

Thank you very much for purchasing Panasonic products.
Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product.
Kindly keep this manual in a convenient place for quick reference.

⚠ WARNING

- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

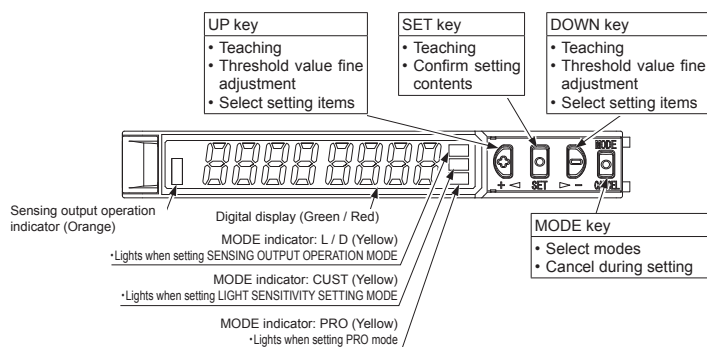
This product is not equipped with an automatic interference prevention function.
By setting different frequencies, interference can be prevented for up to four units.
For the setting method, refer to <PRO3> in "12 PRO MODE."

1 INTENDED PRODUCTS FOR CE MARKING

- This product complies with the following standards / regulations.
<EU Directive>
EMC Directive



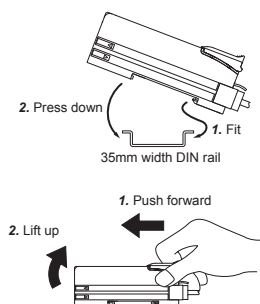
2 PART DESCRIPTION



3 MOUNTING

How to mount

1. Fit the rear part of the mounting section of the amplifier on a DIN rail.
2. Press down the rear part of the mounting section of the unit on the DIN rail and fit the front part of the mounting section to the DIN rail.



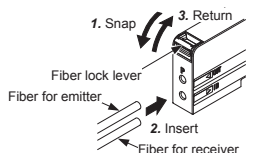
How to remove

1. Push the amplifier forward.
2. Lift up the front part of the amplifier to remove it.

How to connect the fiber cable

- Mount the fiber cables in the state power is not supplied.
- Be sure to fit the attachment to the fibers first before inserting the fibers to the amplifier. For details, refer to the instruction manual enclosed with the fibers.
- Insert the fiber cables slowly into the inlets until they stops. Excessive force may damage the product.

1. Snap the fiber lock lever down till it stops completely.
2. Insert the fiber cables slowly into the inlets until they stops. (Note)
3. Return the fiber lock lever to the original position till it stops.



Note: With the coaxial reflective type fiber, insert the single core fiber cable into the beam-emitting inlet "P" and the multi-core fiber cable into the beam-receiving inlet.
If they are inserted in reverse, the sensing performance will deteriorate.

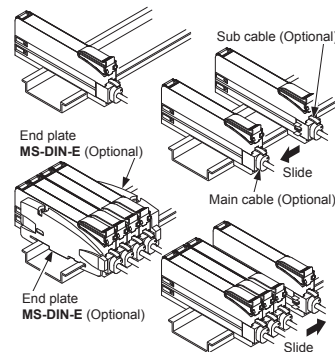
4 INSTALL MORE AMPLIFIER OF SERIES CONNECTION TYPE (Connection type only)

- Make sure that the power supply is OFF while adding or removing the series connection type.
- This product is not equipped with an automatic interference prevention function. By setting different frequencies, interference can be prevented for up to four units. For the setting method, refer to <PRO3> in "12 PRO MODE."
- In case 2 or more the series connection types are connected in cascade, make sure to mount them on a DIN rail.
- In case installing additional amplifier of series connection type, the maximum 15 the series connection types using sub cables (optional) can be added to an amplifier using a main connection cable. (optional)
- When connecting 2 or more the series connection types in cascade, use the sub cable (optional) for the second series connection type onwards.

For mounting and removing the amplifier, refer to "3 MOUNTING."

How to cascade

1. Mount the amplifiers, one by one, on the DIN rail.
2. Slide the amplifiers next to each other, and connect the quick-connection cables.
3. Mount the end plates **MS-DIN-E** (optional) at both the ends to hold the amplifiers between their flat sides.
4. Tighten the screws to fix the end plates.

