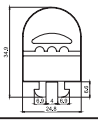
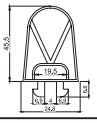
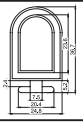
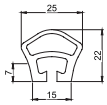
Features

Complete types, low voltage start, customized appearance and structure according to customer requirements.
A maximum of 8 safety edges are allowed to be used in series.
Simple and integrated structure, can integrate the sensor and the original cover with the safety relay SR-E10X, the control level can reach PLe / safety level 3
Response time up to 13ms
Sensor length: 300mm-5000mm

Model structure

Select the cross-sectional shape of the safety edge (sensor). Considering the triggering distance (the amount of compression required from when the pressure starts to act on the safety edge until the pressure is detected) and the triggering force (the compression force when the triggering distance is reached), select the model most suitable for the equipment used. There are 4 series with different cross-sectional shapes to choose from.

Code	35	45	37	15
model	ST-35(N o t e 1)	ST-45(N o t e 1)	ST-37(N o t e 1)	ST-15(N o t e 1)
shape				
Trigger distance (Note 2)	5-7mm	5-7mm	5-7mm	3mm
Trigger force (Note 2)	80-100N	80-100N	80-100N	40-60N

(Note 1). For the specific model, please refer to "Model Composition Instructions".
(Note 2): Tested according to ISO 13856-2, test piece diameter 80 mm, trigger point C3, test speed 10 mm / s, characteristic value at test temperature + 20 ° C. Refer to "Characteristic Data" for details. (According to the test, the test piece diameter is 20mm, the trigger point is C3, the test speed is 10mm / s, and the test temperature is + 20 °C.)

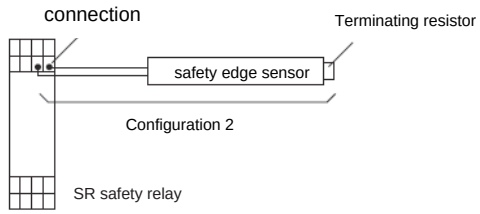
Wiring configuration and cable termination

Configuration number	Outline	Wiring configuration and cable termination
0	Two-wire cable — safety edge sensor — Two-wire cable	2-wire cable at both ends
2	Two-wire cable — safety edge sensor — Terminating resistor	One end is a 2-wire cable and the other end is a terminating resistor (8.2kΩ 0.25W) *
3	Cable with connector (male) — safety edge sensor — Cable with connector (female)	One end has a cable with a connector (male), the other end has a cable with a connector (female)
4	Cable with connector (male) — safety edge sensor — Terminating resistor	One end is a cable with a connector (male), and the other end is a terminating resistor (8.2kΩ 0.25W) *
5	Two-wire cable — safety edge sensor — Cable with connector (female)	One end is a 2-wire cable, and the other end is a cable with a connector (female)

Note 1. There are two methods for connecting safety edges in series: Use a 2-wire cable or M8 connector. 2. When connecting to the edge controller, use a 2-wire cable. * One end of the last safety contact connected in series needs to be connected with a terminating resistor.

Configuration example

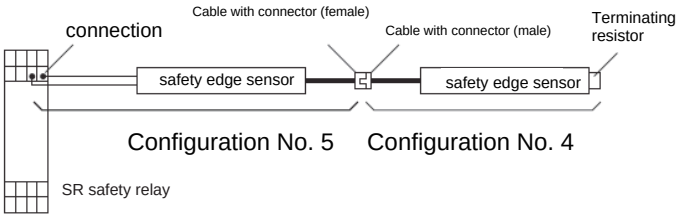
● Use 1 safety edge (No. 2 configuration x 1)



