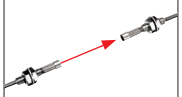
FIBER OPTIONS

Lens (For thru-beam type fiber)

For thru-beam type fiber

Expansion lens (Note 1) — FX-LE1



Increases the sensing range by 5 times or more.

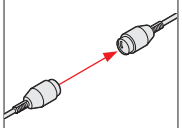
- Ambient temperature: -60 to +350 °C -76 to +662 °F

Beam dia: ø3.6 mm ø0.142 in

Sensing range (mm) [Lens on both sides]

Fiber \ Mode	HYPR	U-LG	LONG	STD	FAST	H-SP
FT-42	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	2,200
FT-B8 FT-FM2 FT-T80	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	2,000
FT-R80	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	1,400
FT-W8	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	2,100
FT-P80	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	2,500
FT-P60	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,500	1,200
FT-P81X	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,500
FT-H35-M2	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,300	1,400
FT-H20W-M1	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	850
FT-H20-M1	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,200
FT-H20-J50-S FT-H20-J30-S FT-H20-J20-S	3,600 (Note 2)	3,600 (Note 2)	3,500	2,000	1,600	500

Super-expansion lens (Note 1) — FX-LE2



Tremendously increases the sensing range with large diameter lenses.

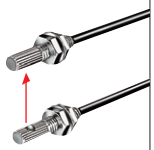
- Ambient temperature: -60 to +350 °C -76 to +662 °F

Beam dia: ø9.8 mm ø0.386 in

Sensing range (mm) [Lens on both sides]

Fiber \ Mode	HYPR	U-LG	LONG	STD	FAST	H-SP
FT-42	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)
FT-B8 FT-FM2 FT-R80 FT-W8 FT-P80 FT-P60	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)
FT-P81X	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)
FT-H35-M2	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)
FT-H20W-M1 FT-H20-M1	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)
FT-H13-FM2	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)
FT-H20-J50-S FT-H20-J30-S FT-H20-J20-S	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)

Side-view lens — FX-SV1



Beam axis is bent by 90°.

- Ambient temperature: -60 to +300 °C -76 to +572 °F

Beam dia: ø2.8 mm ø0.110 in

Sensing range (mm) [Lens on both sides]

Fiber \ Mode	HYPR	U-LG	LONG	STD	FAST	H-SP
FT-42	3,600 (Note 2)	3,600 (Note 2)	3,600 (Note 2)	2,100	1,150	370
FT-B8	3,600 (Note 2)	3,300	2,800	1,600	970	310
FT-FM2 FT-T80	3,600 (Note 2)	3,600 (Note 2)	3,000	1,700	1,000	330
FT-W8	3,600 (Note 2)	3,500	2,000	1,000	600	250
FT-P80	3,600 (Note 2)	3,500	2,200	1,300	790	290
FT-P60	3,500	1,700	1,400	800	500	150
FT-P81X	1,600 (Note 2)	1,600 (Note 2)	1,600 (Note 2)	1,400	880	280
FT-H35-M2	3,500	1,600	1,200	780	500	150
FT-H20W-M1	1,600 (Note 2)	1,600 (Note 2)	1,500	950	560	190
FT-H20-M1	1,600 (Note 2)	1,600 (Note 2)	1,300	780	500	150
FT-H20-J50-S FT-H20-J30-S FT-H20-J20-S	1,600 (Note 2)	960	740	450	290	80

Expansion lens for vacuum fiber (Note 1) — FV-LE1

Sensing range increases by 4 times or more.

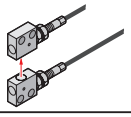
- Ambient temperature: -60 to +350 °C -76 to +662 °F

Beam dia: ø3.6 mm ø0.142 in

Sensing range (mm) [Lens on both sides] (Note 3)

Fiber \ Mode	HYPR	U-LG	LONG	STD	FAST	H-SP
FT-H30-M1V-S	3,600 (Note 2)	3,600 (Note 2)	3,400	1,500	900	370

Vacuum-resistant side-view lens (Note 1) — FV-SV2



Beam axis is bent by 90°.

