

Digital Fiber Sensor

FX-550 SERIES



FX-550 SERIES



CE

PNP output
type available

Timer

Interference
preventionLight intensity
monitorAutomatic
sensitivity setting

Significantly improved stability and operation ease thanks to the industry's top* emission power and enhanced versatility!

* As of January 2016, in-company survey

Industry's No. 1!* Three times higher emission power and 1.6 times longer sensing range than conventional models!

* As of January 2016, in-company survey

Ample sensing distance even with thin fiber

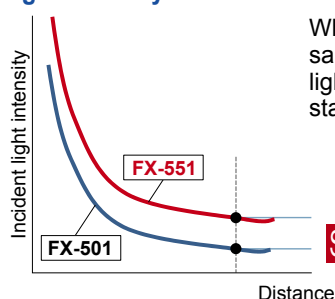
The sensing range of the thin reflective type fiber is about 1.6 times longer than that of a conventional product (the sensing range of the standard reflective type fiber is about 1.4 times longer). This adds extra flexibility to the sensor layout.

Fiber	Sensing range (STD mode)		Rate of increase in sensing range
	FX-551	FX-501	
FT-31	480 mm 18.898 in	315 mm 12.402 in	152 %
FT-42	1,470 mm 57.874 in	1,130 mm 44.488 in	130 %
FD-41	200 mm 7.874 in	125 mm 4.921 in	160 %
FD-61	620 mm 24.409 in	450 mm 17.717 in	138 %



1.6 times approx.
longer than conventional models!

When the hysteresis is the same, the higher incident light intensity results in more stable detection.



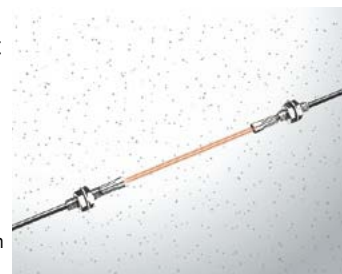
When the hysteresis is the same, the higher incident light intensity results in more stable detection.

Stable detection!

Easy adjustment of beam axis

Thanks to the high emission power, a slight deviation of beam axis causes no problem. It is ideal for use in dusty areas* or for detection through an extremely small slit.

* Need to confirm proper operation in installed condition.



Equipped with a mode to minimize the effect of ambient light

When setting to activate the environment resistance mode in the emission frequency setting, the ambient illuminance for LED lights becomes about 2.5 times higher than that in the normal mode. This reduces erroneous detections caused by LED lights.



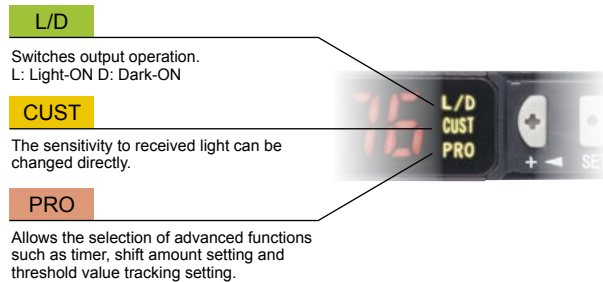
Simplified functions for improved operation ease

The **FX-500** series and newer models are equipped with only basic functions for improved ease of use. No matter which model you select, they are all easy to use.

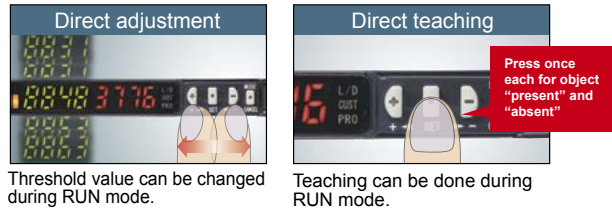
MODE NAVI + Direct setting

MODE NAVI uses three indicators and a dual display to show the amplifier's basic operations. The current operation mode can be confirmed at a glance, so even a first-time user can easily operate the amplifier.

■ NAVI display (lights off during RUN mode)



■ Direct setting

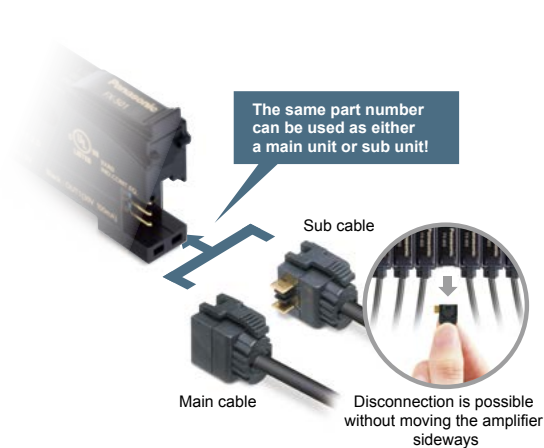


► List of functions in PRO mode

PRO 1	Response time setting, timer setting, shift amount setting
PRO 2	Teaching lock setting, digital display item setting, digital display turning setting, Eco setting
PRO 3	Display adjustment setting, reset setting, emission frequency setting, threshold value tracking setting

