SFC / SFC-R Series INSTRUCTION MANUAL

DRW190758AE

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

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

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice. Follow Autonics website for the latest information.

Safety Considerations

 Observe all 'Safety Considerations' for safe and proper operation to avoid hazards. A symbol indicates caution due to special circumstances in which hazards may occur.

Warning Failure to follow instructions may result in serious injury or death.

- 01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.) Failure to follow this instruction may result in personal injury, economic loss or fire
- Responsible persons for use is an operator who:
 is fully knowledgeable about the installation, settings, use and maintenance of
- the product is familiar with the requirements of laws, regulations and standards in the country or region where the product is installed and used.

Responsible person for use has an obligation to educate the req machine users. Machine users are persons who have been fully trained by the responsible person

for use and can operate the machine correctly. When any error occurs during the operation of the machine control system, they have a responsibility to report it to the responsible person for use immediately.

an unqualified person operates the product, it may result in personal injury, economic

03. Qualified personnel shall carry out installation, configuration and combination with the machine control system. If an unqualified person carry out installation, configuration and combination with the

achine control system, it may cause malfunction or result in accid

- 04. When the connected devices (e.g., motor) is not operating after installation, check that functions and settings of the product correctly operate as you intended. Failure to follow this instruction sult in personal ir ny aconomic loss or fire
- 05. Be sure to consider the delay of the safety output when determining the safety distance to the hazardous source due to the response time (safety input and logic input), setting of off-delay time and off-delay time accuracy. nachine may not stop before an operator reaches the hazardous zone so that it may
- result in personal injury and economic loss. 06. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, salinity, moisture, or steam, or dust may be present.

instruction may result in explosion or fire. 07. Do not disassemble or modify the unit.

Failure to follow this instruction may result in personal injury or fire. In addition, the manufacturer does not guarantee the performance and functionality.

08. Do not connect, repair, inspect, or replace the unit while connected to a power source. Failure to follow this instruction may cause the external devices connected to the product

may unexpectedly operate. For more information, please refer to laws, regulations and standards in the country or region.

- 09. Install the product on a device panel or DIN rail inside the control room with IP54 or higher protection structure.
- e to follow this instruction may result in fire or electric shock 10. When using the product mounted on a DIN rail, fix it using an End plate (sold separately).
- Failure to follow this instruction may result in fire or electric shock 11. When you use the product in a place where vibrations or shocks are very high, use screws to fix it to the panel for use.
- ure to follow this instruction may result in personal injury and fire 12. Check 'Connections' before wiring. And make sure that there are no safety problems.
- ilure to follow this instruction may result in fire. 13. You must conduct daily and regular inspections every six months. ailure to follow this instruction may result in personal injury, economic loss or fire due to the malfunction of the product
- 14. The auxiliary output is non-safety output, therefore, do not use it for safety purposes.

Failure to follow this instruction may result in personal injury, economic loss or fire. 15. This product is designed to comply with industrial environment A. Use of this product in residential environment B may cause unwanted electromagnetic interference. In this case, it requires to take appropriate mitigation measures. **Caution** Failure to follow instructions may result in injury or product damage.

01. Use the product within the rated specifications.

- sult in fire or product damage v this instruction may re-02. Use a dry cloth to clean the unit, and do not use water or organic solvent. Failure to follow this instruction may result in fire
- 03. When connecting the power input and relay output, use AWG 18 (0.8 mm²) cable or over and tighten the terminal screw model with a tightening torque of 0.3 Nm. Use the copper-conductor wire with the temperature class 60 °C. ow this instruction may result in fire or malfunction due to co
- 04. Keep the product away from metal chip, dust, and wire residue which might flow into the unit. ailure to follow this instruction may result in fire, product damage or malfunction
- 05. The durability of relay output depends on conditions of relay switching and load. Be sure to test under actual operating conditions and use it within the appropriate switching cycles without problem on product performance. ow this instruction may result in fire or product damage ailure to f
- 06. Do not touch the relay output terminal immediately after the power source to the load is disconnected.

Failure to follow this instruction may result in electric shock.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents. The power input is insulated and limited voltage/current or use SELV, Class 2 power supply.
- Connect a protective device (fuse etc.) to the safety output terminal for short-circuit,
- overcurrent and ground fault protection.
- Failure to follow this instruction may result in fire or malfunction.
- Do not use AC and DC circuits together between safety output terminals.
 -SFC-R212: between 13-14 terminal and 23-24 terminal
- -SFC-R412, SFC-ER412: between 13-14 terminal and 23-24 terminal or between 33-34 terminal and 43-44 terminal
- -SFC-R212-R2 : between 13-14 terminal and 23-24 terminal or between 37-38 terminal and 47-48 terminal
- · Keep away from high voltage lines or power lines to prevent inductive noise. In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line. Do not use the product near the equipment which generates strong
- agnetic force or high frequency noise · Do not drop the product or expose it to excessive vibration or shock. It may cause failure or
- malfunction. Be sure to turn off the power before connecting, inspecting and repairing the product. It may
- cause malfunction or short circuit When mounting the products close to each other, the rated current of the relay output is 3 A.
 Do not apply a current greater than 3 A. If the current in the relay output flows 3 A, or more,
- make sure that the distance between the products should be 20mm or more. Assessment of conformity to the required safety level is evaluated for the entire system.
- Please consult with a certified certification body regarding the assessment procedure. Be sure to set the off-delay time to maintain the safety function of the system. Set the setting
- of off-delay switch on both the front and back sides to the same value. If you set it diffe an error occurs · For switches used for safety inputs, logic input and feedback start input, use a switch with
- contacts capable of normally switching the micro loads (24 VDC==, 5 mA). It should be done away regarded as an industrial waste. For more information, please refer to laws, regulations and standards in the country or region.
- This unit may be used in the following environment of the fol
- Indoors (in the environment condition rated in 'Specifications')
- Altitude max 2 000 m Pollution degree 3
- Installation category III