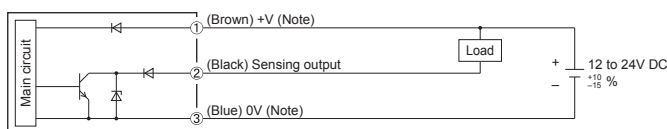


How to Remove

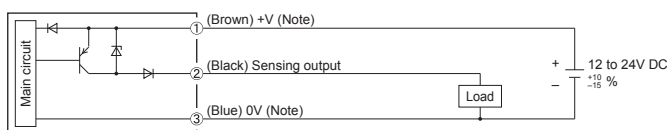
1. Loosen the screws of the end plates.
2. Remove the end plates.
3. Slide the amplifiers and remove them one by one.

5 I/O CIRCUIT DIAGRAMS

< NPN output type >



< PNP output type >



Note: The quick-connection sub cable does not incorporate +V (brown) and 0V (blue). The power is supplied from the connector of the main cable.

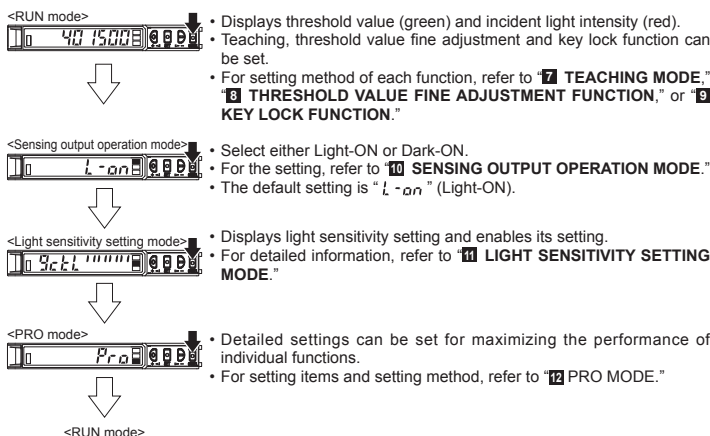
< FX551 terminal arrangement >

Terminal No.	Terminal name
1	+V
2	Sensing output
3	0V

6 OPERATION PROCEDURE

The changed settings are not stored if turning the power OFF while setting. Therefore, confirm the settings by pressing the SET key before turning the power OFF.

- When turning ON the power, RUN mode is displayed and the digital display shows the threshold value (green) and the incident light intensity (red).



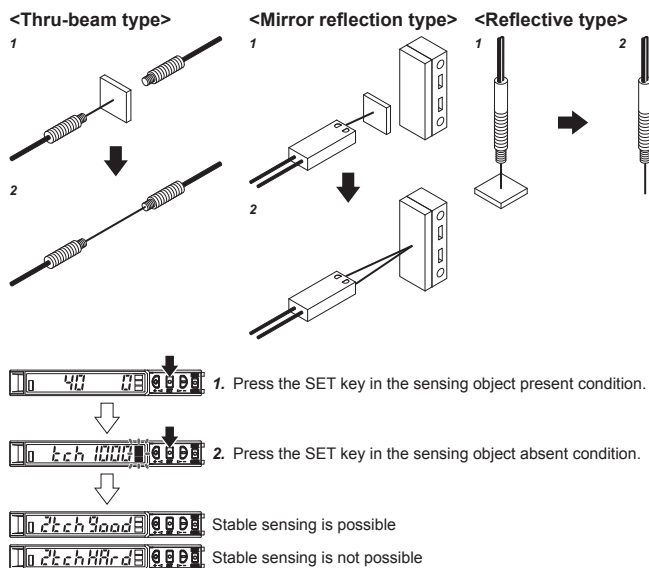
7 TEACHING MODE

Be sure that detection may become unstable depending on the use environment in teaching if less margin is applied.

- Teaching can be set in RUN mode.

Useful when sensing object can be set

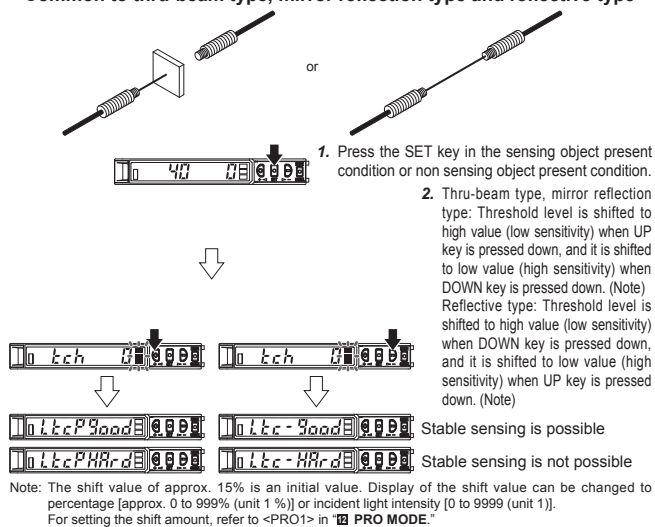
2-point teaching This is basic teaching method.



