Honeywell

FF-SRST Emergency Stop Module with Timer

FF-SR Series

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 contacts
- 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

CE cULus (Pending)

BG Suitable for interfaces up to Category 4 per EN 954-1 (Direct safety contacts)

Suitable for interfaces up to Category 3 per EN 954-1 (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 S31/32.

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.

FF-SRST Emergengy Stop Module with Timer

Suitable for interfaces up to Category 4 per EN 954-1 (Direct safety contacts)
Suitable for interfaces up to Category 3 per EN 954-1 (Delayed safety contacts)
(Pending)

SPECIFICATIONS

• Dual channel Emergency Stop circuits with time delayed contacts

Supply voltage		
	Nominal voltage	24 Vac/dc (ac: ±10 %, dc: -20 %, +10 %)
	Nominal power consumption	dc: 3,5 W • ac: 3,5 VA (or dc)
	Nominal frequency	50 Hz to 60 Hz
	Fuse protection	Internal PTC
Restart input	**Restart delay time**	Manual start mode: 40 ms; automatic start mode: 500 ms
Emergency stop inputs		
	Input voltage at S11	23 Vdc at nominal voltage (provided by control module)
	Minimum voltage at S12, S22, S32	21 Vdc at nominal voltage
	Input current between S11/S12 and S21/S22	40 mA at nominal voltage
	Cable resistance between S11/S12,S21/S22, S31/32	50 Ω (max.)
Relay outputs		
	Relay type	Safety relay with positive guided contacts
	Safety contacts	2 NO, 1 NC, 2 NO off-delayed, 1 NC off-delayed (if Y39/Y40 is jumpered)
	Time delay on de-energisation	***Adjustable:*** FF-SRST❑❑❑R2: 0,06 s to 0,3 s; 0,1 s to 1 s; 0,3 s to 3 s; 0,5 s to 5 s; 1 s to 10 s; 3 s to 30 s; 30 s to 300 s / ***Fixed:*** FF-SRST❑❑❑F2: 0,5 s; 1 s; 3 s; 5 s; 10 s; 30 s; 300 s
	Repeat accuracy of time delay	± 1 % of set value
	Response time	Opening of inputs (S11/S12, S21/S22, S31/S32) : 15 ms; Opening in supply circuit (A1(+)/A2(-)): 40 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 Vac/dc to 250 Vac/dc
	Typical electrical life expectancy	Power factor = 1 Vac/dc at 230 Vac (see Note 2)
	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 switching cycles/h (max.)
	Fuse rating (external)	6 A time delayed (max.)
	Mechanical life	10 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 Hz to 55 Hz
	Connector connection (max.)	1 x 4 mm² solid [12 AWG], 1 x 2,5 mm² [14 AWG], 2 x 1,5 mm² [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	400 g / 0.88 lb

ORDERING INFORMATION

FF-SRST❑❑❑❑2

Max.delay time
D30: 0,3 s (adj. only)
D50: 0,5 s (fixed only)
001: 1 s
003: 3 s
005: 5 s
010: 10 s
030: 30 s
300: 300 s

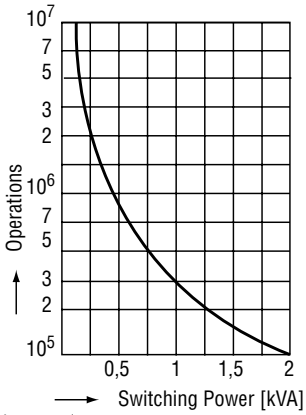
Voltage
2 = 24 Vac/dc

R: Time adjustable
F: Time fixed

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 suppressors across load to avoid module contact arcing and ensure specified contact 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 and 2 A (1 000 000 operations), the limitation factor is 0,70. 1 000 000 x 0,70 = 700 000 total operations.

