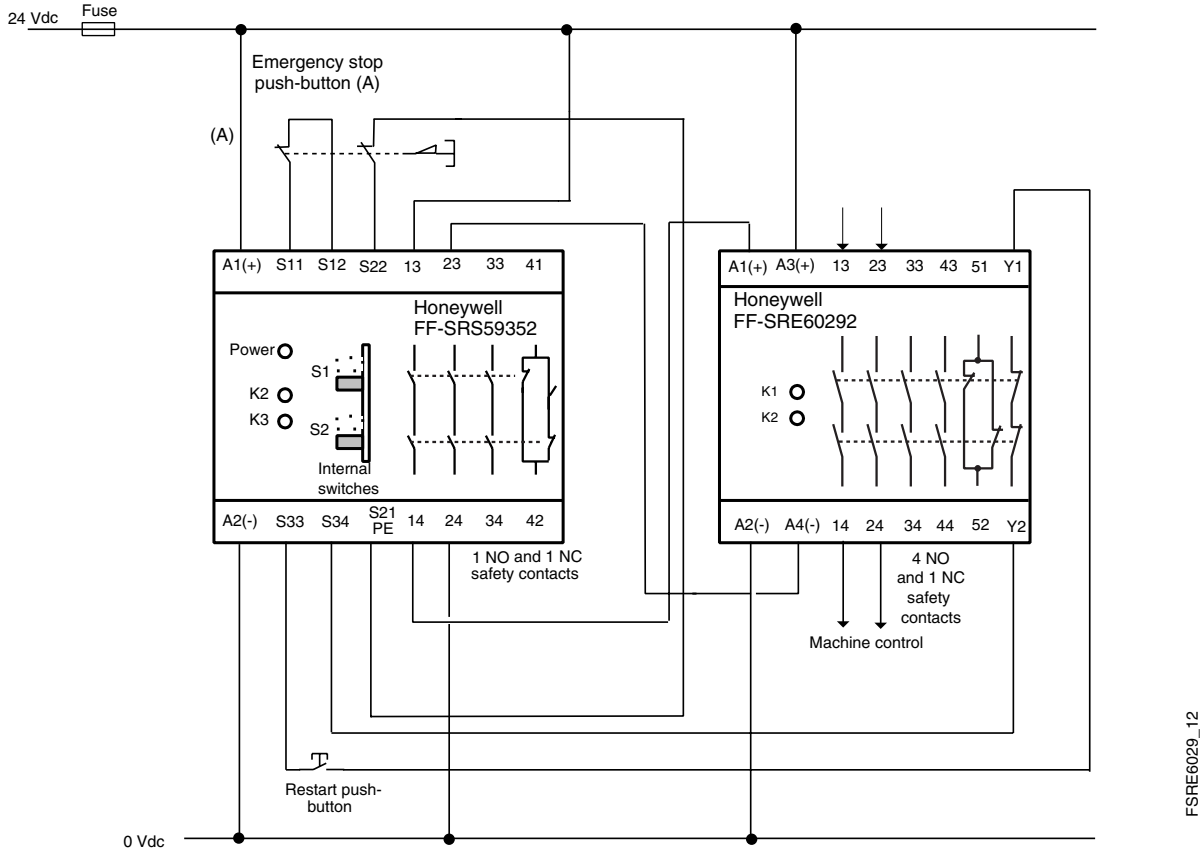
IMPROPER ARC SUPPRESSOR INSTALLATION

- NEVER install an arc suppressor across the safety output contacts of the extension module.
- ALWAYS install arc suppressors across the coils of external safety relays.

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

APPLICATION EXAMPLES

FIGURE 9. CONNECTION OF AN FF-SRS59352 EMERGENCY STOP MODULE



FUNCTIONAL DESCRIPTION:

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 all 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

NOTICE

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

This may be a safety device with dual output safety switching devices (OSSD)

- emergency stop push-button
- safety limit or interlock switches (e.g. CPS, GK, GSS)

⚠ WARNING

IMPROPER INPUT CONNECTIONS

- To ensure the highest level of safety, always connect the two redundant safety device outputs individually to the safety relay inputs A1(+)/A2(-) and A3(+)/A4(-) of the FF-SRE6029 Extension Module.
- When safety devices with relay outputs are used, always connect them using different potentials to A1(+)/A2(-) and A3(+)/A4(-), in order to be able to detect cross-faults.