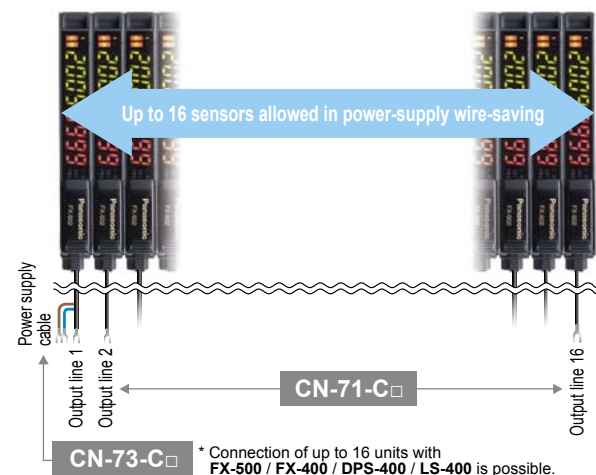
No need to specify a main unit or sub unit

All **FX-500** amplifiers can be used as either a main unit or a sub unit. Just use a main cable or a sub cable to distinguish the two. This reduces the costs of inventory management.



Wire-saving, space-saving



The quick-connection cables enable reduction in wiring. The connections and man-hours required for the relay terminal block setup can be reduced and valuable space is saved.



Note: **FX-550** series is not equipped with a communication function. When connecting to the host communication units **SC-GU3** series and **SC-GU1-485**, please use **FX-500** series.

ORDER GUIDE

Amplifiers Quick-connection cable is not supplied with **FX-551(P)**. Please order it separately.

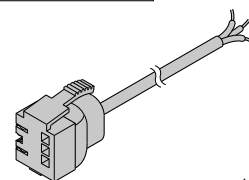
Type	Appearance	Model No.	Emitting element	Output
Connector type		FX-551	Red LED	NPN open-collector transistor
		FX-551P		PNP open-collector transistor
Cable type		FX-551-C2		NPN open-collector transistor
		FX-551P-C2		PNP open-collector transistor

Quick-connection cables Quick-connection cable is not supplied with the connector type amplifier. Please order it separately.

Type	Model No.	Description	
Main cable (3-core)	CN-73-C1	Length: 1 m 3.281 ft	0.2 mm ² 3-core cabtyre cable, with connector on one end Cable outer diameter: ø3.3 mm ø0.130 in
	CN-73-C2	Length: 2 m 6.562 ft	
	CN-73-C5	Length: 5 m 16.404 ft	
Sub cable (1-core)	CN-71-C1	Length: 1 m 3.281 ft	0.2 mm ² 1-core cabtyre cable, with connector on one end Cable outer diameter: ø3.3 mm ø0.130 in Connectable to a main cable up to 15 cables.
	CN-71-C2	Length: 2 m 6.562 ft	
	CN-71-C5	Length: 5 m 16.404 ft	

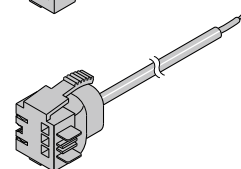
Main cable

• **CN-73-C□**

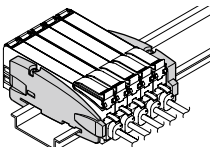


Sub cable

• **CN-71-C□**



End plates End plates are not supplied with the amplifier. Please order them separately when the amplifiers are mounted in cascade.

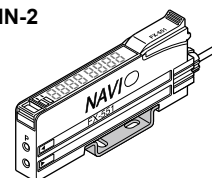
Appearance	Model No.	Description
	MS-DIN-E	When amplifiers are mounted in cascade, or when an amplifier moves depending on the way it is installed on a DIN rail, these end plates clamp amplifiers into place on both sides. Make sure to use end plates when cascading multiple amplifiers together. 2 pcs. per set

OPTIONS

Designation	Model No.	Description
Amplifier mounting bracket	MS-DIN-2	Mounting bracket for amplifier

Amplifier mounting bracket

• **MS-DIN-2**



LIST OF FIBERS

Refer to "Fiber Selection p.5 ~" for details of each fiber.