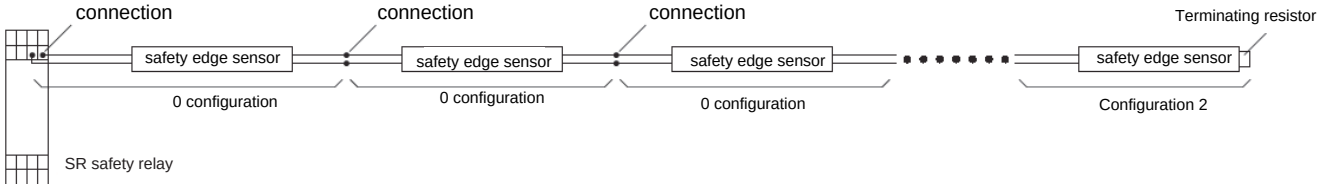
● Use 2 safety edges

Connect with connector

No.5 configuration * 1 + No.4 configuration * 1



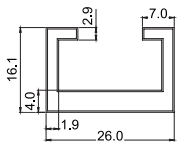
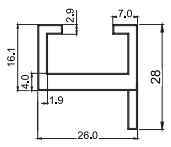
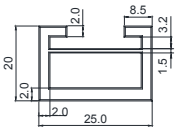
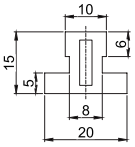
● Use N safety edges



Sensor length

Determine the length of the safety edge. Length selection range: 0300 mm (shortest) * ~ 5000 mm (longest), in units of 10 mm. * When the length is less than 1,000mm, add zero "0" in front of the number to make up 4 digits. Note: The user must not cut the safety edge.

Mounting base

model	ST-35-ZJ-01	ST-45-ZJ-01	ST-37ZJ-01	ST-15-ZJ-01
Code	S	L	NO	NO
shape				

Note: Bases over 1.2m are cut and divided according to the table below before delivery.

Sensor length=LEN(mm)	Cutting length of mounting base(mm)	Number of divided bases
0150 ~ 1200	LEN	1
1210 ~ 2400	1/2 LEN	2
2410 ~ 3600	1/3 LEN	3
3610 ~ 4800	1/4 LEN	4
4810 ~ 6000	1/5LEN	5
6010 ~ 6100	1/6LEN	6

(Example) When the sensor length LEN is equal to 2,700mm, three 900mm mounting bases are provided.

Cable length and cable termination

Determine the cable length at both ends of the safety edge. Length selection range: 00100 mm (shortest) ~ 10000mm (longest), in units of 100mm.

Note 1. There is no cable at one end of the internal termination resistor, so there is no need to specify the cable length. 2. The code length is expressed in 5 digits. When the length is greater than or equal to 100mm but less than 1,000mm, add 00 in front of the number; when greater than or equal to 1, 000mm but less than 10,000mm, add 0 in front of the number.

Determine the cable termination method at both ends of the safety edge, and add the code after the cable length.

Code	specification
C	2-wire cable
M	Cable with connector (male)
F	Cable with connector (female)

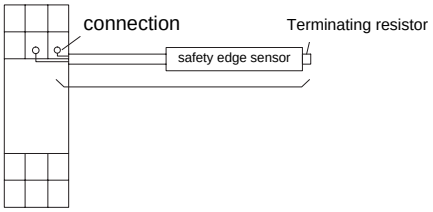
Note: When using terminating resistors, there is no need to select the cable termination method.

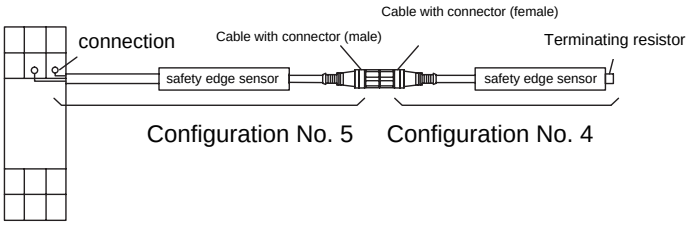
Model composition description

ST - □□ - □□□□ □ - □□ - □□□□□□ - □□□□□□□

① ② ③ ④ ⑤ ⑥

Serial number	options	definition
①（Note1）	Shape code	35:35mmx25mm（Normally open） 45:45mmx25mm（Normally open） 37:37mmx25mm（Normally closed） 15:15mmx16mm（Normally open）
②	Edge length 4 digits	0150~5000 Represents an edge with a length of 450mm (in units of 10mm)
③	Mounting brackets	U: without mounting bracket S: standard mounting bracket L: L-shaped mounting bracket
④	Configuration number	01: 2-core cable at both ends 02: 2-core cable at one end and 8.2K termination resistor at the other end 03: M8 male connector at one end and M8 female connector at the other end 04: M8 male connector at one end One end is 8.2K terminal resistance 05: one end is 2-core cable, the other end is M8 female connector 06: only single side 4 wire