Useful when sensing object cannot be set

Limit-teaching This is teaching method in case small object or object in back ground are existing.

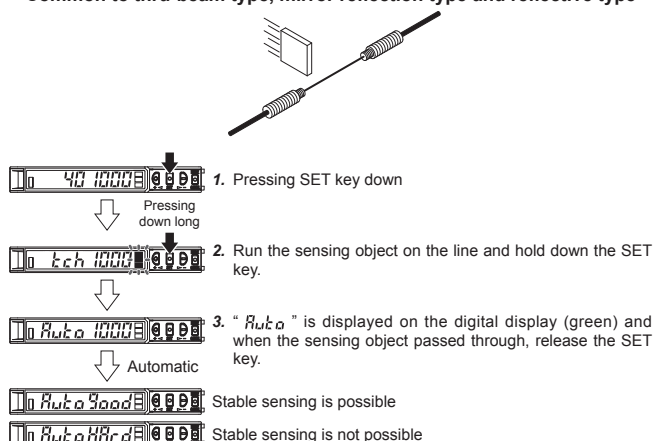
<Common to thru-beam type, mirror reflection type and reflective type>



Useful when not want to stop production line and to keep the sensing object move

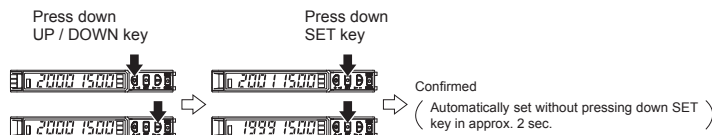
Full-auto teaching This is method to conduct teaching doing sensing object is moving.

<Common to thru-beam type, mirror reflection type and reflective type>



8 THRESHOLD VALUE FINE ADJUSTMENT FUNCTION

- Set the fine adjustment of threshold value in RUN mode.



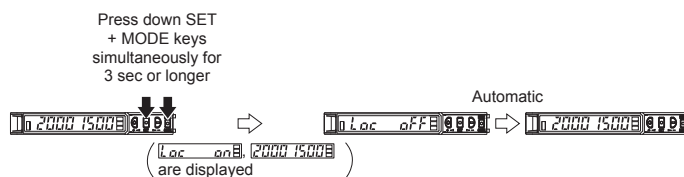
9 KEY LOCK FUNCTION

- The key lock function prevents key operations so that the conditions set in each setting mode are not inadvertently changed.
- If operating key switch after key lock is set, "Loc on" is indicated on the digital display.

<Set key lock>

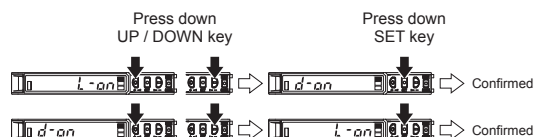


<Release key lock>



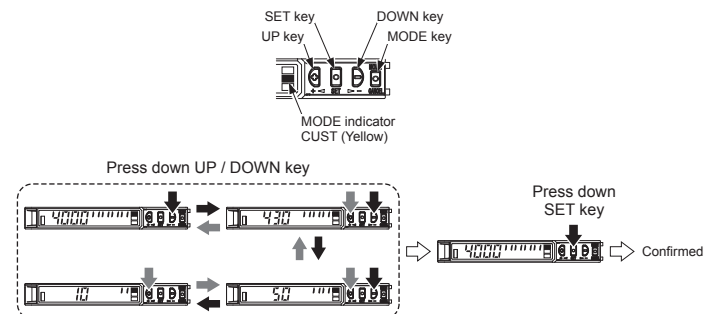
10 SENSING OUTPUT OPERATION MODE

- When MODE indicator: L / D (yellow) lights up, sensing output operation can be set.



11 LIGHT SENSITIVITY SETTING MODE

- When the MODE indicator: CUST (yellow) lights up, light sensitivity setting can be displayed.
- By pressing down UP key or DOWN key, light sensitivity setting can be changed.
- Press SET key to confirm the setting.



- When MODE indicator: PRO (yellow) lights up, PRO mode can be set.



