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, PLe, 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	-	❶	❷	❸	2	-	❹	❺	❻	-	❼

❶ 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

❷ No. of safety instantaneous outputs
Number: Number of outputs

❸ No. of auxiliary outputs
Number: Number of outputs

❹ Off-delay output elements
No mark: P channel FET
R: Relay (relay unit)

❺ No. of Off-delay outputs
No mark: None
2: 2

❻ Max. Off-delay time
Number: Time (unit: sec)

❼ Terminal type
No mark: Screw
L: Screwless

Product Components

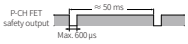
- Product
- Instruction manual

Specifications

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

Unit	Expansion relay	Relay		
Model	**SFC-ER412-□**	**SFC-R412-□**	**SFC-R212-□**	**SFC-R212-R2□-□**
Power supply	24 VDC⎓			
Allowable voltage range	85 to 110% of rated voltage			
Power consumption [01]	≤ 2.5 W	≤ 4.0 W	≤ 4.0 W	≤ 6.0 W
Input	ON: ≥ 11 VDC⎓ ≥ 5 mA, OFF: ≤ 5 VDC⎓ ≤ 1 mA			
Input time	≥ 50 ms, feedback start (manual) : ≥ 100 ms			
Cable	≤ 100 m (≤ 100Ω, ≤ 10nF)			
Safety output	Relay (A contact)	Relay (A contact)		
Instantaneous	4 ×	4 ×	2 ×	2 ×
Off-delay [02]	-	-		2 ×
Time accuracy	-	-		≤ ± 5%
Capacity	240 VAC~ 5 A resistance load, 30 VDC⎓ 5 A resistance load			
Life expectancy	Mechanical: ≥ 10,000,000 operations, Malfunction: ≥ 50,000 operations			
Contact resistance	≤ 100 mΩ			
Inductive load switching	IEC60947-5-1: AC-15(230 V/2 A), DC-13(24 V/1.5 A), UL508: B300/R300			
Conditional short-circuit current	100 A [03]			
Operating time (OFF → ON) [04]	≤ 30 ms [05]	≤ 100 ms		
Response (return) time (ON → OFF) [04]	≤ 10 ms	≤ 15 ms		
Auxiliary output	1 × PNP transistor: X2 (error)	1 × PNP transistor: X1		
Load current	≤ 100 mA	≤ 100 mA		
Leakage current	≤ 0.1 mA			
Expansion units connections	Max. 5 units	-		
Approval	IEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3) IEC/EN 60947-5-1, EN ISO 13849-1 (Category 4, PLe) UL listed E249635			
Certification	CE, cULus	CE, cULus, S		
Unit weight (package)	≈ 100 g (≈ 150 g)	≈ 110 g (≈ 160 g)	≈ 80 g (≈ 130 g)	≈ 110 g (≈ 150 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

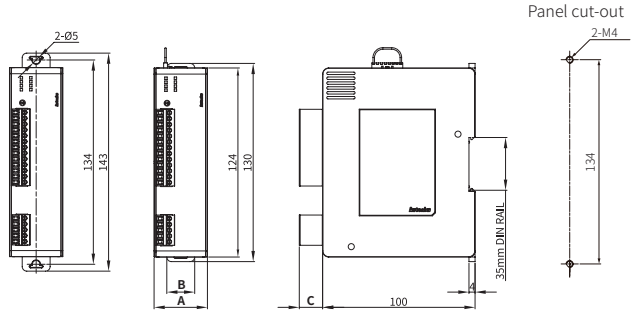
Pollution	3
Overvoltage category	III
Impulse withstand voltag for relay unit (IEC/EN 60947-5-1)	Input terminals and relay output terminals: 6 kV Relay contacts between 13-14 / 23-24 and 33-34 / 43-44 (37-38 / 47-48): 6 kV between 13-14 and 23-24: 4 kV between 33-34 and 43-44 (37-38 and 47-48): 4 kV
Dielectric strength	[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 [01]: 2,500 VAC~ 50/60 Hz for 1 min.
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger)
Vibration [02]	0.75 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 hour
Vibration (malfunc.) [02]	0.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 10 minutes
Shock [02]	300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times
Shock (malfunc.) [02]	100 m/s² (≈ 10 G) in each X, Y, Z direction for 3 times
Protection rating	IP20 (IEC standard)
Ambient temperature	-10 to 55 °C, storage: -25 to 65 °C (no freezing or condensation)
Ambient humidity	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)

Dimensions

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

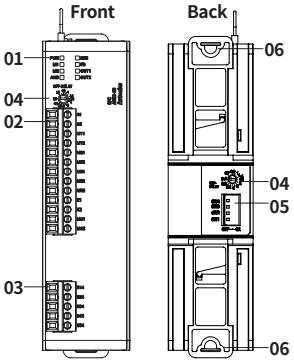


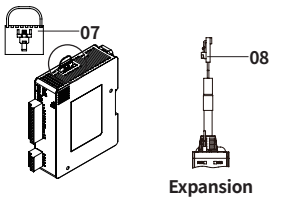
Mounting with bolts

Mounting on DIN rail

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	
Relay unit	SFC-R412-□	22.5	18.3	
	SFC-R212-□	17.5	13.3	
	SFC-R212-R□-□	22.5	18.3	

Parts Descriptions





Expansion relay unit

01. Indicators

02. Power supply, I/O signal terminals

03. Safety output (P ch FET or relay) terminals

04. 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.

05. 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.

06. Rail Lock

07. 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.

08. Expansion connector
When connecting the expansion relay unit, remove the loop connector on the top of the controller and insert the expansion connector.

18, Bansong-ro 513Beon-gil, Haeundae-gu, Busan, Republic of Korea, 48002
www.autonics.com | +82-2-2048-1577 | sales@autonics.com

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