

Ø16/22・25/30 mm E-Stop Push Button Switches

SF16ER/SF2ER/SF3ER Series
INSTRUCTION MANUAL

TCD252004AC

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.



Visit Autonics website (www.autonics.com or QR code) for the latest information. Manuals, CAD files, certifications, software, etc. are available. The dimensions, specifications, certifications, etc. are subject to change without notice for product improvement. Certain models may be discontinued without notice.

Safety Considerations

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

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

- 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.
- System manager means followings;**
- a personnel who is fully aware of installation, setting, operation, and maintenance of the product
- a personnel who well observes standard/regulation/statute on the product by type of machine the product installed in and nation/region the product used in
Machine user means a personnel who is appropriately trained about using machine by the system manager, so that machine user can operate the machine correctly.
System manager has duty to train the machine user about operation of the product.
Machine user has to report directly to the system manager when unusual status has been found while system is operating.
Failure to follow this instruction may result in personal injury, economic loss or fire.
- The product has to be installed, set, and combined with machine control system by the qualified system manager.**
Failure to follow this instruction may result in personal injury due to unintended operation and unstable detection.
- Before using the product, check that function of the product operates as intended while machine is turned off after installation.**
Failure to follow this instruction may result in personal injury due to unintended operation and unstable detection.
- Do not use or store the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, salinity, moisture, steam or dust may be present.**
Failure to follow this instruction may result in explosion or fire.
- Do not disassemble or modify the unit.**
Failure to follow this instruction may result in personal injury or fire due to loss of safety function.
- Do not defeat, tamper, or modify the switch.**
Failure to follow this instruction may result in personal injury.
- Check the installed status of the switch, operating status of the switch, and signs of damage, modification, tampering of the switch at the following situation and on a weekly basis.**
- when operating the safety system at first
- when replacing component of the system
- when the system has not been operated for a long time
Failure to follow this instruction may result in personal injury due to malfunction of the product and safety function.
- Do not connect, repair, inspect, or replace the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
- Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.
- Normally Open (NO) Contacts cannot be used for emergency stop control circuits.**
- Keep away from high voltage lines or power lines to prevent surge and inductive noise, and make cable as short as possible.**
Do not use near the equipment which generates strong magnetic force or high frequency noise(such as transceivers).
When using near devices that generate strong surges (motors, welding machines, etc.), use diodes or varistors to eliminate the surge.
Failure to follow this instruction may result in personal injury due to malfunction of the product and safety function.

⚠ Caution Failure to follow instructions may result in injury or product damage.

- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- 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.
- Keep the product away from metal chip, dust, and wire residue which flow into the unit.**
Failure to follow this instruction may result in fire, product damage or malfunction.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Emergency stop push button switches are UL Listed when mounted in a sealed, non-ventilated enclosure only.
- When installing the product, keep the minimum installation space between units.
- The switch must be properly assembled.
- While wiring or after wiring the contact block, do not pull the cable.
- Do not hit or flip the button, and use hand not any tool to push the button
- To unlock the turn-reset type switch, turn the button approximately 44°clockwise, and do not turn the button with excessive force.
- To unlock the pull-reset type switch, do not pull or turn the button with excessive force. This may damage the product.
- This unit may be used in the following environments.
 - Indoors (UL Type 1 Enclosure)
 - Altitude max. 2,000m
 - 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.

SF1ER	-	2	3	4	5	6	7	-	8
-------	---	---	---	---	---	---	---	---	---

① Panel cut-out size

16: Ø16 mm
2: Ø22/25 mm
3: Ø30 mm

② Contact type

No mark: Modular
C: Integrated

③ Operation

E: Push-lock, turn-reset
P: Push-lock, pull-reset

④ Button

Non-illuminated	Illuminated	Type
1	1L	D30, short head
2	2L	D40, short head
3	3L	D60, short head
4	4L	D44, short head

⑤ Color

R: Red

①) For the modular type model, it consists of 1-level or 2-level contact blocks. Non-illuminated type 4-contact or more models and illuminated type 3-contact or more models include 2-level contact blocks.