- Ambient temperature: -60 to +300 °C -76 to +572 °F

Beam dia: ø3.7 mm ø0.146 in

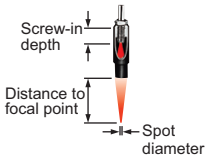
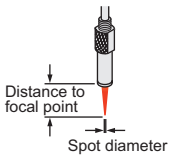
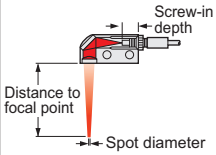
Sensing range (mm) [Lens on both sides] (Note 3)

Fiber \ Mode	HYPR	U-LG	LONG	STD	FAST	H-SP
FT-H30-M1V-S	3,600 (Note 2)	3,600 (Note 2)	3,400	1,500	900	370

Notes: 1) Be careful when installing the thru-beam type fiber equipped with the expansion lens, as the beam envelope becomes narrow and alignment is difficult. Especially when installing a fiber with many cores (sharp bending fibers and heat-resistant glass fiber), please be sure to use it only after you have adjusted it sufficiently.
2) The fiber cable length practically limits the sensing range to 3,600 mm 141.732 in long (**FT-P81X**, **FT-H20W-M1** and **FT-H20-M1**: 1,600 mm 62.992 in).
3) The fiber cable length for the **FT-H30-M1V-S** is 1 m 3.281 ft. The sensing ranges in HYPR, U-LG and LONG modes take into account the length of the **FT-J8** atmospheric side fiber.

FIBER OPTIONS

Lens (For reflective type fiber)

<table>
<tr><th colspan="2">Designation</th><th>Model No.</th><th colspan="2">Description</th></tr>
<tr><td rowspan="5">For reflective type fiber</td><td>Pinpoint spot lens</td><td>FX-MR1</td><td>  </td><td colspan="2">Pinpoint spot of ø0.5 mm ø0.020 in. Enables detection of minute objects or small marks.
• Distance to focal point: 6 ± 1 mm 0.236 ± 0.039 in • Applicable fibers: FD-WG4, FD-G4
• Ambient temperature: -40 to +70 °C -40 to +158 °F</td></tr>
<tr><td>Zoom lens</td><td>FX-MR2</td><td>  </td><td>The spot diameter is adjustable from ø0.7 to ø2 mm ø0.028 to ø0.079 in according to how much the fiber is screwed in.
• Applicable fibers: FD-WG4, FD-G4
• Ambient temperature:-40 to +70 °C
-40 to +158 °F
• Accessory: MS-EX-3 (mounting bracket)</td><td>Sensing range<table><tr><th>Screw-in depth</th><th>Distance to focal point</th><th>Spot diameter</th></tr><tr><td>7mm</td><td>18.5 mm approx.</td><td>ø0.7 mm</td></tr><tr><td>12mm</td><td>27 mm approx.</td><td>ø1.2 mm</td></tr><tr><td>14mm</td><td>43 mm approx.</td><td>ø2.0 mm</td></tr></table></td></tr>
<tr><td>Finest spot lens</td><td>FX-MR3</td><td rowspan="2">  </td><td>Extremely fine spot of ø0.3 mm ø0.012 in approx. achieved.
• Applicable fibers:
FD-WG4, FD-G4, FD-EG1, FD-EG2, FD-EG3, FD-G6X, FD-G6
• Ambient temperature: -40 to +70 °C
-40 to +158 °F</td><td>Sensing range<table><tr><th>Fiber model No.</th><th>Distance to focal point</th><th>Spot diameter</th></tr><tr><td>FD-EG3</td><td>7.5 ± 0.5 mm</td><td>ø 0.15 mm approx.</td></tr><tr><td>FD-EG2</td><td>7.5 ± 0.5 mm</td><td>ø0.2 mm approx.</td></tr><tr><td>FD-EG1</td><td>7.5 ± 0.5 mm</td><td>ø0.3 mm approx.</td></tr><tr><td>FD-WG4/G4/G6X/G6</td><td>7.5 ± 0.5 mm</td><td>ø0.5 mm approx.</td></tr></table></td></tr>
<tr><td>Finest spot lens</td><td>FX-MR6</td><td>Extremely fine spot of ø0.1 mm ø0.004 in approx. achieved.
• Applicable fibers:
FD-WG4, FD-G4, FD-EG1, FD-EG2, FD-EG3, FD-G6X, FD-G6
• Ambient temperature: -20 to +60 °C
-4 to +140 °F</td><td>Sensing range<table><tr><th>Fiber model No.</th><th>Distance to focal point</th><th>Spot diameter</th></tr><tr><td>FD-EG3</td><td>7 ± 0.5mm</td><td>ø0.1 mm approx.</td></tr><tr><td>FD-EG2</td><td>7 ± 0.5mm</td><td>ø0.15 mm approx.</td></tr><tr><td>FD-EG1</td><td>7 ± 0.5mm</td><td>ø0.2 mm approx.</td></tr><tr><td>FD-WG4/G4/G6X/G6</td><td>7 ± 0.5mm</td><td>ø0.4 mm approx.</td></tr></table></td></tr>
<tr><td>Zoom lens (side-view type)</td><td>FX-MR5</td><td>  </td><td>FX-MR2 is converted into a side-view type and can be mounted in a very small space.
• Applicable fibers: FD-WG4, FD-G4
• Ambient temperature: -40 to +70 °C
-40 to +158 °F</td><td>Sensing range<table><tr><th>Screw-in depth</th><th>Distance to focal point</th><th>Spot diameter</th></tr><tr><td>8 mm</td><td>13 mm approx.</td><td>ø0.5 mm</td></tr><tr><td>10 mm</td><td>15 mm approx.</td><td>ø0.8 mm</td></tr><tr><td>14 mm</td><td>30 mm approx.</td><td>ø3.0 mm</td></tr></table></td></tr>
</table>