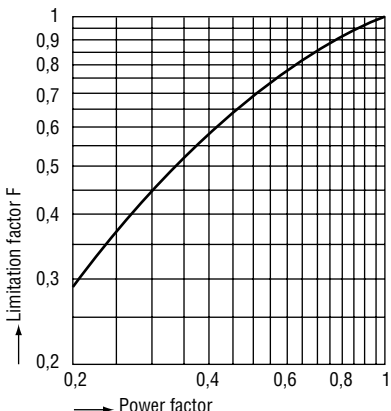
CONTACT LIFE FOR 100 % RESISTIVE LOAD (TYPICAL)

Power factor = 1 (cos φ)(see Note 3)

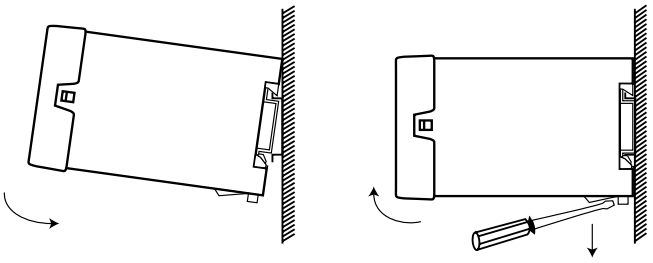


LIMITATION FACTOR FOR INDUCTIVE LOADS

Power factor < 1 (cos φ)(see Note 3)

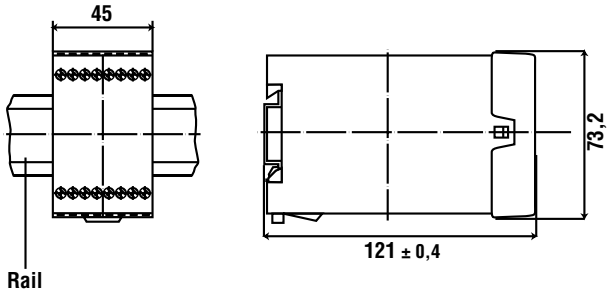


INSTALLATION DIAGRAM

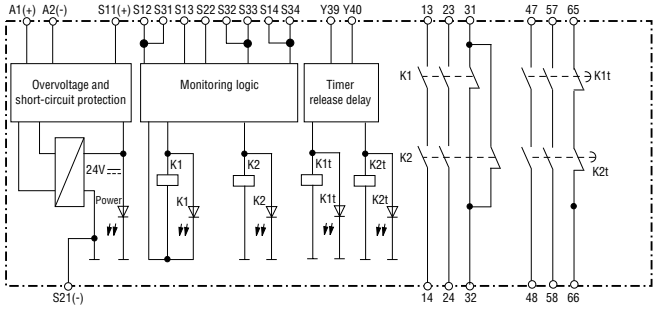


MOUNTING DIMENSIONS

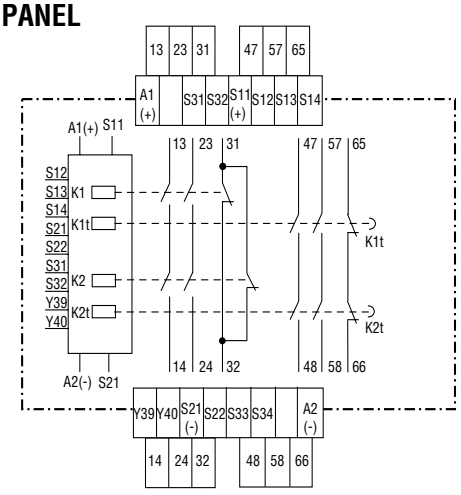
Width: 45 mm/1.7 in; Height: 74 mm/2.91 in; Depth: 121 mm/4.76 in