⑥ Contact block^{①)}

Contact block	Contact	Contact block	Contact
B	1b	A4B	1a4b
AB	1a1b	2A3B	2a3b
2B	2b	5B	5b
A2B	1a2b	A5B	1a5b
3B	3b	2A4B	2a4b
A3B	1a3b	3A3B	3a3b
2A2B	2a2b	6B	6b
4B	4b		

⑦ Characteristic

No mark: General
P: Padlock
C: IP69K

⑧ Mark

No mark: No mark
A: EMO
S: EMS

Sold Separately

■ SF16ER

- Locking handle: SA-16LH

- Contact blocks: SFEA16-CA, SA16-CB

■ SF2ER/SF3ER

- Locking handle: SA-LH

- [Integrated] LED lamp: LDR-SF2ER

- Contact blocks: SFEA-C□, SFEA-2C□□

- LED block: SA-LDR

■ Exclusive for SF2ER

- Protection guard ring: GUARD□-SF2ER-□

- Name plate: SF2ER-B□

- Protection guard ring + Name plate set: GUARD□-SF2ER-□-□

- Control box: SCB-SF2ER

- Radial support: BK-SF2ER-□

■ Exclusive for SF3ER

- Group locking device(HASP): SF-LT

Specifications

■ Control unit

Series	SF16ER	SF2ER		SF3ER
Characteristic	General	General	IP69K	Padlock ^{①)}
1 Contact operating power	10 to 15 N	20 to 30 N	30 to 40 N	30 to 40 N
Operation distance	4.0 mm ± 0.5	4.7 mm ± 0.5	4.7 mm ± 0.5	6.0 mm ± 0.5
Contact operating angle	CW (clock wise) 33 to 37°	CW (clock wise) 33 to 37°	PULL RESET	CW (clock wise) 29 to 30°
Rotation torque	0.04 to 0.05 N m	0.04 to 0.05 N m	PULL RESET	0.06 to 0.07 N m
Material	Button: PC, Body: PA6	Button: PC, Body: PA6	Button: PA6, Body: PA6	Button: PC, Body: PA6
Protection structure ^{②)}	IP65 (IEC standards)	IP65 (IEC standards)	IP69K (ISO standards)	IP65 (IEC standards)

①) Refer to the 'Specifications of Padlock' in the product manual.

②) It is only for part from front of the panel. Protection structure is guaranteed only when the switch is installed on flat and smooth surface.

■ Operation unit

Series	SF16ER	SF2ER/SF3ER	
Contact type	Modular	Modular	Integrated
Rated voltage/ current	250 VAC~, 3 A (Resistive load)	AC-15 (220 VAC~, 3 A)	AC-15 (250 VAC~, 1.5 A)
	30 VDC=, 3 A (Resistive load)	DC-13 (220 VDC=, 0.2 A)	DC-13 (220 VDC=, 1A)
Applicable wire	AWG 18 (0.823 mm ²)		
Insulation resistance	≥ 100 MΩ (500 VDC= megger)		
Dielectric strength	2,500 VAC~ 50/60 Hz for 1 minute		
Material	Lever in fixing unit: PA6, Contact block: PA6		Lever in fixing unit: PA6, Contact block: PC

■ Assembled

Series	SF16ER	SF2ER/SF3ER	
Contact type	Modular	Modular	Integrated
Allowable operation frequency ^{①)}	Electrical: 20 operations/min, mechanical: 20 operations/min		
Life cycle	Electrical: ≥ 100,000 operations, mechanical: ≥ 250,000 operations		
Vibration	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours		
Vibration (malfunction)	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 10 minutes		
Shock	1,000 m/s ² (≈ 100 g) in each X, Y, Z direction for 3 times ^{②)}		
Shock (malfunction)	250 m/s ² (≈ 25 g) in each X, Y, Z direction for 3 times		
Ambient temperature	-20 to 65 °C ^{③)} , storage: -40 to 70 °C (at no freezing or condensation)		
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (at no freezing or condensation)		
Certification	CE, UKCA, ENEC, IEC, S, E		
Weight ^{④)}	≈ 18 g	1-level contact: ≈ 65.2 g 2-level contact: ≈ 98.2 g	≈ 66.4 g

①) Setting and resetting once is counted as one operation.

②) [Modular 2-level contact] 500 m/s² (≈ 50 g) in each X, Y, Z direction for 3 times

③) UL approved ambient temperature: 55 °C

④) Based on the maximum contact block of the D40 button type.

