Blanking Setting Box RPX-BP and Blanking Control Box RPX-CBBP for Photoelectric Press Safety Device

User's Guide

We heartily express our gratitude for your making use of our company's product.
Prior to using this device, please adhere to the following guidelines:

- Please read through and understand the instructions contained in this User's Guide before operation, inspection and maintenance of the device,
- When transferring the device to the next owner, please attach this User's Guide to it without fail.
- This device has been manufactured in accordance with Japan's regulations and standards.
- When using the device in a foreign country, it is necessary to observe the safety standards of the country.
- Please retain this User's Guide carefully for ready reference.

RIKEN OPTECH CORPORATION

INTRODUCTION

We heartily express our gratitude for your making use of our RPX series photoelectric safety device. The RPX series meets the construction code for press safety devices and is compliant with the certification requirements of the Ministry of Health, Labor and Welfare.

Certificate No. TA544 (RPX414, RPX425)

Before operating the safety device, it is important to read through this User's Guide and fully understand the items contained therein.
In order to ensure safe operation, be sure to read the User's Guide because things which you must not do, must do, must be adhered to and must be attended to are stated therein.
Divided into "Safety Section" describing items for safe operation, "Nameplate Section" describing nameplates attached to this device, "Specification Section," "Installation Section" and "Maintenance Section," the User's Guide explains specific operations and operation instructions.
In addition, the important items are described in detail as "Danger," "Warning" and "Caution." We request users to correctly understand the photoelectric safety device and abide by the items described in the User's Guide for the sake of safe operation.

An explanation of this User's Guide will be provided by our sales staff. However, if you have any questions, please refer to our office.

Safety Instructions

In order to ensure safe operation of the RPX, safety instructions are shown by the following symbols in this Use's Guide. These instructions specify important matters for safe operation. The symbols and their meanings are as follows:

WARNING	There is a possibility of death or serious injury resulting from improper use by ignoring this indication.

	Symbol that means "Must not do."

⚠ WARNING

Applicable machines

○This device cannot be used except for machines with quick-stopping mechanism or with restart prevention circuit.

Installation position of emitter/receiver

○ Ensure the safe distance conforming to the time delay specified on the certification plate.
The machine may fail to stop before the operator reaches the dangerous part, resulting in serious injury.

○ Install the device so that part of the human body remains in the detection area of the emitter/receiver.
Install the emitter/receiver so as to operate efficiently over the entire length of the protection height (stroke length + die height).

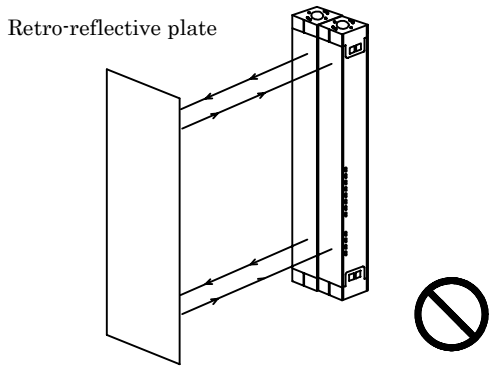
○ Install a protective structure around the machine so that the operator can reach the dangerous part only after passing through the detection area.

○ Never change the installation position.

○ Install the device so as not to be affected by wall reflection.
Detection becomes impossible, resulting in serious injury.

○ In the case of using plural photoelectric safety devices, install them, using a light-shielding plate or the like to prevent mutual interference.

○ Do not use a reflective or retro-reflective configuration. Detection may become impossible.



Do not mute the safety device.

○ Do not set the on-off key switch of the photoelectric safety device to “OFF” (mute) without taking other safety measures.

Keep key switch.

○ Always select “ON” for the on-off key switch of the photoelectric safety device.

○The key must always be kept and taken charge of by the person responsible for the work or press operation chief.

Installation of auxiliary beams

○ When a clearance through which part of the human body enters exists between the beam centerline of the emitter/receiver and the front end of the bolster, install auxiliary beams at intervals of 75 mm or less in horizontal distance.

Never use the photoelectric safety device in the detached or nonfunctioning state.

○ Using it in such a state may result in serious injury.

Inspection before operation of the safety device

○ Check the photoelectric safety device by the attached test rod to see whether or not it operates properly.

Turn off the power supply before opening the control box.

○ Always turn off the main power supply before opening the control box door.

⚠ WARNING
Do not use the safety device in a flammable or explosive gas environment.
Do not disassemble, repair or modify the main body.
Protection from flying workpieces cannot be provided. Other safety measures should be taken.
Securely tighten the fixing screws for the main body and cord connectors.
Periodical inspection of the safety device ○ Subject the safety device to the manufacturer's periodical inspection at least once a year.

Request

(1) Do not connect an AC power supply directly to the emitter/receiver.
Connect the emitter/receiver to the special control box.

(2) Periodical inspection of the safety device
Subject the safety device to the manufacturer's periodical inspection at least once a year.

(3) When trouble occurs in the safety device or the press machine, immediately stop the press machine and make contact with the press operation chief.

(4) Installation environment
Do not install the safety device in the following places:

- Place exposed to direct sunlight or strong ambient light.
- Place where temperature is high and dew may condense.
- Place where corrosive gas exists.

Instructions before Use

Please check to see that the following goods are contained in the box. All possible measures have been taken to ensure proper packaging. However, if anything is deficient, please contact our local business office nearest you.

(1) Emitter/receiver　Type RPX414-□□□■、Type RPX425－□□□■

One set of main body emitter and receiver of either of these types

(2) Sensor fittings　2 sets for emitter, 2 sets for receiver

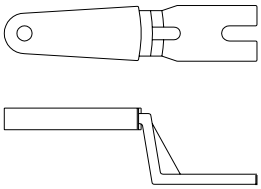
(3) Test rod x 1 pc.

For Type RPX414－□□□□■ …φ14 mm　1 pc.

For Type RPX425－□□□□■ …φ25 mm　1 pc.

(4) Blanking control box Type RPX-CBBP-□

- Type RPX-CBBP-64 or RPX-CBBP-128　1 pc.
- Handle A-310-3-H　1 pc.



- Instruction manual (this User's Guide)　1 book
- Ferrite core GTFC-25-15-12　1 pc.

(5) Blanking setting box Type RPX-BP-□

- Type RPX-BP-64 or RPX-BP-128　1 pc.
- Key TL110-1　1 pc.
- Instruction manual (this User's Guide)　1 book

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Chapter 1 OVERVIEW

1-1 Features

Detection distance

RPX414-225X4～RPX414-1143X4 : 9 m（aperture angle ±2.5°）

RPX425-240X4～RPX425-1620X4 : 9 m（aperture angle ±2.5°）
RPX425-1640X4～RPX425-2480X4 : 7 m（aperture angle ±2.5°）

RPX414-225X2～RPX414-1143X2 : 4 m（aperture angle ±5°）
RPX425-240X2～RPX425-2480X2 : 4 m（aperture angle ±5°）

Continuous light-shielding width（minimum detectable object）

RPX414-□□□□■ series : 14 mm
RPX425-□□□□■ series : 25 mm

In calculating the safety distance, each series is different in “additional distance+ C).”
Additional distance (C)

RPX414-□□□□■ series : 0 mm
RPX425-□□□□■ series : 0 mm

Detection widths are various, so necessary sizes for the device can be selected.

RPX414-□□□□■ series : 225 mm and 234 mm - 2061 mm (per 63 mm)
RPX425-□□□□■ series : 240 mm - 2460 mm (per 60 mm)

Light quantity display monitor

The quantity of light received is displayed by 5 LEDs. Light beams are easy to align.

Error display

When an error occurs, the error state is displayed by 3 LEDs. The cause of the error is easy to investigate.

External diagnosis function (stop of light emission)

Forcibly stops light emission from the emitter. This function is beneficial for the inspection at the start of the safety system.

1-2 Function

●Self-diagnosis function at power-up

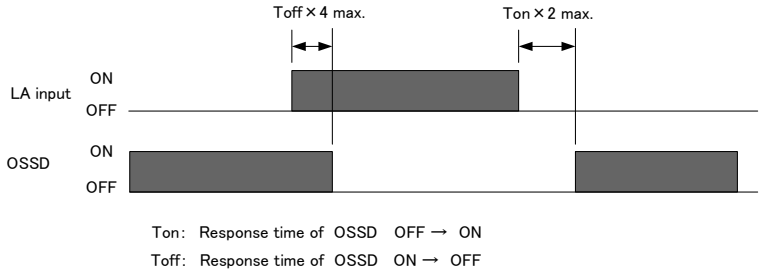
At power-up, self-diagnosis is performed for about 3 seconds. When no trouble is found, the sensor immediately starts to operate normally.

● Cyclic self-diagnosis function

Self-diagnosis relating to safety is repeated within the response time. If electronic components fail, the sensor enters the lockout state.

● External diagnosis function (test input)

The function to diagnose with optional timing. With a voltage of 9-24V applied to the LA input of the control box, light emission stops and the output turns off. (The application time needs to be more than 4 times as longer as "$T_{off.}$") (The off-response of the stop output (A1-A2) is T_{off}×4+10 ms or less and the on-response is Ton×2+20 ms or less.).



● External relay monitor function

The receiver confirms that two relays of the control box are operating properly. Connect the B-contact of the control box. If the B-contact shows a delay time within 300 ms when the control output switches from ON to OFF, it is judged that there is no trouble and normal operation continues.

● Manual reset function

After power-up and when light is interrupted, the sensor enters the interlock state. In this state, the sensor keeps the control output off, so the control output does not turn on even when the sensor becomes ready to receive light. With no light-shielding object in the detection area, apply a voltage of 9-24V to the reset input wire for 250 ms or more. After that, open or set to 0-1.5V. The sensor is released from the interlock state and the control output turns on.

●Muting function

○ Start conditions

The sensor enters the muting state when the following two conditions are met:

1. The control output is on with the RPX in the on-state.
2. After turning on the muting input 1 (MU1) (connecting to 9-24V), turn on the muting input 2 (MU2) (connect to 9-24V) within the muting input time limits of T1min- T1max (0.03 - 3 seconds).

   Up to 0.15 seconds after the condition of Item 2 above is formed, the muting function is enabled.

   In cases where the condition of Item 1 is met, but the time condition of Item 2 is not met, a muting error results and the muting error indicator on the receiver side turns on.

   In the muting error state, however, the safety function of the RPX operates and normal operation continues.

   The muting error is canceled under either of the following conditions:

   ・Muting is started by the correct muting procedure (performed in the order of the start conditions 1 and 2).

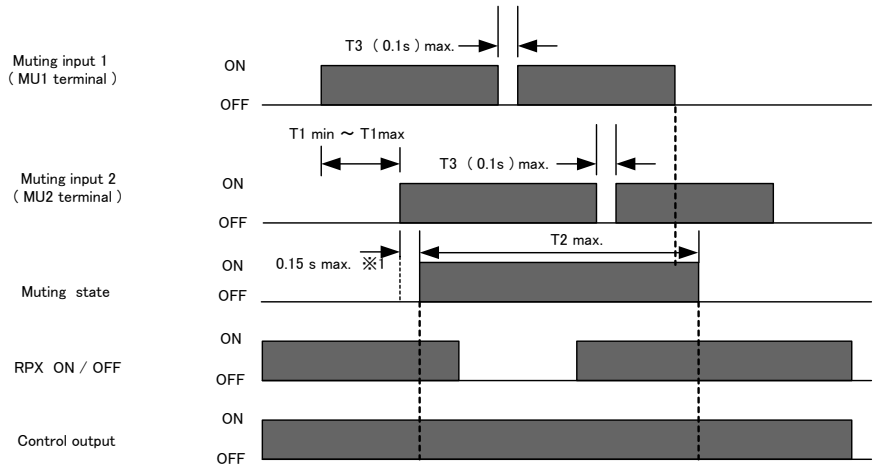
   ・The power supply is turned on again with the muting inputs 1 and 2 off.

○ End conditions

The muting state is canceled when either of the following conditions is met:

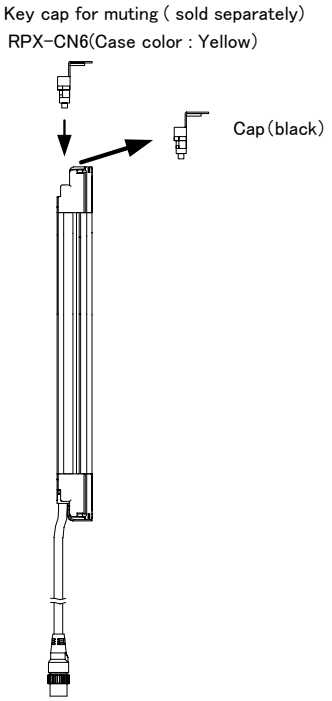
・The muting input 1 or 2 turns off when T3 (0.1 seconds or more) is exceeded.

・The muting duration exceeds the muting time limit of T2 (60 seconds).



● How to extend to the muting system:

1. Remove the cap of the emitter or receiver.
2. In place of the removed cap, attach the key cap for muting.



● Blanking setting function

By using the special blanking box (Type CBBP or BP), the RPX sensor is enabled for fixed blanking of up to 100 beams (disabling of specific beams).

* However, up to the number of beams (number of sensor beams - 1) is settable.
* In the case of series connection, only the primary sensor is capable of blanking setting operation while the secondary sensor is unable to do blanking operation.

1-3 Type Names

Name of emitter/receiver

RPX4○○－□□□□■△

○○ denotes the sensor series name.

□□□□ denotes the protection height.

■ denotes the aperture angle type X2 or X4.