FIBER OPTIONS

Designation	Model No.	Description				
Protective tube (For thru-beam type fiber)	**FTP-500** (0.5 m 1.640 ft)	For M4 thread	Applicable fibers	**FT-42** **FT-B8** **FT-FM2** **FT-FM2S** **FT-FM2S4** **FT-H13-FM2** **FT-P60** **FT-P80**		The protective tube, made of non-corrosive stainless steel, protects the inner fiber cable from any external forces.
	FTP-1000 (1 m 3.281 ft)					
	FTP-1500 (1.5 m 4.921 ft)					
	FTP-N500 (0.5 m 1.640 ft)	For M3 thread		**FT-31** **FT-NFM2** **FT-NFM2S** **FT-NFM2S4** **FT-P40** **FT-T80** **FD-P40** **FD-T40**		
	FTP-N1000 (1 m 3.281 ft)					
	FTP-N1500 (1.5 m 4.921 ft)					
Protective tube (For reflective type fiber)	**FDP-500** (0.5 m 1.640 ft)	For M6 thread		**FD-61** **FD-B8** **FD-FM2** **FD-FM2S** **FD-FM2S4** **FD-H13-FM2** **FD-P80**		
	FDP-1000 (1 m 3.281 ft)					
	FDP-1500 (1.5 m 4.921 ft)					
	FDP-N500 (0.5 m 1.640 ft)	For M4 thread		**FD-41** **FD-NFM2** **FD-NFM2S** **FD-NFM2S4** **FD-T80**		
	FDP-N1000 (1 m 3.281 ft)					
	FDP-N1500 (1.5 m 4.921 ft)					
Fiber bender	**FB-1**	The fiber bender bends the sleeve part of the fiber head at the proper radius. (Note 1)				
Universal sensor mounting stand (Note 2)	**MS-AJ1-F**	Horizontal mounting type			Mounting stand assembly for fiber (For M3, M4 or M6 threaded head fiber)	
	MS-AJ2-F	Vertical mounting type				
Resin nut set	**FX-M6N**	Applicable fibers	**FD-G60**		For 10 set of resin M6 nuts and flat washers	
	FX-M4N		**FT-F41**, **FD-G40**		For 10 set of resin M4 nuts and flat washers	
Liquid inflow prevention joint (Note 2)	**MS-FX-01Y**		**FD-HF40Y** **FD-F41Y**		This joint suppresses false operations due to liquid slip-in from the top of the protective tube.	
Protective tube extension joint (Note 2)	**MS-FX-02Y**				The protective tube can be extended.	
Fiber mounting joint (Note 2)	**MS-FX-03Y**				The joint is used for mounting fibers on a tank.	
Single-core holder	**FX-AT15A**	The incident light intensity may vary when using a multi-core fiber or a thin type sharp bending fiber. This holder suppresses the variation in the incident light intensity.				