Ordering Information

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

Function	O No. of Off-delay outputs
No mark: Basic unit	No mark: None
A: Advanced unit	2:2
N: Non-contact door switch unit (for Autonics SFN Series)	
ER: Expansion relay unit	
R: Relay unit	
O No. of safety instantaneous out	puts 🗿 Max. Off-delay time
Number: Number of outputs	Number: Time (unit: sec)
No. of auxiliary outputs	Terminal type
	• Terminal type No mark: Screw L: Screwless
Number: Number of outputs	No mark: Screw
Number: Number of outputs	No mark: Screw
Off-delay output elements	No mark: Screw
Number: Number of outputs Off-delay output elements No mark: P channel FET	No mark: Screw

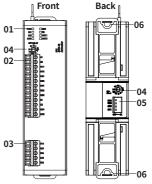
Specifications

•							
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, feedbac	≥ 50 ms, feedback start (manual) : ≥ 100 ms					
Cable	$\leq 100 \text{ m} (\leq 1000 \text{ m})$	$\leq 100 \text{ m} (\leq 100\Omega, \leq 10 \text{ nF})$					
Safety output	P channel FET 02)						
Instantaneous	4 ×	3 × ⁽¹³⁾	3 × ⁰³⁾				
Off-delay ⁰⁴⁾	-	2 × ⁰³⁾	2 × ⁰³⁾				
Time accuracy	-	$\leq \pm 5\%$	$\leq \pm 5\%$				
Load current	Below 2-point out	tput: ≤ DC 1 A, Over 3-point	toutput: ≤ DC 0.8 A				
Leakage current	\leq 0.1 mA						
	Safety input: ≤ 50) ms					
Operating time	-	 Logic input: ≤ 200 ms 					
$(OFF \rightarrow ON)^{(05)}$	-	-	Non-contact door switch input: ≤ 100 ms				
Response (return) time (ON → OFF) ^(IS)	\leq 15 ms, non-cor	\leq 15 ms, non-contact door switch input or logic input: \leq 20 ms					
Auxiliary output	2 × PNP transistor: X1, X2 (error)						
Load current	≤ 100 mA						
Leakage current	\leq 0.1 mA						
Logical AND connections		is: max. 4 units, no. of total c c. 5 layers, cable length: ≤ 10					
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 TANNOS (Burns (S					
Unit weight (package)	\approx 70 g (\approx 120 g)	≈ 90 g (≈ 140 g)	≈ 100 g (≈ 150 g)				
01) Not include the power cons (SFC-N exclude the power set		ntact door switch.)					
 Includes a diagnostic pulse signal as an input signal for 	the control device.	0 1	P-CH FET ≈ 50 ms safety output Max. 600 µs				
Available changing via settir							
04) Available to set Off-delay tin							
 The operation (response) tir unit is connected. 	me of each model. The	e time increases when a logica	l connection or expansion rela				
06) SFC-N units can only be co	nnected to Autonics n	non-contact door switch units	SFN Series.				

