SF-AC

Safety Relay Unit (For PNP output type light curtain)

New

Control category 4

Possible to create the highest level safety system

Conforming to Machine Directive & EMC Directive

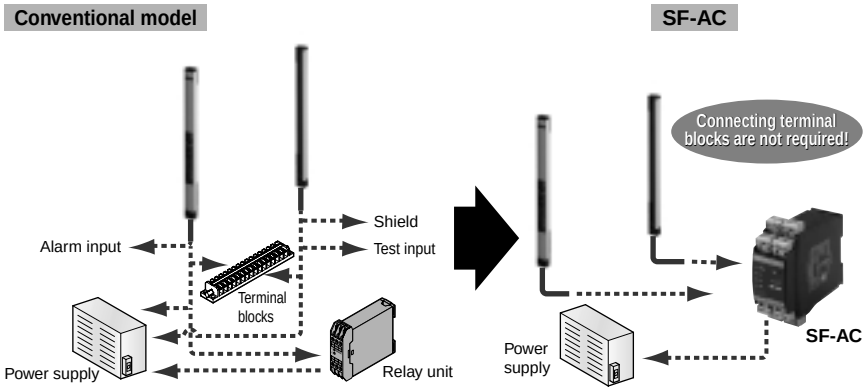
Approved Listing

Compatible up to control category 4

Control category 4 compatible with an **SF4-AH** series / **SF2-EH** series combination and control category 2 compatible with an **SF2-A** series / **SF2-N** series combination.

A connecting terminal blocks are not needed

As **SF-AC** incorporates a power supply terminals and synchronization lines terminals for the light curtain, so terminal blocks are not required.



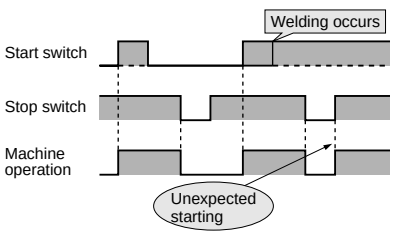
Installation time and labor can be saved due to the usage of detachable terminal blocks

As wiring can be performed with the terminal blocks removed, it is not necessary to detach the controller from the control panel when performing maintenance, thus reducing the number of installation procedures required. Also, when replacing the relay units, you simply insert new terminals without having to manipulate the wiring.

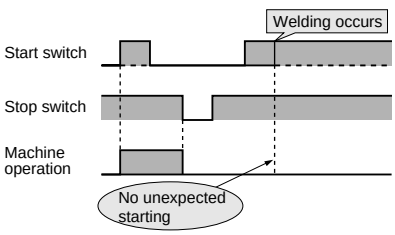
Unexpected start due to start-switch welding prevented

The unit is equipped with a trailing edge switching function, which causes an ON signal to be sent when the start switch signal is falling. This prevents unexpected starting which can occur if the start switch gets welded.