SPECIFICATIONS

Item	Model No.	Type	Connector type	Cable type
		NPN output	FX-551	FX-551-C2
		PNP output	FX-551P	FX-551P-C2
CE marking directive compliance			EMC Directive, RoHS Directive	
Supply voltage			12 to 24 V DC \pm_{-15}^{+10} % Ripple P-P 10 % or less	
Power consumption			Normal operation: 960 mW or less (current consumption 40 mA or less at 24 V supply voltage) ECO mode: 680 mW or less (current consumption 28 mA or less at 24 V supply voltage)	
Output		<NPN output type> NPN open-collector transistor <ul style="list-style-type: none">Maximum sink current: 100 mAApplied voltage: 30 V DC or less (between output and 0 V)Residual voltage: 2 V or less (Note 2) (at maximum sink current)	<PNP output type> PNP open-collector transistor <ul style="list-style-type: none">Maximum source current: 100 mAApplied voltage: 30 V DC or less (between output and +V)Residual voltage: 2 V or less (Note 2) (at maximum source current)	
	Output operation	Switchable either Light-ON or Dark-ON by L/D mode		
	Short-circuit protection	Incorporated		
Response time			FAST: 60 μs or less, STD: 250 μs or less, LONG: 2 ms or less, U-LG: 4 ms or less, HYPR: 24 ms or less, selectable	
Sensitivity setting			2-point teaching / Limit teaching / Full-auto teaching / Manual adjustment	
Incident light sensitivity setting			Incorporated, 4 steps	
Incident light intensity display range			FAST / STD: 0 to 4,000, LONG: 0 to 8,000, U-LG / HYPR: 0 to 9,999	
Timer function			Incorporated with variable OFF-delay / ON-delay / One-shot / switchable either effective or ineffective	
	Timer period	Timer range "ms": 1 to 9,999 ms approx., 1 ms approx., Timer range "sec.": 1 to 32 s approx., 1 s approx., Timer range "1/10 ms": 0.1 to 999.9 ms approx., 0.1 ms approx. (Note 3)		
Different frequency interference prevention function (Note 4)			Incorporated (up to 4 units). Note that the response time varies depending on the setting. F-1: 0.8 ms or less, F-2: 0.9 ms or less, F-3: 1.0 ms or less, F-4: 1.7 ms or less	
Protection			IP40 (IEC)	
Ambient temperature			-10 to +55 °C +14 to +131 °F (If 4 to 7 units are mounted in cascade: -10 to +50 °C +14 to +122 °F or if 8 to 16 units are mounted in cascade: -10 to +45 °C +14 to +113 °F) (No dew condensation or icing allowed), Storage: -20 to +70 °C -4 to +158 °F	
Emitting element (modulated)			Red LED (Peak emission wavelength: 660 nm 0.026 mil)	
Material			Enclosure, Case cover: Polycarbonate, Switch: Polyacetal	
Cable			—————	0.2 mm ² 3-core cabtyre cable, 2 m 6.562 ft long
Cable extension			—————	Extension up to total 100 m 328.084 ft is possible with 0.3 mm ² , or more, cable. (however, supply voltage 12 V DC or more)
Weight			Net weight: 15 g approx., Gross weight: 55 g approx.	Net weight: 55 g approx., Gross weight: 90 g approx.

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73.4 °F**.

2) In case of using the quick-connection cable (cable length 5 m **16.404 ft**) (optional).

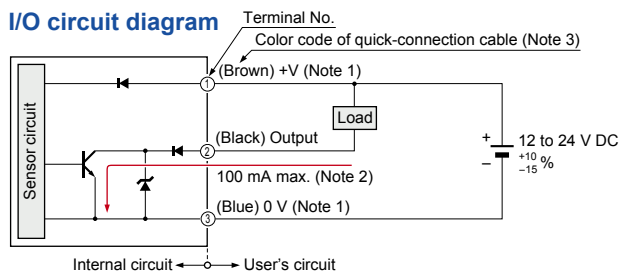
3) When set to LONG, U-LG, HYPR, IP-F or IP-R, the time range cannot be set to 1/10 ms.

4) This function increases the hysteresis. Check the sensing condition when using the function.

I/O CIRCUIT AND WIRING DIAGRAMS

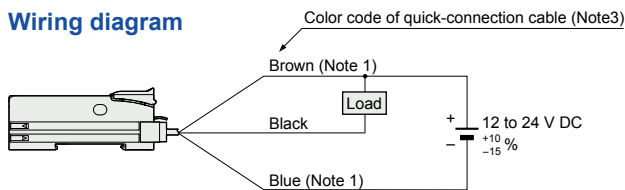
FX-551(-C2)

NPN output type



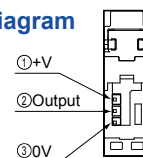
Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
 2) 50 mA max., if five amplifiers or more, are connected together.
 3) The color code of the connector attached cable is also the same.

