

# Safety Controllers / Safety Relay Unit



## SFC / SFC-R Series CATALOG

**For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

### Major Features

- Slim size (17.5 / 22.5 / 35 mm) for saving installation space
- Various LED indicators for displaying status (power / input / logic input / error / feed back / output)
- Screw / Screwless connection models
- P channel FET / Relay contact safety output models
- Available off-delay output and time setting (advanced/non-contact door switch/relay output models)
- Available logic (AND) connection and extension relay unit connection (advanced/non-contact door switch models)
- The product structure conforms with international safety regulations and standards : SIL3, SIL CL3, PLc, CE, UL Listed, and S Mark

### Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

SFC - ① ② ③ 2 - ④ ⑤ ⑥ - ⑦

#### ① Function

No mark: Basic unit  
A: Advanced unit  
N: Non-contact door switch unit  
(for Autonics SFN Series)  
ER: Expansion relay unit  
R: Relay unit

#### ⑤ No. of Off-delay outputs

No mark: None  
2: 2

#### ② No. of safety instantaneous outputs ⑥ Max. Off-delay time

Number: Number of outputs

Number: Time (unit: sec)

#### ③ No. of auxiliary outputs

Number: Number of outputs

#### ⑦ Terminal type

No mark: Screw  
L: Screwless


#### ④ Off-delay output elements

No mark: P channel FET  
R: Relay (relay unit)

### Product Components

- Product
- Instruction manual

## Specifications

Unit	Basic	Advanced	Non-contact door switch
<b>Model</b>	SFC-422-□	SFC-A322-2□-□	SFC-N322-2□-□
<b>Power supply</b>	24 VDC≒		
<b>Allowable voltage range</b>	85 to 110% of rated voltage		
<b>Power consumption</b> <sup>(01)</sup>	≤ 2.5 W	≤ 3.0 W	≤ 3.5 W
<b>Input</b>	ON: ≥ 11 VDC≒ ≥ 5 mA, OFF: ≤ 5 VDC≒ ≤ 1 mA		
<b>Input time</b>	≥ 50 ms, feedback start (manual): ≥ 100 ms		
<b>Cable</b>	≤ 100 m (≤ 100Ω, ≤ 10nF)		
<b>Safety output</b>	P channel FET <sup>(02)</sup>		
<b>Instantaneous</b>	4 ×	3 × <sup>(03)</sup>	3 × <sup>(03)</sup>
<b>Off-delay</b> <sup>(04)</sup>	-	2 × <sup>(03)</sup>	2 × <sup>(03)</sup>
<b>Time accuracy</b>	-	≤ ± 5%	≤ ± 5%
<b>Load current</b>	Below 2-point output: ≤ DC 1 A, Over 3-point output: ≤ DC 0.8 A		
<b>Leakage current</b>	≤ 0.1 mA		
<b>Operating time (OFF → ON)</b> <sup>(05)</sup>	Safety input: ≤ 50 ms		
	-	Logic input: ≤ 200 ms	Non-contact door switch input: ≤ 100 ms
<b>Response (return) time (ON → OFF)</b> <sup>(05)</sup>	≤ 15 ms, non-contact door switch input or logic input: ≤ 20 ms		
<b>Auxiliary output</b>	2 × PNP transistor: X1, X2 (error)		
<b>Load current</b>	≤ 100 mA		
<b>Leakage current</b>	≤ 0.1 mA		
<b>Logical AND connections</b>	No. of connections: max. 4 units, no. of total connections: max. 20 units No. of layers: max. 5 layers, cable length: ≤ 100 m		
<b>SFN connections</b> <sup>(06)</sup>	-	-	Max. 30 units
<b>Approval</b>	IEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3) IEC/EN 60947-5-1, EN ISO 13849-1 (Category 4, PLe) UL listed E249635		
<b>Certification</b>	CE 		
<b>Unit weight (package)</b>	≈ 70 g (≈ 120 g)	≈ 90 g (≈ 140 g)	≈ 100 g (≈ 150 g)

(01) Not include the power consumption of loads.