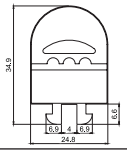
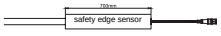
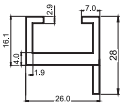
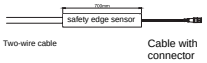
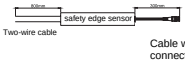
Note 1: The ST-37 series normally closed edge switch only has a straight bracket; the connection method is only a single side 4 wire, and its maximum length is 1.5m.

	Terminal code	cable length	Terminal code
⑤	C	00100-05000（In units of 100）	C
	C	Terminating resistor	no
	M	00100-05000（In units of 100）	F
	M	Terminating resistor	no
	C	00100-05000（In units of 100）	F
	---	---	----

	④Configuration number	cable length	Terminal code
⑥	01	00100-05000（In units of 100）	C
	02	00100-05000（In units of 100）	no
	03	00100-05000（In units of 100）	F
	04	00100-05000（In units of 100）	no
	05	00100-05000（In units of 100）	F
	06	00100-05000（In units of 100）	----

When the cable length and cable termination in ⑤ and ⑥ are set to 02, 04 or 06, specify the parameter of ⑤. When the configuration number is 01, 03 or 05, the parameters of ⑤ and ⑥ should be specified (because both ends need cable termination). Terminal code: C: 2-wire cable M: cable with connector (male) F: cable with connector (female)

Selection examples

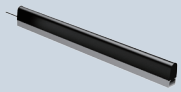
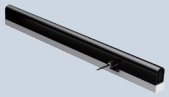
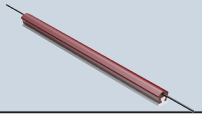
order	step1	step2	step3	step4	step5	
position						
category	1. Shape code	2. Sensor length	3. Mounting base	4. Configuration number	5. Wire length and cable splicing	6. Cable length and cable termination
Code, configuration number	45	0700	L	05	00800c	00300F

kind

Safety Relays

Exterior	Safety output	Auxiliary output	Terminal	Rated value	model
	SPST-NO	no	Screw terminal	240VAC, 24V DC	SR-E10X
	SPST-NO	SPST-NC	Screw terminal	24VAC/DC	SR-E16P

Selection examples

Exterior	Sectional size (without mounting base)	Trigger distance * 1	Material	Model * 2	Output
	35mmx25mm	5-7mm	EPDM	ST-35	NO
	45mmx25mm	5-7mm	EPDM	ST-45	NO
	37mmx25mm	5-7mm	EPDM	ST-37	NC
	15mmx16mm	3mm	EPDM	ST-15	NO

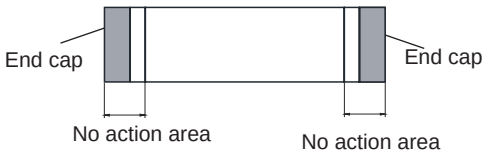
* 1. Tested according to ISO 13856-2, test piece diameter 80mm, trigger point C3, test speed 10mm / s, characteristic value at test temperature + 20 ℃ * 2. For specific models, ple ase refer to "Model Composition and Description".