Wiring diagram



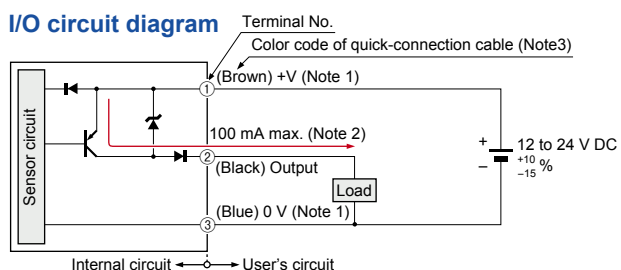
Note: The quick-connection sub cable does not have a brown and a blue lead wire.

Terminal arrangement diagram



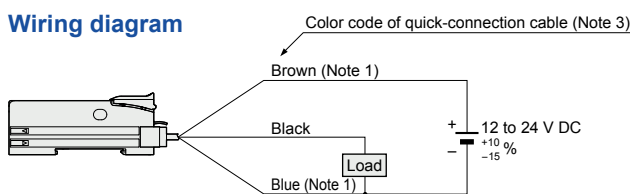
FX-551P(-C2)

PNP output type



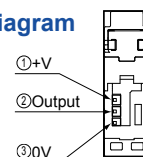
Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
 2) 50 mA max., if five amplifiers or more, are connected together.
 3) The color code of the connector attached cable is also the same.

Wiring diagram



Note: The quick-connection sub cable does not have a brown and a blue lead wire.

Terminal arrangement diagram



PRECAUTIONS FOR PROPER USE



- 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.

Wiring

- Make sure that the power supply is OFF while adding or removing the amplifiers.
- Note 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 damaged.
- Note 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.
- 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.

- Make sure to use the quick-connection cable (optional) for the connection of the controller. Extension up to total 100 m **328.084 ft** is possible with 0.3 mm² or more, cable. However, in order to reduce noise, make the wiring as short as possible.
- Make sure that stress by forcible bending or pulling is not applied to the sensor cable joint and fiber cable.

Others

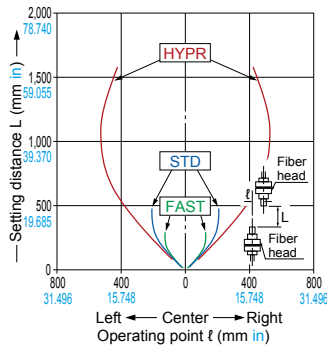
- This product has been developed / produced for industrial use only.
- The specification may not be satisfied in a strong magnetic field.
- The ultra long distance (U-LG, HYPR) mode is more likely to be affected by extraneous noise since the sensitivity of that is higher than the other modes. Make sure to check the environment before use.
- Do not use during the initial transient time (FAST, STD: 0.5 sec., U-LG, HYPR: 1 sec.) after the power supply is switched ON.
- These sensors are only for indoor use.
- Avoid dust, dirt, and steam.
- Make sure that the product does not come in contact with oil, grease, organic solvents such as thinner, etc., strong acid or alkaline.
- This product cannot be used in an environment containing inflammable or explosive gases.
- Never disassemble or modify this product.
- This product adopts EEPROM. Settings cannot be done a million times or more because of the EEPROM's lifetime.

SENSING CHARACTERISTICS (TYPICAL)

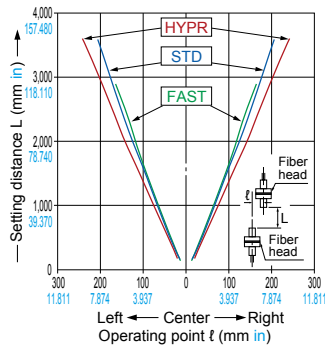
Contact our office for sensing characteristics that are not contained here.