IMPROPER EXTENSION MODULE MONITORING

- The External Device Monitoring (EDM) function checks the correct operation of the internal relays before each FF-SRE6029 activation and is able to detect failures of the internal relays (e.g. welded safety relay contacts).
- ALWAYS connect the normally closed contact (Y1/Y2) of the extension module to the External Device Monitoring (EDM) loop of the connected safety device. NEVER use the normally closed contact (51/52) for the EDM monitoring.

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

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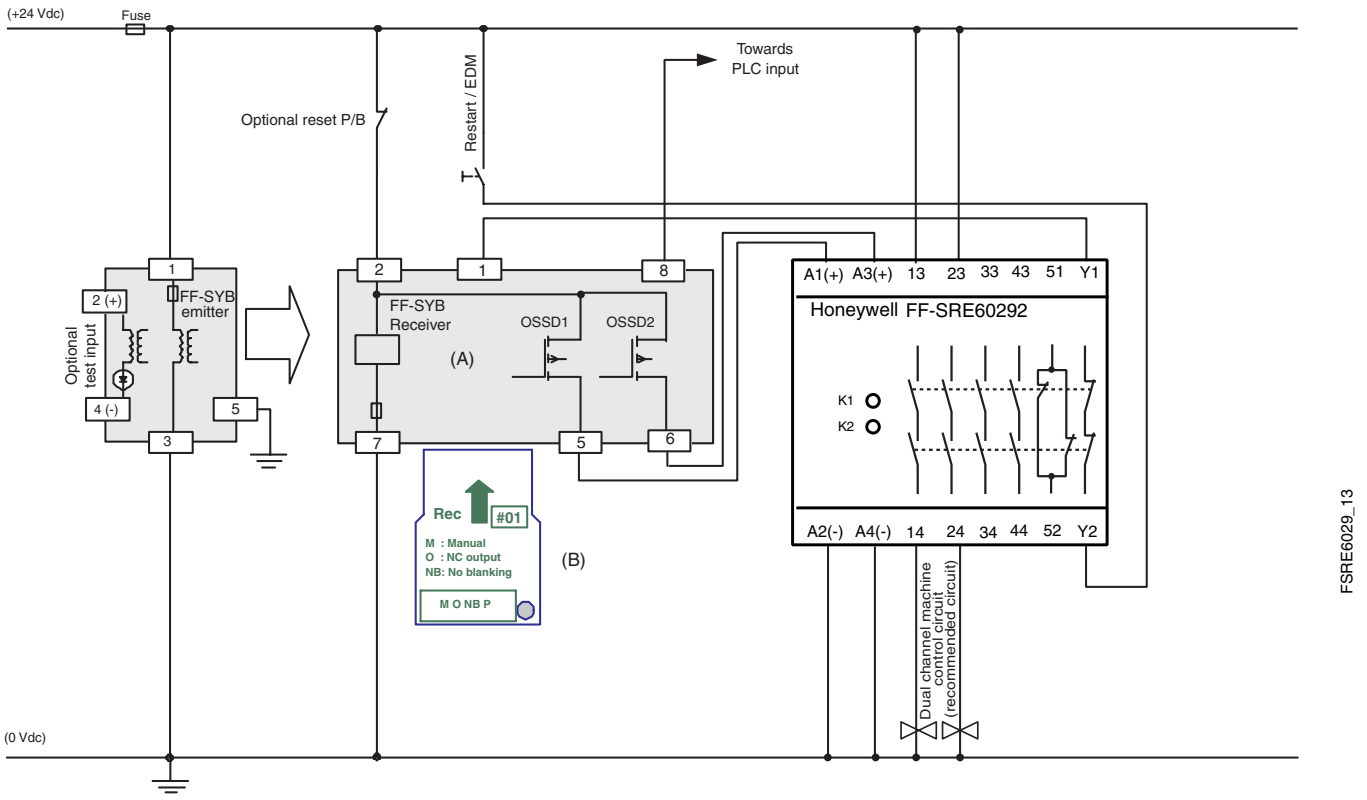
FIGURE 10. CONNECTION OF AN FF-SYB TYPE 4 SAFETY LIGHT CURTAIN



FUNCTIONAL DESCRIPTION:

After interrupting the sensing field of the FF-SYB safety light curtain, both static safety oututs (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

NOTICE

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.