Notes: 1) Do not bend the sleeve part of any side-view type fiber or ultra-small diameter head type fiber.
2) The joint internal ferrule (**MS-FX-YF**) is available as a spare part. A distorted ferrule may result in leakage.

Protective tube

• **FTP-□**
• **FDP-□**

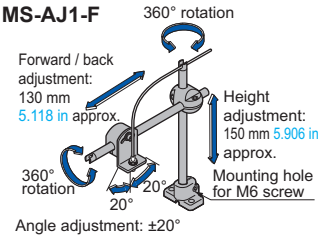
Fiber bender

• **FB-1**

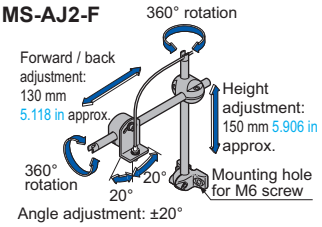
Universal sensor mounting stand

Using the arm which enables adjustment in the horizontal direction, defection can also be done from above an assembly line.

• **MS-AJ1-F**

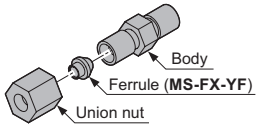


• **MS-AJ2-F**



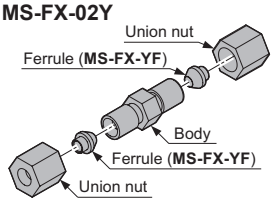
Liquid inflow prevention joint

• **MS-FX-01Y**



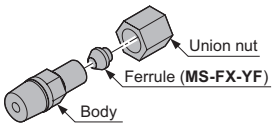
Protective tube extension joint

• **MS-FX-02Y**



Fiber mounting joint

• **MS-FX-03Y**



Single-core holder

• **FX-AT15A**

SPECIFICATIONS

Item \ Type	Standard type	2-output type	Cable type (Analog output type)
Model No. NPN output	**FX-501**	**FX-502**	**FX-505-C2**
Model No. PNP output	**FX-501P**	**FX-502P**	**FX-505P-C2**
Supply voltage	12 to 24 V DC ±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, excluding analog output of cable type) ECO mode: 680 mW or less (current consumption 28 mA or less at 24 V supply voltage, excluding analog output of cable type)		
Output (2-output type and cable type: Output 1, Output 2)	<NPN output type> NPN open-collector transistor • Maximum sink current: 100 mA (2-output type and cable type are 50 mA) (Note 2) • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (Note 3) (at maximum sink current)	<PNP output type> PNP open-collector transistor • Maximum source current: 100 mA (2-output type and cable type are 50 mA) (Note 2) • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 2 V or less (Note 3) (at maximum source current)	
Output points	1 point	2 points	
Output operation	Switchable either Light-ON or Dark-ON by L/D mode		
Short-circuit protection	Incorporated		
Response time	H-SP: 25 µs or less, 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		
Analog output (Cable type only)	Output current: 4 to 20 mA approx. [H-SP, FAST STD: At 0 to 4,000 digits, LONG: At 0 to 8,000 digits (Note 4)], Response time: 2 ms or less, Zero point: Within 4 mA ±1 % F.S., Span: Within 16 mA ±5 % F.S., Linearity: Within ±3 % F.S., Load resistance: 0 to 250 Ω		
External input (2-output type only, switchable with Output 2)	———	<NPN output type> NPN non-contact input • Signal condition High: +8 V to +V DC or Open Low: 0 to +1.2 V DC (at 0.5 mA source current) • Input impedance: 10 kΩ approx.	<PNP output type> PNP non-contact input • Signal condition High: +4 V to +V DC (at 3 mA sink current) Low: 0 to +0.6 V DC or Open • Input impedance: 10 kΩ approx.
Possible external input function	———	Emission halt / Teaching (Full-auto, Limit, 2-point) / Logic operation setting / Copy lock / Display adjustment / Data bank load / Data bank save, selectable	
Sensitivity setting	2-point teaching / Limit teaching / Full-auto teaching / Manual adjustment		
Incident light intensity display range	H-SP / 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 / ON-delay • OFF-delay / ON-delay • ONE SHOT timer, switchable either effective or ineffective	<Output 1> Incorporated with variable OFF-delay / ON-delay /ONE SHOT / ON-delay • OFF-delay / ON-delay • ONE SHOT timer, switchable either effective or ineffective <Output 2> Incorporated with variable OFF-delay / ON-delay /ONE SHOT timer, switchable either effective or ineffective	
Timer period	Timer range "ms": 0.5 ms approx., 1 to 9,999 ms approx., 1 ms approx., Timer range "sec.": 0.5 s approx., 1 to 32 s approx., 1 s approx., Timer range "1/10 ms": 0.05 ms approx., 0.1 to 999.9 ms approx., 0.1 ms approx., each output is set individually		
Light emitting amount selection function	Incorporated, 3 levels (each level 25 to 100 %) + Auto setting [1 level (25 to 100 %) when using H-SP mode]		
Interference prevention function	Incorporated (Note 5), selectable either automatic interference prevention or different frequency		
Various settings	Hysteresis setting / Shift amount setting / Emission power setting / Display turning setting / ECO setting / Data bank loading saving setting / Copying setting / Code setting / Reset setting / Logical calculation setting / Threshold tracking setting, etc.		
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 (cable type: 8 to 12 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: 643 nm 0.025 mil)		
Material	Enclosure, Case cover: Polycarbonate, Switch: TPEE		
Cable	———		0.2 mm² 6-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 mm², or more, cable. (however, supply voltage 12 V DC)
Weight	Net weight: 15 g approx., Gross weight: 70 g approx.		Net weight: 60 g approx., Gross weight: 100 g approx.
Accessory	**FX-MB1** (Amplifier protection seal): 1 set		