specific

Technical Parameters

model	ST-35 （Note1）	ST-45 （Note1）	ST-37 （Note1）	ST-15 （Note1）
Signal mode	Normally open	Normally open	Normally closed	Normally open
Material*1	EPDM	EPDM	EPDM	EPDM
Maximum length of single safety edge	5m	5m	1m	5m
Trigger distance (Note 2) (at 200mm / s)	8-7mm	10-13mm	5-7mm	3mm
Trigger force (Note 3) (at 200mm / s)	80-100N	80-100N	80-100N	40-60N
Maximum allowable load	500N	500N	500N	500N
Maximum trigger angle	2 × 30 °	2 × 30 °	2 × 30 °	2 × 30 °
No action area (both ends) (Note 4)	20mm	20mm	20mm	20mm
Outgoing way	Unilateral four lines / bilateral two lines	Unilateral four lines / bilateral two lines	Unilateral four lines / bilateral two lines	Unilateral four lines / bilateral two lines
Mechanical life	10,000 次以上			
Ambient temperature	Working time: -20 ～ 55 ° C (no icing), storage time: -25 ～ 75 ° C (no icing)			
Use environment humidity	0% ～ 90%RH			
Protection level	IP65			

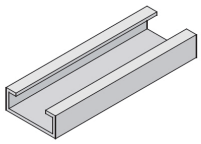
Note 1) Please refer to the "Model Composition and Description" in this manual for specific models. (Note 2) EPDM: Ethylene-propylene rubber (Note 3) is tested according to ISO 13856-2, with a test piece diameter of 80 mm, a trigger point of C3, a test speed of 10 mm / s, and a test temperature at + 20 ° C. (Note 4) There is no motion area at both ends of the safety edge. (Including the end cap part)



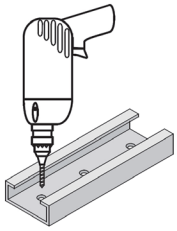
installation

The safety edge must be installed by a designated person.

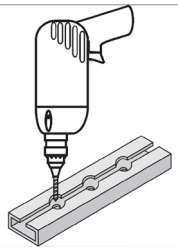
1. To facilitate the installation of the safety edge, the mounting base must be fixed on a flat surface. If the safety edge needs to be installed with a certain arc, the bending radius must not be less than the specified minimum.



2. The mounting base must be fixed with countersunk screws or rivets with a diameter of 4mm. The nail holes are 4.5mm and must be evenly distributed over the entire length of the mounting base. The hole spacing must not exceed 300mm. The counterbore part must be processed according to the screw size.

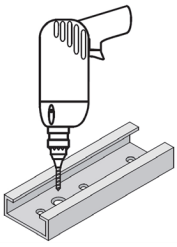


Use the ST safety pad type, drill a guide hole in the slot to ensure that the head of the countersunk screw can pass through (about 8mm).



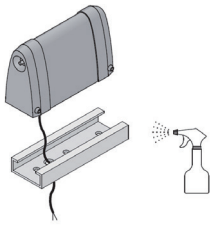
3. Do not use flat or round head screws, otherwise the connecting wires in the mounting base will be damaged.

4. In order to pass the connecting wire through the base, an 8mm hole must be drilled in place. Carefully remove the burrs on both sides.

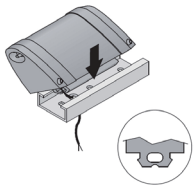


5. The connecting wire and the end of the cable with terminating resistor must be placed in the mounting base.

6. To make the safety edge easier to install, spray soapy water on the mounting base and safety edges. After the soapy water evaporates, the safety edge can be firmly fixed on the aluminum base. In order to avoid slipping after the safety edge, talc, oil and other long-lasting lubricants must not be used.

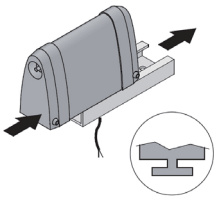


7. For the safety edge with a C-shaped base, one side must be snapped into the mounting base and then pressed into the entire C-shaped base. Pushing and pulling the safety edge in the mounting base can cause damage to the safety edge and should be avoided in any case.



C-shaped base

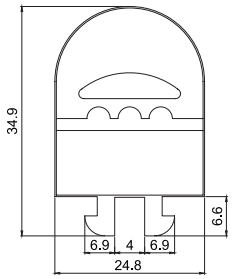
8. For the safety edge with a T-shaped base, insert it from the side along the groove of the mounting base.