FT-31 Thru-beam type

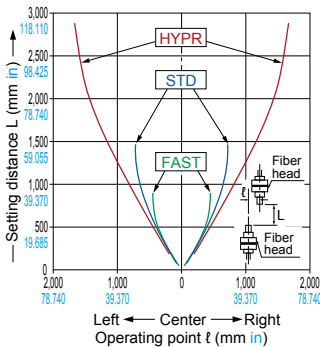
Parallel deviation

**FT-32** Thru-beam type

Parallel deviation

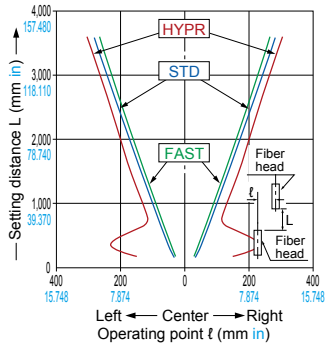
**FT-42** Thru-beam type

Parallel deviation

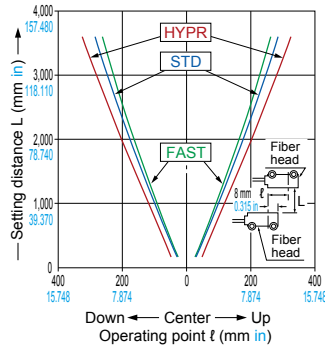
**FT-A11** Thru-beam type

Parallel deviation

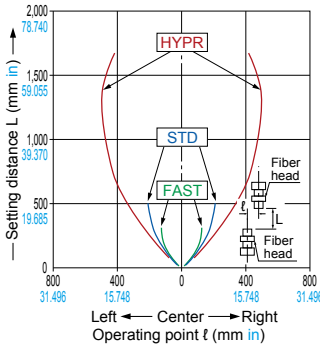
• Horizontal direction



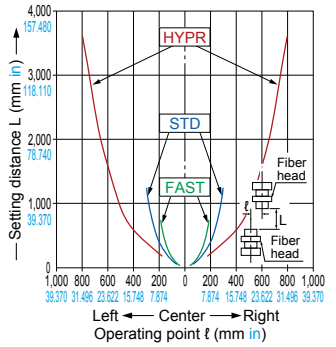
• Vertical direction

**FT-R31** Thru-beam type

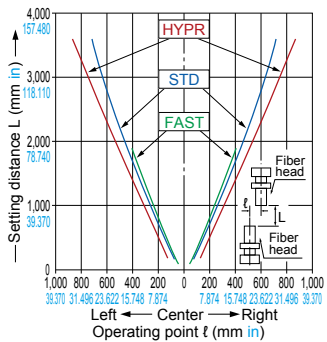
Parallel deviation

**FT-R43** Thru-beam type

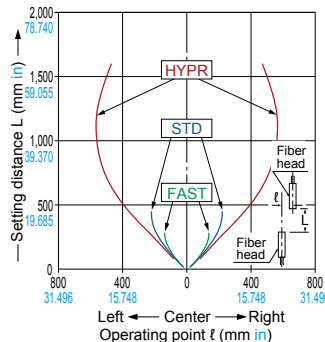
Parallel deviation

**FT-R60Y** Thru-beam type

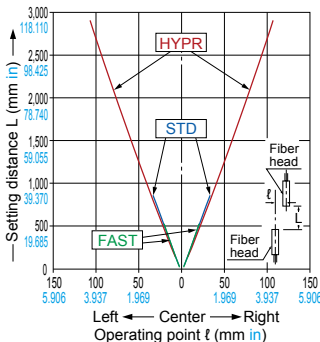
Parallel deviation

**FT-S21** Thru-beam type

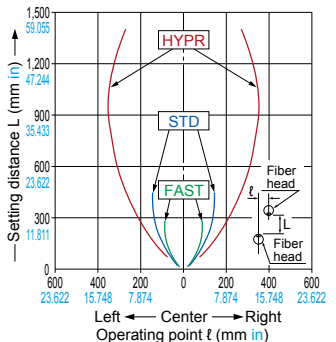
Parallel deviation

**FT-S22** Thru-beam type

Parallel deviation

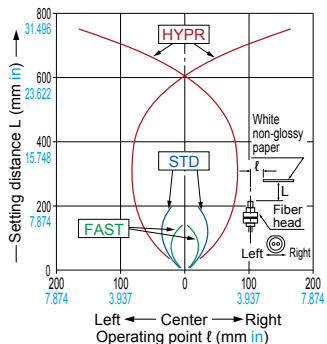
**FT-V25** Thru-beam type

Parallel deviation

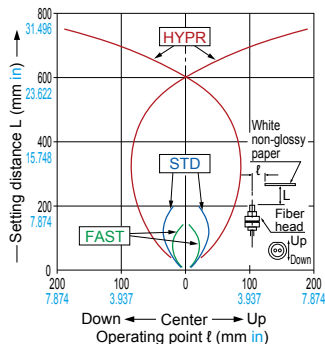
**FD-31 FD-41** Reflective type

Sensing field

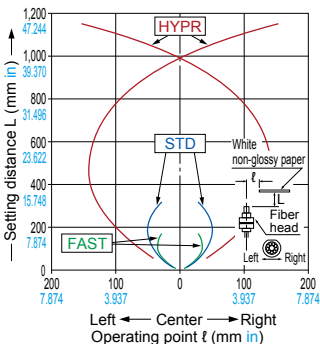
• Horizontal direction



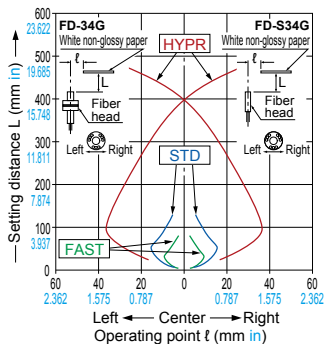
• Vertical direction

**FD-32G FD-42G** Reflective type

Sensing field

**FD-34G FD-S34G** Reflective type

Sensing field



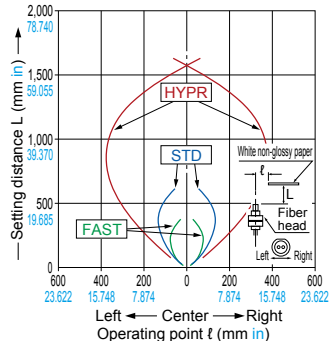
SENSING CHARACTERISTICS (TYPICAL)

Contact our office for sensing characteristics that are not contained here.