△ denotes whether or not the muting function for the emitter/receiver is provided. It is not provided for the standard type. When the muting function is provided, attach “M.”

Name of blanking control box:

RPX-CBBP

In the case of set configuration:

(1) (2) (3)

RPX4○○－□■－CBBP

○○ denotes the sensor series name.

□ denotes the protection height. In the case of 4 digits, enter all 4 digits.

■ denotes the aperture angle type X2 or X4.

(1) and (2) denote the emitter and receiver, respectively.

(3) denotes the type of control box.

CBBP denotes the built-in type. (Single-side specification only)

Name of blanking setting box (type connectable to CB6 control box)

RPX-BP

In the case of set configuration

(1) (2) (3) (4) (5)

RPX4○○－□■－BP▲－□■－BP

○○ denotes the sensor series name.

□ denotes the protection height. In the case of 4 digits, enter all 4 digits.

■ denotes the aperture angle type X2 or X4.

BP denotes the type of blanking setting box.

▲ denotes the type of control box CB6.

"S" for single-sided type

"W" for double-sided type

(1) and (2) denote the front side emitter and receiver, respectively.

(3) denotes the type of control box.

BP denotes the front side equipped with the blanking setting box.

In the case of "S," item (3) and onwards are not applicable..

(4) denotes the rear-side emitter/receiver.

(5) denotes the rear side equipped with the blanking setting box.

Chapter 2 RATINGS/PERFORMANCE

2-1 List of Ratings

Item　Type		RPX414-□□□X4 RPX414-□□□X2	RPX425-□□□X4 RPX425-□□□X2
Number of beams		26～128 （protection height 225～1143 mm at 63 mm intervals）	13～125 （protection height 240～2480 mm at 60 mm intervals）
Beam pitch		9 mm	20 mm
Continuous light interrupting width		14 mm	25 mm
Detection distance		0.2～9 m (Type X4) (protection height 1620 mm or less) 0.2～7 m (Type X2) (protection height 1640 mm or more) 0.2～4 m (Type X2)	
Response time (including control box)		ON→OFF：20 ms～30 ms or less、OFF→ON：60 ms～100 ms or less (when entrance of light is stable) (For response time of emitter/receiver, see attached table.)	
Supply voltage		AC100V～AC200V (power supply to emitter/receiver: DC24V)	
Consumption power		RPX-CBBP: 15W, RPX-BP: 6W (For consumption current of emitter/receiver, see attached table.)	
Output contact		1a × 2 contact capacity AC240V 3A	
Key switch output contact		1a, 2b×2 contact capacity AC240V 3A	
Light source		Infrared LED（wavelength 870 m）	
Effective aperture angle		Type X4：±2.5° or less /Type X2: ±5° or less when detection distance is 3 m or more	
External diagnosis function		LA input wire open or at 9～24V: emission stop (short-circuit current 3 mA or less) External diagnosis input wire at 0～1.5V: normal emission	
Indicator	Emitter	Received light level indicator (greenLED×2, orangeLED×3): Turns on according to light intensity. Error mode indicator (red LED×3): Blinks to indicate fault. Power indicator (green LED×1): Turns on in energized state. Interlock indicator (yellow LED x 1): Turns on in interlock state and blinks at lockout. External relay monitor indicator (muting input 1 indicator)、 Blanking/test indicator (muting input 2 indicator) (green LED×2) ：Turns on or blinks according to function.	
	Receiver	Received light level indicator (green LED×2、orange LED×3): Turns on according to light intensity. Error mode indicator (red LED×3): Blinks to indicate fault. OFF output indicator (red LED×1): Turns on when control output is off and blinks at lockout. ON output indicator (green LED×1): Turns on when control output is on. Muting error indicator, blanking/test indicator (green LED×2) ：Turns on or blinks according to function.	
Ambient temperature		During operation:-10～55℃（not to freeze） During storage：-30～70℃	
Ambient humidity		During operation: 35～85%RH（not to freeze） During storage：35～95%RH	
Ambient light intensity		Incandescent lamp: light intensity on light receiving surface 3,000 lx or less/ Sunlight：light intensity on light receiving surface 10,000 lx or less	

Insulation resistance	20MΩ or more（with DC500V megger）
Withstand voltage	AC1000V (sensor)　AC1500V (control box)　50/60Hz for 1 minute
Protective structure	Emitter/receiver：IP65, control box: IP51
Vibration resistance	Durability: 10～55Hz、double amplitude 1.5 mm, 2 hours in each of X, Y and Z directions Malfunction：10～55Hz、double amplitude 0.7 mm, 50 min in each of X, Y and Z directions
Impact resistance	Durability: 300 m/s²、[30G]、3 cycles in each of　X, Y and Z directions Malfunction：100 m/s²、[10G]、1000 cycles in each of　X, Y and Z directions
Applicable standards	(Only sensor, not including control box) Type X2: IEC61496-1 type 2　ESPE and IEC61496-2 type 2　AOPD IEC61508-1～-7 (SIL1), ISO13849-1:2006 Cat. 2 PLc Type X4: IEC61496-1 type 4　ESPE and IEC61496-2 type4　AOPD IEC61508-1～-7 (SIL3), ISO13849-1:2006 Cat. 4 PLe

2-2 Response Time and Consumption Current of Emitter/Receiver

	Protection height (mm)	Number of beams	Response time (ON→OFF) (ms)	Response time (OFF→ON) (ms)	Consumption current (mA) Protection width in ( )
RPX414−□□□□X4 RPX414−□□□□X2	225～234	26～27	11.0	44	76
	261～369	30～42	12.0	48	76
	378～486	48～55	13.0	52	(～ 441) 76 (～594) 106
	495～594	56～-67	14.0	56	
	603～711	68 ～80	15.0	60	106
	720～999	81 ～112	17.5	70	(～891) 106 (～999) 130
	1008～1143	113 ～128	20.0	80	130
	Detection width (mm)	Number of beams	Response time (ON→OFF) (ms)	Response time (OFF→ON) (ms)	Consumption current (mA)
RPX425−□□□□X4 RPX425−□□□□X2	240～300	13 ～16	10.0	40	76
	320～560	17 ～29	11.0	44	76
	580 ～820	30 ～42	12.0	48	76
	840 ～1080	43 ～55	13.0	52	(～980) 76 (～ (～1080) 106
	1100 ～ 1320	56～-67	14.0	56	196
	1340 ～ 1580	68 ～80	15.0	60	106
	1600～-2220	81 ～112	17.5	70	(～1980) 106 (～2220) 130
	2240 ～ 2480	113 ～125	20.0	80	130

The number of sets connectable in series is two (including the main beam) and the response times is (sum of response times of individual sensors -1) ms.

Chapter 3 NAMES AND FUNCTIONS OF COMPONENTS

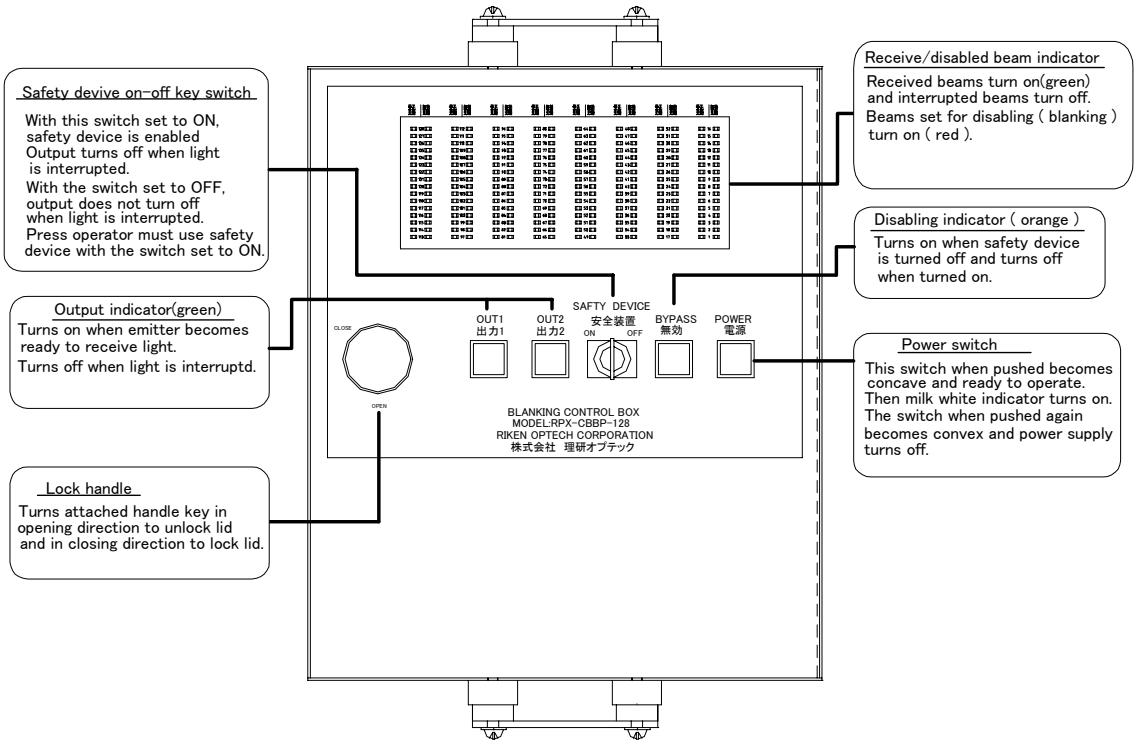
3-1 Control Box

WARNING

Safety device on-off key switch

- Set the switch to ON and remove the key.
  The removed key should be taken charge of by the press operation chief.
- When using the device with the switch set to OFF, always take other safety measures,

3-1-1 Type RPX-CBBP



Safety device on-off key switch
With this switch set to ON, safety device is enabled Output turns off when light is interrupted.
With the switch set to OFF, output does not turn off when light is interrupted. Press operator must use safety device with the switch set to ON.

Output indicator (green)
Turns on when emitter becomes ready to receive light.
Turns off when light is interrupted.

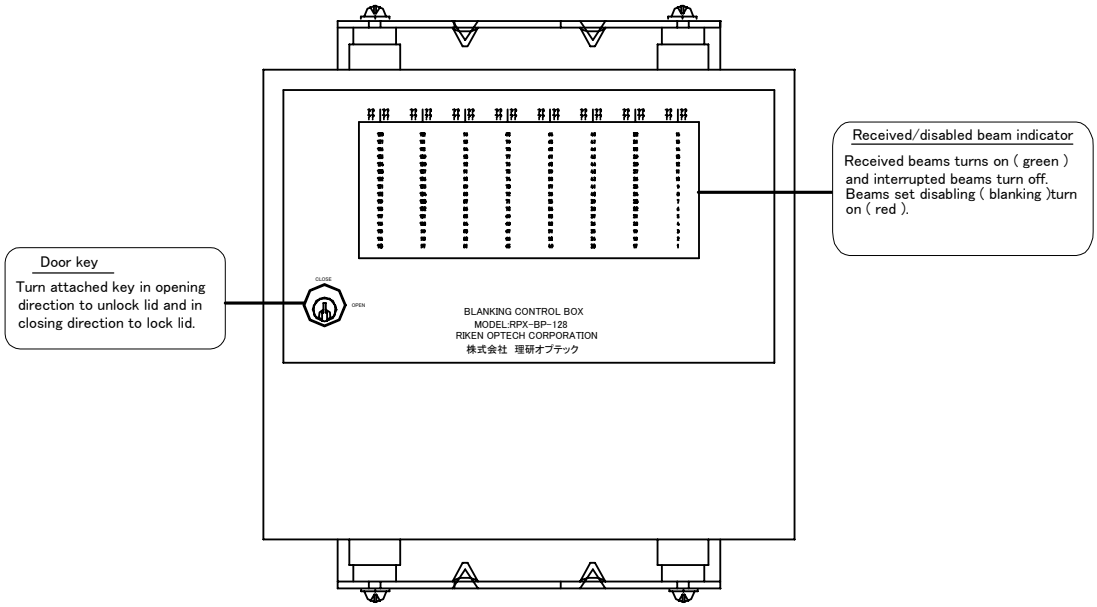
Lock handle
Turn attached handle key in opening direction to unlock lid and in closing direction to lock lid.

Received/disabled beam indicator
Received beams turn on (green) and interrupted beams turn off.
Beams set for disabling (blanking) turn on (red).

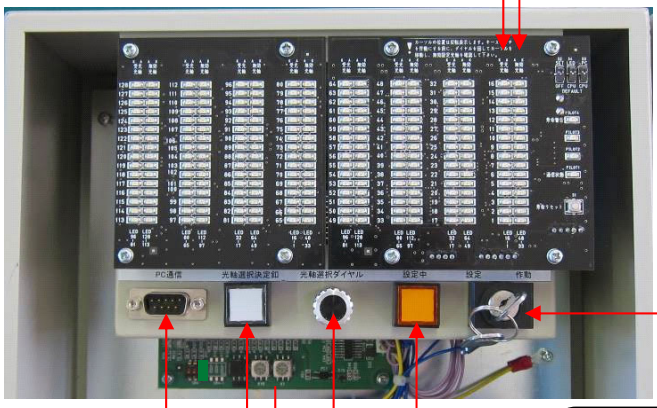
Disabling indicator (orange)
Turns on when safety device is turned off and turns off when turned on.

Power switch
This switch when pushed becomes concave and ready to operate. Then milk white indicator turns on. The switch when pushed again becomes convex and power supply turns off,

3-1-2 Type RPX-BP



3-1-3 Internal switches and indicators of RPX-CBBP and RPX-BP



Received light indicator (green)
Received beams turn on (green) and interrupted beams turn off.