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
2) 50 mA max. if 5 or more standard types are connected together. (25 mA in case of 2-output type and cable type)
3) In case of using the quick-connection cable (cable length 5 m 16.404 ft) (optional).
4) If display adjustment was conducted, it is not in this range.
5) Number of sensor heads which is possible to be mounted closely in auto interference prevention function depends on response time as shown in table below.
Number of sensor heads which is possible to be mounted closely in different frequency Interference prevention function is up to 3 units.

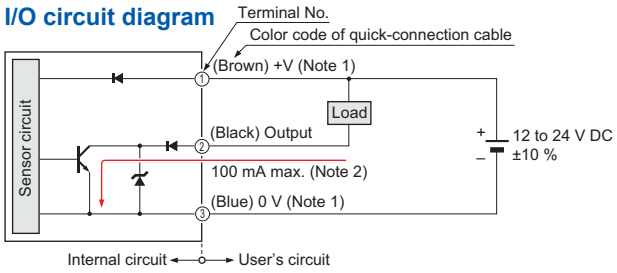
• Number of sensor heads mountable closely (Unit: set)

Response time	H-SP	FAST	STD	LONG	U-LG	HYPR
IP-1	0	2	4	8	8	12

I/O CIRCUIT AND WIRING DIAGRAMS

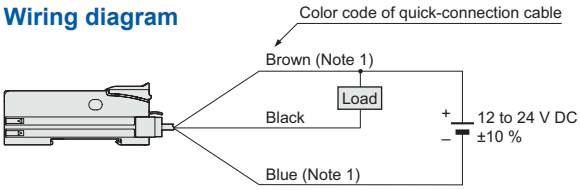
FX-501 — NPN output type

I/O circuit diagram



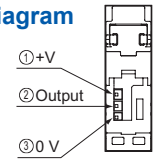
Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
2) 50 mA max., if five amplifiers, or more, are connected together.

Wiring diagram



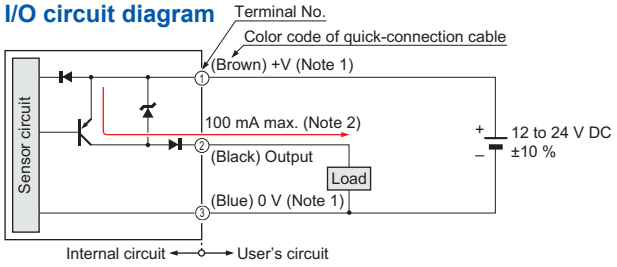
Note: The quick-connection sub cable does not have brown lead wire and blue lead wire.

