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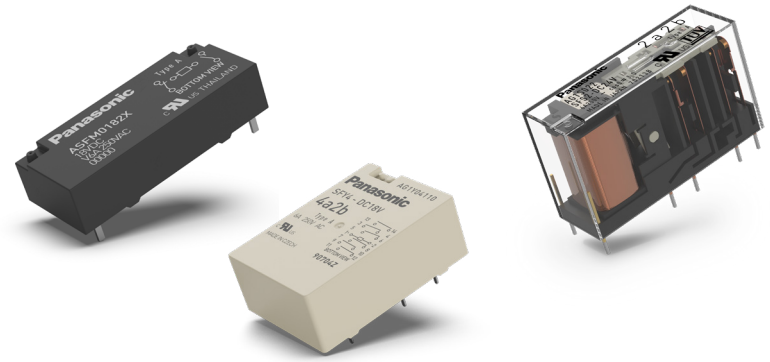
INDUSTRY

SF Relays with Forcibly Guided Contacts



Your Committed Enabler

Relays with Forcibly Guided Contacts – what is that?

During the 1970s, the wish to make automation functions safer became ever more prevalent, especially from European industry. The reason for this was the increasing focus on protecting employees' health, preventing expensive machines from being damaged, and safeguarding complex processes such as those found in the chemical industry.

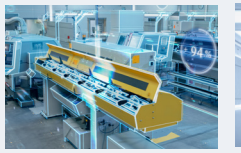
As a switching device for motor drives, relay control centers or signals, for example, relays shoulder the main responsibility for guaranteeing machine safety. Workers can be severely injured or killed if, for example, a relay in a press malfunctions and the press begins operation prematurely.

In relays designed according to the standard EN 61810-3 the contacts are interconnected in such a way that in case of failure, e.g. when a load contact for a motor welds, the corresponding forcibly guided contacts are blocked. Redundancy in the circuit can, for example, allow a motor to be shut off whereby the blocked contact prevents the motor from being turned on again because the release circuit is not closed.

What this boils down to are relays with forcibly guided contacts, usually power relays with several NO and NC contacts that comply with the relay standards EN 61810-1 and EN 61810-3. This technology guarantees defined and hence safe operating conditions in the event of a failure.

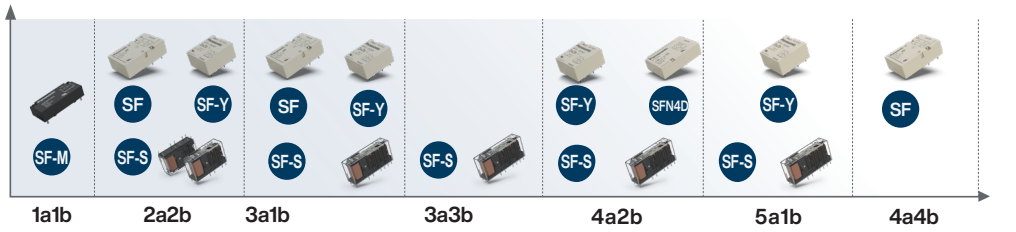
Learn more about our Relays with Forcibly Guided Contacts

Application Examples




- » Emergency stop switches
- » Machine safety engineering
- » Safety control units
- » Automation technology
- » Elevators
- » Cable cars
- » Escalators
- » Process technology
- » Signalling technology
- » Medical technology
- » Mining engineering
- » Conveyance
- » Overcurrent protection with monitor contact

Contact arrangement



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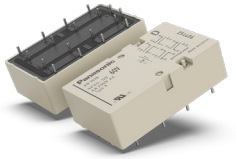
Product Overview

SF-Y relay family

» Low profile design, just 14.5mm high
» Available with 2 NO and 2 NC contacts, 3 NO and 1 NC contacts, 4 NO and 2 NC contacts, or 5 NO and 1 NC contacts
» Forcibly guided contacts according to EN 61810-3, Type A
» Reinforced insulation according to EN 50178, creepage and clearance distance ≥ 5.5mm (U=230V overvoltage category III, 6kV)

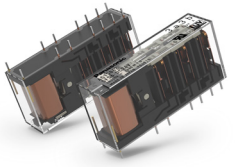


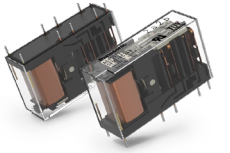
Highlights

- Gold clad contacts on request
- Low coil power dissipation thanks to polarized drive system
- High shock and vibration resistance thanks to rotating armature
- Degree of protection: RTIII
- Suitable for applications requiring IEC/EN 60335-1
- Suitable for applications in explosive environments. Please contact your local Panasonic office.
- Approvals: TÜV, cULus

SF-S relay family

» 4-pole version: 2 NO / 2 NC or 3 NO and 1 NC contacts
» 6-pole version: 4 NO / 2 NC, 5 NO and 1 NC or 3 NC and 3 NO contacts
» Forcibly guided contacts according to EN 61810- 3, Type A
» Available with LED to indicate operating position
» Available with integrated free wheeling diode
» Sockets for PC boards or DIN-rail mounting available