Disabled beam indicator (red)
Beams set for disabling (blanking) turn on (red).

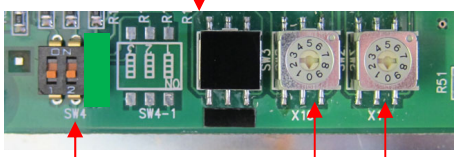
"Set-operate" key switch
Set this switch to OPERATE for sensor operation. When setting beams for disabling, switch it to SET and return to OPERATE after setting.

PC communication (RS232C)
Connected to PC for maintenance.

Setting state indicator
Kept in off-state while sensor is operating. Turns on (orange) when beams are set for disabling.

Beam select button
Select beams to be disabled and push this button to determine disabled beams.

Beam select dial
When setting beams for disabling, check disabled beam indicator and manipulate this dial.

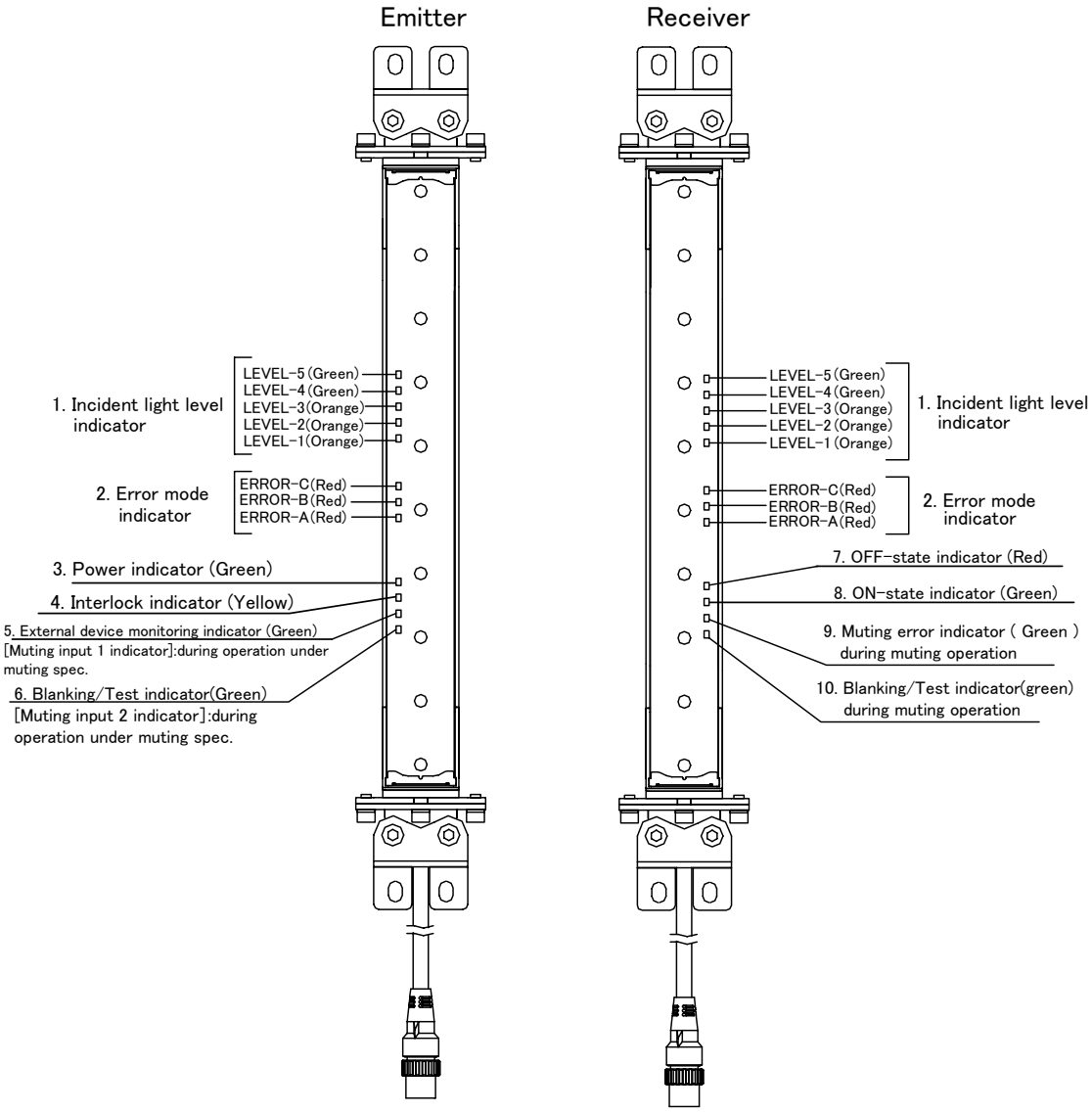


1. Blanked beam select mode switch
2. Lockout switch
   upper: ON, lower: OFF

Max. disabled beams setting dial
Sets max. number of disabled beams. Set 1st digit at right side (X1) and 2nd digit at left side (X10) by dial. Up to 100 beams can be set by setting at "0""0."

3-2 Emitter/receiver Type BPX4〇〇－□□□□■

Emitter　　Receiver



No	Internal indicator		ON / Blink	Description
1	Received light level indicator 1～3（orange） 4～5 （green）	LEVEL- 1～5	ON	Indicates light receiving state of RPX under conditions of 1～5.
2	Error mode indicator （red）	ERROR- A～C	ON /Blink	Turns on/blinks when RPX enters lockout state and indicates cause of error according to states of A～C.
3	Power indicator （green））	POWER	ON	Turns on when power is on.
4	Interlock indicator (yellow)	INTLK	ON /Blink	Turns on when RPX enters interlock state and blinks at lockout.
5	External relay monitor indicator（green）	EDM	ON	Turns on when an input is given to external relay monitor input.
	[Muting input 2 indicator]		ON	Turns on when an input is given to muting input 2 during muting operation. Blinks during muting operation.
6	Blanking/test indicator （green）	BLANKING /TEST	ON	Turns on when blanking function is enabled. (Special control box for blanking is used.) Turns on at emitter side during normal operation and at receiver side during muting operation.
			Blink	Blinks during external test. Turns on at emitter side during normal operation and at receiver side during muting operation.
	[Muting input 1 indicator]		ON	Turns on when an input is given to muting input 1 during muting operation. Blinks during muting operation.
7	OFF output indicator (red)	OFF	ON	Turns on when control output is off.
			Blink	Blinks in lockout state.
8	ON output indicator (green)	OFF	ON	Turns on when control output is on.
9	Muting error indicator (green)	MUTING ERROR	ON	Turns on in muting error state during muting operation...
10	Blanking/test indicator (green) during muting operation	BLANKING /TEST	ON	Turns on when blanking function is enabled by using blanking box during muting operation.
			Blink	Blinks in external test state during muting operation.

Chapter 4 WIRING AND INSTALLATION

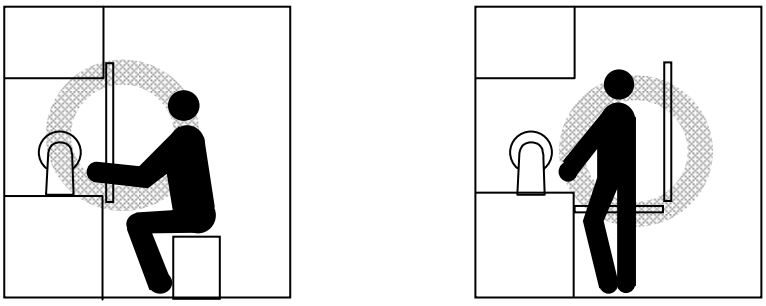
4-1 Installation Conditions

4-1-1 Detection area and approach route

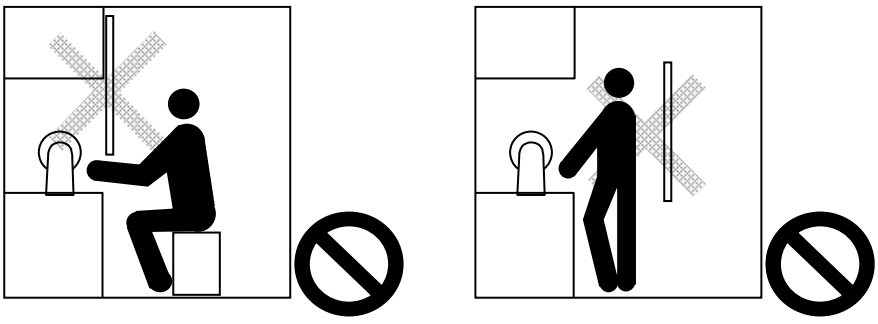
WARNING ⚠
The device is not applicable to machines that are incapable of quick stopping by electric control.
Install a protective structure around the machine so that the operator cannot reach the dangerous part of the machine unless he passes through the detection area. Install the device so that part of the human body always remains in the detection area when operating in the dangerous part of the machine. The human body becomes undetectable, resulting in serious injury.

Machines to which the RPX can be installed are capable of quick stopping by electric control. Confirm that the machine itself is designed so as not to interfere with the safety function such as stopping.
The detection area of the RPX emitter/receiver includes the entire range connecting the detection width of the emitter with that of the receiver. The protective structure should be such that the operator cannot reach the dangerous part of the machine unless he passes through the detection area.
Install the device so that the operator working in the dangerous part of the machine is always kept detectable by the RPX emitter/receiver. In cases where the space between the machine and the RPX emitter/receiver is so wide that the operator may enter the space and becomes undetectable, use auxiliary beams to make it possible for part of the operator to always remain in the detection area of the RPX emitter/receiver.

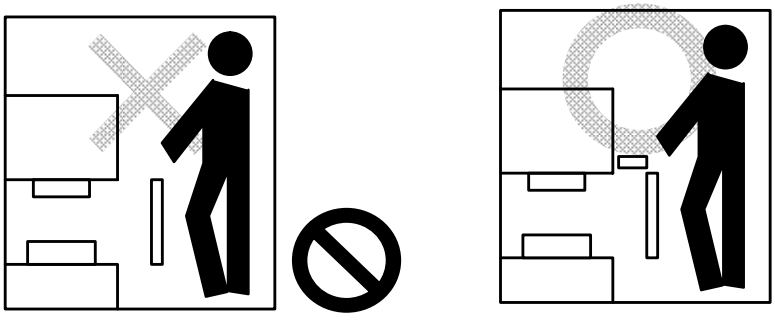
Correct installation



Incorrect installation



In the case of a small-sized press, etc., when a clearance is formed through which the operator's arms, etc. can get inside from above the sensor, prevent this possibility by using auxiliary beams, etc.



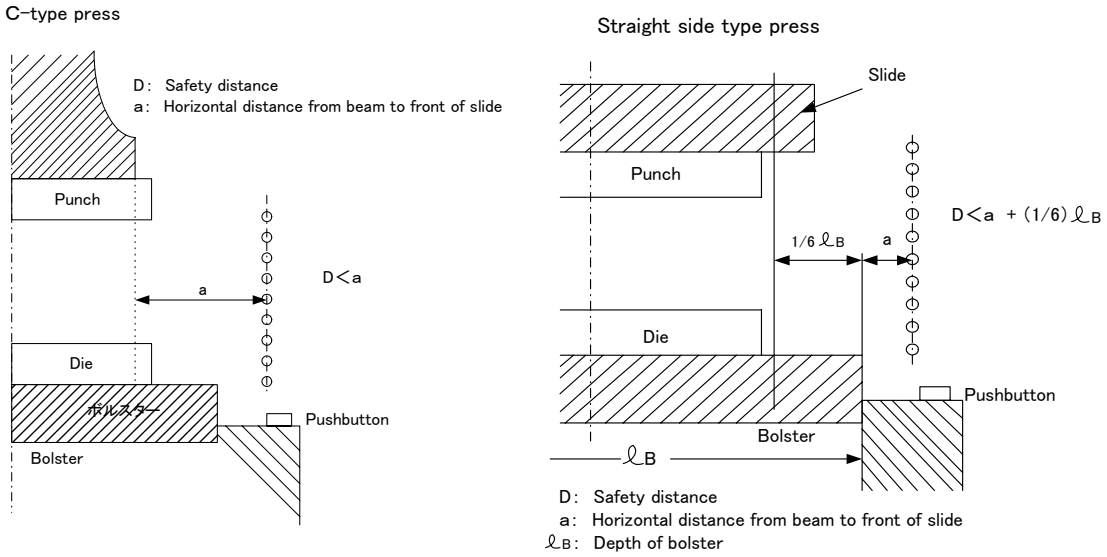
4-1-2 Safety distance(Japanese standard)

⚠ WARNING

Provide a safety distance (D) between the RPX emitter/receiver and the dangerous part. The machine may fail to stop before the operator reaches its dangerous part, resulting in serious damage.

The safety distance is the minimum distance by which the RPX emitter/receiver must be separated from the dangerous part to stop the dangerous part before the human body or object reaches there. When the human body vertically enters the detection area of the emitter/receiver, the safety distance is calculated based on the following concept:

Straight side press



Safety distance D = 1.6(T1 + T2) + C

D: Safety distance (mm)

T1: Duration from when the hand interrupts a light beam until the quick stop mechanism starts operating (ms)

Ts: Duration from when the quick stop mechanism starts operating until the slide stops (ms)

C: Additional distance entered in the lower column of Table 1 according to the continuous light-shielding width in the upper column.