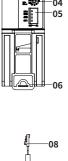
ModelSFC.ER12.SFC.R12.SFC.R212.SFC.R212.Power supply24 VDC=Allowable voltage rangeS5 to 110% of rated voltagePower consumptionS5 to 110% of rated voltagePower consumptionNo \ge 11 VDC = \ge 5 mA, OFF: 5 S VDC = S I mAInput time \ge 50 ms, feedback start (manual): \ge 100 msCable \le 100 m [< 1000, \le 11 VDC =Safety outputRelay (A contact)Instantaneous $4 \times$ Avx $4 \times$ [2 \times 2 \times Time accuracy2 \times Infe expectancy-Machanization constraintsContact resistanceS100 mQInductive load switchingIEC60947-5-1: AC-15(230 V/2 A), DC-13(24 V/15 A), UL508: B300/R300Conditional short-Grout100 A ^{stal} CurrentOperating time (OFF \rightarrow 0N) ⁶⁰⁰ S100 mAEakage currentS100 mAEakage current<	Ilait	Evenencies velo	Delay					
Power supply $24 VOC=$ Allowable voltage range85 to 110% of rated voltagePower consumption85 to 110% of rated voltagePower consumption85 to 110% of rated voltageInput time ≥ 250 ms, feedback start (manual): ≥ 100 msCable ≤ 100 m (≤ 1000 , $\leq 10n1$)Safety outputRelay (A contact)Instantaneous $4 \times$ $2 \times$ $2 \times$ Time accuracy $ 2 \times$ $2 \times$ Mathinchica: ≥ 1000000 operations,Malfunction: ≥ 50000 operationsConditional short-Grout 20000×20000 operationsConditional short-Grout $20000 \times 20000 = 200000000 = 200000000000$	Unit	Expansion relay	Relay					
Allowable voltage range Power consumption 61 $\leq 2.5 W$ $\leq 4.0 W$ $\leq 4.0 W$ $\leq 6.0 W$ Power consumption 61 $\leq 2.5 W$ $\leq 4.0 W$ $\leq 4.0 W$ $\leq 6.0 W$ Input time $\geq 50 ms$, feedback start (manual): $\geq 100 ms$ $cable$ $\leq 100 m(5 100\Omega, \leq 100F)Safety outputRelay (A contact)Relay (A contact)Relay (A contact)Instantaneous4 \times4 \times2 \times2 \timesOff-delay ^{10}2 \times2 \timesCapacity240 VAC - 5 A resistance load, 30 VDC = 5 A resistance load4 \times4 \timesIf expectancyMechanical: \geq 10,000,000 operations,Malfunction: \geq 50,000 operations,Malfunction: \geq 50,000 operations,Malfunction: \geq 50,000 operations,Malfunction: \geq 50,000 operations,Contact resistance\leq 100 m\Omega\leq 100 mS\leq 100 mSResponse (return) time (ON\times 0 GF) ^{50}\leq 100 mA\leq 100 mALeakage current\leq 100 mA\leq 100 mA\leq 100 mALeakage current\leq 0.1 mAEC/EN 60947-51: AC-15(230 V/2 A), DC-13(24 V/1.5 A), UL508: B300/R300Conditional short-circuitcurrent100 A^{10}\leq 30 ms^{50}Load current\leq 100 mA\leq 100 mA\leq 100 mALeakage current\leq 0.1 mAEC/EN 60947-51: AC-15(230 V/2 A), DC-13(24 V/1.5 A), UL508: B300/R300Conditional short-circuitcurrent100 RA^{10}\leq 100 mALeakage current\leq 0.1 mAEC/EN 60947-51: AC-15(230 V/2 A), DC-13(24 V/1.5 A), UL508: B300/R300Condurent\leq 0.0 mA$			SFC-R412-	SFC-R212-[]	SFC-R212-R2			
Power consumption 61 $\leq 2.5 \text{ W}$ $\leq 4.0 \text{ W}$ $\leq 4.0 \text{ W}$ $\leq 6.0 \text{ W}$ InputON: $\geq 11 \text{ VDC} = \geq 5 \text{ mA}, OFF: \leq 5 \text{ VDC} = \leq 1 \text{ mA}Input time\geq 50 \text{ ms}, \text{feedback start (manual): \geq 100 \text{ ms}}Cable\leq 100 \text{ m} (\leq 1000, \leq 100F)\leq 1000 \text{ ms} (\leq 1000, \leq 100F)\geq 30 \text{ ms}, \text{feedback start (manual): \geq 100 \text{ ms}}Cable\leq 100 \text{ m} (\leq 1000, \leq 100F)\geq 1000 \text{ ms} (\leq 100, 2 \text{ ms})\geq 2.8 \text{ ms}Instantaneous4 \times4 \times2 \times2 \timesOff-delay time\geq 10000 \text{ ms} (\approx 100, 000 \text{ operations}, mathematical: \geq 10000, 000 \text{ operations}\leq 100 \text{ ms}Capacity240 VAC~- 5 A resistance load, 30 VDC= 5 A resistance loadIffe expectancyMechanical: \geq 1000 \text{ ms} (\approx 100 \text{ ms})Contact resistance\leq 100 \text{ ms}\leq 100 \text{ ms}\leq 100 \text{ ms}Conditional short-circuitcurrent100 \text{ A}^{10}\leq 100 \text{ ms}Operating time (OFF \rightarrow 0N)^{66}\leq 30 \text{ ms}^{10}\leq 100 \text{ ms}Auxiliary output\geq 100 \text{ ms}\leq 15 \text{ ms}Auxiliary output\geq 100 \text{ ms}\leq 10 \text{ mA}Leakage current\leq 100 \text{ mA}\leq 100 \text{ mA}Leakage current\leq 100 \text{ mA}\leq 100 \text{ mA}Leakage current\leq 0.0 \text{ mA}\leq 100 \text{ mS}Ut itset (224935)Certification(\in C \otimes 100 \text{ mA})Leakage current\leq 0.0 \text{ mA}\leq 100 \text{ mS}Ut itset (224935)Certification dressons)\leq 100 \text{ mS}CertificationCe (\otimes 0.00 \text{ me})\approx 100 $								
Input ON: ≥ 11 VDC= ≥ 5 mA, OFF: ≤ 5 VDC= ≤ 1 mA Input time ≥ 50 ms, feedback start (manual): ≥ 100 ms Cable ≤ 100 m (≤ 1000, ≤ 1007, ≤ 100 ms Safety output Relay (A contact) Instantaneous 4 × A × 4 × QP-delay [®] - - 2 × Capacity 240 VAC~ 5 A resistance load, 30 VDC= 5 A resistance load Capacity 240 VAC~ 5 A resistance load, 30 VDC= 5 A resistance load Contact resistance ≤ 100 mΩ Inductive load switching IECC60947-5-1: AC-15(230 V/2 A), DC-13(24 V/1.5 A), UL508: B300/R300 Conditional short-circuit 100 A [®] current 100 mA Conditional short-circuit 100 A [®] vertering time (OFF → 0N) ^{\$}				< 10W	1< C 0.W			
Inputtime ≥ 50 ms, feedback start (manual) : ≥ 100 ms Cable ≤ 100 m (≤ 1000, ≤ 10nF) Safety output Relay (A contact) Instantaneous 4 × 12 × Off-delay ⁶⁰ - - Time accuracy - 2 × Capacity 240 VAC~ 5 A resistance load, 30 VDC= 5 A resistance load Life expectancy Mathunction: ≥ 50,000 operations, Contact resistance ≤ 100 mC Inductive load switching IEC60947-51: AC-15(230 V/2 A), DC-13(24 V/1.5 A), UL508: B300/R300 Conditional short-circuit current 100 A ⁶⁰ Operating time (OFF → 0N) ⁶⁰ ≤ 30 ms ⁶⁰ ≤ 100 ms Response (return) time (ON ≤ 10 ms ≤ 15 ms Auxiliary output 1 × PNP transistor: X1 X2 (error) Load current ≤ 100 mA ≤ 100 mA Leakage current ≤ 0.1 mA Expansion units connections Expansion units connections Max. 5 units - IEC/EN 61508 (SI.3), IEC/EN 62061 (SILCL3) ≈ 110g(≈ 150g) Unit weight (package) ≈ 100 g(≈ 100g) ≈ 110g (≈ 100g) ≈ 110g (≈ 150g) 0.1 Not include the power consumption of loads.								