Normal switching

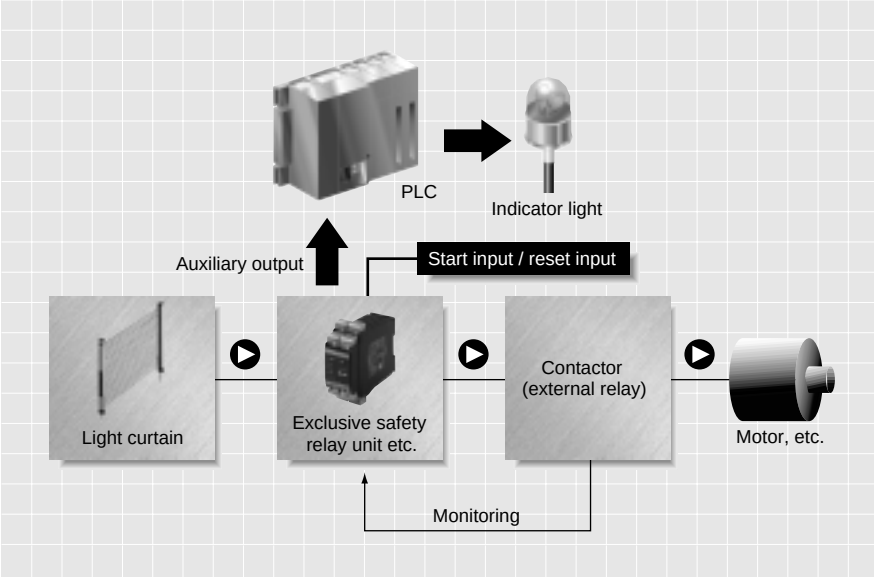


Trailing edge switching



Incorporates a 2-channel auxiliary output

SF-AC incorporates both an auxiliary output that operates together with the light curtain's control output (OSSD), and an alarm output that functions together with the light curtain's auxiliary output (non-safety output). These features allow for monitoring of light curtain activity.



Maintenance free

Equipped with a hybrid fuse that enables recovery with only the reintroduction of the power supply making fuse replacement unnecessary.

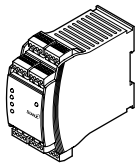
10 ms high-speed response

We have realized the highest-class response time, 10 ms, for the relay output making for even more enhanced safety.

A contact point mechanical lifetime of 10 million operations

Longer usage is possible due to the long contact point lifetime.

ORDER GUIDE

Type	Appearance	Model No.	Enabling path
Control category 4		**SF-AC**	NO contact × 3