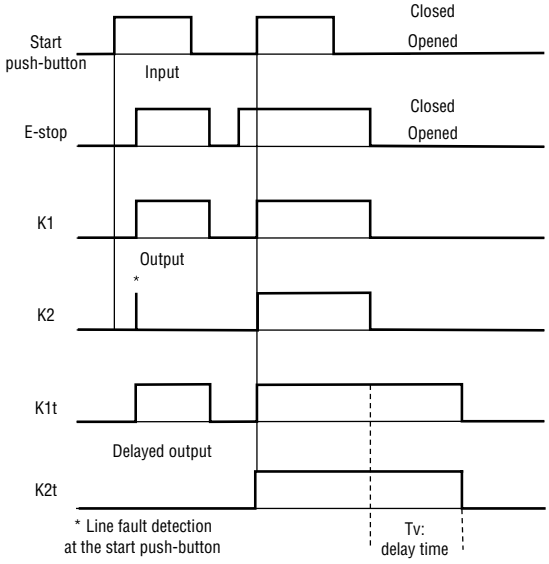
INTERNAL CIRCUITRY



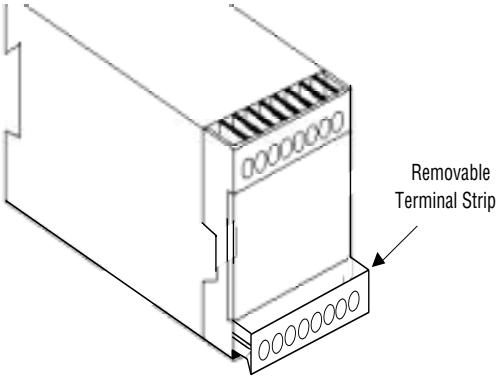
FRONT PANEL



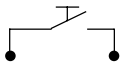
FUNCTIONAL DIAGRAM



REMOVABLE TERMINAL BLOCKS



SETTING OF START MODE

Start Mode	Jumper between S13/S14	Start push-button between S33/S34	This module offers the possibility to function in the automatic start mode or manual start mode.
Manual start mode	not connected		Insert the start push-button between terminals S33/S34 for **manual start mode**.
Automatic start mode	connected		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.

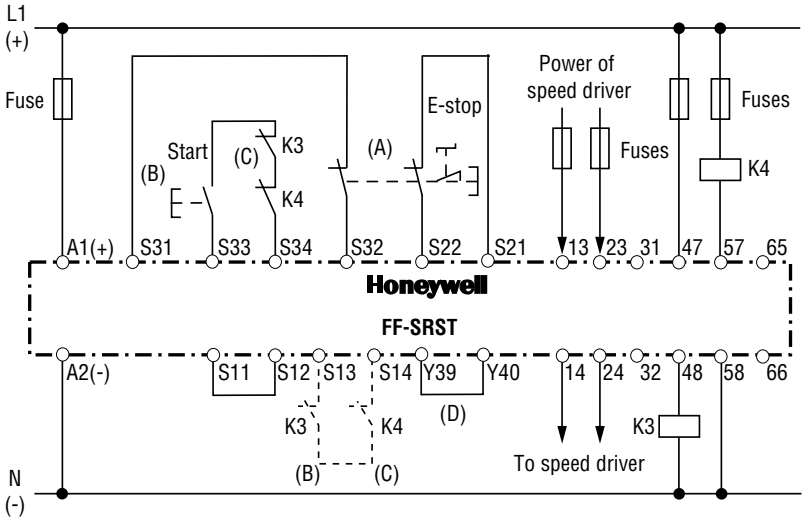
APPLICATION EXAMPLES

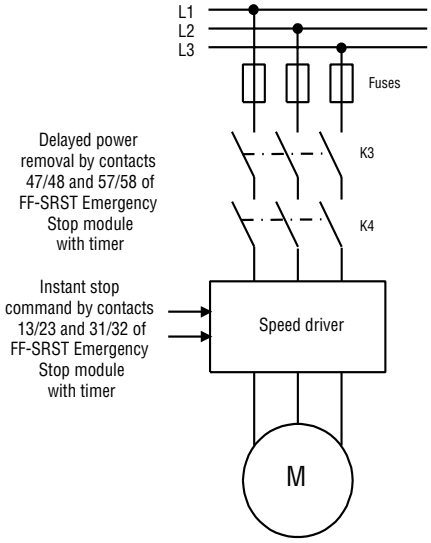
Dual channel emergency stop circuitry (with cross-fault monitoring, manual start mode, external contactors)

If an emergency stop condition occurs (emergency push-button or another safety device is actuated), the internal relays K1 and K2 de-energize immediately. The normally open contacts (13/14, 23/24) will open and the normally closed contact (31/32) will close. This emergency stop condition issignalled by these safety contacts for the machine control circuitry (e.g. a speed driver) to stop hazard.