Terminal arragement diagram



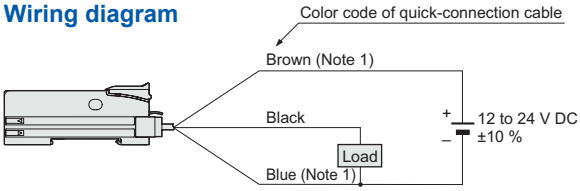
FX-501P — PNP output type

I/O circuit diagram



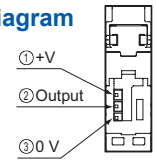
Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
2) 50 mA max., if five amplifiers, or more, are connected together.

Wiring diagram



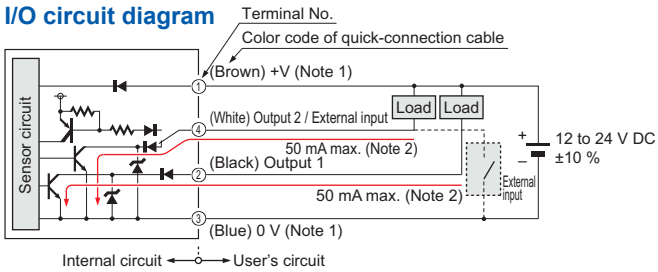
Note: The quick-connection sub cable does not have brown lead wire and blue lead wire.

Terminal arragement diagram



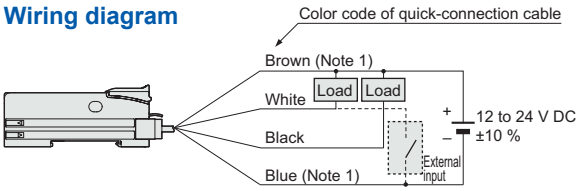
FX-502 — NPN output type

I/O circuit diagram



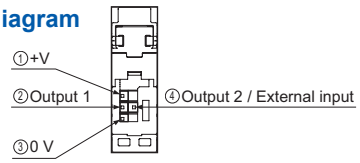
Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
2) 25 mA max., if five amplifiers, or more, are connected together.

Wiring diagram



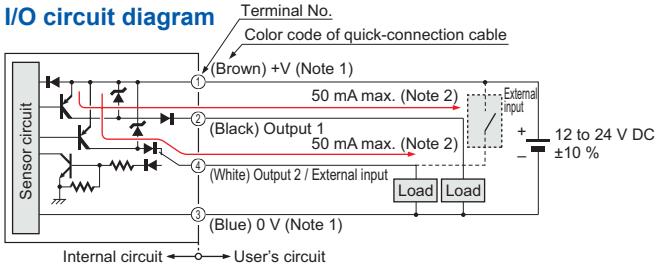
Note: The quick-connection sub cable does not have brown lead wire and blue lead wire.

Terminal arragement diagram



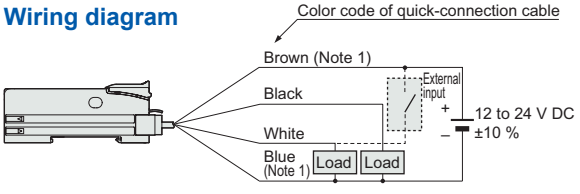
FX-502P — PNP output type

I/O circuit diagram



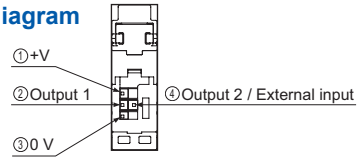
Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
2) 25 mA max., if five amplifiers, or more, are connected together.

