FF-SRE59292

Extension Module

Instructions for use

(pending)

(pending)

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

⚠ WARNING

IMPROPER INSTALLATION

- Consult with US 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-SRE59292 Extension Module provides contact multiplication for emergency stop modules, safety door modules and other safety sensors with final switching device monitoring capability (FF-SB, FF-LS, FF-SCAN, FF-SPS4 or Detector 3 safety light curtains). This product has two safety relays with positive-guided contacts to ensure redundancy and offers four NO contacts and one NC 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.

DIRECTIVES COMPLIANCE

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

REGULATIONS COMPLIANCE

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

STANDARDS COMPLIANCE

Standard	Title
EN 292	Safety of Machinery – Basic Concepts, General Principles for Design
EN 60204	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
NFPA 79	Electrical Standard for Industrial Machinery

SPECIFICATIONS

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 Caution)
Voltage Range (min. to max.)	0,1 to 250 Vac/dc
Switching capability per AC15 (EN60947-5-1)	NO contact: 3 A/250 Vac – NC contact : 2 A/250 Vac
Typical Electrical Life Expectancy	Power factor = 1 at 230 Vac (see Note 1)
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 2)
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 solid (max.) [14 AWG] or 2 x 1,5 mm^2 (max.) [16 AWG] stranded wire with sleeve DIN 46288
Wire/conductor attachment	Removable terminal strips 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)

NOTE 1: Install arc suppression device across load to avoid module contact arcing and ensure specified relay life expectancy. Install module to allow maximum air circulation around the safety module.

NOTE 2: 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

Figure 1. Contact life for 100 % resistive load (typical)
power factor = 1 (cos φ), (see Note 1)

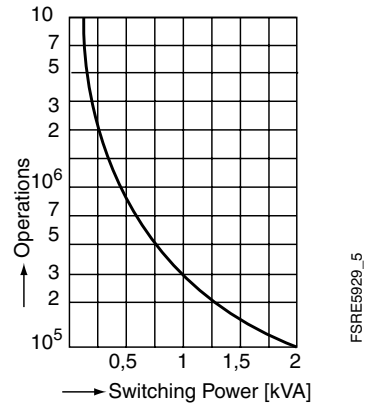
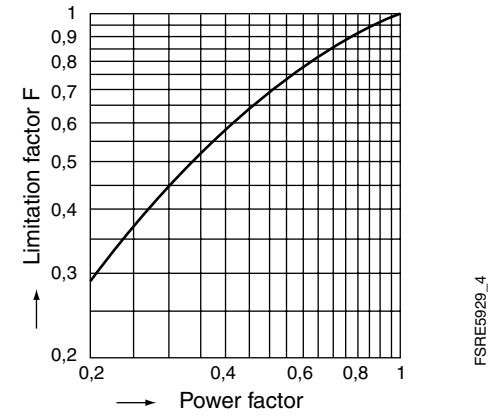


Figure 2. Limitation factor for inductive loads
Power factor < 1 (cos φ), (see Note 2)



CAUTION

Contact damage
To ensure the 1 mA switching capability during the lifetime of the contact, never exceed 300 mA or 60 V.
Failure to comply with these instructions will result in loss of low current switching capability.

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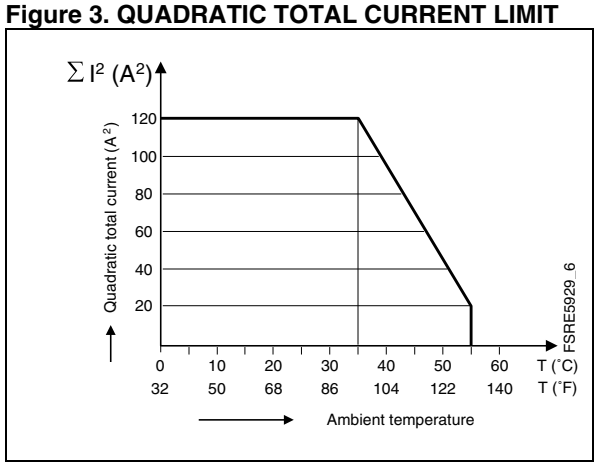
Figure 3. QUADRATIC TOTAL CURRENT LIMIT



Quadratic total current limit (see figure 3) displays the maximum recommended external temperature versus the total load of all the safety module contacts. To use this curve, do the following:

(1) Square the current in each contact branch, then sum all the results to obtain the vertical axis value.
(2) Follow the horizontal line from the obtained value and note intersection of the appropriate curve.
(3) Follow the intersection point down to determine the maximal recommended external temperature. (Ex: $\sum I^2 = 120\ A^2$ current inside safety contacts, then T = 35 °C (95 °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-SRE59292 must be installed inside a NEMA 3 (IEC IP 54) rating enclosure or better. The module can be clipped easily onto a 35 mm (1.38 in) width DIN rail (see Figure 4) for DIN rail installation and removal. Specific features of this product include removable block terminals. This feature provides easy access to wiring during installation and reduces machine downtime during maintenance.

To remove a terminal block, slide the terminal block out

Figure 4. Mounting dimensions

(for reference only)

a Width: 22,5 mm / 0.89 in
b Height: 74 mm / 2.91 in
c Depth: 121 mm / 4.77 in

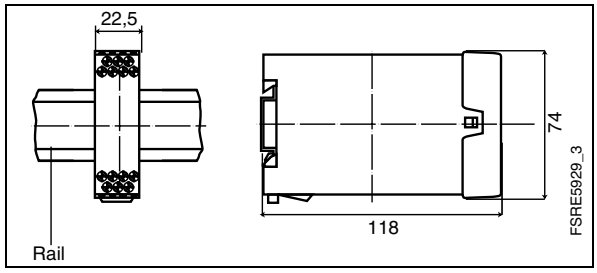


Figure 5. INSTALLATION DIAGRAM

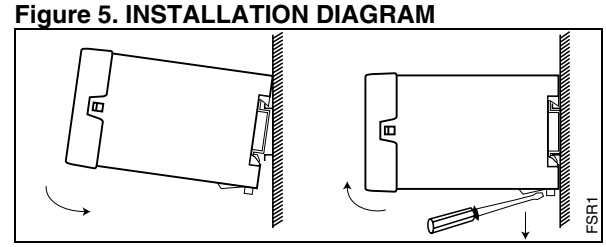
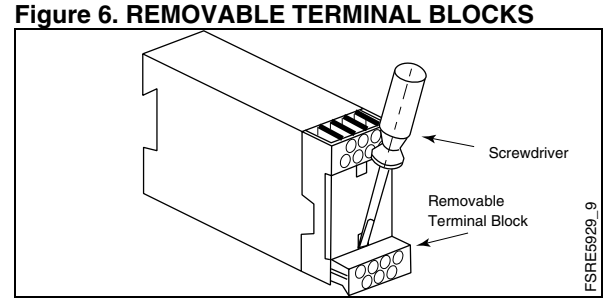


Figure 6. REMOVABLE TERMINAL BLOCKS



CONTROL RELIABILITY

"Control Reliability" essentially means that "the sensor, 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 being 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 complete interface is dependent on the safety category of the main safety device (emergency stop modules, safety light curtains, etc.) and the way of interconnecting it to the FF-SRE5929 Extension module.

The safety of the interconnection mainly relies on redundancy and the final switching device monitoring:

monitoring capability provide the compulsory monitoring of the correct functioning of the internal relays of the FF-SRE59292 Extension module.

Interconnecting the FF-SRE59292 extension module to the emergency stop module using two redundant channels and the emergency stop module's FSD monitoring capability help to build a safe electrical interface.

ELECTRICAL INSTALLATION

⚠ WARNING

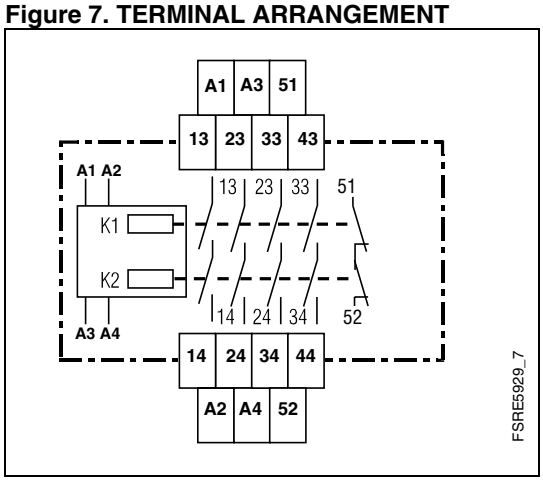
ELECTRICAL SHOCK

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-SRE59292 extension control module. General guidelines are provided because there are various ways to interface the module to machine control circuitry. Refer to the important warnings (page 5) and the application examples (pages 6 through 7).