Cable ≤ 100 m (≤ 100Ω, ≤ 10nF) Safety output Relay (A contact) Instantaneous 4 × 4 × 2 × Off-delay ⁶⁰ - - 2× Time accuracy - - 2× Capacity 240 VAC~ 5 A resistance load, 30 VDC= 5 A resistance load Life expectancy Mechanical: ≥ 10,000,000 operations, Malfunctions: ≥ 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 Operating time (OFF → 0N) ⁶⁶ ≤ 30 ms ⁶⁰ ≤ 100 ms Response (return) time (ON Availiary output 1 × PNP transistor: 1 × PNP transistor: 1 × 2 (error) Auxiliary output 1 × PNP transistor: 1 × 2 (error) 1 × PNP transistor: Auxiliary output 1 × PNP transistor: 1 × Expension units connections Max. 5 units IEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3) IEC/EN 61508 (SIL3), EC/EN 62061 (SILCL3) IEC/EN 61508 (SIL3), EC/EN 62061 (SILCL3) Uti tweight (package) ≈ 100 g(≈ 150 g) ≈ 110 g(≈ 150 g) ≈ 100 g(≈ 150 g) 01) Not include the power consumption of bads.								
Safety outputRelay (A contact)Relay (A contact)Relay (A contact)Instantaneous $4 \times 4 \times 2 \times $								
Instantaneous 4×1 4×1 $2 \times 2 \times$								
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Time accuracyImage		4 ×	4 ×	2 ×				
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 IECEG0947-5-1: AC-15(230 V/2 A), DC-13(24 V/1.5 A), UL508: B300/R300 Conditional short-circuit 100 A ^{cap} Operating time (OFF → ON) ⁶⁴ ≤ 30 ms ^{cap} Auxiliary output ≤ 10 ms × 0 FF) ⁶⁴ ≤ 30 ms ^{cap} Auxiliary output ≤ 10 mA Leakage current ≤ 100 mA Leakage current ≤ 0.1 mA Expansion units connections Max. 5 units IEC/EN 61508 (SIL3), IEC/EN 62061 (SILC13) IEC/EN 60947-5-1, EN ISO 13849-1 (Category 4, PLe) UL listed E249635 Certification C€ @ @ @ @ @ Unit weight (package) ≈ 100 g(≈ 150 g) ≈ 110 g(≈ 150 g) ON to include the power consumption of loads. 0.2127 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 wink-no-contact door switch unit Pollution 3		•	-					
Life expectancyMechanical: $\geq 10,000,000$ operations, Malfunction: $\geq 50,000$ operationsLife expectancyMechanical: $\geq 10,000,000$ operationsInductive load switchingIEC60947-5-1: AC-15(230 V/2 A), DC-13(24 V/1.5 A), UL508: B300/R300Conditional short-circuit current100 A ^{con} Operating time (OFF \rightarrow ON) ⁵⁰¹ \leq 30 ms ^{con} Auxiliary output \geq 10 msAuxiliary output \leq 10 msLoad current \leq 100 mALoad current \leq 100 mALeakage current \leq 0.1 mAExpansion units connectionsMax. 5 unitsIEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3)IEC/EN 61508 (SIL3), EC/EN 62061 (SILCL3)IEC/EN 60947-5-1, EN ISO 13849-1 (Category 4, PLe)ULI isted E249635CertificationCf € @-maxSec A fast-blow fue 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 unitPollution3Overvoltage categoryIIIImpulse withstand 		-	-					
Life expectancy 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 ^{cos} Operating time (OFF→ON) ⁵⁶¹ ≤ 30 ms ^{cos} ≤ 10 ms Response (return) time (ON ≤ 10 ms ≤ 15 ms Auxiliary output 1 × PNP transistor: 1 × PNP transistor: X1 Load current ≤ 100 mA ≤ 100 mA Leakage current ≤ 100 mA ≤ 100 mA Leakage current ≤ 100 mA ≤ 100 mA Leakage current ≤ 100 mA Leakage current ≤ 10.0 mA Leakage current ≤ 0.1 mA Expansion units connections Max. 5 units - Expansion units connections Max. 5 units - UL listed E249635 Certification C € (-0) -ar (-0) (-0) (-1)	Capacity			= 5 A resistance lo	ad			
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Conditional short-circuit 100 A ^{cag} Coperating time (DFF \rightarrow ON) ^{out} \leq 30 ms ^{cag} \leq 100 ms Response (return) time (ON \rightarrow OFF) ^{out} \leq 10 ms \leq 15 ms Auxiliary output 1 × PNP transistor: $1 \times$ PNP transistor: X1 Load current \leq 100 mA \leq 100 mA Leakage current \leq 0.1 mA Expansion units connections Responsel (return) time (ON \rightarrow 0.1 mA Expansion units connections Max. 5 units Reproval IEC/EN 61508 (SIL3), IEC/EN 62061 (SILC13) IEC/EN 60947-5-1, EN ISO 13849-1 (Category 4, PLe) UL itsed E249635 Certification \subseteq @ $(\cong$ 100 g(\approx 150g) \approx 110 g(\approx 160g) \approx 80 g(\approx 130 g) \approx 110 g(\approx 150 g) 2) 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 (IEC/EN 60947-5-1) Imput 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 Detectric strength Imput terminals and case: 500 VAC~ 50/60 Hz for 1 min. IExpansion relay / Relay unit]								
current 100 A ⁻¹ Operating time (OFF → ON) ⁶⁴ ≤ 30 ms ⁶⁶ ≤ 100 ms Response (return) time (ON ≤ 10 ms ≤ 15 ms Auxiliary output 1 × PNP transistor: X2 (error) 1 × PNP transistor: X2 (error) Load current ≤ 100 mA ≤ 100 mA Leakage current ≤ 0.1 mA Expansion units connections Max. 5 units . . IEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3) . Leakage current ≤ 0.1 mA . Approval IEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3) UL isted E249635 . . Qurit weight (package) ≈ 100g(≈ 150g) ≈ 110g(≈ 160g) ≈ 80g(≈ 130g) ≈ 110g(≈ 150g) Q) Available to set Off-delay time (max. 3 sec. / 30 sec. depends on model) Q) Available to set Off-delay time (max. 3 sec. / 30 sec. depends on switch unit Q) Available to set Off-delay time (max. 3 sec. / 30 sec. depends on model) <t< th=""><th>Inductive load switching</th><td>IEC60947-5-1: AC-15</td><td>6(230 V/2 A), DC-13(</td><td>24 V/1.5 A), UL508</td><td>: B300/R300</td></t<>	Inductive load switching	IEC60947-5-1: AC-15	6(230 V/2 A), DC-13(24 V/1.5 A), UL508	: B300/R300			
Response (return) time (ON $\leq 10 \text{ ms}$ $\leq 15 \text{ ms}$ Auxiliary output $1 \times \text{PNP transistor:}$ $1 \times \text{PNP transistor: X1}$ Load current $\leq 100 \text{ mA}$ $\leq 100 \text{ mA}$ Leakage current $\leq 0.1 \text{ mA}$ Expansion units connections Max. 5 units Expansion units connections Max. 5 units - IEC/EN 60947-5-1; EN 1503 (SIL3), IEC/EN 62061 (SILCL3) IEC/EN 60947-5-1; EN 1503 (349-9-1 (Category 4, PLe) Ull isted E249635 Certification Cf @@w=@ @w=@ @w=@ @w=@ @w=@ @w=@ @w=@ @w		100 A ⁰³⁾						