SF-AC

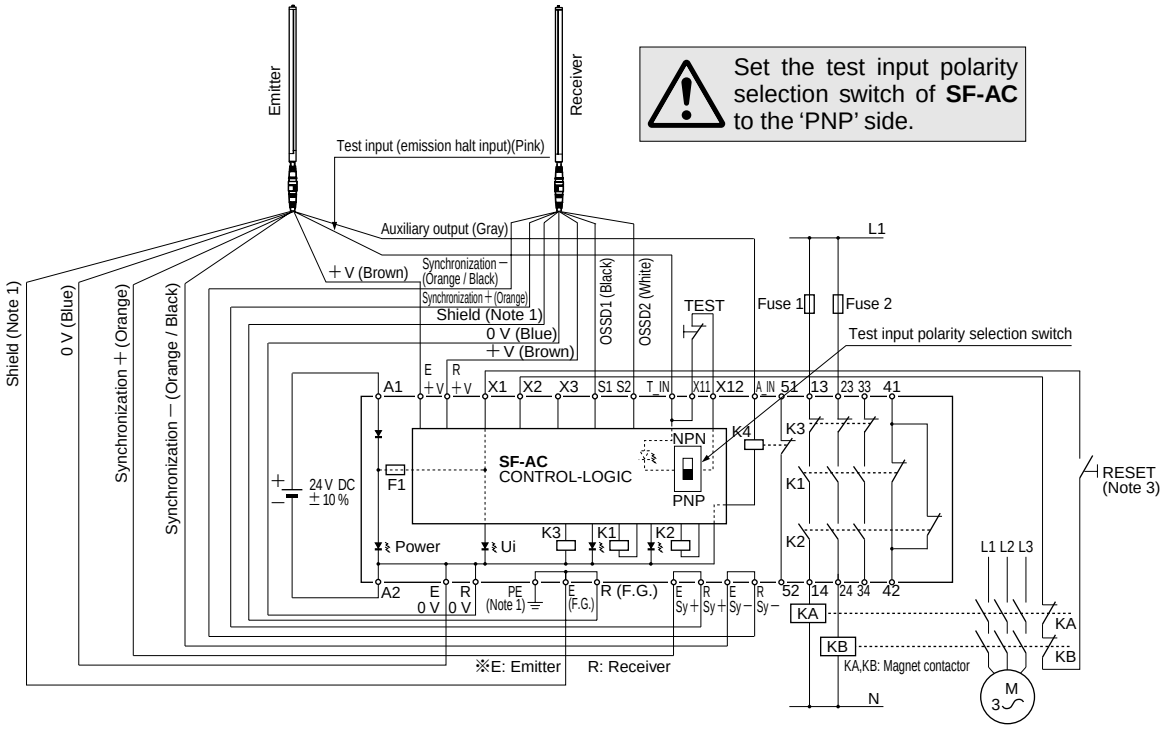
SPECIFICATIONS

Item \ Model No.		SF-AC
Standards		BG, UL and CSA
Control category		ISO 13849-1 (EN 954-1) compliance up to Category 4 standards
Supply voltage		24 V DC ±10 % Ripple P-P 10 % or less
Fuse (power supply)		Hybrid fuse, triggering current: 1.1 A or more, Reset after power down
Power consumption		1.7 W approx. (without light curtain)
Power supply for light curtain		24 V DC ±10 %
Enabling path		NO contact×3
	Switching current (13-14, 23-24, 33-34)	Max. 6 A 30 V DC / 6 A 230 V AC, resistive load
	Fuse	6 A (slow blow)
Auxiliary output		NC contact×1
	Switching current (41-42)	Max. 1 A 24 V DC
	Fuse	1 A (slow blow)
Alarm output (Note)		NC contact×1 (Non-safety contact, related to input 'Alarm in')
	Switching current (51-52)	Max.1 A 24 V DC, Min. 5 mA 24 V DC
	Fuse	1 A (slow blow)
Utilization category		AC-15, DC-13 (EN 60947-5-1)
Pick-up delay		40 ms or less / 50 ms or less (Auto / Manual)
Drop-out delay		10 ms or less
Contact material / contacts		AgSnO, Self cleaning, positively driven
Contact resistance		100 mΩ or less
Mechanical lifetime		10 million times (switching frequency 180 times/min.)
Electrical lifetime		100,000 times (switching frequency 20 times/min, rated load)
Indicators	Power	Green LED (lights up when the power is supplied)
	Internal circuit operation (Ui)	Green LED (lights up when both conditions are present: unit is powered up and hybrid fuse is at normal state)
	Relay operation (K1 / K2)	Green LED×2 (lights up when enabling contacts are closed)
	Test input (Test)	Yellow LED (lights up when X11-X12 is opened)
Trailing edge function		Incorporated
Test input polarity selection function		Incorporated (Selectable PNP or NPN test input polarity by internal switch)
Environmental resistance	Pollution degree	3 (Industrial environment)
	Degree of protection	Enclosure: IP40, Terminal: IP20
	Ambient temperature	−10 to +55 °C +14 to +131 °F, Storage: −10 to +55 °C +14 to +131 °F
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH
	Vibration resistance	10 to 55 Hz frequency, 0.35 mm 0.014 in amplitude in X, Y, Z directions for three times each (in power OFF state)
Connection terminal		Removable European terminal
	Tightening torque	0.6 N·m
Weight		460 g approx.
Material		Enclosure: Polycarbonate

Note: The alarm output is 'open' when the alarm input from the light curtain is ON.
Refer to each light curtain for details pertaining to each type of alarm.