Figure 7. TERMINAL ARRANGEMENT



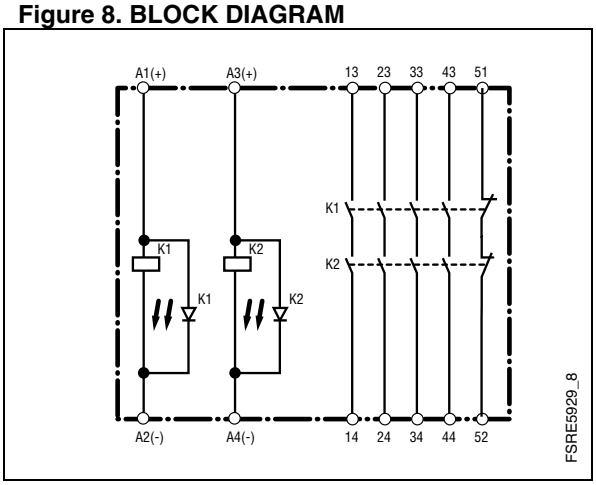
FUNCTIONAL DESCRIPTION

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

If a safety device is actuated (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 signalled to the machine control circuitry by the module's normally open safety contacts to stop the hazard and remove power.

Figure 8. BLOCK DIAGRAM



The normally closed contact of the extension module (51/52) must be connected to the Final Switching Device (FSD) monitoring loop of the connected safety device. This configuration will ensure that the two safety relays in the extension module are operating correctly.

One or more FF-SRE59292 Extension Modules can be cascaded or external contactors with positive guided safety contacts can be used to increase the number of contacts.

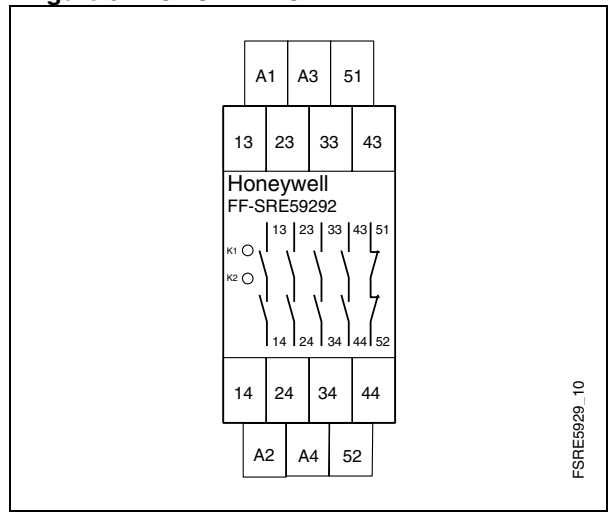
If multiple safety contacts are used in parallel with one load, the maximum admissible current can be increased.

LED INDICATORS

The FF-SRE59292 module has two green LED status indicators (K1 and K2) as illustrated in Figure 9.

Illuminated K1 and/or K2 LEDs indicate(s) that the corresponding internal safety relay is energized. Both K1 and K2 relays must be energized to have the normally open contacts 13/14…43/44 in a closed condition. If one of the safety relays de-energizes, the normally open contacts will open immediately.

Figure 9. MODULE FRONT PANEL



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APPLICATION WARNINGS

⚠ WARNING

IMPROPER INPUT CONNECTIONS

- To ensure the highest level of safety, connect the two safety device outputs to the redundant inputs A1/A2 and A3/A4 of the FF-SRE59292 Extension Module.
- If only one safety output from the safety sensor is used, connect the FF-SRE59292 module as shown in the single input channel example. In this case, take extra precaution to avoid any short circuit possibilities on this single input channel. Conduit may be used to protect wiring. Additional protection may also be applied to the terminal strips inside the machine cabinets to avoid any possible short circuits.

IMPROPER FF-SRE59292 MONITORING

- Always connect the normally closed contact of the extension module (51/52) to the Final Switching device (FSD) monitoring loop of the safety control module or any other safety sensor offering the FSD monitoring capability. This configuration will ensure that the two internal safety relays of the extension module are checked and operate correctly.

CONTACT WELDING

- Always protect all safety contacts with correctly rated fuses. These fuses must never exceed the rated FF-SRE59292 safety output capability to prevent contact welding.