Table 1

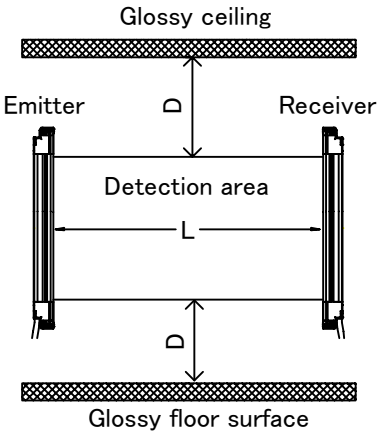
Continuous light-shielding width (mm)	30 or less	Over 30 to 35	Over 35 to 45	Over 45 to 50
Additional distance (mm)	0	200	300	400

4-1-3 Distance from glossy surface

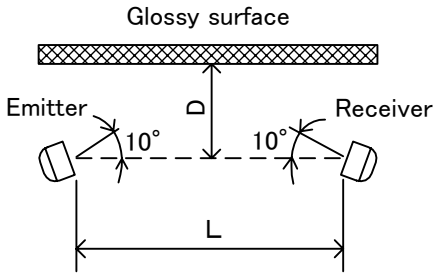
⚠ WARNING

Install the device so as not to be affected by the reflection from glossy surfaces. The human body becomes undetectable, resulting in serious injury.

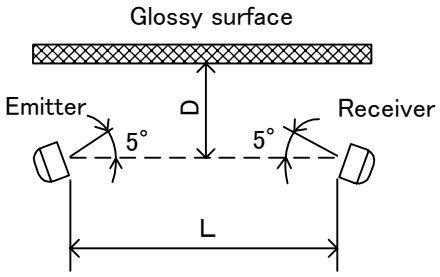
Separate the device from the glossy surfaces (highly reflective surfaces) of the metallic wall, floor, ceiling, work, etc, by more than the distance D shown below:



Glossy surface



RPX4□□□□X2 type



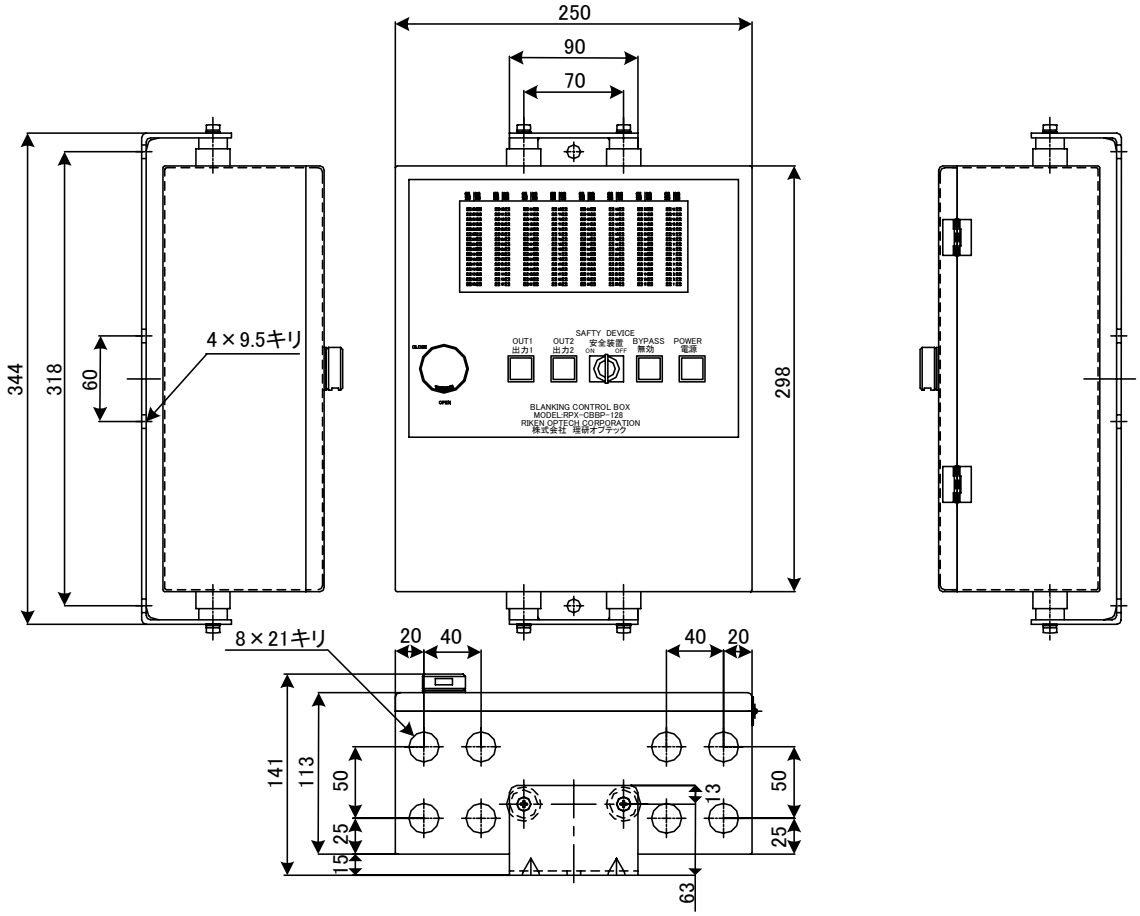
RPX4□□□□X4 type

Sensor type	Distance between emitter and receiver (detection distance L)	Allowable installation distance D
RPX414-□X2 RPX425-□X2	0.2 ～3 m	0.26 m
	3 ～5 m	L/2×tan10°= L×0.089 (m)
RPX414-□X4 RPX425-□X4	0.2 ～ 3 m	0.13 m
	3 ～ 5 m	L/2×tan5°= L×0.044 (m)

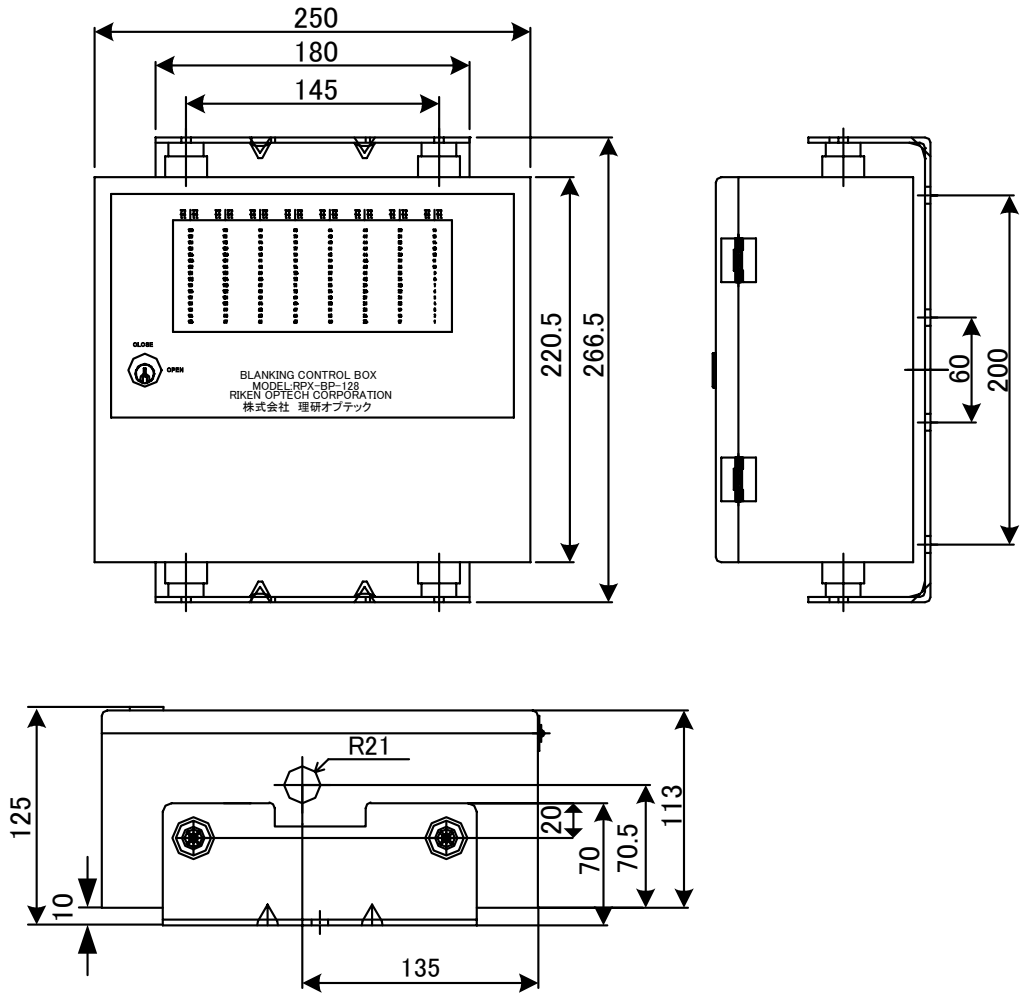
Note 1: Though the aperture angle of the RPX4-□X2 emitter/receiver is ±5° (when L>3m) as specified in IEC61496-2, install the sensor apart from the glossy surfaces, taking the directivity angle as ±10° with consideration to misalignment of light beams, etc. at the time of installation.
Though the aperture angle of the RPX4-□X4 is ±2.5° (when L>3m) , install the sensor apart from the glossy surfaces, taking the directivity angle as ±5° with consideration to misalignment of light beams, etc. at the time of installation.