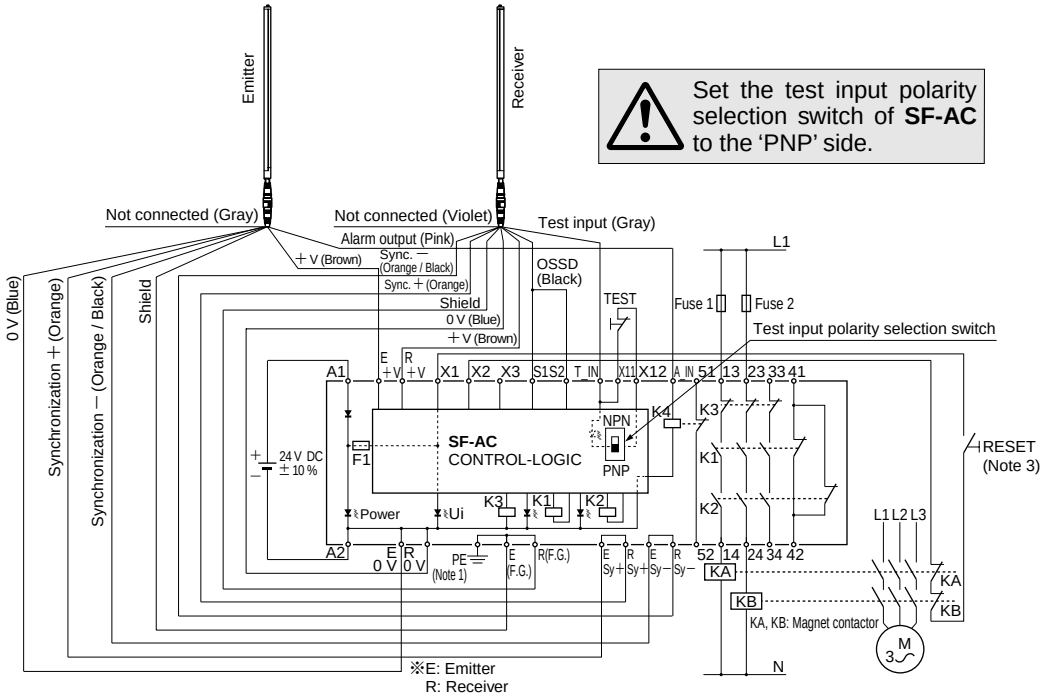
I/O CIRCUIT AND WIRING DIAGRAMS

Light curtain SF4-AH series wiring diagram (Control category 4)



Notes: 1) Connect the light curtain's shield wire to the frame ground (F.G.), and ground the **SF-AC**'s PE terminal.
2) If using the equipment with the manual reset, wire X1 to X2 as per the illustration above.
If using with the automatic reset, disconnect X2 wire and connect it to X3. In this case, reset button is not required.
3) Use a momentary-type switch for the reset button.

Light curtain SF2-A series wiring diagram (Control category 2)