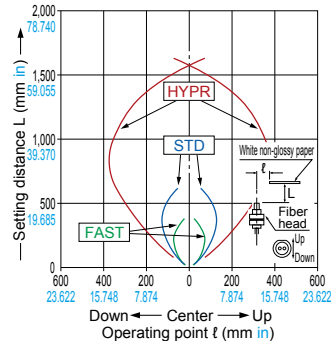
FD-61

Reflective type

Sensing field
• Horizontal direction

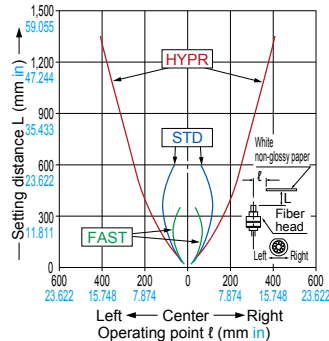


• Vertical direction

**FD-61G**

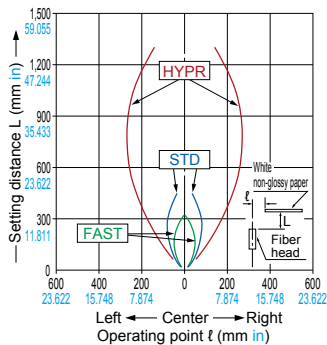
Reflective type

Sensing field

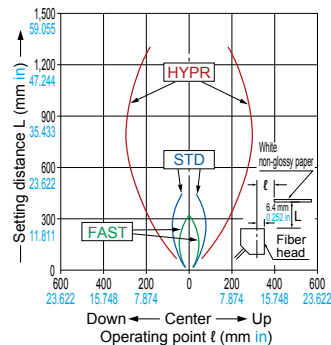
**FD-AL11**

Reflective type

Sensing field
• Horizontal direction

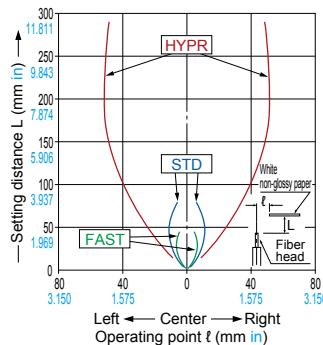


• Vertical direction

**FD-E23**

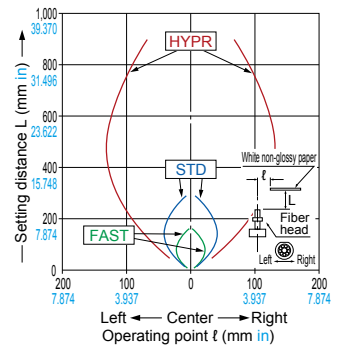
Reflective type

Sensing field

**FD-R31G**

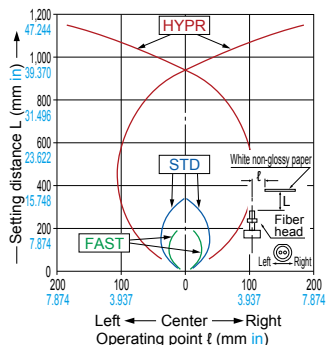
Reflective type

Sensing field

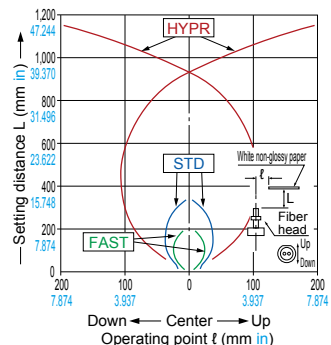
**FD-R41**

Reflective type

Sensing field
• Horizontal direction