4-2 Outline Dimensional Drawing

4-2-1 Control box Type RPX-CBBP

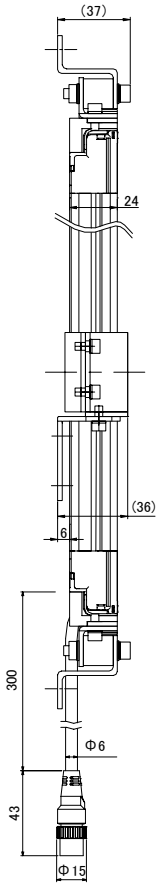


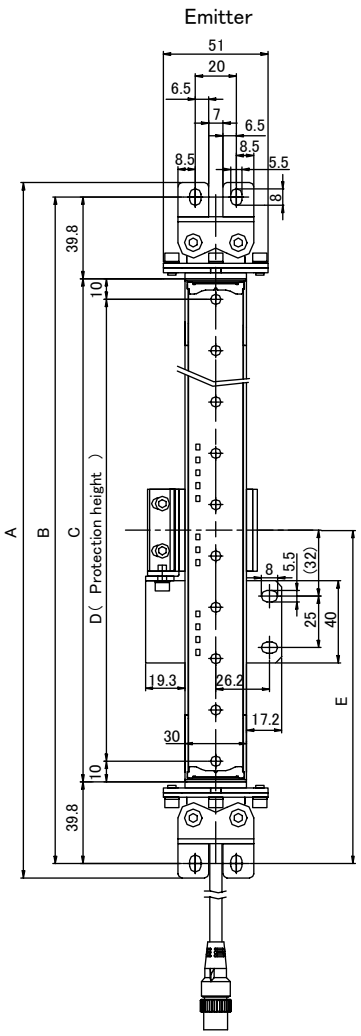
4-2-2 Control box Type RPX-BP

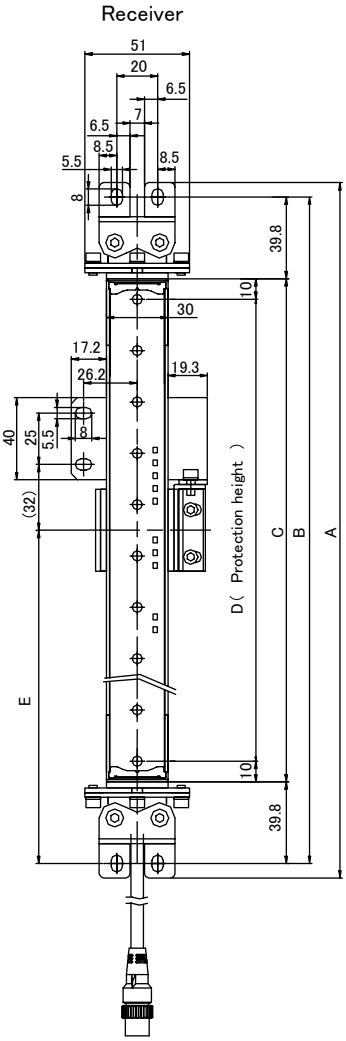


4-2-3 Emitter/receiver

Rear mounting

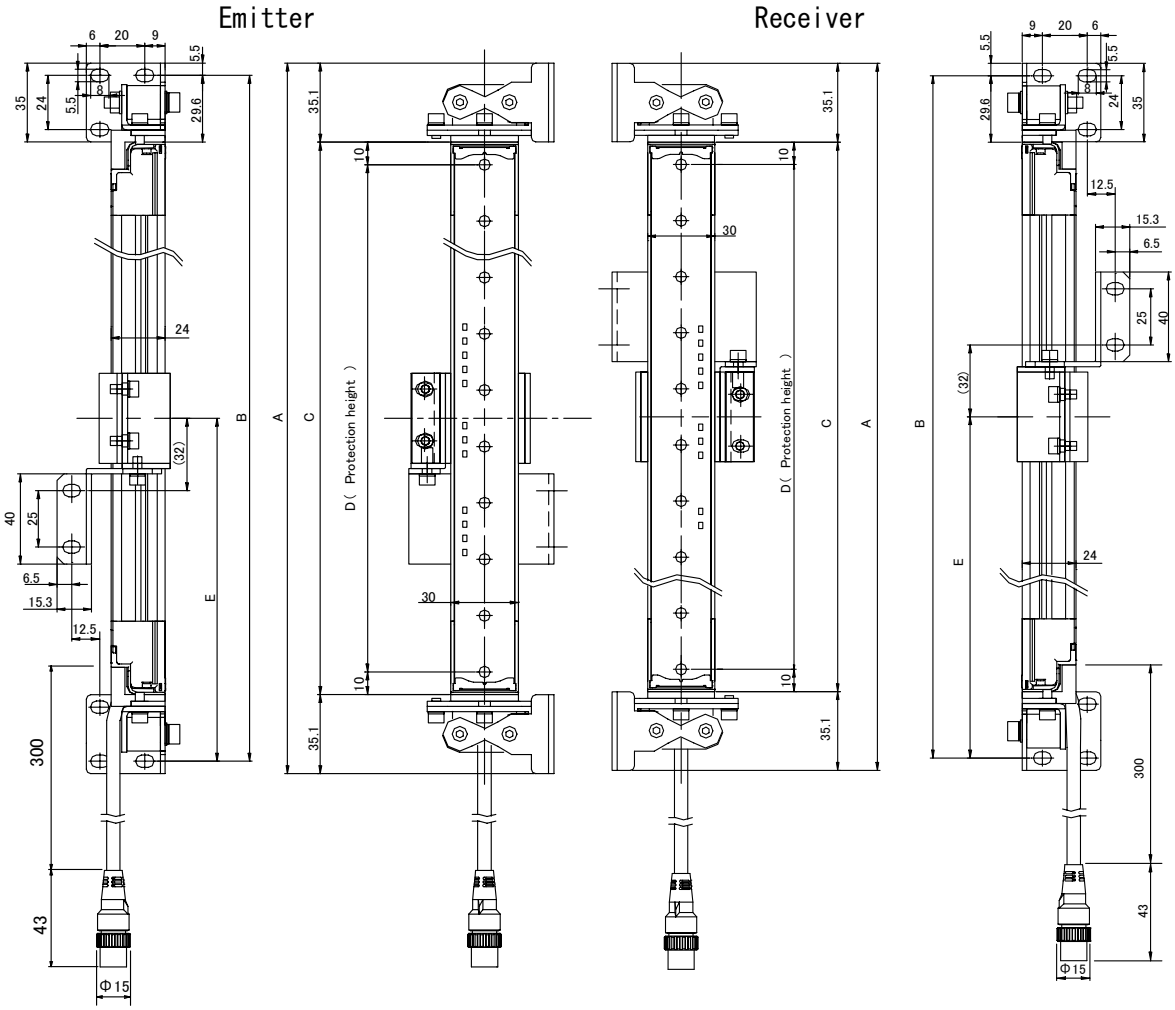






Type	D (Numeral after "—" in type)	A	B	C	Q'ty of inter-mediate fittings	E
RPX414-225 ～576 RPX425-240-～560	225 ～576 240 ～560	C+93.6	C+79.6	D+20	0	—
RPX414-585～1107 RPX425-580 ～1100	585 ～1107 580 ～1100				1	B/2
RPX414-1116 ～1638 RPX425-1120 ～1640	1116～1638 1120～1640				2	B/3
RPX414-1647 ～097 RPX425-1660～2160	1647 ～097 1660 ～160				3	B/4
RPX425-2180 ～480	2187～2439				4	B/5

Side mounting



Type	D (Numeral after "—" in type)	A	B	C	Q'ty of inter-mediate fittings	E
RPX414-225～576 RPX425-240～560	225～576 240～560	C+70.2	C+59.2	D+20	0	—
RPX414-580～1107 RPX425-580 ～1100	580～1107 580 ～1100				1	B/2
RPX414-1116～638 RPX425-1120～1640	1116～1638 1120～1640				2	B/3
RPX414-1647～2097 RPX425-1660～2160	1647～2097 1660～2160				3	B/4
RPX425-2180～2480	2180～2480				4	B/5

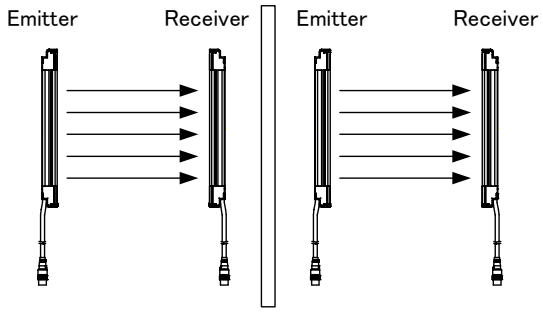
4-3 How to Prevent Mutual Interference

⚠ WARNING
Use the same set type for the emitter and receiver standing opposite each other. Using an incorrect combination results in producing an area in which detection cannot be done.
Do not use the sensors in reflective configuration. Detection may become impossible.
When using 2 emitters/receivers, use auxiliary beams. When using CB6-W, install the front and rear emitters/receivers using a light-shielding plate so that mutual interference does not occur,

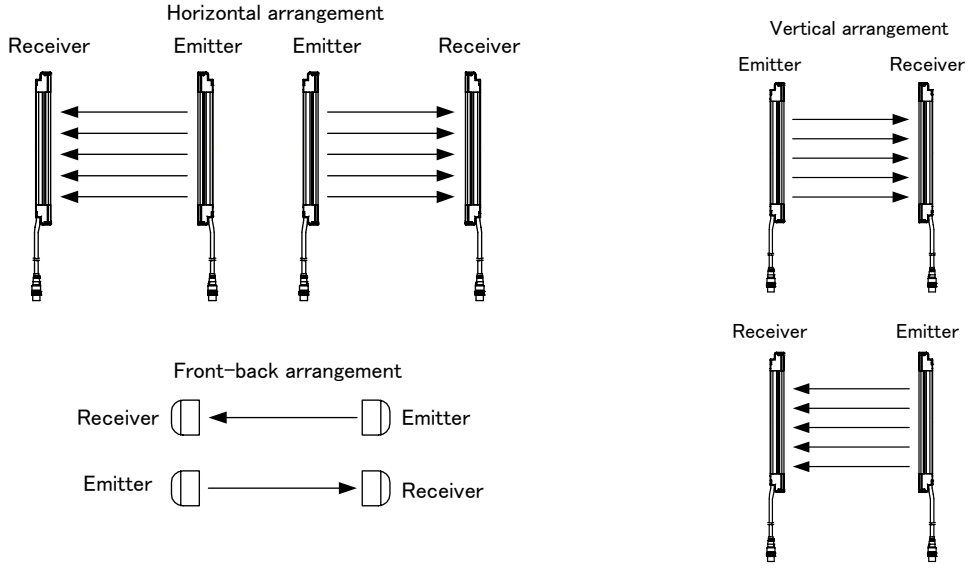
Owing to the light interference prevention algorism, mutual interference can be prevented for up to 3 sets with no connection to each other. When installing 4 or more RPX sets, arrange them so that mutual interference does not occur.

If the distance between 2 sets is short, mutual interference may occur due to the reflection on the RPX surface. When mutual interference occurs, the RPX enters the locked state. It is effective to take measures by combination of the following 3 items below:

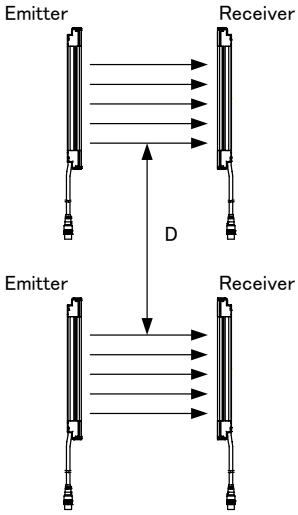
1. Install a light-shielding plate between 2 sets.

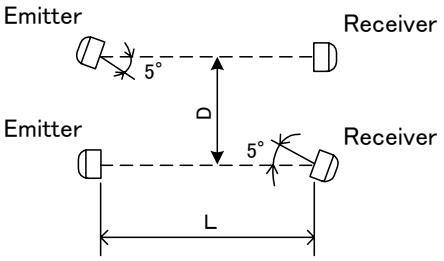


2. Make 2 sets different in emission direction (staggered arrangement).

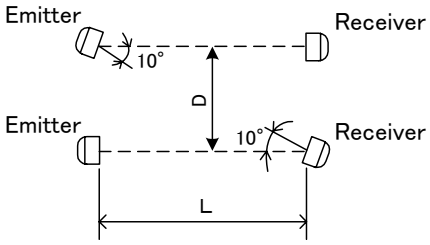


3. Install 2 sets by spacing them by a distance preventing interference.





RPX4□□□□X4 type



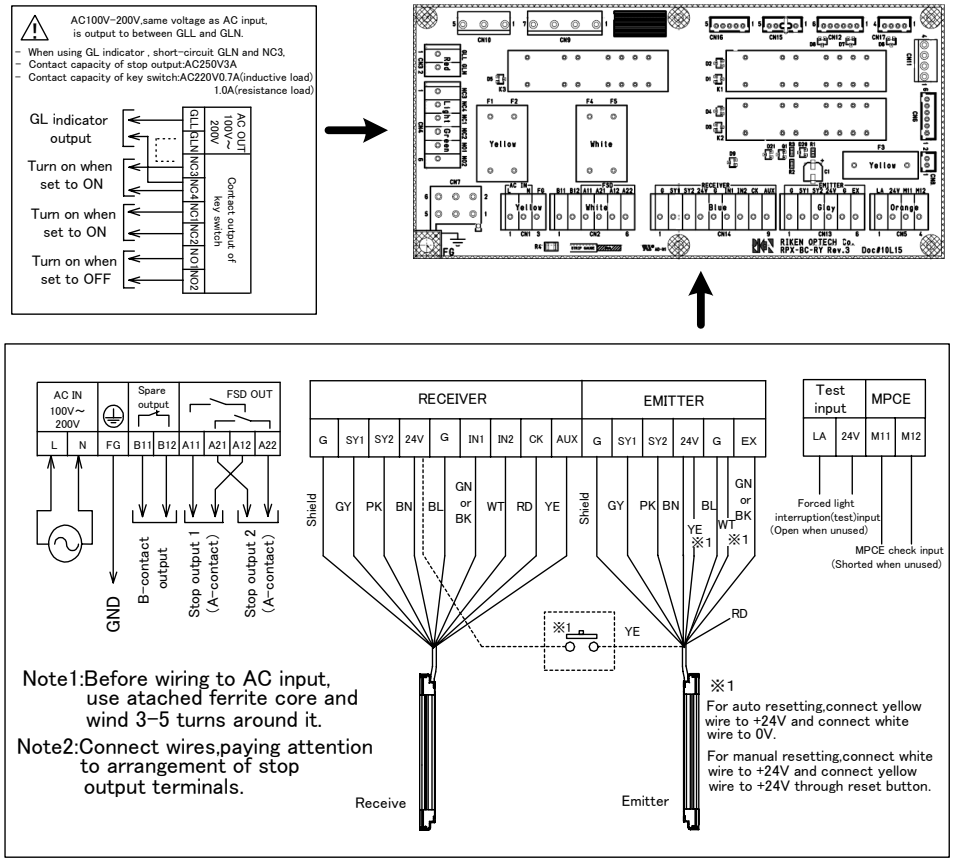
RPX4□□□□X2 type

Sensor type	Distance between emitter and receiver (detection distance L)	Allowable installation distance D
RPX414-□X2 RPX425-□X2	0.2 ～ 3 m	0.52 m
	3 ～ 5 m	L×tan10°= L×0.177 (m)
RPX414-□X4 RPX425-□X4	0.2 ～ 3 m	0.26 m
	3 ～ 5 m	L×tan5°= L×0.088 (m)