⚠ WARNING

IMPROPER INPUT CONNECTIONS

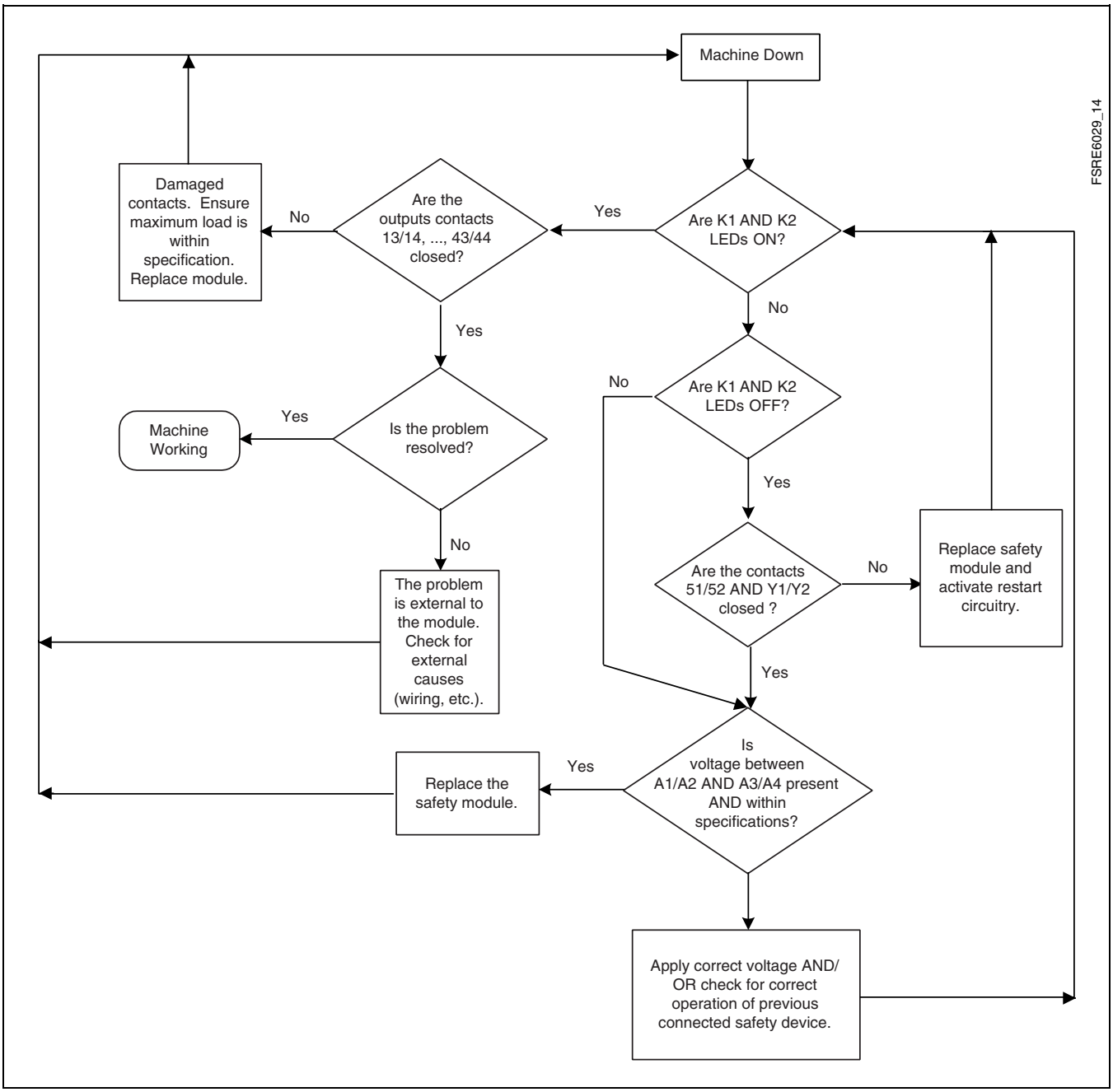
To ensure the highest level of safety, always connect the two redundant safety device outputs individually to the safety relay inputs A1(+)/A2(-) and A3(+)/A4(-) of the FF-SRE6029 Extension Module.

IMPROPER EXTENSION MODULE MONITORING

- The External Device Monitoring (EDM) function checks the correct operation of the internal relays before each FF-SRE6029 activation and is able to detect failures of the internal relays (e.g: welded safety relay contacts).
- ALWAYS connect the normally closed contact (Y1/Y2) of the extension module to the External Device Monitoring (EDM) loop of the connected safety device. NEVER use the normally closed contact (51/52) for the EDM monitoring.

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

FIGURE 11. FF-SRE6029 TROUBLESHOOTING FLOW DIAGRAM



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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 and through our literature and the Honeywell Website, 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.

ORDER GUIDE

FF-SRE6029□

└── 2 = 24 Vac/dc

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