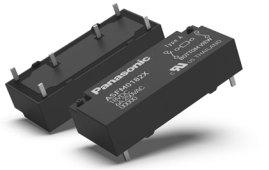


Highlights

- Little mounting space required on PC boards thanks to small surface area
- Low coil power dissipation thanks to polarized drive system
- Ensures operations' shut down and/or set into a safe state in case of overload
- Degree of protection: RTII (RTIII on request)
- Up to 85°C ambient temperature
- VDE approval according to DIN EN 60947-5-1 available

SF-M relay family

» The world's flattest 1a1b relay with forcibly-guided contacts according to EN 61810-3
» Extremely low height of 7.8mm
» Available as reflow (THR) version
» SF-M series can be used to miniaturize all kind of safety applications, from signaling boards with a focus on low level loads to high power safety relays or safety controls.



Highlights

- Rating 6A (NO), 4A (NC) @ 250VAC, 30VDC
- 100mW coil holding power
- High shock resistance >20g
- THT & THR type available
- Reinforced insulation ≥ 5.5mm (V=230V over-voltage category III, 6kV) on NO side
- Coil voltage from 3 to 24V
- Ambient temperature -40 to +85°C

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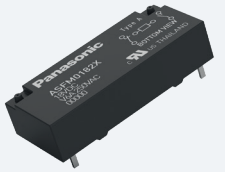
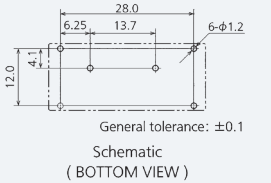
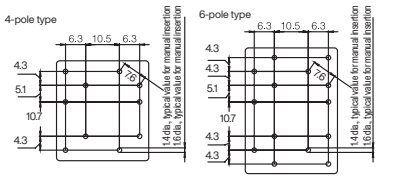
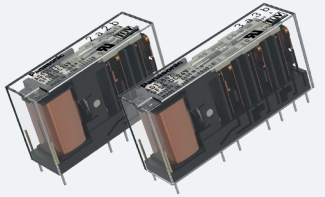
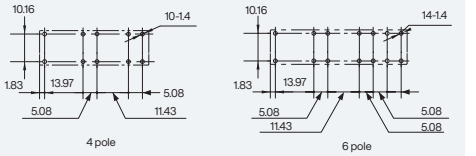
At a glance

Series	Features	Coil	Breakdown voltage			Mounting (bottom view)
			open contacts	contact sets	contacts to coil	
SF-M  RTII PiP type · RTIII THT type 33.0 x 14.0 x 7.8 mm 1a1b · UL / C-UL · TÜV	» Extremely low height » Low holding power 100mW » High shock resistance >20g » Reinforced insulation ≥ 5.5mm (V=230V overvoltage category III, 6KV) on NO side » Ambient temperature -40 to +85°C » Tape & Reel available 6A N.O. · 4A N.C. · 30V DC 250V AC	DC 3, 5, 12, 16, 18, 21, 24V 270mW	1,500Vrms	- (no contact sets next to each other)	2,500Vrms for NC side 4,000Vrms for NO side	THT · PiP 
SF-Y  RTIII 31.0 x 28.6 x 14.5 mm · 39.0 x 28.6 x 14.5 mm 2a2b · 3a1b · 4a2b · 5a1b · UL / C-UL · TÜV	» Gold clad contacts on request » Reinforced insulation according to EN 50178, creepage and clearance distance ≥5.5mm (V=230V overvoltage category III, 6 kV) » Ambient temperature -40 to +85°C » Tested as sealed device according to IEC / EN 60079-15:2010 clause 22.5 (VDE) 8A N.O. · 8A N.C. · 400V DC 250V AC	DC 5, 12, 16, 18, 21, 24V 670mW	1,500Vrms	4,000Vrms	2,500Vrms for NC side 4,000Vrms for NO side	THT PCB 
SF-S  RTIII 40.0 x 13.0 x 24.0 mm · 50.0 x 13.0 x 24.0 mm 2a2b · 3a1b · 4a2b · 5a1b · 3a3b · TÜV · UL / C-UL · CQC	» Slim profile reduces mounting area » PC board sockets available » DIN-rail terminal sockets available » RTII (IP54), RTIII 4pole on request » Ambient temperature -40 to +85°C » LED indication type available 6A N.O. · 6A N.C. · 30V DC 250V AC	DC 12, 18, 21, 24, 48V 360mW (4pole) 500mW (6pole)	2,500Vrms	4,000Vrms	4,000Vrms	THT PCB 