(SFC-N exclude the power supplied to the non-contact door switch.)

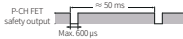
(02) Includes a diagnostic pulse (max. 600 μs). Be cautious when using the output signal as an input signal for the control device.

(03) Available changing via setting switch on the back side of the product.

(04) Available to set Off-delay time (max. 3 sec. / 300 sec., depends on model)

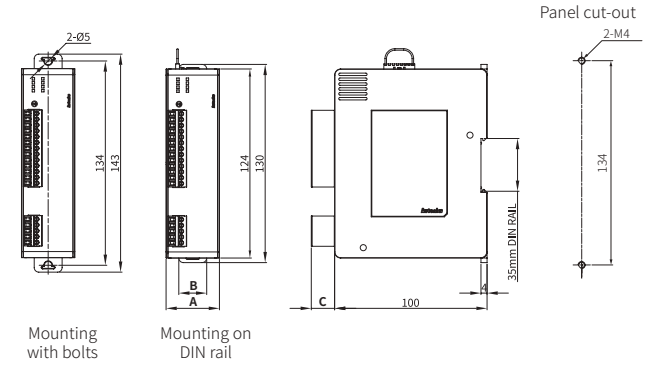
(05) The operation (response) time of each model. The time increases when a logical connection or expansion relay unit is connected.

(06) SFC-N units can only be connected to Autonics non-contact door switch units SFN Series.



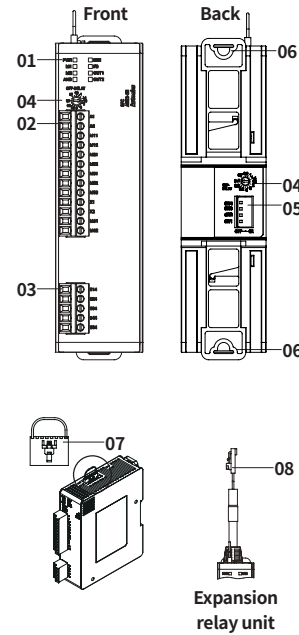
## Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.
- The below is based on SFC-A (screw type) model




Model		A	B	C
Basic unit	SFC-422-□	22.5	18.3	Screw type: 15.3 Screwless type: 15.5
Advanced unit	SFC-A322-□-□	35	18.3	
Non-contact door switch unit	SFC-N322-□-□	35	18.3	
Expansion relay unit	SFC-ER412-□	22.5	18.3	
	SFC-R412-□	22.5	18.3	
Relay unit	SFC-R212-□	17.5	13.3	
	SFC-R212-R□-□	22.5	18.3	

## Parts Descriptions



- Indicators**
- Power supply, I/O signal terminals**
- Safety output (P ch FET or relay) terminals**
- Setting switch for off-delay time**  
(only off-delay output model)  
The settings of the switch on the front and back of the product must be the same. Other settings are displayed as an error.
- Setting switch for function**  
(only advanced / non-contact door switch unit)  
The setting of switches for each function must meet each other. Other settings are displayed as an error.
- Rail Lock**
- Loop connector**  
(only advanced / non-contact door switch unit)  
Do not disconnect the loop connector when using a single unit. When connecting the expansion relay unit, insert the loop connector to the loop port of a unit, which located at the end position (farthest to the right). If the loop connector is not inserted, FB error occurs.
- Expansion connector**  
When connecting the expansion relay unit, remove the loop connector on the top of the controller and insert the expansion connector.