Response time setting (Note 1)

Timer setting

When timer is used, set the timer range and timer time. (Note 2)

Shift amount setting

Teaching lock setting

Setting items in digital display setting

Setting of digital display turning

ECO setting

Display adjustment setting

Reset setting

Emission frequency setting

Setting of threshold value tracking

Sensing output setting

Storage cycle setting

Algorithm setting (Note 5)

Limit teaching

Auto teaching

	Item	Default setting	Description
PRO1 mode	Response time setting	<i>SPEdStd</i>	Set response time.
	Timer setting	<i>dELy non</i>	Set timer operation.
	Timer range setting	<i>trn9 n5</i>	Set timer range and timer time.
	Shift amount setting	<i>SHft ---P</i>	Set shift amount of threshold value in limit teaching.
PRO2 mode	Teaching lock setting	<i>t-Lc OFF</i>	Be able to prevent from wrong operation of teaching. " <i>OFF</i> ": Teaching mode is valid " <i>on</i> ": Teaching mode is invalid
	Digital display item setting	<i>dISPd19t</i>	Incident light intensity can be displayed in percentage or the peak / bottom value can be displayed on the digital display (red).
	Period hold setting	<i>Hold OFF</i>	" <i>OFF</i> ": Peak / bottom value in the digital display refreshing condition can be displayed. " <i>on</i> ": Peak / bottom value in the hold condition can be displayed.
	Digital display turning on setting	<i>tur-n OFF</i>	Sets the viewing orientation of the digital display.
	ECO setting	<i>Eco OFF</i>	Power consumption can be lowered. " <i>OFF</i> ": ECO OFF " <i>on</i> ": If any key operation is not carried out for 20 sec. in RUN mode, the digital display turns OFF. " <i>FULL</i> ": If key operation is not done in 20 sec. or setting the key lock function in Run mode, all indicators turns OFF.
PRO3 mode	Display adjustment setting	<i>dRdu OFF</i>	Incident light intensity can be set to "0." When the correction amount is large, " <i>OVER</i> " is blinked as the setting cannot be conducted normally. " <i>OFF</i> ": Display adjustment OFF " <i>SEt</i> ": Incident light intensity is offset (in the negative direction) to cancel sneaking light.
	Reset setting	—	If setting to " <i>SE5</i> " returns to default settings (factory settings).
	Emission frequency setting	—	" <i>IP-I</i> ": Interference prevention function is disabled. " <i>IP-F</i> ": Set this when emission frequency is changed and interference prevention function is used. The maximum number of sensor heads for adherence mounting is 4 units when 4 types of emission frequency are set. " <i>IP-r</i> ": Set this to minimize the effect of ambient environment. When this setting is set, mutual interference prevention function is disabled.
		<i>InPr IP-I</i>	Response time is as follows when " <i>IP-F</i> " or " <i>IP-r</i> " is selected.
			Response time " <i>IP-F</i> " : F-1: 0.8ms or less, F-2: 0.9ms or less F-3: 1.0ms or less, F-4: 1.7ms or less " Not affected by " <i>Pro1SPCd</i> " setting. (Response time setting) " <i>IP-r</i> " : FAST: 120μs or less, STD: 500μs or less LONG: 4ms or less, U-LG: 8ms or less, HYPR: 48ms or less (selectable)
	Setting of threshold value tracking	<i>Eycl OFF</i>	This mode can change the threshold value depending on the cycle (1 to 9,999 sec.) that is set with the variations of the incident light intensity. The tracking shift amount is the one which is set at the shift setting.
	Sensing output setting	<i>bRSE OFF</i>	Selects whether tracking threshold when the output is OFF or when the output is ON.
	Storage cycle setting	<i>rEc OFF</i>	Selects a threshold storage cycle in EEPROM from 1 to 250 times.
PRO4 mode	Algorithm setting	—	" <i>SHft</i> ": Limit teaching Threshold value is followed up on the basis of shift amount. (recommended when using thru-beam-type fiber or mirror-reflection-type fiber) " <i>Rtch</i> ": Auto teaching Threshold value is followed up on the basis of each cycle. (recommended when using reflective-type fiber)
		<i>Rt9 SHft</i>	

13 ERROR INDICATION

- In case of errors, attempt the following measures.

Error indication	Description	Remedy
<i>Er01</i>	EEPROM is broken or reached the end of its working life.	Please replace the product.
<i>Er02</i>	EEPROM writing error	
<i>Er11</i>	Load of the sensing output is short-circuited causing an over-current to flow.	Turn OFF the power and check the load.