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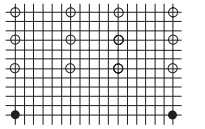
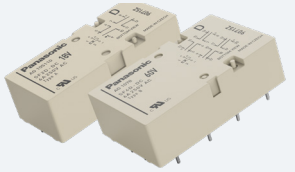
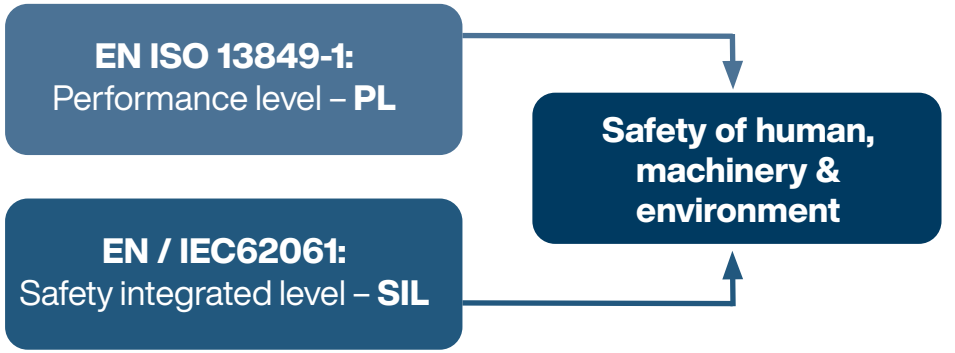
At a glance

Series	Features	Coil	Breakdown voltage			Mounting (bottom view)
			open contacts	contact sets	contacts to coil	
SFN4D  53.3 x 33 x 14.5 mm RTIII 4a2b TÜV UL CSA	» EN 61810-3, Type B safety double contact » Reinforced insulation, creepage and clearance distance 5.5mm 8A N.O. 8A N.C. 500V DC 500V AC	DC 5, 9, 12, 16, 18, 21, 24, 36, 48, 60V 390mW (5 - 24V) 420mW (36 - 60V)	2,500Vrms	4,000Vrms	5,000Vrms	THT PCB Grid 2.5mm  4a2b
SF  53.3 x 25 x 16.5 mm 53.3 x 33 x 16.5 mm RTIII 2a2b 3a1b 4a4b TÜV UL CSA	» SF4D: EN 61810-3, Type B safety double contact » SF2D: EN 61810-3, Type A safety double contact » SF3: EN 61810-3, Type A » IEC/EN 60335-1 (GWT) available 8A N.O. 8A N.C. 400V DC 400V AC	DC 5, 9, 12, 18, 21, 24, 36, 48, 60V 500mW	2,500Vrms	4,000Vrms	5,000Vrms	THT Go To Overview

Information about B10 / B10d Value

Relays with forcibly guided contacts do not have a PL or SIL itself. B10/B10d for the safety calculation of e. g. module or PLC manufacturers:



PL or SIL is mainly

A failure probability of a safety function respectivly the combination of components in a safety function. Risk assessment of whole safety function has to be done by machine manufacturer.

B10/B10d Value

» Statistically expected value determined on the basis of life tests with a corresponding number of test pieces.

» Value expressed in number of cycles

» How to determine the B10d value is described in the international standard IEC 61810-2-1

B10

Number of switching cycles in which 10% of the components fail during a lifetime test.

B10d (d = dangerous)

Number of cycles, until 10% of the components fail dangerously.

Not for individual component / relay, but application dependant. B10/B10d value is always related to a certain load.

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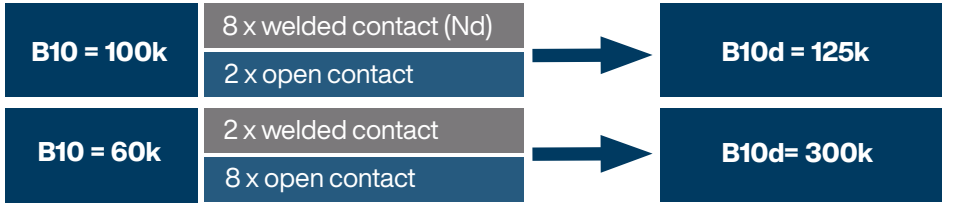
Information about B10 / B10d Value

Failure judgment according to EN 61810-2-1:

The failure to open (welded contact) of a make contact and the insulation failure is judged as a dangerous failure.
An open contact is judged as a non-dangerous failure.

Examples:



It describes: **B10d = B10 x 10 / Nd**

with:
10 = number of tested relays
Nd = number of registered dangerous failures
(When no dangerous failure is registered, Nd = 1 is assumed)

In the worst case, the B10 value is equal to the B10d value. This means that every relay has failed with a dangerous fault.

In the best case, the B10d value is ten times the B10 value. This means that all relays have failed at the end of their lifetime without a dangerous failure.

Normally we confirm a B10d value according to the application specification. If no load values are defined, we can only confirm B10d values for standard data sheet load values.

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We are dedicated to the highest standards of global sustainability as **Your Committed Enabler**. Find out more on our website.

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