Response (return) time (ON $\leq 10 \text{ ms}$ $\leq 15 \text{ ms}$ Auxiliary output $1 \times \text{PNP transistor:}$ $1 \times \text{PNP transistor: X1}$ Load current $\leq 100 \text{ mA}$ $\leq 100 \text{ mA}$ Leakage current $\leq 0.1 \text{ mA}$ Expansion units connections Max. 5 units Expansion units connections Max. 5 units - IEC/EN 60947-5-1; EN 1503 (SIL3), IEC/EN 62061 (SILCL3) IEC/EN 60947-5-1; EN 1503 (349-9-1 (Category 4, PLe) Ull isted E249635 Certification Cf @@w=@ @w=@ @w=@ @w=@ @w=@ @w=@ @w=@ @w	Operating time (OFF → ON) ⁰⁴⁾	\leq 30 ms ⁽⁵⁾	≤ 100 ms					
Auxiliary output X2 (error) 1X PNP transistor: X1 Load current \leq 100 mA \leq 100 mA \leq 100 mA Leakage current \leq 0.1 mA Expansion units connections Max. 5 units - 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 Cf		\leq 10 ms	\leq 15 ms					
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 61508 (SIL3), IEC/EN 62061 (SILCL3) Util isted E249635 Certification C € VI isted E249635 Out include the power consumption of loads. 20) Available to set Off-delay time (max. 3 sec. / 30 sec., depends on model) 30) Use 6 A fast-blow fuse under the IEC 60127 standard as a short-circuit protection device. 40) The operation (response) time of each model. The time increases when a logical connection or expansion relay unit is connected. 30) Except operation time of advanced unit, non-contact door switch unit Pollution 3 Overvoltage category III Impulse withstand violagi (Arta) 23-24: 4 kV Relay contacts between 13-14 / 23-24 and 33-34 / 43-44 (37-38 / 47-48): 6 kV between 33-34 and 43-34 (3/-33-34 and 43-44 (3/-38 / 47-48): 6 kV between 13-14 and 23-24: 4 kV Impulse withstand violagi (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: 500 VAC ~ 50/60 Hz for 1 min. Expansion relay / Relay unit] Between all terminals and case: 1,	Auxiliary output		$1 \times \text{PNP}$ transisto	or: X1				
Leakage current $\leq 0.1 \text{ mA}$ Expansion units connections Max 5 units Approval IEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3) IEC/EN 60547-5-1, EN ISO 13849-1 (Category 4, PLe) UL listed E249635 Certification C€ @ © Unit weight (package) $\approx 100 g(\approx 150 g)$ 01) Not include the power consumption of loads. $\approx 300 g(\approx 130 g)$ 02) Available to set Off-delay time (max 3 sec. / 30 sec., depends on model) $\approx 100 g(\approx 150 g)$ 03) Use 6 A fast-blow fuse under the IEC 60127 standard as a short-circuit protection device. \ll 04) The operation (response) time of each model. The time increases when a logical connection or expansion relay unit is connected. \otimes 05) Except operation time of advanced unit, non-contact door switch unit \bigcirc Pollution 3 \bigcirc Overvoltage category III 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 33-34 and 43-44 (37-38 and 47-48): 4 kV Dielectric strength IBastic / Advanced / Non-contact door switch unit] Between all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Basic / Advanced / Non-contact door switch unit] Between all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min.	Load current		≤ 100 mA					
Expansion units connections Max. 5 units . Approval IEC/EN 61508 (SIL3), IEC/EN 62061 (SILC13) IEC/EN 60947-5-1; LSI ISO 13849-1 (Category 4, PLe) UL listed E249635 Certification C€ @0-ma C€ mail @0-mailson Unit weight (package) ≈ 100g(≈ 150g) ≈ 110g(≈ 150g) ≈ 80g(≈ 130g) ≈ 110g(≈ 150g) 10 Not include the power consumption of loads. 20 Available to set Off-delay time (max. 3 sec. / 30 sec., depends on model) .								
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 $C \in$ O_{arran} $O = 100 g (\approx 150 g)$ $\approx 100 g (\approx 150 g)$ $\approx 100 g (\approx 150 g)$ 01 Not include the power consumption of loads. $O = 100 g (\approx 150 g)$ $\approx 100 g (\approx 160 g)$ $\approx 80 g (\approx 130 g)$ $\approx 110 g (\approx 150 g)$ 03 Natinclude the power consumption of loads. $O = 100 g (\approx 160 g)$ $\approx 80 g (\approx 130 g)$ $\approx 110 g (\approx 150 g)$ 03 Use 6 A fast-blow fuse under the IEC 60127 standard as a short-circuit protection device. A A 04 The operation (response) time of each model. The time increases when a logical connection or expansion relay unit is connected. B 05 Except operation time of advanced unit, non-contact door switch unit P P Pollution 3 O A 05 Except operation time of advanced unit, non-contact door switch unit P P Pollution 3 O P P O P P P P O P P P P O P P P P P			-					
Certification C € $(- 0 m)$ C € $(- 0 m)$ $(- 0 - m)$		IEC/EN 61508 (SIL3), IEC/EN 62061 (SILCL3) IEC/EN 60947-5-1, EN ISO 13849-1 (Category 4, PLe)						
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 Afast-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 IIII Impulse withstand voltag of the contact between 13·14 / 23·24 and 33·34 / 43·44 (37·38 / 47·48): 6 kV Detween 33·34 and 43·44 (37·38 and 47·48): 4 kV [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. [Expansion relay/ Relay unit] Between all terminals and output terminals a^{41} , 2,500 VAC ~ 50/60 Hz for 1 min. Insulation resistance ≥ 100 MΩ (500 VDC= megger) Vibration e^{a1} 0.75 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y	Cortification		(().	0				
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 33-34 and 43-44 (37-38 and 47-48): 4 kV IBelectric 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. [Expansion relay / Relay unit] Between all terminals and output terminals ¹¹ : 2,500 VAC ~ 50/60 Hz for 1 min. [Expansion relay / Son VDC=megger) Vibration ⁶² 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.) ⁶² 300 m/s ² (≈ 30 G) in each X, Y, Z direction for 3 times					$\sim 110 \sigma (\sim 150 \sigma)$			
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 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 ⁶ . 2,000 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ⁶ . 2,000 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ⁶ . 2,000 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ⁶ . 2,000 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ⁶ . 2,000 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ⁶ . 2,000 VAC ~ 50/60 Hz for 1 min. Vibration ⁶² 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.) ⁶² 300 m/s ² (≈ 30 G) in each X, Y, Z direction for 3 times			[~110 g (~100 g)	[~00g(~130g)	1~110g(~130g)			