14 SPECIFICATIONS

Type	Connection type		Cable type	
	NPN output	PNP output	NPN output	PNP output
Model No.	FX-551	FX-551P	FX-551-C2	FX-551P-C2
Supply voltage	12 to 24V DC: ¹⁰ / ₁₀ % Ripple P-P10% or less			
Power consumption	Normal operation: 960mW or less (current consumption 40mA or less at 24V supply voltage) Eco mode: 680mW or less (current consumption 28mA or less at 24V supply voltage)			
Sensing output	< NPN output type > NPN open-collector transistor • Maximum sink current: 100mA (Note 1) • Applied voltage: 30V DC or less (Between sensing output and 0V) • Residual voltage: 2V or less (Note 2) [At 100mA (Note 1) sink current]		< PNP output type > PNP open-collector transistor • Maximum source current: 100mA (Note 1) • Applied voltage: 30V DC or less (Between sensing output and +V) • Residual voltage: 2V or less (Note 2) [At 100mA (Note 1) source current]	
	Switchable either Light-ON or Dark-ON			
Output operation	Switchable either Light-ON or Dark-ON			
Short-circuit protection	Incorporated			
Response time (Note 3)	FAST: 60µs or less, STD: 250µs or less, LONG: 2ms or less, U-LG: 4ms or less, HYPR: 24ms or less, Selectable			
Interference revention function	Incorporated Emission frequency selection method (Functions at emission frequency 1, 2, 3 or 4)			
Protection	IP40 (IEC)			
Ambient temperature (Note 4)	-10 to +55°C (when 4 to 7 units are installed: -10 to +50°C, when 8 to 16 units are installed: -10 to +45°C) (No dew condensation or icing allowed), Storage: -20 to +70°C			
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH			
Material	Enclosure: Polycarbonate, Key: Polyacetal, Protective cover: Polycarbonate			
Cable	(Note 5)		0.2-mm ² 3-core cabtire cable (2 m) provided	
Weight (Main body only)	Approx. 15 g		Approx. 60 g	

Notes: 1) 50mA in the case 5 or more connection-type units are connected in series
2) When 5-m-long one-touch cable (optional) is used with connection-type units
3) Response tisme varies depending on the emission frequency setting. Regarding the response time in the case " *!P-F* " or " *!P-r* " is selected, refer to <PRO3> in " **PRO MODE**."
4) In the case of connection type: When connected in series.
In the case of cable type: When adherence-mounted.
5) Cable is not provided with the connection-type product. Be sure to use the following cables (optional).

< Connection type >

	Cable					
	Cable length 1m		Cable length 2m		Cable length 5m	
	Main cable	Sub cable	Main cable	Sub cable	Main cable	Sub cable
FX-551 □	CN-73-C1	CN-71-C1	CN-73-C2	CN-71-C2	CN-73-C5	CN-71-C5

15 CAUTIONS

- This product has been developed / produced for industrial use only.
- Make sure that the power supply is OFF while adding or removing the amplifiers.
- Take care that if a voltage exceeding the rated range is applied, or if an AC power supply is directly connected, the product may get burnt or be damaged.
- Take care that short-circuit of the load or wrong wiring may burn or damage the product.
- Do not run the wires together with high-voltage lines or power lines, or put them in the same raceway. This can cause malfunction due to induction.
- The specification may not be satisfied in a strong magnetic field.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- The ultra long distance (U-LG, HYPR) mode is more likely to be affected by extraneous noise since the sensitivity of that is higher than the other modes. Make sure to check the environment before use.
- Do not use during the initial transient time (FAST, STD: 0.5 sec., LONG, U-LG, HYPR: 1 sec.) after the power supply is switched ON.
- When extending the cable length, use a cable with a conductor cross-sectional area of 0.3 mm² or more. Note that the maximum allowed cable length is 100 m. However, in order to reduce noise, make the wiring as short as possible.
- Set the power supply voltage by considering the voltage drop resulting from the conduction resistance of the cable.
- Make sure that the cable joint is not applied with stress, such as strain caused by forcible bending or pulling.
- This product is suitable for indoor use only.
- Avoid dust, dirt, and steam.
- Take care that the product does not come into contact with organic solvents such as thinner.
- Take care that the product does not come into contact with strong acids or alkalis.
- Take care that the product does not come into contact with oil or grease.
- This product cannot be used in an environment containing inflammable or explosive gasses.
- Never disassemble or modify the product.
- This product adopts EEPROM. Settings cannot be done 100 thousand times or more because of the EEPROM's lifetime.

Panasonic Industrial Devices SUNX Co., Ltd.

<http://panasonic.net/id/pidsx/global>
Overseas Sales Division (Head Office)
2431-1 Ushiyama-cho, Kasugai-shi, Aichi, 486-0901, Japan
Phone: +81-568-33-7861 FAX: +81-568-33-8591

For sales network, please visit our website.

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