Unit	Expansion relay	Relay
<b>Model</b>	SFC-ER412-□	SFC-R412-□
<b>Power supply</b>	24 VDC≒	
<b>Allowable voltage range</b>	85 to 110% of rated voltage	
<b>Power consumption</b> <sup>(01)</sup>	≤ 2.5 W	≤ 4.0 W
<b>Input</b>	ON: ≥ 11 VDC≒ ≥ 5 mA, OFF: ≤ 5 VDC≒ ≤ 1 mA	
<b>Input time</b>	≥ 50 ms, feedback start (manual): ≥ 100 ms	
<b>Cable</b>	≤ 100 m (≤ 100Ω, ≤ 10nF)	
<b>Safety output</b>	Relay (A contact)	Relay (A contact)
<b>Instantaneous</b>	4 ×	4 ×
<b>Off-delay</b> <sup>(02)</sup>	-	2 ×
<b>Time accuracy</b>	-	≤ ± 5%
<b>Capacity</b>	240 VAC ~ 5 A resistance load, 30 VDC≒ 5 A resistance load	
<b>Life expectancy</b>	Mechanical: ≥ 10,000,000 operations, Malfunction: ≥ 50,000 operations	
<b>Contact resistance</b>	≤ 100 mΩ	
<b>Inductive load switching</b>	IEC60947-5-1: AC-15(230V/2 A), DC-13(24V/1.5 A), UL508: B300/R300	
<b>Conditional short-circuit current</b>	100 A <sup>(03)</sup>	
<b>Operating time (OFF → ON)</b> <sup>(04)</sup>	≤ 30 ms <sup>(05)</sup>	≤ 100 ms
<b>Response (return) time (ON → OFF)</b> <sup>(04)</sup>	≤ 10 ms	≤ 15 ms
<b>Auxiliary output</b>	1 × PNP transistor: X2 (error)	1 × PNP transistor: X1
<b>Load current</b>	≤ 100 mA	≤ 100 mA
<b>Leakage current</b>	≤ 0.1 mA	
<b>Expansion units connections</b>	Max. 5 units	
<b>Approval</b>	IEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3) IEC/EN 60947-5-1, EN ISO 13849-1 (Category 4, PLe) UL listed E249635	
<b>Certification</b>	CE 	
<b>Unit weight (package)</b>	≈ 100 g (≈ 150 g)	≈ 110 g (≈ 160 g)

(01) Not include the power consumption of loads.

(02) Available to set Off-delay time (max. 3 sec. / 30 sec., depends on model)

(03) Use 6 A fast-blow fuse under the IEC 60127 standard as a short-circuit protection device.

(04) The operation (response) time of each model. The time increases when a logical connection or expansion relay unit is connected.

(05) Except operation time of advanced unit, non-contact door switch unit

<b>Pollution</b>	3
<b>Overvoltage category</b>	III
<b>Impulse withstand voltag for relay unit (IEC/EN 60947-5-1)</b>	Input terminals and relay output terminals: 6 kV Relay contacts between 13-14 / 23-24 and 33-34 / 43-44 (37-38 / 47-48): 6 kV between 13-14 and 23-24: 4 kV between 33-34 and 43-44 (37-38 and 47-48): 4 kV
<b>Dielectric strength</b>	[Basic / Advanced / Non-contact door switch unit] Between all terminals and case: 500 VAC ~ 50/60 Hz for 1 min. [Expansion relay / Relay unit] Between all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals <sup>(01)</sup> : 2,500 VAC ~ 50/60 Hz for 1 min.
<b>Insulation resistance</b>	≥ 100 MΩ (500 VDC≒ megger)
<b>Vibration</b> <sup>(02)</sup>	0.75 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 hour
<b>Vibration (malfunc.)</b> <sup>(02)</sup>	0.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 10 minutes
<b>Shock</b> <sup>(02)</sup>	300 m/s <sup>2</sup> (≈ 30 G) in each X, Y, Z direction for 3 times
<b>Shock (malfunc.)</b> <sup>(02)</sup>	100 m/s <sup>2</sup> (≈ 10 G) in each X, Y, Z direction for 3 times
<b>Protection rating</b>	IP20 (IEC standard)
<b>Ambient temperature</b>	-10 to 55 °C, storage: -25 to 65 °C (no freezing or condensation)
<b>Ambient humidity</b>	25 to 85 %RH, storage: 25 to 85 %RH (no freezing or condensation)

(01) In case of relay unit, output terminals between 13-14, 23-24 and 33-34, 43-44 (37-38, 47-48)

(02) This data based on the product is mounted with bolts. When installing DIN rail, use the product in an environment with small vibration (condition: less than 0.4 mm double amplitude)