IMPROPER EXTERNAL SAFETY RELAY MONITORING

- When using additional safety relays, always connect one normally closed contact of each relay in series to the Final Switching Device (FSD) monitoring loop of the safety control modules or any other safety device offering the FSD monitoring capability. This connection will ensure correct operation of the external relays after each FF-SRE59292 activation.
- If the FF-SRE59292 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-SRE59292 at machine power up.

IMPROPER ARC SUPPRESSOR INSTALLATION

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

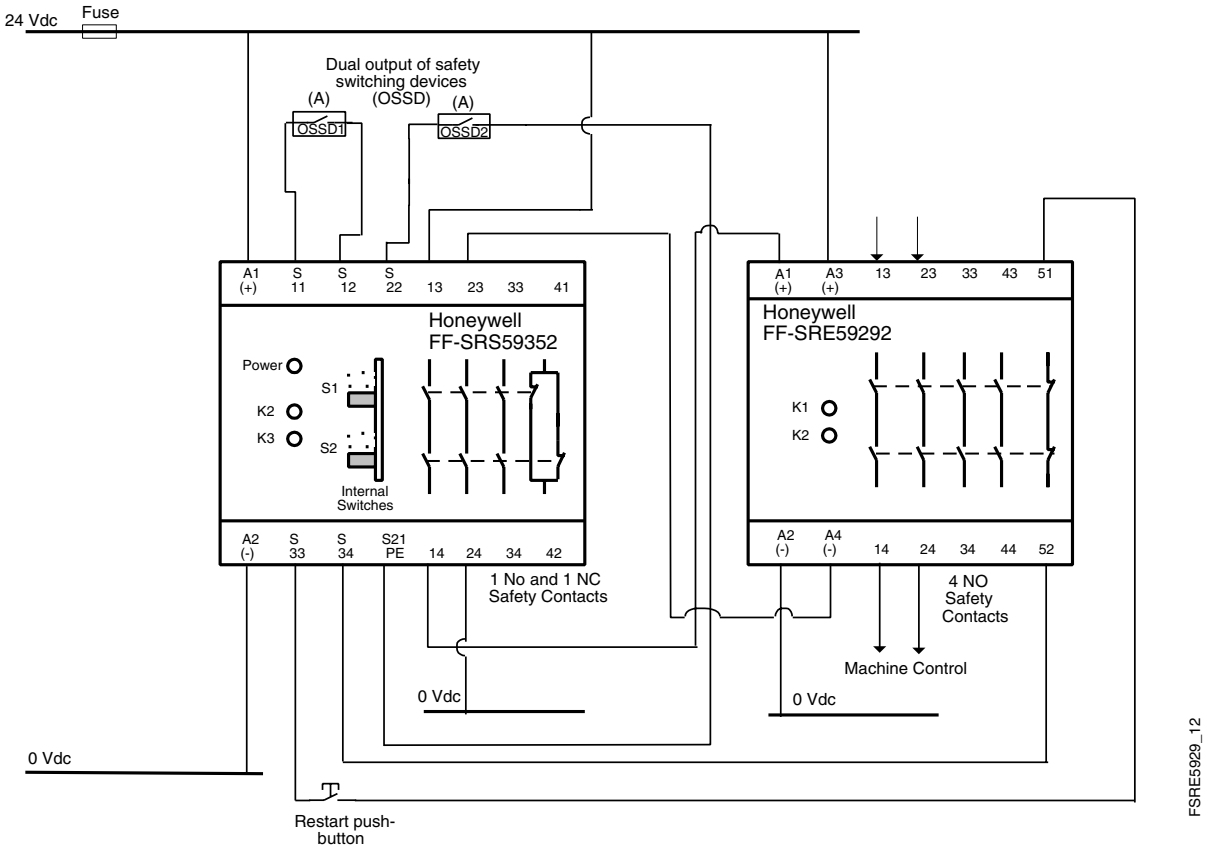
Failure to comply with these instructions could result in death or serious injury.

NOTICE

The FF-SRE59292 will immediately change state when the two input channels A1/A2 and A3/A4 receive power. No timing limitation exists when power is applied to each of these two inputs.

APPLICATION EXAMPLES

Figure 10. Two channel connection of an FF-SRE59292 extension module to a FF-SRS59352 Dual Channel Emergency Stop Module (Recommended interface)



This circuit uses redundancy in the extension module circuit, because of its two channel connection to the emergency stop module. It offers the highest possible safety level.