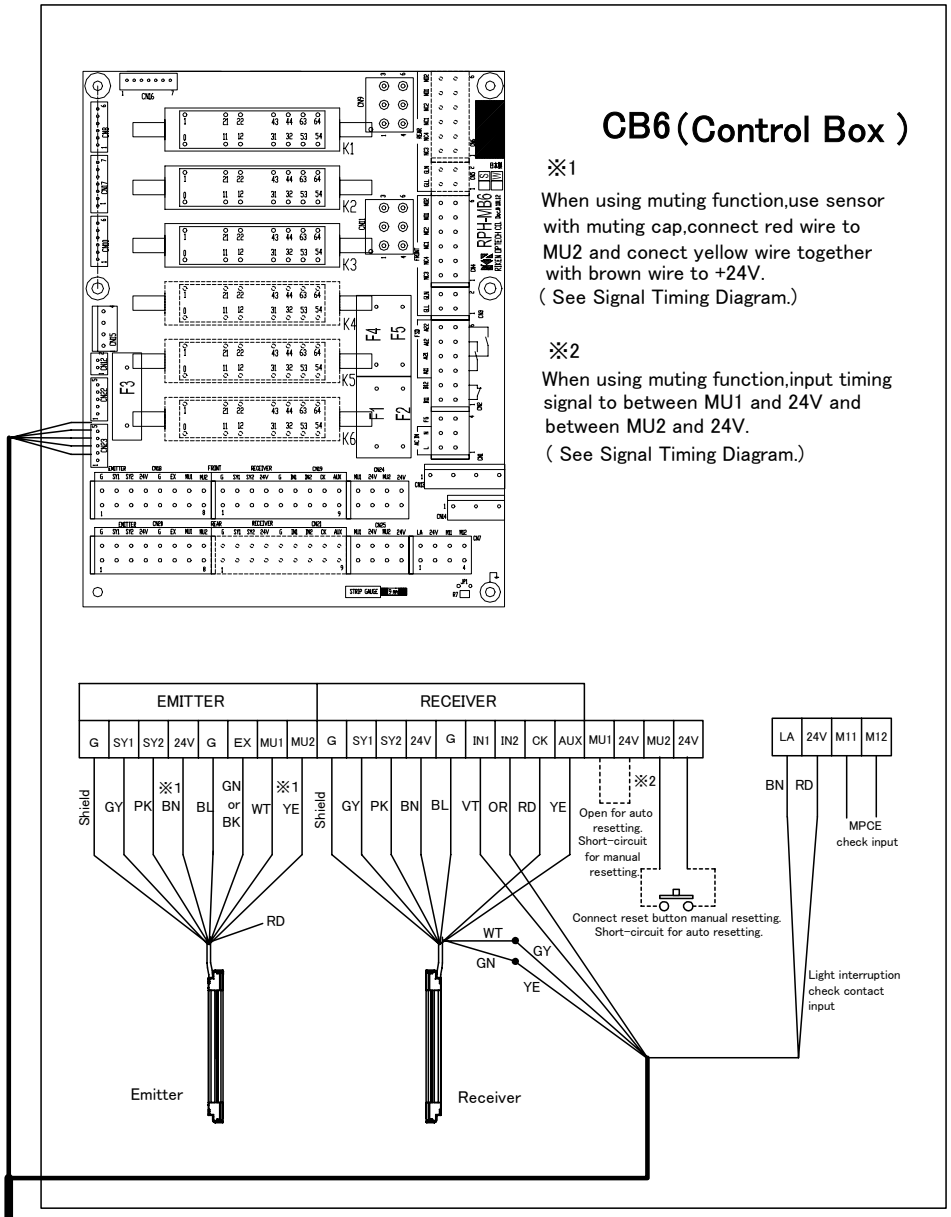
4-4 Wiring

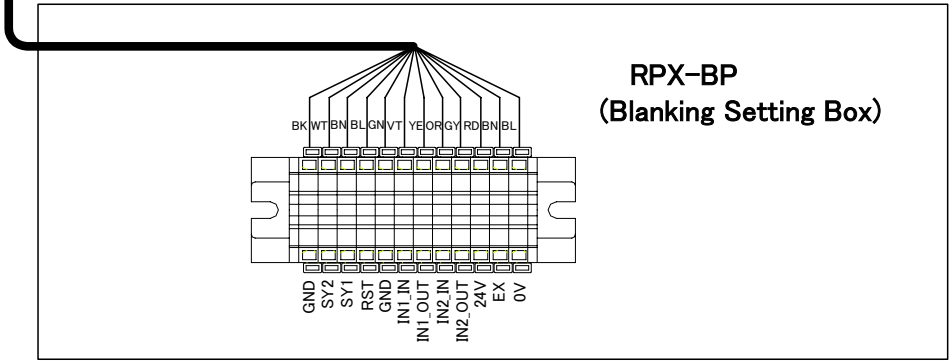
⚠ WARNING
Connect each wire of the emitter/receiver to the special control box.
When turning off the safety device on-off key switch, take other safety measures.
Be sure to use the stop output for both lines and form the safety system. If the safety system is formed for one line only, there is a possibility of suffering serious injury when the output circuit fails.
Do not make the output wire of the emitter/receiver short to +24V. The output always stays on. This is dangerous,
Do not connect each wire of the emitter/receiver to a DC power exceeding DC24V＋10%. Do not connect to the AC power, either. There may be a risk of electric shock.
Terminate any unused signal wires of the emitter/receiver so as not to touch other things.

4-4-1 Wiring of blanking control box (RPX-CBBP)



4-4-2 Wiring of blanking setting box (BPX-BP) and control box (CB6)





4-4-3 Control box terminal block

Terminal	Signal Direction	Description
L	AC input	Supplies AC100V or AC200V 50/60Hz power.
N		
FG	Frame ground	Connects to GND.
A11	Contact output (A1)	Contact output turning on when light passes. Turns on also when safety device on-off key switch is turned off. Contact capacity: AC250V 2A COSφ=0.5 When turning off safety device, provide other measures such as doing safety one stroke or inching operation by contact signal of later-mentioned key switch.
A12		
A21	Contact output (A2)	
A22		
B11	Auxiliary contact output (B)	Contact output of relay that turns off when light passes. Turns off when safety device on-off key switch is turned off. Contact capacity: AC250V 2A COSφ=0.5 When turning off safety device, provide other measures such as doing safety one stroke or inching operation by contact signal of later-mentioned key switch.
B12		
GLL	AC output (GL indicator)	AC100V or AC200V is output. Voltage varies with AC IN voltage. Interrupted when power switch is turned off.
GLN		
NC3	Contact output	Outputs closing no-voltage contact signal when safety device on-off key switch is turned on. Opens when it is turned off. Contact capacity: AC250V 2A COSφ=0.3 When using safety device ON indicator, short- circuit GLN and NC3 and connect to GLL and NC4.
NC4		
NC1	Contact output	Outputs closing no-voltage contact signal when safety device on-off key switch is turned on. Opens when it is turned off. Use this output as interlock when safety device key switch is turned off. Contact capacity: AC250V 2A COSφ=0.3
NC2		
NO1	Contact output	Outputs closing no-voltage contact signal is output when safety device on-off key switch is turned off. Opens when it is turned on. Contact capacity: AC250V 2A COSφ=0.3
NO2		

LA	Light interruption check input	Short-circuit this terminal and emitter stops emitting. Confirm that receiver turns off. Use it at start of one stroke, etc.
24V		
M11	EDM input	External device monitor input. Inputs contact signal of clutch brake relay.
MI2		
MU1	Signal input 1	Short-circuit for manual resetting. Open for auto resetting. Inputs muting 1 signal during muting operation.
24V		
MU2	Signal input 2	Connects reset button for manual resetting. Short-circuit for auto resetting. Inputs muting 2 signal during muting operation.
24V		

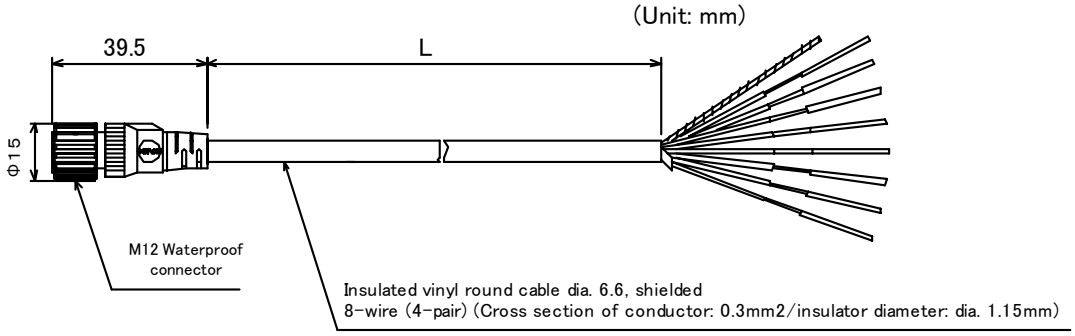
* MU1 and MU2 terminals are not provided in the RPX-CBBP.

4-4-4 Wiring of emitter/receiver

	Terminal	Wire Color	Function Name
Emitter	G	Shield	0V
	ＳＹ１	Grey	Communication line RS485(A)
	ＳＹ２	Pink	Communication line RS485(B)
	２４Ｖ	Brown	Power DC24V side
		Yellow	*Connected for muting specification. *Connected to MU2 for ordinary specification.、
	G	Blue	Power 0V side
	ＥＸ	Green or black	Supplies test (external diagnosis) input (24V).
	ＭＵ１	White	Interlock mode select wire (use for OFF output holding operation during light interruption). Muting 1 input for muting specification.
	ＭＵ２	Yellow	Reset input (inputs reset signal at interlock.
		Red	Muting 2 input for muting specification. Open for ordinary specification.

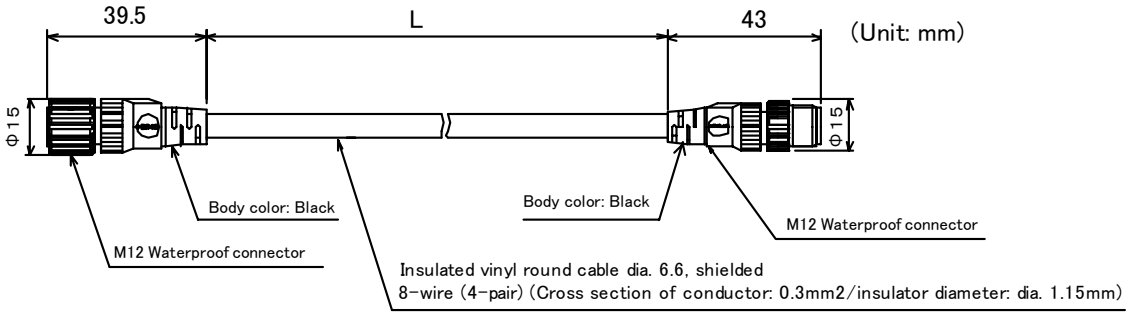
	Terminal	Wire Color	Function Name
Receiver	G	Shield	0V
	ＳＹ１	Grey	Communication line RS485(A)
	ＳＹ２	Pink	Communication line RS485(B)
	２４Ｖ	Brown	Power DC24V side
	G	Blue	Power 0V side
	ＩＮ１	Green or black	PNP transistor output turning on when light is received.
	ＩＮ２	White	PNP transistor output turning on when light is received.
	ＣＫ	Red	Relay monitor (fusion check) input.
	ＡＵＸ	Yellow	PNP transistor output turning on when light is interrupted.

4-4-5 Unilateral connector cord (sold separately: Type RP-JD□A)



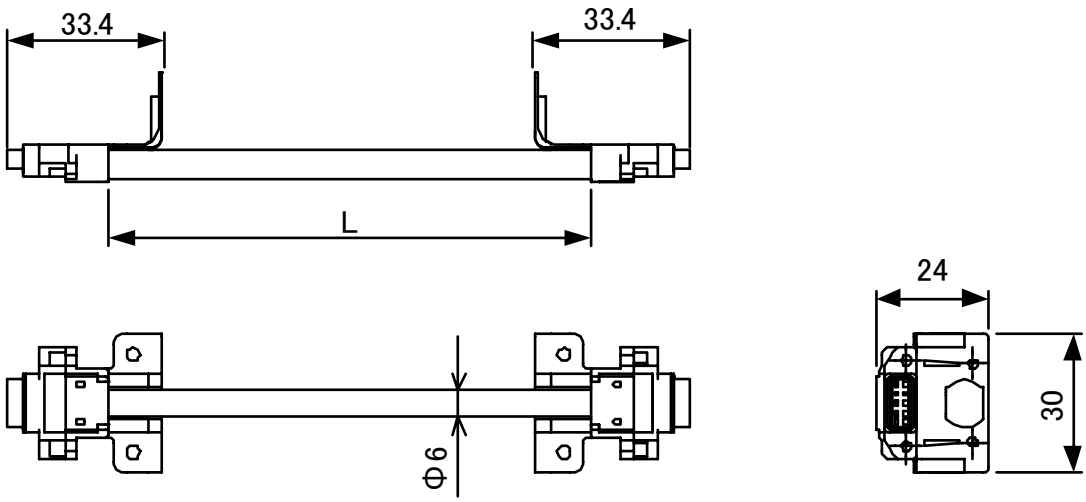
Set type	For emitter		For receiver		L
RP-JD3A	RP-JD3A-E	Grey cord	RP-JD3A-R	Black cord	3000
RP-JD7A	RP-JD7A-E		RP-JD7A-R		7000
RP-JD10A	RP-JD10A-E		RP-JD10A-R		10000
RP-JD15A	RP-JD15A-E		RP-JD15A-R		15000
RP-JD20A	RP-JD20A-E		RP-JD20A-R		20000

4-4-6 Cord for auxiliary beams (sold separately: Type RP-JD□B)



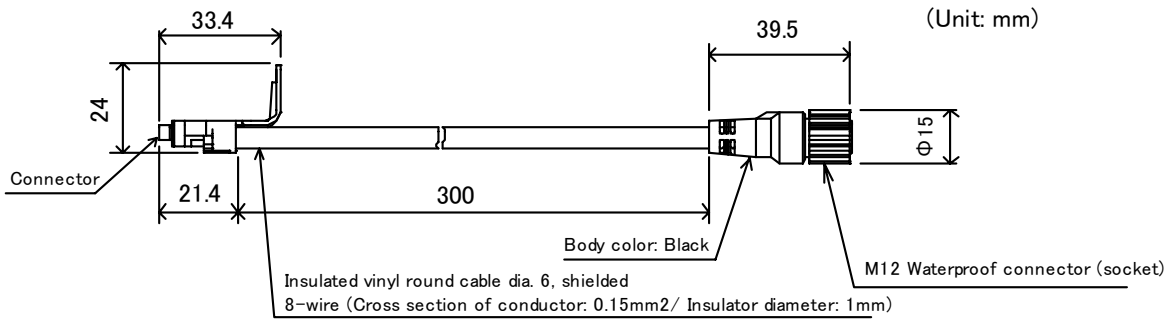
Set type	For emitter		For receiver		L
RP-JDR5B	RP-JDR5B-E	Grey cord	RP-JDR5B-R	Black cord	500
RP-JD1B	RP-JD1B-E		RP-JD1B-R		1000
RP-JD3B	RP-JD3B-E		RP-JD3B-R		3000
RP-JD5B	RP-JD5B-E		RP-JD5B-R		5000
RP-JD7B	RP-JD7B-E		RP-JD7B-R		7000
RP-JD10B	RP-JD10B-E		RP-JD10B-R		10000
RP-JD15B	RP-JD15B-E		RP-JD15B-R		15000
RP-JD20B	RP-JD20B-E		RP-JD20B-R		20000