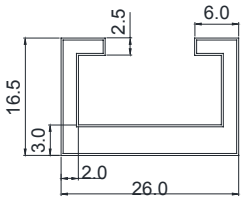


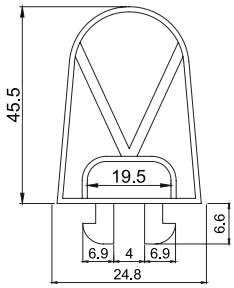
T-shaped base

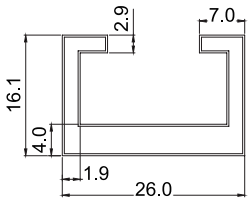
To use other fastening methods, the manufacturer must be agreed in advance.

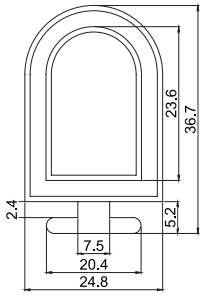
Dimensions

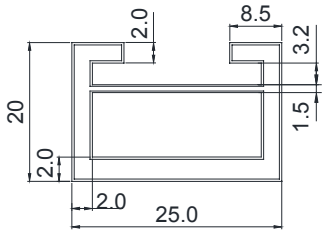


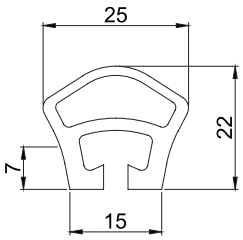


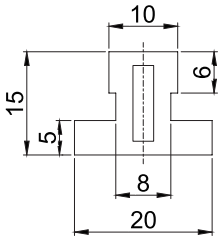






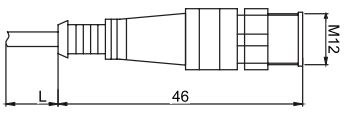


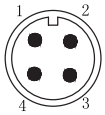




Connector

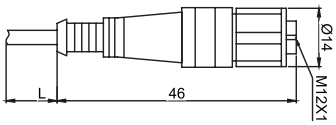
Connector (male) terminal code: M

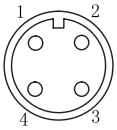




1: Brown
2: white
3: blue
4: black

Connector (female) terminal code: F





1: Brown
2: white
3: blue
4: black

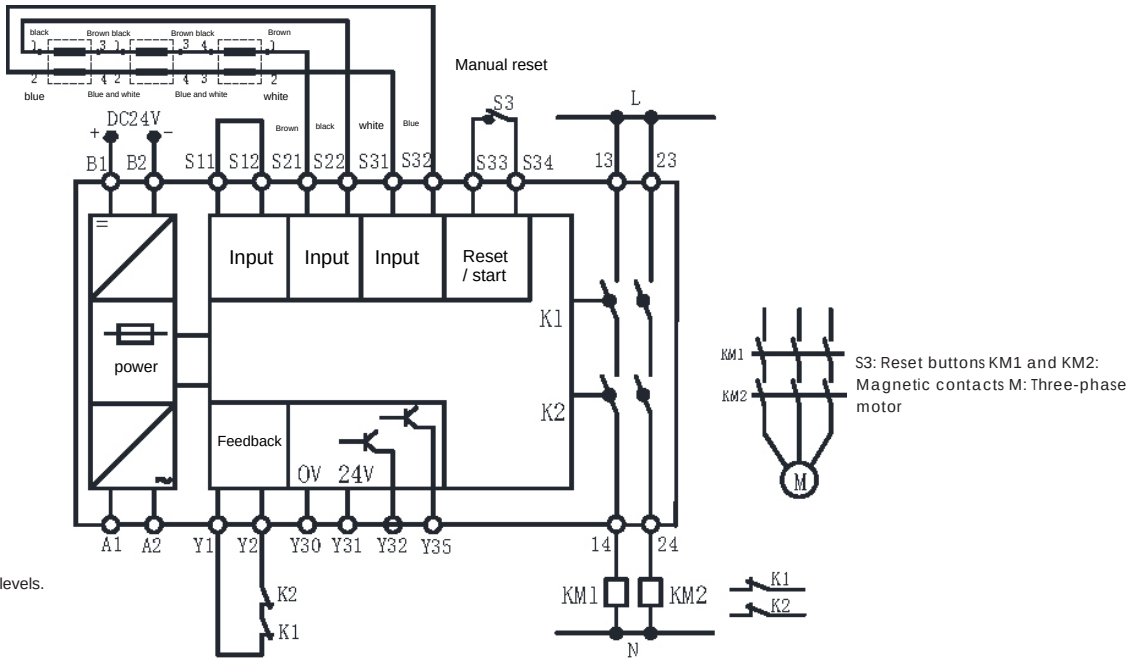
Applications

PL / Security category	model	Stop type	Reset
Equivalent to PLe / 3	Safety Edge / Safety Relay SR-E10X	0	Manual / Auto

Note: The above applicable performance level (PL) is only an example of the evaluation results. The applicable performance level must be tested by the customer in actual application after confirming the conditions of use.

Application examples

1. Only connect the safety mat / safety edge switch (manual reset, short-circuit between two-channel detection contacts)
2. When the safety mat / safety edge is triggered, the power of the motor M will be turned off.
3. The power of the motor M will remain off until the safety mat / safety edge is reset and S3 is reset.



Note: The safety level of this circuit reaches 4 levels.

Precautions for use

Precautions

Symbols and meanings for safe use

⚠ caveat	Indicates an urgent and dangerous situation that, if not avoided, will result in serious personal injury or death, or may result in serious property damage.
Safety Precautions	Supplementary instructions on how to use this product safely.
Precautions for use	Supplementary instructions on how to prevent operational failures, malfunctions, and poor product performance.

⚠ caveat

Safety Relays

Failure of the safety output may cause serious personal injury. Do not connect a load exceeding the rated value to the safety output.

Loss of required safety functions may result in serious personal injury. Loss of required safety functions may result in serious personal injury. Do not use safety edges that could cause the monitored device to start due to a logic misoperation. Instead, use a safety edge where the logic function is normal and the safety output can be turned OFF in a dangerous situation.