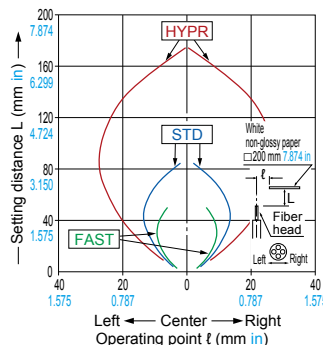


• Vertical direction

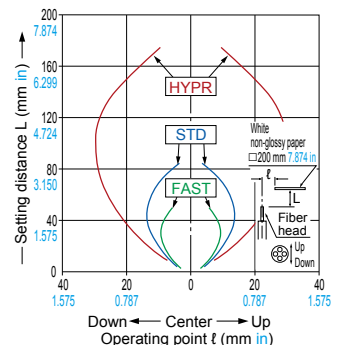
**FD-S21**

Reflective type

Sensing field
• Horizontal direction

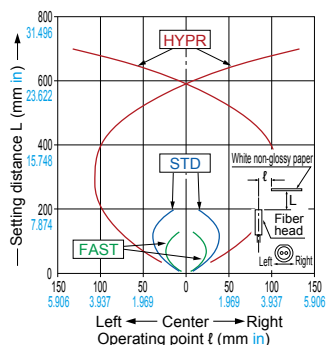


• Vertical direction

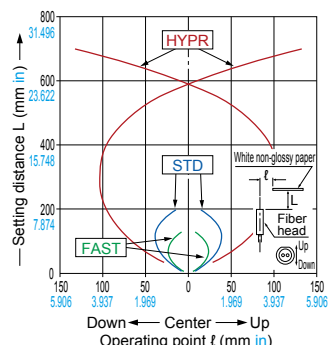
**FD-S31**

Reflective type

Sensing field
• Horizontal direction

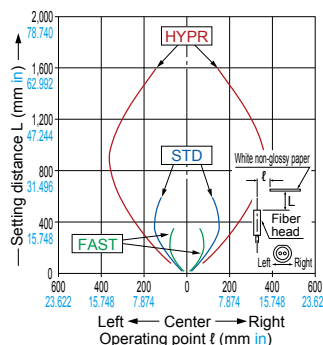


• Vertical direction

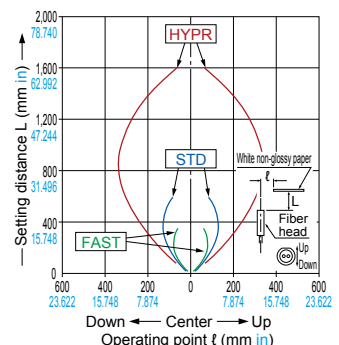
**FD-S32**

Reflective type

Sensing field
• Horizontal direction



• Vertical direction



SENSING CHARACTERISTICS (TYPICAL)

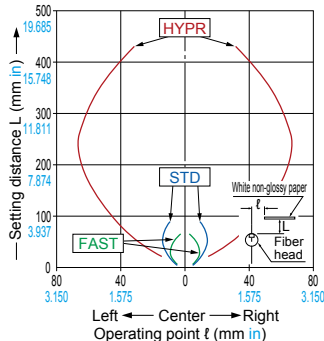
Contact our office for sensing characteristics that are not contained here.