APPLICATION NOTE:

NOTE (A): Dual Channel Safety devices

This may be a dual output safety switching device (OSSD) with cross-monitoring such as emergency push-buttons, safety light curtains (FF-SB, FF-LS), single beam (FF-SPS), modular safety light curtains (FF-SCAN), safety laser scanner (FF-SE), dual output safety limit or interlock switches with positive opening (for example, 2CLS and GK).

FUNCTIONAL DESCRIPTION:

After activation of the safety device, both LEDs K2 and K3 of the FF-SRS59352 emergency Stop module will turn OFF, indicating that the two internal safety relays K2 and K3 are de-energized. The normally open safety outputs 13/14, 23/24 and 33/34 will open and the normally closed safety output will close. Then both LEDs K1 and K2 on the FF-SRE59292 extension modules go off indicating that the two internal safety relays are de-energized. Safety contacts 13/14 to 43/44 open and 51/52 closes.

1. After removing the emergency stop condition, press and release the restart push-button to restart the FF-SRS59352 emergency stop module.
2. If the FF-SRE59292 extension module is operating properly, both LEDs K2 and K3 of the FF-SRS59352 module illuminate, indicating that the safety relays K2 and K3 are energized. At this time, the three normally open safety contacts will close and the normally closed safety contact will open. Both LEDs K1 and K2 of the FF-SRE59292 illuminate, indicating that safety relays K1 and K2 are energised. Safety contacts 13/14 to 43/44 will close and 51/52 will open. This action will allow the machine to operate.

The proper operation of the FF-SRE59292 extension module is monitored by connecting the NC contacts 51/52 in series to the restart circuit (S33/S34) of the FF-SRS59352 emergency-stop module.

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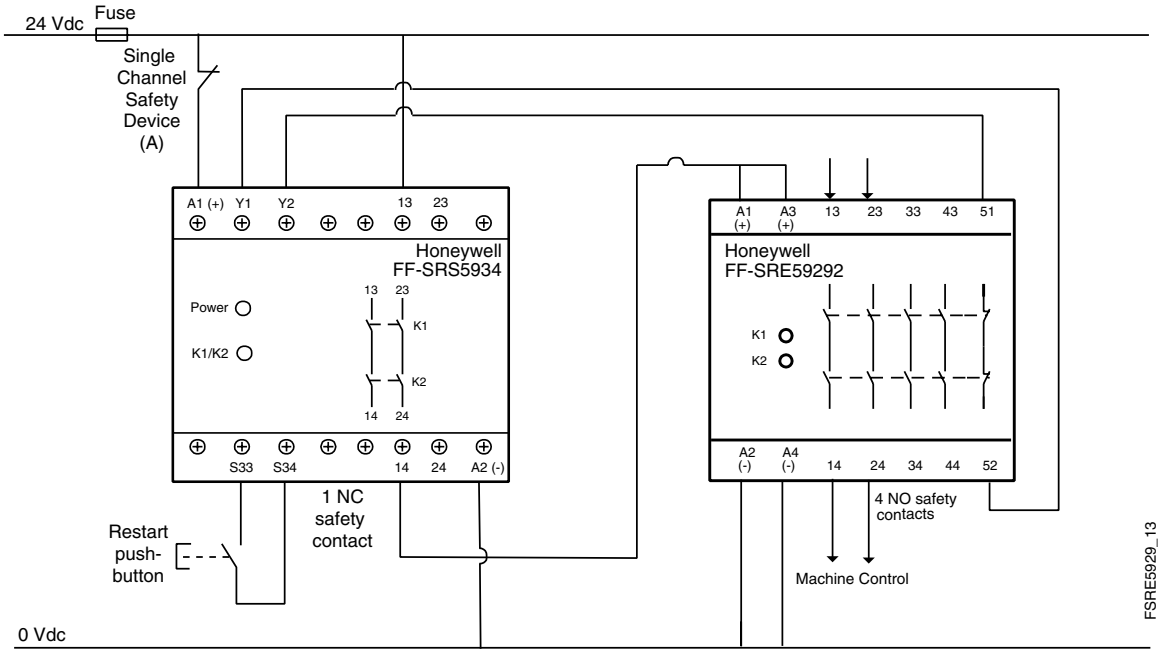
Figure 11. One channel connection of an FF-SRE59292 Extension Module to a FF-SRS59342 Single Channel Emergency Stop Module



This circuit has NO redundancy in the extension module circuit due to the single channel connection to the emergency stop module. This interface offers a lower safety level.