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 voltage category III Impulse withstand (JEC/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 33-34 and 43-44 (37-38 and 47-48): 4 kV Edisc: / Advanced / Non-contact door switch unit] Between 31: Hard (37-48) 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 all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ¹⁰ : 2,500 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ¹⁰ : 2,500 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ¹⁰ : 2,500 VAC ~ 50/60 Hz for 1 min. Between input terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between input	, , , , , , , , , , , , , , , , , , , ,							
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 Between all terminals and case: 500 VAC ~ 50/60 Hz for 1 min. [Expansion relay unit] Between all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between all terminals and case: 500 VAC ~ 50/60 Hz for 1 min. Between all terminals and case: 500 VAC ~ 50/60 Hz for 1 min. Between all terminals and case: 500 VAC ~ 50/60 Hz for 1 min. Between input terminals and case: 500 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ⁶¹ : 2,500 VAC ~ 50/60 Hz for 1 min. Vibration ⁶²⁰ 0.75 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 hour 0.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 minutes 300 m/s ² (≈ 30 G) in each X, Y, Z direction for 3 times								
05) Except operation time of advanced unit, non-contact door switch unit Pollution 3 Overvoltage category III Impulse withstand Input terminals and relay output terminals: 6 kV roltag for relay unit Relay contacts between 13-14 / 23-24 and 33-34 / 43-44 (37-38 / 47-48): 6 kV between 13-32 and 13-34 / 4 (37-38 and 47-48): 4 kV Basic / Advanced / Non-contact door switch unit] Dielectric strength [Basic / Advanced / Non-contact door switch unit] Between al 3-32 and 43-34 (37-38 and 47-48): 4 kV [Basic / Advanced / Non-contact door switch unit] Between al s-24 and (37-38 and 47-48): 4 kV [Basic / Advanced / Non-contact door switch unit] Between al s-24 and 23-24: 4 kV [Basic / Advanced / Non-contact door switch unit] Between all terminals and case: 1,500 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 all terminals and output terminals ¹⁰ : 2,500 VAC ~ 50/60 Hz for 1 min. Insulation resistance ≥ 100 MΩ (500 VDC=m megger) 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.) ⁶⁰ 0.75 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 0 minutes Shock ⁶² 300 m/s ² (6 * 30 G) in each X, Y, Z direction for 3 times	04) The operation (response)				n or expansion relay			
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 13-34 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. [Expansion relay / Relay unit] Between all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ¹¹ : 2,500 VAC ~ 50/60 Hz for 1 min. Insulation resistance ≥ 100 MΩ (500 VDC= megger) Vibration ⁶²⁰ 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.) ⁶²⁰ 0.75 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 hour Shock ⁶²⁰ 300 m/s ² (~ 30 G) in each X, Y, Z direction for 3 times		dvanced unit, non-contac	t door switch unit					
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 13-34 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. [Expansion relay / Relay unit] Between all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between input terminals and output terminals ¹¹ : 2,500 VAC ~ 50/60 Hz for 1 min. Insulation resistance ≥ 100 MΩ (500 VDC= megger) Vibration ⁶²⁰ 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.) ⁶²⁰ 0.75 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 hour Shock ⁶²⁰ 300 m/s ² (~ 30 G) in each X, Y, Z direction for 3 times	Pollution	3						
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. 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 all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between all terminals and case: 1,500 VAC ~ 50/60 Hz for 1 min. Between all terminals and output terminals ⁴¹ , 2,500 VAC ~ 50/60 Hz for 1 min. Insulation resistance ≥ 100 MΩ (500 VDC = megger) Vibration ⁴² 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.) ⁴²⁰ 0.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 hour Shock ⁴²⁰ 300 m/s ² (≈ 30 G) in each X, Y, Z direction for 3 times								
Dielectric strength 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 ^{α1} ; 2,500 VAC ~ 50/60 Hz for 1 min. Insulation resistance ≥ 100 MΩ (500 VDC= megger) Vibration ^{α2} 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.) ^{α1} 0.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 1 minutes Shock ^{α2} 300 m/S ² (≈ 30 G) in each X, Y, Z direction for 3 times	Impulse withstand voltag for relay unit	Input terminals and re Relay contacts betwee between 13-14 and 23	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 k between 13-14 and 23-24: 4 kV					
Vibration 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.) 0.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 10 minutes Shock 300 m/s ² (≈ 30 G) in each X, Y, Z direction for 3 times	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 :						
Vibration direction for 1 hour Vibration (malfunc.) ⁽²¹⁾ 0.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 10 minutes Shock ⁽²²⁾ 300 m/S ² (≈ 30 G) in each X, Y, Z direction for 3 times	Insulation resistance	\geq 100 M Ω (500 VDC=	megger)					
Shock ⁶² 300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times	Vibration ⁰²⁾		frequency of 10 to	55 Hz (for 1 min) i	n each X, Y, Z			
Shock ⁰²⁾ 300 m/s ² (≈ 30 G) in each X, Y, Z direction for 3 times				5 Hz (for 1 min) in	each X, Y, Z			
	Shock 02)			for 3 times				
SHOCK (Inaturic.) 100 m/s (~ 10 G) in each X. Y. Z direction for 3 times	Shock (malfunc.) 02)							
Protection rating IP20 (IEC standard)			, ,					
Ambient temperature -10 to 55 °C, storage: -25 to 65 °C (no freezing or condensation)			to 65 °C (no freezin	g 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)								