4-4-7 Series connection cord for adhesion (sold separately: Type RPX-JJR□L)



Set type	For emitter		For receiver		L
RPX-JJR06L	RPX-JJR06L-E	Grey cord	RPX-JJR06L-R	Black cord	65
RPX-JJR15L	RPX-JJR15L -E		RPX-JJR15L-R		150

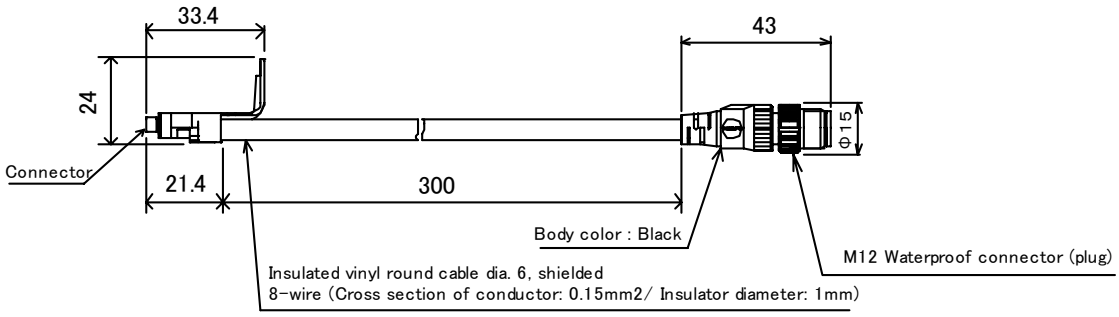
4-4-8 Series connection cod or extension (sold separately: Type RPX-JJR3W)



Set type	For emitter		For receiver	
RPX-JJR3W	RPX-JJR3W-E	Grey cord	RPX-JJR3W-R	Black cord

4-4-9 Power cord (sold separately: Type RPX-JJR3K)

Power cord is a standard accessory. If your cord is damaged or lost, please buy a new one.

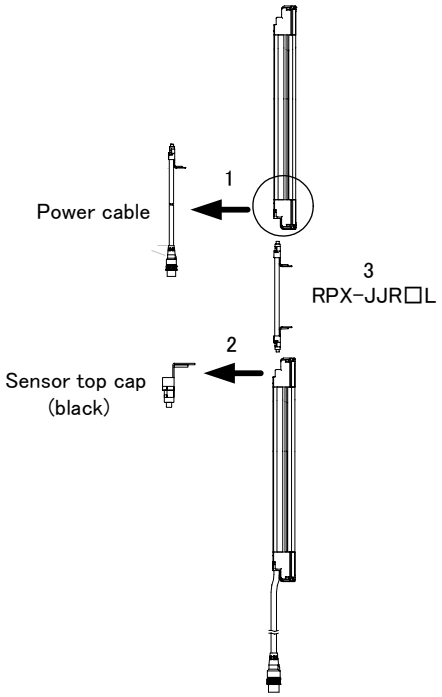


Set type	For emitter		For receiver	
RPX-JJR3K	RPX-JJR3K-E	Grey cord	RPX-JJR3K-R	Black cord

4-5 Connection Method

4-5-1 Series connection cord for adhesion RPX-JJR□L (sold separately)

1. Remove the power cord of the secondary side RPX.
2. Remove the top cap of the primary side RPX.
3. Connect the sensors by series connection cord for adhesion RPX-JJR□L.
   At that time, be careful not to install the RPX upside down.
   Connect 1, 2 and 3 to both the emitter and the receiver.

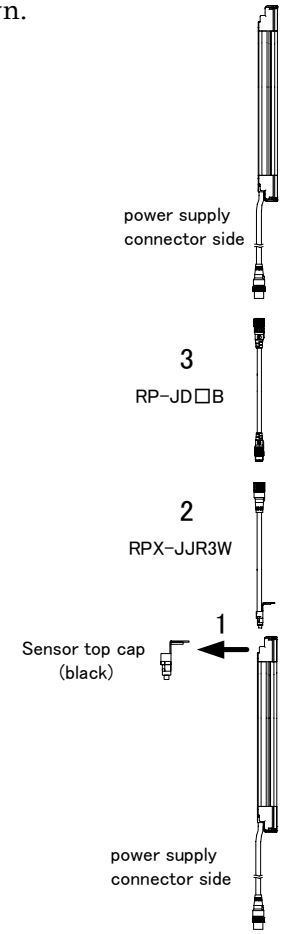


Note 1: Removing and installing the cap and series connection cord may result in displacing the rubber packing around the connector. When the rubber packing is displaced, push it down into the connector as far as it goes and then make it adhere to the RPX.

Note 2: When installing the cord and cap, securely tighten the screws (M2, four each) . (Recommendable torque: 0.15 N・m). Dropping off or degradation of the protective function may result.

4-5-2 Series connection cord for extension RPX-JJR3WL (sold separately)

1. Remove the top cap of the primary side RPX.
2. Connect the sensors by the series connection cord for extension Type RPX-JJR3W.
3. When changing the connection distance between RPX sensors, connect a bilateral connector cord Type RPX-JD□B（sold separately）.
   At that time, be careful not to install the RPX upside down.
   Connect 1, 2 and 3 to both the emitter and the receiver.



● Length of power cord

The length of the power cord must not exceed:

・Single (1 set)---------- max.100 m

・2 connections (2 sets) --- max.60 m
15 m btw connections

・3 connections（3 sets）---max.45 m
15 m btw connections

・4 connections (4 sets)--- max. 30 m
15 m btw connections

* Cable specification when extending the cord without using a special cable. Use a cord (twisted pair cord) that has a better performance than the following and do not use it in the same piping as that for high voltage cable and power cable.

・8-core（0.3 mm² ×4 pairs、conductor resistance 0.058 Ω/m）with braided shield.

・Communication wires (+) ＜special cable color : grey＞ and (-) ＜special cable color : pink＞, and 24V wire ＜special cable color : brown＞ and 0V wire ＜special cable color : blue＞, as a twisted pair, respectively.

4-6 Adjusting Method

Procedure

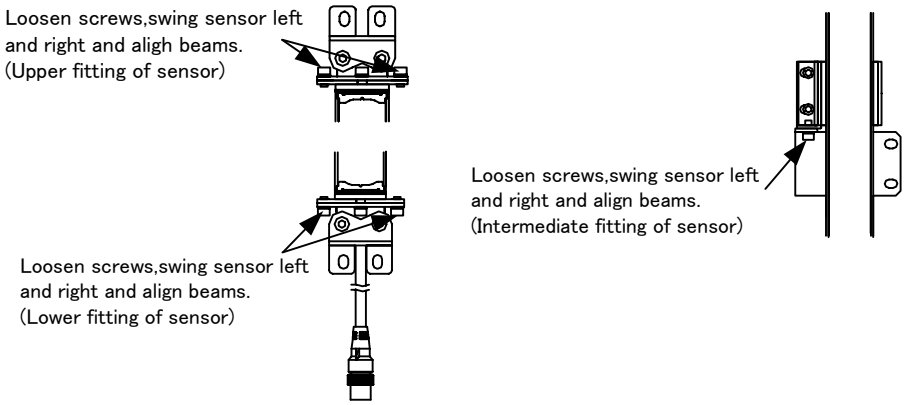
1. Confirm the following;

Note: The optical surfaces of the emitter and receiver are not dirty.

Note: There is no light-shielding object in the detection area of the emitter/receiver.

2. Adjust the beams of the emitter.

   Adjust the torsion angle of the emitter while looking at the received light level indicator and align the emitter to the center of the angle at which the ON output indicator (ON: green) turns on.



3. Adjust receiver.

   Adjust the torsion angle of the receiver while looking at the received light level indicator and align the receiver to the center of the angle at which the ON output indicator (ON: green) turns on

4. Confirm that the 5 received light level indicators are all lit.

5. After completing this adjustment, use care not to cause the state of beam adjustment of the emitter/receiver to vary and tighten all fittings set screws and fixing screws. The values of tightening torque for attached screws are as follows:

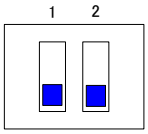
Fittings	Nominal designation and length of screw (mm)	Tightening torque
Fittings (upper and lower)	M5×14	2.3 N·m
Fittings (intermediate)	M5×14	2.3 N·m

6. In cases where angle adjustment of the receiver is complete, but all received light level indicators do not turn on, check whether or not the mounting surfaces of the emitter and receiver are parallel and whether or not the mounting heights of the emitter and receiver are correct.

Chapter 5 OPERATION FUNCTION AND SETTING

5-1 Operation Function and Setting of Main Circuit Board

Method of setting the mode select switch



1. Blanked beam select mode switch
2. Lockout switch

(1) Blanked beam select mode switch (selection of disabled beams)

(a) When the blanked beam select mode switch SW-1 is off:

Setting is manual.

Turn the beam select dial to select a beam desired to be disabled while observing the blanked beam indicator, then push the beam select button to select a fixed blanked (disabled) beam (the indicator of the beam set for disabling turns on (red)).

(b) When the blanked beam select mode switch SW-1 is on:

Setting is automatic.

Only the interrupted beam is fixed blanked (disabled) when the "set-operate" key switch is set to OPERATE.

(2) Lockout switch

(a) When the lockout switch SW-2 is on:

In case that a beam set for blanking (disabling) according to the item (1) above is allowed to pass, all beams are interrupted and the control box output turns off.

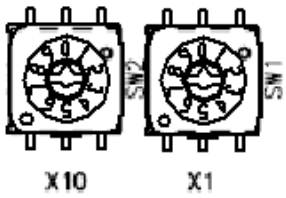
(In this case, once turn off the power supply. Return the "set-operate" key switch to SET and turn on the power supply again. By so doing, resetting can be done.)

(b) When the lockout switch SW-2 is off:

In case that a beam set for blanking (disabling) is allowed to pass, all beams are enabled. (In this case, return the "set-operate" key switch to SET and proceed with resetting.)

Note: Blanking is settable only for up to 5 areas. One area means continuous blanking. (For example, when beams 2, 3 and 4 and beams 6 and 7 are blanked, the number of areas is 2.)

How to Set Rotary Switch



(1) Max. blanked beam number dial

Sets the upper limit number of blanked beams.

Set the value of the 10th digit by the rotary switch SW-2 on the circuit board and the value of the 1st digit by the rotary switch SW-1. Up to the set number of beams can be set for disabling. When the set number of beams is exceeded, all beams are enabled and cannot be set for disabling.

“0 0” means 100 beams.

Operating Procedure

(1)-1 Manual setting

- In the case of making all stop when the beams set for disabling become receivable:

① Lockout switch ・・・・・・・・・・・・・・・・・・・・・・ ON

② Blanked (disabled) beam select mode switch・・・・・・・ OFF

③ Number-of-blanked (disabled) beams limit switch ・・Sets the number of beams settable for disabling

（Ex.| 0 | 3 | --- Up to 3 beams can be set for disabling at random.）

④ Safety device key switch ・・・・・・・・・・・・・・・・・ON

⑤ “Set-operate” key switch・・・・・・・・・・SET (The setting indicator turns on.)

⑥ Power switch ・・・・・・・・・・・・・・・・・・・・・・ ON

⑦ Check the received beams of the sensor by the light reception indicator.

⑧ Turn the beam select dial so as to move the disabled beam indicator (red) to the beam for which the light reception indicator ⑦ is turned off. *1

⑨ When a disabled beam is selected, push the beam select button.

⑩ Repeat steps ⑧–⑩. After completion of all steps, set the “set-operate” key switch to OPERATE. (The setting indicator turns off.)

⑪ Close the box panel door, turn the door lock key in the closing direction and remove it.

*1 When disabled beams to be selected are successive:

Turn the beam select dial while pushing the beam select button. Thus successive disabled beams can be selected. In this case, disabled beams are already selected when the beam select button is released, so this button need not be pushed again.

(1) -2 Manual setting

- In the case of enabling all beams when the beams set for disabling become receivable:

① Lockout switch ・・・・・・・・・・・・・・・・・・・・・・ OFF

② Blanked (disabled) beam select mode switch・・・・・・・・ OFF

③ Number-of-blanked (disabled) beams limit switch・・Sets the number of beams settable for disabling.

（Ex.| 0 | 3 | --- Up to 3 beams can be set for disabling at random.）

④ Safety device key switch ・・・・・・・・・・・・・・・・・ON

⑤ “Set-operate” key switch ・・・・・・・・SET (The setting indicator turns on.)

⑥ Power switch ・・・・・・・・・・・・・・・・・・・・・・・ ON

⑦ Check the received beams of the sensor by the light reception indicator.

⑧ Turn the beam select dial so as to move the disabled beam indicator (red) to the beam for which the light reception indicator ⑦ is turned off.

⑨ When disabled beams are selected, push the beam select button.

⑩ Repeat steps ⑧-⑩. After completion of all steps, set the “set-operate” key switch to OPERATE. (The setting indicator turns off.)

⑪ Close the box panel door, turn the door lock key in the closing direction and remove it.

(2)-1 Automatic setting

- In the case of making all stop when the beams set for disabling become receivable:

① Lockout switch ・・・・・・・・・・・・・・・・・・・・・・・・ON

② Blanked (disabled) beam select mode switch・・・・・・・・ON

③ Number-of-blanked (disabled) beams limit switch ・・Sets the number of beams settable for disabling

(Ex. | 0 | 3 | --- Up to 3 beams can be set for disabling at random.)