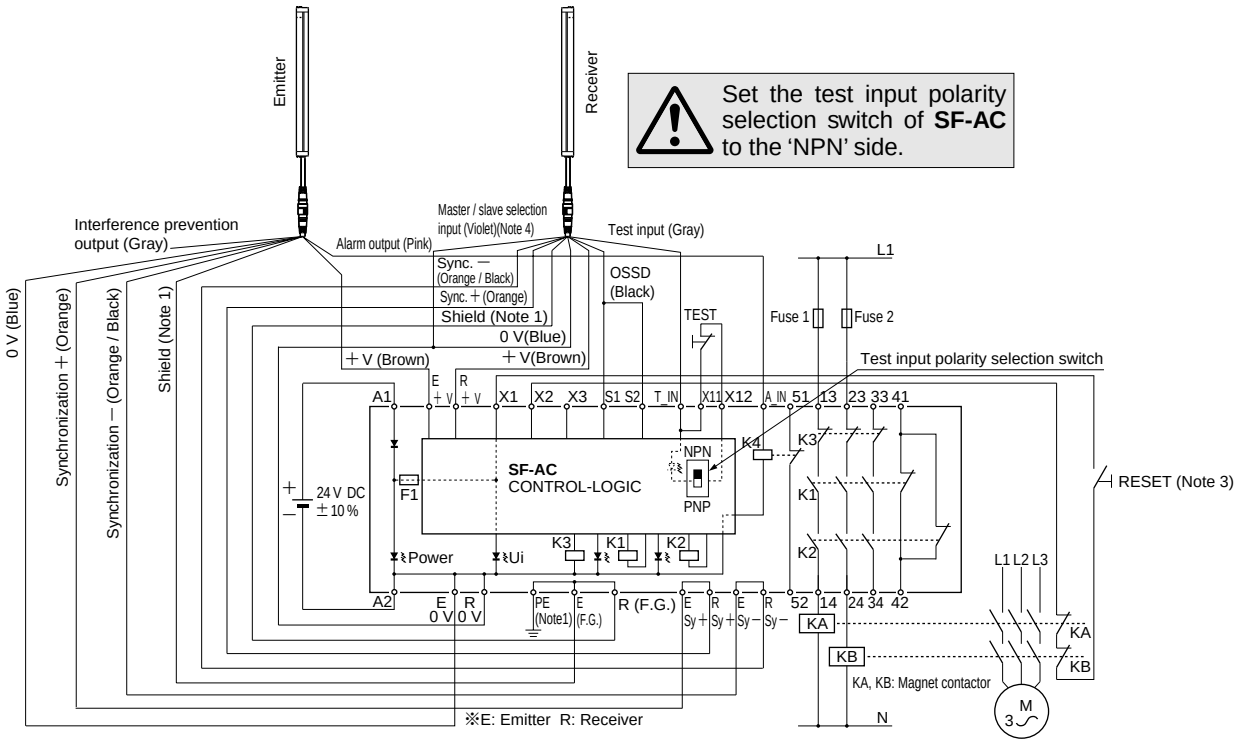


Notes: 1) Connect the light curtain's shield wire to the frame ground (F.G.), and ground the **SF-AC**'s PE terminal.
2) If using the equipment with the manual reset, wire X1 to X2 as per the illustration above.
If using with the automatic reset, disconnect X2 wire and connect it to X3. In this case, reset button is not required.
3) Use a momentary-type switch for the reset button.

SF-AC

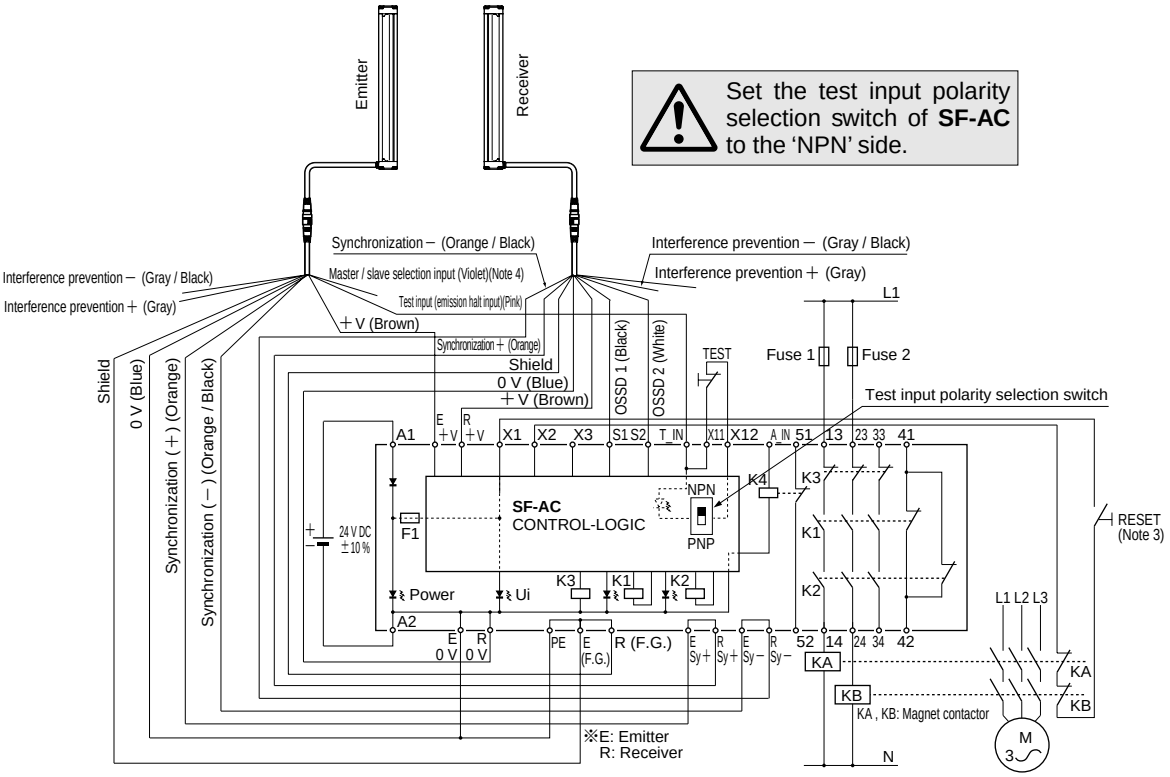
I/O CIRCUIT AND WIRING DIAGRAMS

Light curtain SF2-N series wiring diagram (Control category 2)



Notes: 1) Connect the light curtain's shield wire to the frame ground (F.G.), and ground the **SF-AC**'s PE terminal.
2) If using the equipment with the manual reset, wire X1 to X2 as per the illustration above.
If using with the automatic reset, disconnect X2 wire and connect it to X3. In this case, reset button is not required.
3) Use a momentary-type switch for the reset button.
4) Refer to '**SF2-N** series' on p.478 for master / slave selection input.