APPLICATION NOTE
Note (A): Single Channel Safety Devices

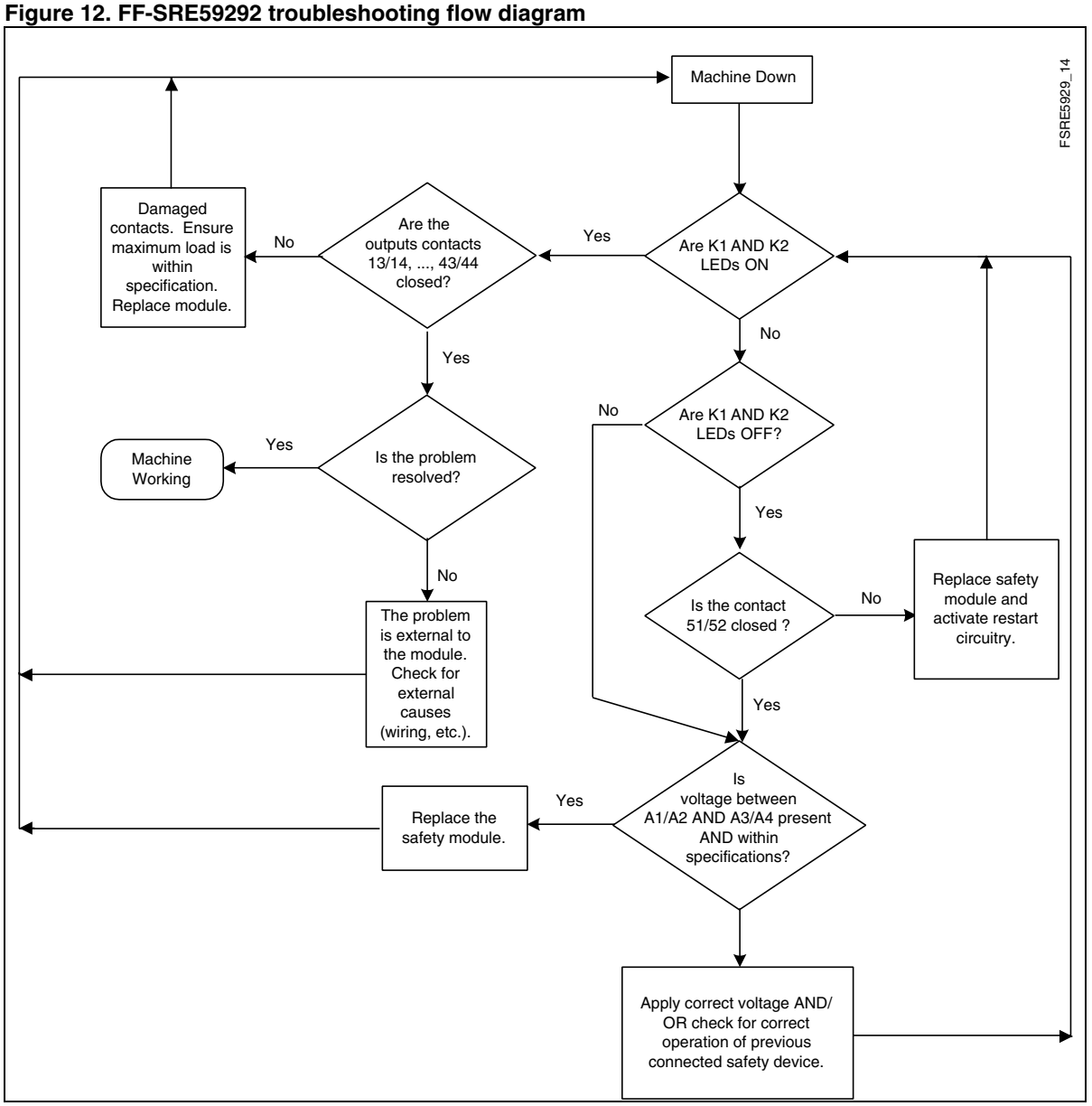
This may be an emergency stop push-button or another single output safety device such a safety limit switch or key interlock switch (for example: CLS, GK or GSS).