④ Safety device key switch ・・・・・・・・・・・・・・・・・・ON

⑤ “Set-operate” key switch・・・・・・・・・SET (The setting indicator turns on.)

⑥ Power switch ・・・・・・・・・・・・・・・・・・・・・・・・ ON

⑦ Check the received beams of the sensor by the light reception indicator.

⑧ Set the “set-operate” key switch to OPERATE. (The setting indicator turns off.)

⑨ Close the box panel door, turn the door lock key in the closing direction and remove it.

(2)-2 Automatic setting

- In the case of enabling all beams when the beams set for disabling become receivable:

① Lockout switch ・・・・・・・・・・・・・・・・・・・・・・・・ ON

② Blanked (disabled) beam select mode switch・・・・・・・ ・ ON

③ Number-of-blanked (disabled) beams limit switch ・・Sets the number of beams settable for disabling

(Ex. | 0 | 3 | --- Up to 3 beams can be set for disabling at random.)

④ Safety device key switch ・・・・・・・・・・・・・・・・・・ON

⑤ “Set-operate” key switch・・・・・・・・・SET (The setting indicator turns on.)

⑥ Power switch ・・・・・・・・・・・・・・・・・・・・・・・・ ON

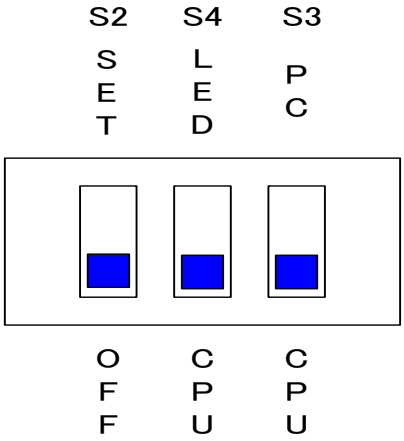
⑦ Check the received beams by the light reception indicator.

⑧ Set the “set-operate” key switch to OPERATE. (The setting indicator turns off.)

⑨ Close the box panel door, turn the door lock key in the closing direction and remove it.

5-2 Operation Function and Setting of LED-MB Circuit Board

How to Set Mode Select Switch



S3 Major selection of communication partner

S4 Selection of communication partner

S2 Selection of time correction

(1). S3 Major selection of communication partner

Selects a communication partner. PC is a personal computer. CPU is a main circuit board. Normally a CPU is used.

(2). S4 Selection of communication partner

Selects a particular communication partner for S3. LED is a LED-MB circuit board. CPU is a main circuit board. This switch is effective when a PC is used for S3.

(3). Selection of time correction

For time correction, the switch is set to SET. At power-up, with the switch in the SET position, the time is corrected when it is within 3 minutes from the just right time. (For example, when the time is from 1:57 to 2:03, it is corrected to just 2 o'clock.)

(4). Life reset button

The life reset button is a function to clear the relay OFF counter that is counting the duration of life. With this button pushed at power-up, the relay OFF counter is reset to zero, data is written in the EEPROM and the service-life indicator turns off.

When the relay OFF counter exceeds a count of 100,000, the service-life indicator (PILOT4) turns on. This means the life of the relay or EERPROM. When this LED turns on, replace the relay and LED circuit board.

(5).Description of LEDs

① PILOT1: Displays the transmission state. Turning green means the reception waiting state.

② PILOT2: Displays an overrun error.

③ PILOT3: Displays a framing error.
Simultaneous turning on of PILOT2 and PILOT3 indicates an undefined command error.

④ PILOT4: Service life alarm light. When the relay OFF counter reaches a count of 100,000 or more, the service-life indicator turns on. This means the service life of the relay or EEPROM. When this LED turns on, replace the relay and LED circuit board. The relay OFF counter can be cleared by the life reset button.

5-3 Operation Function and Setting of COM Circuit Board

(Note ! : Do not change this setting,)

The COM circuit board comprises 8 switches.
Switches 1, 3, 5, 6 and 7 are fixed in the on-state.
Switches 2, 4 and 8 are fixed in the off-state.
Meaning: 115200 bps, 8 bit length, no parity, 1 stop bit.
For reference, the meaning of switches is shown below:

SW3	SW2	SW1	
OFF	OFF	OFF	9600 bps
OFF	OFF	ON	14400
OFF	ON	OFF	19200
OFF	ON	ON	38400
ON	OFF	OFF	57600
ON	OFF	ON	115200
ON	ON	OFF	Unused
ON	ON	ON	Unused

SW5	
OFF	7-bit length
ON	8-bit length

SW6	
OFF	Even parity
ON	No parity

SW7	
OFF	2 stop bits
ON	1 stop bit

5-4 Bank Switching Function

Up to 8 blanking settings are stored in memory. Previous blanking settings can be called up and set.

(1) Set the “set-operate” key switch to SET while pushing the select button. (The setting indicator turns on.)

(2) Release the select button. The preceding setting is displayed by the disabled beam indicator. Push the select button to display the setting before that if desired. (At each push of the select button, the setting before the displayed setting is displayed.)

(3) Repeat step (2). When the desired setting is displayed, set the “set-operate” key switch to OPERATE. (The setting indicator turns off.)

(4) Close the box panel door, turn the door lock key in the closing direction and remove it,

Note: The lockout setting is the preceding setting (not the current switch value).

⚠ WARNING
Be sure to use the RPX after the following inspection has been normally completed. There is a possibility of injury and death.
Do not disassemble, repair and modify the main body. There is a risk of losing the primary safety function.

Request:

Record and retain the inspection results in order to ensure safety.

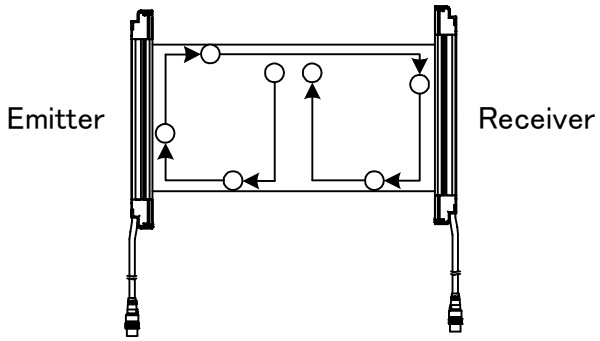
Perform inspection only after fully understanding the RPX and machine.

In cases where the installer, design engineer and user are different, give a sufficient guidance about maintenance to the user.

Daily Inspection

Confirm the following inspection items before operation and at the time of change in work shifts:

1. ☐There is no approach route to the dangerous part of the machine with the exception of the detection area of the RPX.
2. ☐When working in the dangerous part of the machine, part of the body remains in the detection area of the RPX.
3. ☐The measured value of the safety distance is greater than the calculated value.
4. ☐The optical surfaces of the emitter and receiver are not dirty and damaged.
5. ☐The detectable object for inspection is not deformed.
6. ☐Turn on the power supply to the RPX with nothing existing in the detection area. The power indicator and ON output indicator turn on within 3 seconds after power up.
7. ☐When the test rod is made to move in the detection area as shown below, the test rod can be detected. That is, when the test rod enters the detection area, all of the 5 received light level indicators turn off and the OFF output indicator turns on.



Make the machine operable and confirm the stop of the dangerous part as follows:

8.☐The dangerous part is operable with nothing existing in the detection area.

9.☐When the test rod is made to enter the detection area at three places “right before emitter,” “right before receiver” and “middle between emitter and receiver,” the dangerous part stops at once. (Use the correct test rod).

10.☐The dangerous part continues stopping as far as the detectable body for inspection exists in the detection area.

11.☐Turn off the power supply to the RPX with nothing existing in the detection area and the dangerous part stops.

Semi-Annual Inspection

Confirm the following inspection items every six months and when the machine settings are altered:

1.☐The machine itself is designed not to interfere with the safety function such as stopping.

2.☐Modifications and connection changes that adversely affect the control system of the machine have not been made.

3.☐The output of the RPX and the machine are correctly wired.

4.☐The actual response time of the machine as a whole is less than the calculated value.

5.☐The switching frequency of the relay is sufficiently low with respect to the lifetime counts.

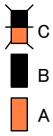
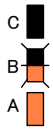
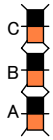
6.☐The tightening screws of fittings are not loose.

7.☐There is no ambient light.

Chapter 7 BEFORE TROUBLE SEEMS TO EXIST

7-1 Lockout State

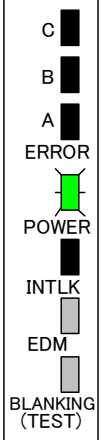
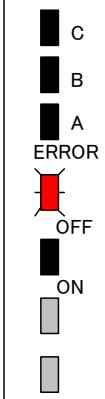
When the emitter/receiver enters the lockout state, the error mode indicators blink to indicate errors. Take measures according to the table below:

Emitter	Receiver	Error code	Cause	Solution
		Mutual interference error	Entry of ambient light	Interrupt ambient light
		Power capacity error	①. Supply voltage deviating from ratings. ②. Voltage change due to insufficient. current capacity of power supply. ③. Momentary turn-off or stop due to sharing of power supply with other device.	①. Connect to DC24V±20% supply voltage. ②. Replace with power supply greater in current capacity. ③. Stop sharing and use as special power supply.
		Blanking monitoring error. (Note:When special box for blanking is used)	Light entering fixed blanking beam.	Correct position of device etc to prevent light entering fixed blanking beam. (Set device again.)
		Communication error	①. The communication line or other wiring is broken or short-circuited. ②. Connector of power cord or seriesconnected cord detached. ③. Communication error due to noise ④. Faulty internal circuit	①. Check whether or not wiring and cord are faulty. ②. Check noise environment around communication wire.
		Lockout of other sensor than the primary receiver (error mode indicator will not turn on)	A sensor other than the primary receiver is in lockout when seriesconnected.	Replace sensor.
		External device monitoring error	①. Relay is welded. ②. The relay and external device monitoring input line are not properly wired. ③. The relay response time exceeds the allowable delay time. ④. Wire broken or shorted.	①. Replace the relay. ②. Check the wiring for the relay. ③. Replace the relay with one that has an appropriate response time.
		Interlock wiring error	①. The reset input line and interlock selection input line are not properly wired. ②. The interlock selection input line is broken or short-circuited.	①. Check that wiring has been made for auto reset or manual reset. ②. Check wiring of interlock selection input line.
		Safety output error (1)	①. Safety output lines are shortcircuited to each other at power on. ②. Safety output line and 24V, 0V, or device or the connection. other input/output line are shortcircuited at power on. ③. Failure of safety output circuit.	①. Wire the output lines properly. ②. Replace the receiver. ③. Check if series connection cables are connected properly
		Safety output error (2)	①. Safety output lines are shortcircuited to each other after power on. ②. Safety output line and 24V, 0V, or device or the connection. other input/output line are shortcircuited after power on.	①. Wire the output lines properly. ②. Check if series connection cables are connected properly
		Effect of noise.	Effect of noise is excessive.	Check noise environment around emitter/receiver.
		Failure of RPX's internal circuit.	RPX's internal circuit is damaged.	Replace the RPX.

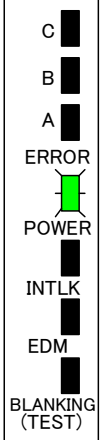
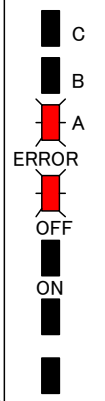
7-2 Troubles Except in Lockout State

The measures to deal with trouble when the emitter/receiver does not operate though the lockout indicator and error mode indicator do not blink are shown below:

The state in which the received light level indicator does not turn on and only the power indicator and OFF output indicator are on when light is allowed to enter:

Emitter	Receiver	Cause	Action
		①. Beam is misaligned. ②.Test input is being applied. ③. Detection surface of an emitter or a receiver is dirty.	①. Adjust the beam so that it should receive light. ②. Check if the test indicator is blinking. If it is blinking, set the test input OFF or open. ③. Clean the surface.

The state in which the received light level indicator does not turn on and only the power indicator, OFF output indicator and receiver side error code A are on when light is allowed to enter:

Emitter	Receiver	Cause	Action
		①. Communication line is broken between an emitter and a receiver. ②. Effect of noise on the communication line is too much. ③. Power connector is detached.	①. Perform the proper wiring. ②. Check the noise level in the environment around the communication line. ③. Plug the power connector tightly to ensure connection.

- When considering using the device in the conditions or environment not specified in this User's Guide or for nuclear control, railways, aircrafts, vehicles, combustion devices, medical equipment, amusement machines and safety equipment and for applications which are expected to greatly affect human life and property and for which safety is especially required, please be sure to operate the device, leaving some leeway with respect to the ratings and performance, and take measures to ensure safety such as fail-safe operation. In addition, please check up necessary matters with the Specification etc., consulting with our business staff.

Riken Optech Corporation

Home page address http://www.rikenoptech.com/

Safety & Automation System Div. Head Office	2-6-9, Higashi Ohi, Shinagawa-ku, Tokyo140-8533 TEL 03-3474-8602 FAX 03-3450-5295
Kitakanto Sales Office	943, Shimo Kanai-cho, Utsunomiya City, Tochigi 321-2114 TEL 028-666-1261 FAX 028-666-1263
Nagoya Sales Office	9-10, Futano-cho, Mizuho-ku, Nagoya City, Aichi467-0861 TEL 052-882-3641 FAX 052-881-9967
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Kyushu Sales Office	2900-2, Seiganji, Nagasu-cho, Tamana-gun, Kumamoto 8 69-0105 TEL 0968-78-1169 FAX 0968-78-ween GLL and GLN.

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