Loss of required safety functions may result in serious personal injury. The safety relay should be properly wired so that the power supply voltage or load voltage line does not accidentally touch the safety output.

Safety margin

Loss of required safety functions may result in serious personal injury. When using a safety edge, the design of the safety system should consider the speed and quality of the detected object.

Safety Precautions

Safety Relays

(1) The power supply must be turned off before performing wiring work. Do not touch the terminal when power is on, otherwise it may cause an electric shock.
(2) Do not perform wiring work under lightning weather conditions, otherwise it may result in electric shock.
(3) A voltage conforming to the regulations should be applied to the input terminal. Applying a non-compliant voltage may affect normal operation, resulting in damage or burning of this product.
(4) Please use the power supply with the specified voltage. Do not use a power supply with severe ripple or intermittent voltage deviation.
(5) Under no circumstances should this product be used for loads that exceed its switching capacity (switching voltage and switching current) and other contact ratings, otherwise it will not only cause problems such as insulation failure, contact welding, and contact failure, which affect product performance, It can also damage or burn the product.
(6) The durability of the relay depends largely on the switching conditions. Please confirm the operation of the relay under actual use conditions. Make sure that the number of switching operations is within the allowable range. If a relay whose performance has been seriously degraded is used, it may cause insulation failure between the circuits or burnout of the relay.
(7) Do not use this product in an environment that contains flammable or explosive gases. Otherwise, the relay may overheat or arc discharge during switching, resulting in a fire or explosion accident.
(8) Do not drop the product or use disassembled parts, otherwise the performance of the product will be reduced and the product may be damaged. (9) Connect the fuse in series with the switch to protect the switch from short-circuit damage or ground fault, otherwise it will cause damage.