FUNCTIONAL DESCRIPTION:
After activation of the safety device, the LEDs Power and K1/K2 of the FF-SRS59342 Emergency Stop module will turn OFF, indicating that the two internal safety relays K1 and K2 are de-energized. The normally open safety outputs 13/14 and 23/24 will open. Then, both LEDs K1 and K2 of the FF-SRE59292 extension modules go off indicating that the two internal safety relays are de-energized. Safety contacts 13/14 to 43/44 open and 51/52 closes.

1. After removing the emergency stop condition, the LED Power will light on. Press and release the restart push-button to restart the FF-SRS59342 emergency stop module.
2. If the FF-SRE59292 extension module is operating properly, the LED K1/K2 of the FF-SRS59342 module illuminate, indicating that the safety relays K1 and K2 are energized. At this time, the two normally open safety contacts will close. Both LEDs K1 and K2 of the FF-SRE59292 illuminate, indicating that safety relays K1 and K2 are energised. Safety contacts 13/14 to 43/44 will close and 51/52 will open. This action will allow the machine to operate.

The proper operation of the FF-SRE59292 extension module must be monitored connecting the Normally Closed contacts 51/52 between Y1/Y2 of the FF-SRS59342 emergency stop module.

Figure 12. FF-SRE59292 troubleshooting flow diagram



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 that period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is the 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 website, it is up to the customer to determine the suitability of the product in the application.

Specifications may change 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 world-wide network of sales offices and distributors. For application assistance, current specifications, pricing or the name of the nearest distributor, contact a nearby sales office or call:

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+ 1-815-235-6545	USA

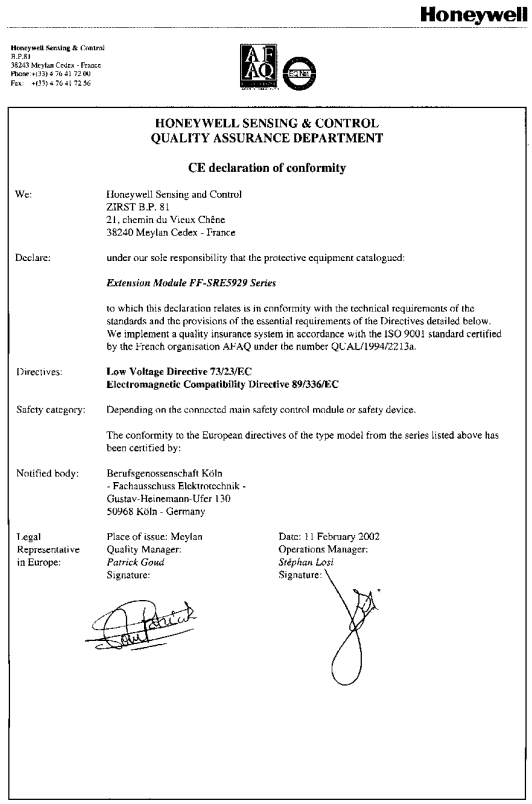
INTERNET

http://www.honeywell.com/sensing/
info.sc@honeywell.com

ORDER GUIDE

FF-SRE5929 ❑	**Voltage:** 2 = 24 Vac/dc (only)

EC DECLARATION OF CONFORMITY



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HONEYWELL SENSING & CONTROL
QUALITY ASSURANCE DEPARTMENT

CE declaration of conformity

We: Honeywell Sensing and Control
ZIRST B.P. 81
21, chemin du Vieux Chêne
38240 Meylan Cedex - France

Declare: under our sole responsibility that the protective equipment catalogued:

Extension Module FF-SRE5929 Series

to which this declaration relates is in conformity with the technical requirements of the standards and the provisions of the essential requirements of the Directives detailed below. We implement a quality insurance system in accordance with the ISO 9001 standard certified by the French organisation AFAQ under the number QUAL/1994/2213a.

Directives: **Low Voltage Directive 73/23/EC**
Electromagnetic Compatibility Directive 89/336/EC

Safety category: Depending on the connected main safety control module or safety device.

The conformity to the European directives of the type model from the series listed above has been certified by:

Notified body: Berufsgenossenschaft Köln
- Fachausschuss Elektrotechnik -
Gustav-Heinemann-Ufer 130
50968 Köln - Germany

Legal Representative in Europe: Place of issue: Meylan
Quality Manager:
Patrick Goud
Signature:

Date: 11 February 2002
Operations Manager:
Stéphan Losi
Signature:

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