The internal relays K1t and K2t will de-energize after the selected delay time has elapsed, leading to the opening of the normally open contacts (47/48, 57/58) and the closure of the normally closed contacts (65/66)(see note (D)). These contacts may be used to remove the main power of the stopped machine (category 1 emergency stop per EN 418) and NFPA79.

The emergency-stop condition can be reset while de-activating and activating the connected safety devices (inputs: S22 and S32). After restarting the module (manual or automatic restart: see note (B)), all internal safety relays K1, K2, K1t and K2t will energize immediately. All normally open contacts (13/14, 23/24, 47/48, 57/58) will close and the normally closed contacts (31/32, 65/66) will open, allowing the machine to operate (see note (D)).



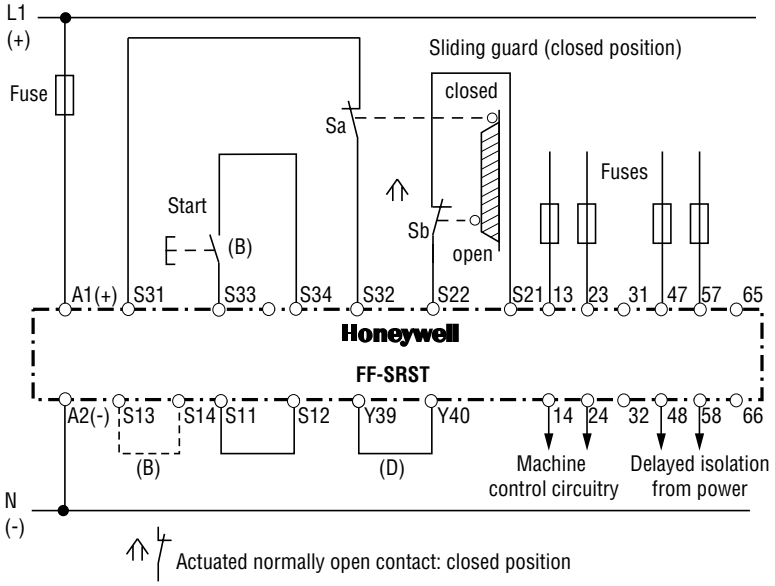


Dual-channel safety door monitoring (with cross-fault monitoring, manual start mode)

The FF-SRST Emergency Stop module may also monitor the status of locking or interlocking devices (usually safety switches) of protective gates. When the protective gate is open, the initiation of the hazardous motion is inhibited. When the door is closed again, the next machine cycle can start, but only after initiating a manual restart sequence.

After opening the door, the two external safety switch contacts Sa and Sb will open and two internal safety relays K1 and K2 will de-energize. The normally open safety contacts (13/14, 23/24) will open and the normally closed contact (31/32) will close relaying the stop condition to the machine control circuitry. The off-delayed safety relays K1t and K2t will de-energize, the normally open safety contacts (47/48, 57/58) will open and the normally closed contact (65/66) will close after the specified time delay has elapsed (see note (D)). These delayed safety contacts may be used to isolate the machine from power (category 1 stop per EN 418) and NFPA79.

When closing the door, Sa and Sb will close and the module is ready to be restarted (see note (B)). Then, the four internal relays K1, K2, K1t and K2t will energize immediately. (see note (D)). All 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, 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 S13/S14.

Automatic start mode: Insert jumper between S13/S14; the start push-button is omitted.

Note (C): EXTERNAL CONTACTORS:

If contact reinforcement via external safety contactors with positive-guided contacts is necessary, the proper operation of the external contactors must be monitored by looping their normally closed contacts into the restart loop (manual start mode: S33/S34; automatic start mode: S13/S14).

Note (D): DELAYED CONTACTS:

The off-delayed safety relays K1t and K2t (safety contacts 47/48, 57/58, 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.

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