Safety edge

(1) The power supply must be cut off before carrying out the wiring operation, otherwise it may cause an electric shock accident.
(2) Do not perform wiring work under lightning weather conditions, otherwise it may result in electric shock.
(3) Do not use this product in an environment that contains flammable or explosive gases. Otherwise, overheating of the relay or arc discharge may occur during the switching process, resulting in a fire or explosion accident.
(4) Do not drop the product or use disassembled parts, otherwise the product characteristics will be reduced and the product may be damaged.

Precautions for use

Safety Relays

(1) Please be careful not to drop this product or subject it to strong vibration or mechanical shock.
Otherwise, the product may be damaged or work abnormally.
(2) Adhesive solvent Avoid organic solvents such as alcohol, thinner, trichloroethane, or gasoline in contact with thisproduct. Such solvents can
damage the markings on the safety relay and cause the related parts to deteriorate.
(3) Storage and
usage conditions Do not store or use this product under the following conditions: 1. Under direct sunlight 2. Ambient temperature exceeds the range of ?20 ～ 55 ° C 3. Relative humidity is greater than 90% or due to severe temperature changes Environments that cause condensation 4. The air pressure is outside the range of 86 to 106 kPa 5. Contains corrosive or flammable gases 6. Vibration or mechanical shock exceeds the rated value 7. Will be exposed to water, oil or chemicals 8. Contains excessive dust and salt Type or metal powder environment
(4) Wiring 1. Please connect the safety relay according to the following
requirements: • Stranded wire (flexible wire): 0.75 ～ 1.5mm2 • Single wire: 0.75 ～ 1.5mm2 • Length of wire insulation stripping No more than 7mm. • Terminal tightening torque: 0.5 to 0.6 N · m 2. Ground the negative side of the power supply. Grounding the positive side will make the controller inoperable.
(5)
Installation of multiple safety relays Make sure the distance between the safety edge and the nearest SR relay is greater than 25mm.
(6) Mount the DIN rail of the edge controller. Use end plates at both ends of the SR relay (PFP-M: sold separately).
(7) This product belongs to Class A products (industrial grade products). If this product is used in civilian applications , radio interference may occur. In this case, please take
appropriate measures.
Send feedback history

safety edge sensor

(1) Make sure to use the ST series safety edge in combination with the SR series safety relay.
(2) Please handle carefully 1. Do not drop this product or subject it to strong vibration or mechanical shock. Otherwise, the product may be damaged or work abnormally. 2. Do not apply a load to a position of the safety edge for a long time, otherwise the safety edge may be damaged. 3. Do not immerse the safety edge in water or use it in frequent splashes.
(3) Adhesive solvent Avoid organic solvents such as alcohol, thinner, trichloroethane, or gasoline to contact this product. Such solvents can damage the markings on the safety relay and cause the related parts to deteriorate.
(4) Storage and usage conditions Do not store or use this product under the following conditions: 1. Direct sunlight 2 . The ambient temperature exceeds the range of ?25 ～ 75 ° C 3. The air pressure is outside the range of 86 ～ 106kPa 4. Contains corrosion Or combustible gas 5. Vibration or mechanical shock exceeds the rated value 6. Exposure to water, oil or chemicals 7. Environment containing excessive dust, salt or metal powder
(5) Installation of the safety edge 1. Use special installation Bracket to install the safety edge. 2. Do not install the safety edge on a raised surface area, but install it on a flat surface. 3. Do not lift or move the safety edge by pulling the cable. 4. Do not use the safety edge with a covering.
(6) This product belongs to Class A products (industrial grade products). If this product is used in civilian applications, radio interference may occur. In this case, please take appropriate measures.

■ Security Level

When this product is used with SR series edge controllers, it can meet the requirements of PLe / safety level 3. If you use SR series safety relays, if you want to make the circuit meet the PLd / safety level 3 requirements when connecting external safety relays or electromagnetic contactors, you need to use a separate safety controller.

■ standard

ST series safety edge ISO 13856-2 EN
ISO13849-1
SR-E10X, SR-E16P safety relay EN
ISO13849-1 PLe / safety level 3