Light curtain SF2-EH series wiring diagram (Control category 4)



Notes: 1) The shielding wire and 0 V (blue) of the **SF2-EH** series are connected in the their bodies.
2) If using the equipment with the manual reset, wire X1 to X2 as per the illustration above.
If using with the automatic reset, disconnect X2 wire and connect it to X3. In this case, reset button is not required.
3) Use a momentary-type switch for the reset button.
4) Refer to '**SF2-EH** series' on p.496 for master / slave selection input.

PRECAUTIONS FOR PROPER USE

Mounting

- Use the 35 mm 1.378 in width DIN rail to install the unit.
- The installation position / direction is not basically limited.
- Please fix this product with optional DIN rail stopper (**MS-DIN-E**) after it installs it in 35 mm 1.378 in width DIN rail.

Short-circuit protection

- The power supply unit of this equipment adopts the hybrid fuse which do not require any replacement.
- When the hybrid fuse is operated, turn off the power supply, and remove the cause of overcurrent before restarting the power supply for resetting.
- The hybrid fuse is not suitable to use in which the equipment is operated continuously or daily. Note that operating the equipment continuously may not be unable to satisfy the specifications.

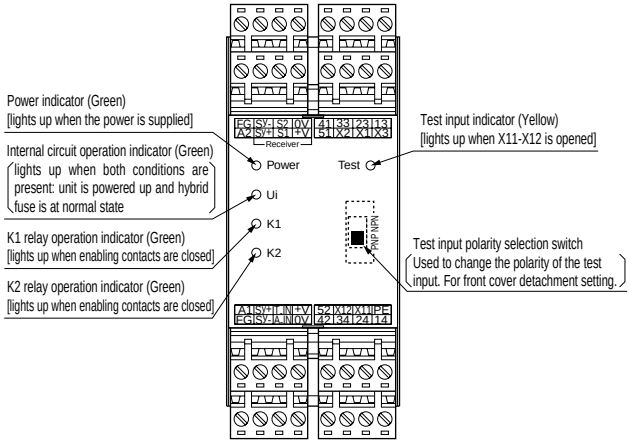
Trailing edge function

- The function is used to accept the input when the reset switch is pressed temporarily (contact: 'CLOSE'), and is then released (contact: 'OPEN'). The function works to prevent the unexpected start-up when the reset switch is fused.

Test input polarity selection function

- The function is used to change the polarity of the test input to PNP or NPN with an internal switch.

Functional description



Wiring

- Tighten the wiring to the wiring terminal block at tightening torque of 0.6 N·m.
- Please install and connect ferrule (stick) terminal when the lead wire of the connected equipment is a twisted wire. Please do not connect the twisted wire directly with the terminal.
- Make sure that the power supply is off while wiring.
- Take care that wrong wiring will damage the product.
- Verify that the supply voltage variation is within the rating. Take care that if a voltage exceeding the rated range is applied, or if an AC power supply is directly connected, the unit may get burnt or damaged.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.

Others

- Avoid dust, dirt, and steam.
- Take care that the product does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- The seal as shown in the drawing on the right is stuck to the engagement point of unit. When the seal is peeled off or broken, this equipment will not be certified as 'Safety equipment'.

- Note that this equipment is applicable only in the control circuit grounded in accordance with IEC 60204-1 and JIS B9960-1, or in the control circuit in which the insulation monitor unit (ground fault detection unit) is arranged.
- This equipment is compatible to the shut-down category 0.
- The control category of this equipment follows the light curtain to be connected.
- This unit is suitable for indoor use only.

DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/