■ [SF2ER/SF3ER]Contact capacity

- IEC (EN60947-5-1)

Contact type	Modular				Integrated		
Rated current	10 A				5 A		
Rated voltage	24 V	110 V	220 V	380 V	30 V	125 V	250 V
AC	Resistive load (AC-12)	10 A	10 A	6 A	3 A	-	5 A
	Inductive load (AC-15)	10 A	5 A	3 A	2 A	-	3 A
DC	Resistive load (DC-12)	10 A	2 A	0.6 A	0.2 A	2 A	0.4 A
	Inductive load (DC-13)	1.5 A	0.5 A	0.2 A	0.1 A	1 A	0.22 A

- UL / CSA (UL508, CSA C22.2 No. 14)

[Modular] A300

Rated voltage	Through current	Current (A)		Volt ampere (VA)	
		Making	Breaking	Making	Breaking
AC120 V	10 A	60	6	7,200	720
AC240 V		30	3		

[Integrated] B300

Rated voltage	Through current	Current (A)		Volt ampere (VA)	
		Making	Breaking	Making	Breaking
AC120 V	5 A	30	3	3,600	360
AC240 V		15	1.5		

[Modular / Integrated] Q300

Rated voltage	Through current	Current (A)		Volt ampere (VA)	
		Making	Breaking	Making	Breaking
DC125 V	2.5 A	0.55	0.55	69	69
DC250 V		0.27	0.27		

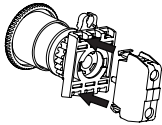
■ [Illuminated] LED Specifications

LED	Modular LED block	Integrated LED lamp
Rated current	20 mA	12 mA
Rated voltage	12 to 24 VDC= / VAC~	12 to 24 VDC= / VAC~

[Modular type] Contact block Assembling / Disassembling

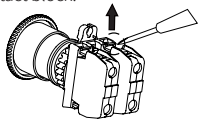
■ Assembling

Insert the contact block in the arrow direction.



■ Disassembling

Lift up the lever in the arrow direction with the screwdriver and to disassemble the contact block.



Wiring

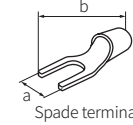
■ SF16ER

- Soldering time: 350 °C (soldering iron tips) ≤ 3 seconds (30 W soldering iron)
- Do not apply external force for 1 minute after soldering.
- After completing the switch wiring, ensure adequate insulation distance.

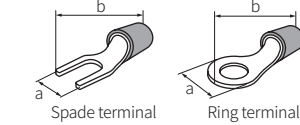
■ SF2ER/SF3ER

- Unit: mm, Please use UL certified terminals.

Non-insulated terminal



Insulated terminal



[Modular]

When wiring contact block, use phillips or slotted M3.5 screws with square washers. (Tightening torque: 0.6 to 0.8 N m)

	Non-insulated		Insulated	
Terminal	Spade	Ring	Spade	Ring
a	≤ 7	≤ Ø7	≤ 7	≤ Ø7
b	≤ 16.0		≤ 20.2	

[Integrated]

When wiring contact block, use phillips or slotted M3 screws with square washers. (Tightening torque: 0.8 to 1.0 N m)

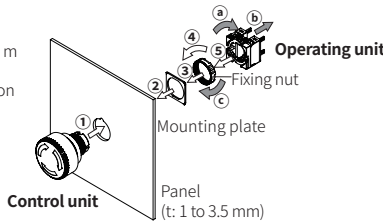
	Non-insulated		Insulated	
Terminal	Spade	Ring	Spade	Ring
a	≤ 6.2	≤ Ø6.2	≤ 6.2	≤ Ø6.2
b	≤ 14.0		≤ 16.3	

Installation and Remove

- Before tightening the fixing nut, be sure that there is rubber washer between the switch and panel.
- Tighten the fixing nut using the switch nut fixing handle (sold separately: SA-□LH)
- Use the head that matches the integrated contact or the modular contact. An improper combination may cause product malfunction and lead to safety hazards.

■ SF16ER

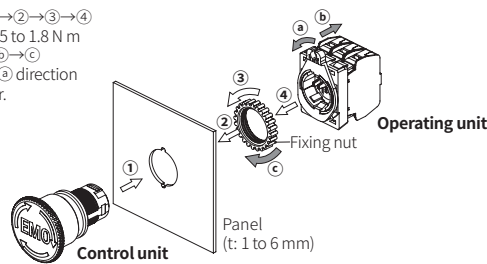
- Installation order: ①→②→③→④→⑤
- Tightening torque: 0.4 to 0.5 N m
- Remove order: ③→④→⑤
- Turn the lever in the ⑤ direction using the screwdriver.



■ SF2ER/SF3ER

[Modular]

- Installation order: ①→②→③→④
- Tightening torque: 1.5 to 1.8 N m
- Remove order: ③→④→⑤
- Turn the lever in the ⑤ direction using the screwdriver.



[Integrated]

- Installation order: ①→②→③→④→⑤
- Assemble the control unit and operating unit by aligning the ▼ marks.
- Tightening torque: 1.5 to 1.8 N m
- Remove order: ③→④→⑤→⑥
- Press the RELEASE button(⑥) and then turn the operating unit in the UNLOCK direction(⑥).