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)

Parts Descriptions







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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 connecto

(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.

Indicators

Indicators	Model	SFC	SFC-A	SFC-N	SFC-ER	SFC-R 12 -	SFC-R212 -R2
PWR (green)	Power	•	•	•	•	•	•
M1 (white)	Safety input 1	•			—	•	
M2 (white)	Safety input 2				-		
NS (white)	Non-contact door switch input	_	_	•	_	_	_
AND (white)	Logic input	—	•	•	—	—	—
ERR (red)	Error		•				
FB (white)	Feedback start input	•	•	•	_	•	•
OUT1 (green)	Instantaneous safety output	•	•	•	•	•	•
OUT2 (green)	Off-delay safety output	_	•	•	-	-	•

Setting Switches

Setting Switch for off-delay time

- Only off-delay output mode
- Available to set off-delay time (max. 3 / 300 / 30 sec., depends on 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
- If the off-delay time is set as 0 (factory default), the product operates as the instantaneous output.

	Max. 3 sec.	Max. 300 sec.	Max. 30 sec.	
Model	SFC-A322-23- SFC-N322-23- SFC-R212-R23-	SFC-A322-2300- SFC-N322-2300-	SFC-R212-R230-	
Total 16 level	0/0.2/0.3/0.4/0.5/0.6/0. 7/0.8/0.9/1.0/1.2/1.4/1. 8/2.0/2.5/3.0 sec.	0/10/20/30/40/50/60/7 0/80/90/100/120/150/ 180/240/300 sec.	0/1/2/4/5/6/7/8/9/10/ 12/14/16/20/25/30 sec.	

Setting switch for function

ON

output points

- 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

Function	SW1	SW2	Logic (AND) input			
Logic (AND) input	OFF	OFF	Not available			
Logic (AND) input	ON	ON	Available	_		
Function	SW3	SW4	Instantaneous safety output	Off-delay sa output		
Off-delay safety	OFF	OFF	S14, S24, S34	S44, S54		

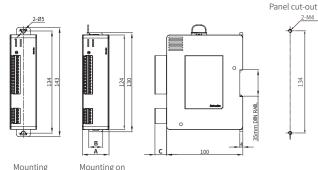
S14

S24, S34, S44, S54

ON

Dimensions

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



with bolts DIN rail

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

Installation

Mounting with bolts 1. Pull each rail locks to up and down

 $(attach/detach: \geq 25N)$ 2. Insert bolts and fix it on rail lock. (fixing torque: 1.0 N m to 1.5 N m)



Mounting on DIN Rail 1. Hang the top rail lock to DIN rail.

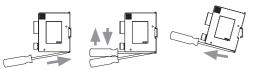
2. Push and press the module to down direction.

3. Install END PLATE at both ends of the module to fix the products.

(It is the same way when using one unit.)

Removing on DIN Rail

1. Insert a screwdriver into the rail hook of the lower rail lock. 2. Lift the screwdriver and pull the lower rail lock downward. 3. Lift the module with the lower rail lock pulled down.



■ How to connect the expansion relay units (SFC-ER412-□)

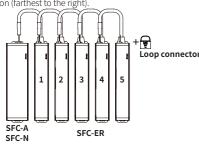
In case of advanced unit and non-contact door switch unit, it is possible to increase the number of safety outputs of relay type by connecting expansion relay unit (SFC-ER412-□). (Up to 5 expansion relay units can be connected to each controller)

When the safety output of the controller is on, the output of the expansion relay unit also goes to on.

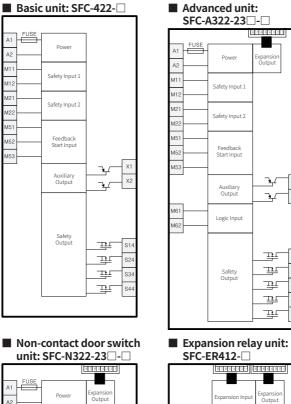
- The controller is installed from the end of the left or right side.
- Power of expansion relay unit should be supplied individually.
- E.g.) Installation from the end of left side
- 1. Install the expansion relay units (max. 5 units) toward the right side based on the controller.
- 2. Remove the loop connector on the top of the controller.

3. Connect the expansion connector of each right (expansion relay unit) to the expansion connector of the left unit.

4. Insert the loop connector removed in 2 into the loop port of the unit, which located at the end position (farthest to the right)



Connections



Feedback itart Input

Auxiliary Output

Safety Output

Relay unit:

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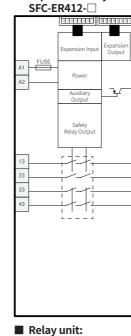
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fety Input

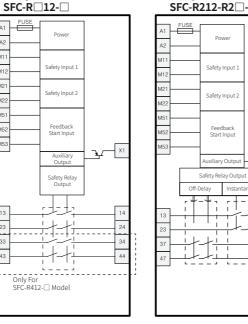
Feedback Start Input

Auxiliary Output

Logic Inpu

Safety Output

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Wiring of Input

■ A1, A2: Power supply input

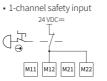
The input terminals for power supply. Connect the positive side (24 VDC==) of the external power supply to the A1 terminal and connect the negative side (GND) of the external power supply to the A2 terminal.

M11, M12: Safety input 1, M21, M22: Safety input 2

To turn ON the safety outputs, ON state signals must be input to both safety input 1 and safety input 2.