FD-V30

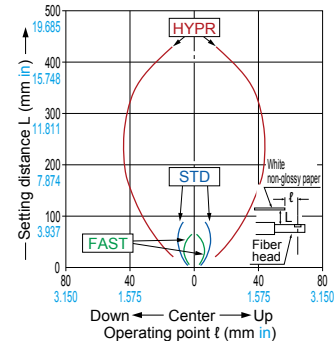
Reflective type

Sensing field

- Horizontal direction



- Vertical direction

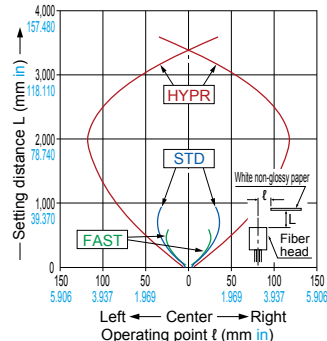


FD-Z50HW

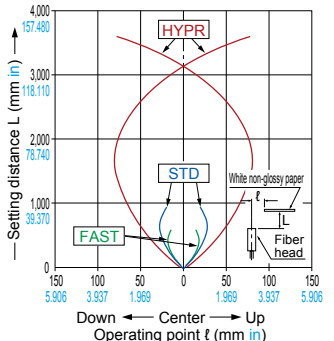
Reflective type

Sensing field

- Horizontal direction



- Vertical direction

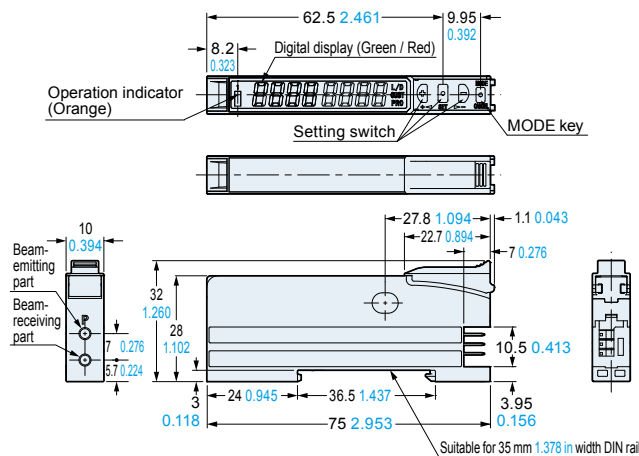


DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

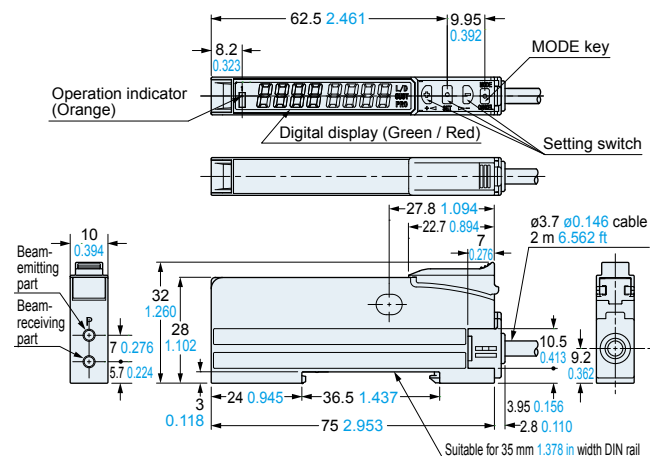
FX-551(P)

Amplifier



FX-551(P)-C2

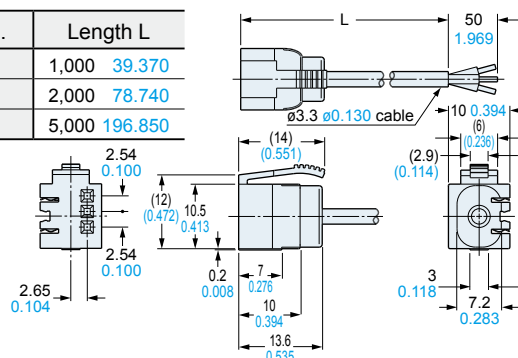
Amplifier

**CN-73-C□**

Main cable (Optional)

- Length L

Model No.	Length L
CN-73-C1	1,000 39.370
CN-73-C2	2,000 78.740
CN-73-C5	5,000 196.850

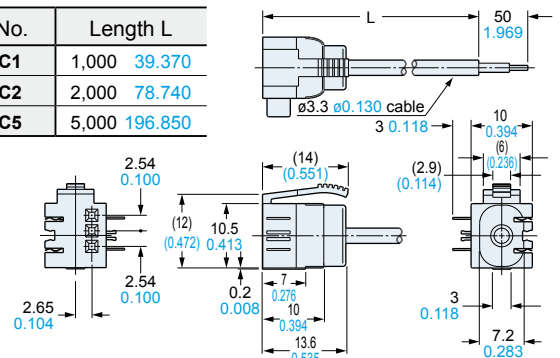


CN-71-C□

Sub cable (Optional)

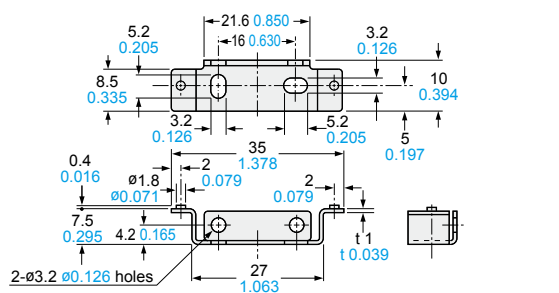
- Length L

Model No.	Length L
CN-71-C1	1,000 39.370
CN-71-C2	2,000 78.740
CN-71-C5	5,000 196.850



MS-DIN-2

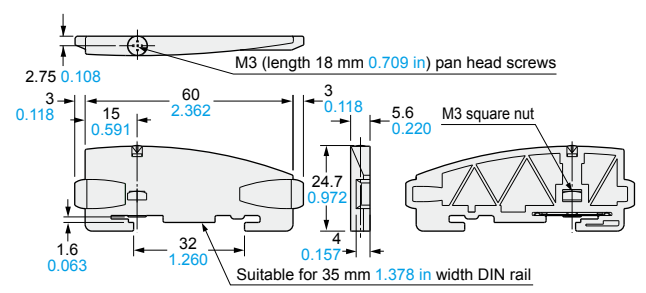
Amplifier mounting bracket (Optional)



Material: Cold rolled carbon steel (SPCC) (Uni-chrome plated)

MS-DIN-E

End plate (Optional)



Material: Polycarbonate

Disclaimer

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Panasonic
INDUSTRY

Panasonic Industry Co., Ltd.

Industrial Device Business Division

7-1-1, Morofuku, Daito-shi, Osaka 574-0044, Japan

industrial.panasonic.com/ac/e/