2-channel safety input

24 VDC==

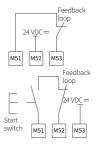


Manual start

24 VDC= M11 M12 M21 M22

M51, M52, M53: Feedback start input Auto start

To turn ON the safety outputs, the feedback loop must remain ON state.



To turn ON the safety outputs, the feedback loop must

remain ON state and the signal input to M52 must be changed from OFF state to ON state, and then to OFF state.

(The duration that the start switch is in the ON state: min. 100 ms)

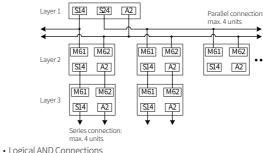
M61, M62: Logic input

Connect the safety outputs of the upper unit to the logic (AND) input of the lower unit. To use the logic input function, SW1 and SW2 of switch for setting function must be set to ON state.

Up to four units (advanced / non-contact door switch unit) can be connected as logic (AND) connections in parallel per safety output.

Up to four units can be connected in serial logic (AND) connection. Up to 20 units can be connected to the entire unit via logic connection.

Basic unit can only be used in layer 1.



Basic / Advanced / Non-contact door switch unit
Max. 4 units
Max. 20 units
Max. 5 layers
Max. 100 m

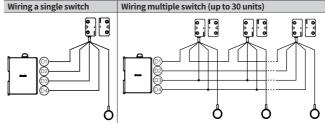
	Configuration			Max. operating time (OFF → ON)	
Layer	Expansion unit	Excepts	Includes	Excepts	Includes
Layer 1	Basic / Advanced / Non- contact door switch unit	15 ms	25 ms	50 ms	80 ms
Layer 2		30 ms	40 ms	250 ms	280 ms
Layer 3	Advanced / Non-contact	45 ms	55 ms	450 ms	480 ms
Layer 4		60 ms	70 ms	650 ms	680 ms
Layer 5		75 ms	85 ms	850 ms	880 ms

D1, D2, D3, D4: Non-contact door switch input

All the non-contact door switch inputs connected to the non-contact door switch SFN Series must be ON as a required condition for the safety outputs to be ON. Up to 30 noncontact door switches can be connected.

For more information, refer to the non-contact door switch SFN Series instruction manual

Wiring a single switch



Wiring of Output

S14, S24, S34, S44, S54 : P channel safety outputs

The instantaneous or off-delay safety outputs go to ON or OFF based on the safety inputs, feedback start input, logic input, and input signals of non-contact door switch.

- Leave unused safety outputs in the OPEN state.
- Configure a protection circuit against the counter electromotive force when connecting inductive loads.
- To expand the number of safety outputs in the form of contacts, connect the expansion cable of the expansion relay unit to advanced unit or the expansion connector of non-contact door switch unit, and connect the loop connector to the expansion relay unit located at the end of position.
- Operation of safety output and safety off-delay output based on the safety input signal Safety input ON

Safety instantaneous			
Safety off-delay output	ON		
		⊷Off-delay→	

13/14, 23/24, 33/34 (37/38), 43/44 (47/48) : Safety outputs of relay unit

The instantaneous or off-delay safety outputs go to ON or OFF based on the safety inputs, feedback start input.

· Leave unused safety outputs in the OPEN state.

X1: Auxiliary output 1

When the instantaneous safety outputs are ON, the X1 auxiliary output goes to ON. When the instantaneous safety outputs are OFF, the X1 also goes to OFF. Leave unused auxiliary output in the OPEN state.

X2: Auxiliary output 2

X2 auxiliary output goes to ON when the ERR indicator turns on or flashes. • Leave unused auxiliary output in the OPEN state.

Error Indication

When an error occurs, the ERR indicator and other indicators turn on or flash to notice the cause of error.

Be sure to check and take measures according to the table below, and turn the power on again. If the measures are not valid, please contact the Autonics.

	Indicator				
	otor Others	Cause	Check and measures		
ERR	PWR	The power voltage is out of the allowable	Check the supplied power voltage.		
	flashes M1	range. Wiring error of safety input 1	Check the wiring to M11, M12 terminal.		
	flashes	Failure of internal circuit of safety input 1	Please contact the Autonics.		
	M2	Wiring error of safety input 2	Check the wiring to M21, M22 terminal.		
	flashes	Failure of internal circuit of safety input 2	Please contact the Autonics.		
		Wiring error of feedback start input	Check the wiring to M51, M52 and M53 terminal.		
		Internal circuit error of feedback start input	Please contact the Autonics.		
	FB flashes	Error at the power of expansion relay unit	Check the supplied power voltage to the expansion relay unit.		
		Feedback error of the relay unit	Check the cable of expansion relay unit and loop connector connection.		
		Safety output error of the relay unit	Please contact the Autonics.		
ON	NS flashes Failu	Wiring error of input and output of the non-contact door switch	Check the wiring to the D1 and D2 terminal of non-contact door switch.		
		Wiring error of series connection of the non-contact door switch	Check the wiring to between the non-contact door switches.		
		Failure of internal circuit of the non- contact door switch	Replace the non-contact door switch (SFN series).		
		Wiring error of logic input	Check the wiring to M61 and M62 terminal.		
	AND flashes	Setting error of logic input	Check the setting values of SW1 and SW2 at switch for logic (AND) input.		
		Failure of internal circuit of logic input	Please contact the Autonics.		
	OUT1	Wiring error of instantaneous safety output	Check the wiring to instantaneous safety output terminal.		
	flashes	Failure of internal circuit instantaneous safety output	Please contact the Autonics.		
		Wiring error of the off-delay safety output	Check the wiring to the off-delay safety output terminal.		
		Failure of internal circuit of the off-delay safety output	Please contact the Autonics.		
		Setting error of the off-delay time	Check the setting value of the switch for off-delay time.		
Flash	-	Error at internal circuit and output relay of the expansion relay unit	Please contact the Autonics.		
OFF	M1 M2 flashes	The different input signal between safety input 1 and safety input 2	Check the wiring to the safety input devices. Check the input sequence of safety inputs.		