Wiring diagram



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

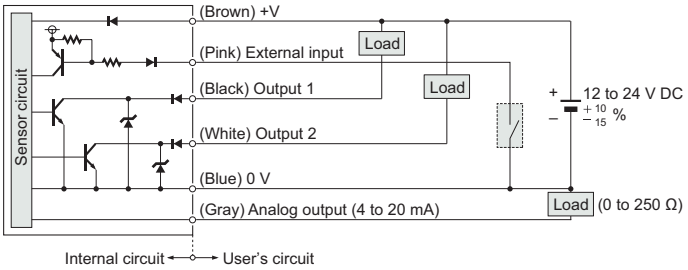
Terminal arragement diagram



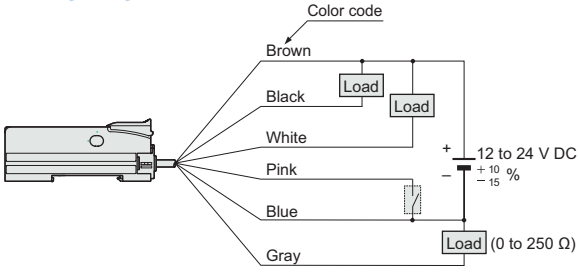
I/O CIRCUIT AND WIRING DIAGRAMS

FX-505-C2 NPN output type

I/O circuit diagram

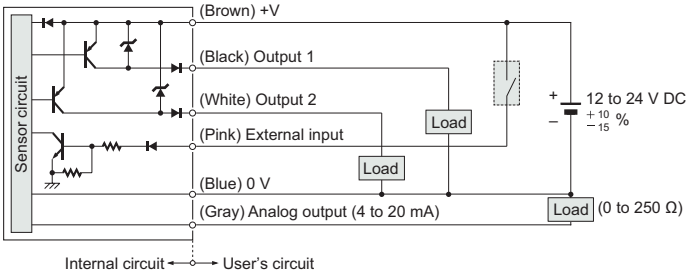


Wiring diagram

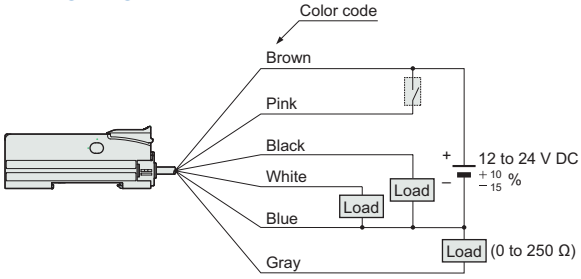


FX-505P-C2 PNP output type

I/O circuit diagram



Wiring diagram

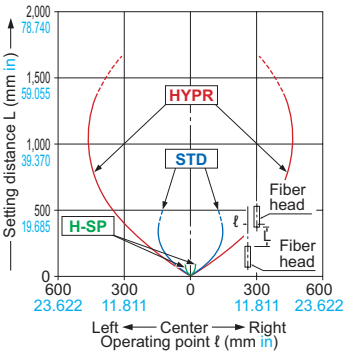


SENSING CHARACTERISTICS (TYPICAL)

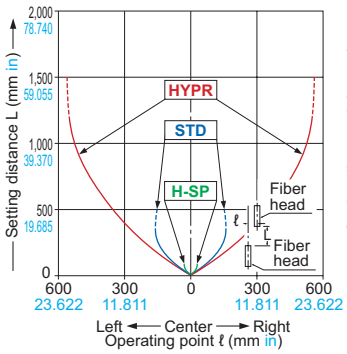
Thru-beam type Parallel deviation

Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

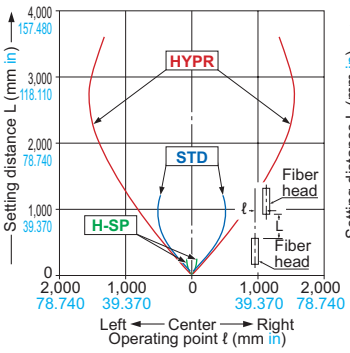
FT-30 FT-S20 Thru-beam type



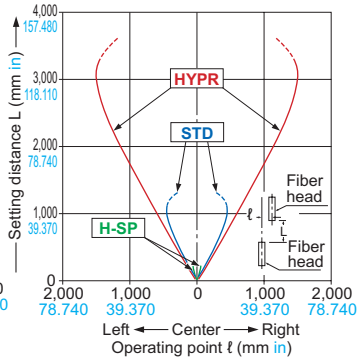
FT-31 FT-S21 Thru-beam type



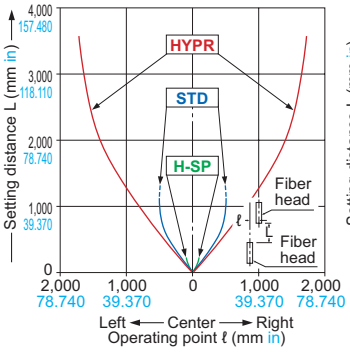
FT-40 FT-S30 Thru-beam type



FT-41 FT-FM2 FT-FM2S FT-FM2S4 FT-SFM2 FT-T80 Thru-beam type

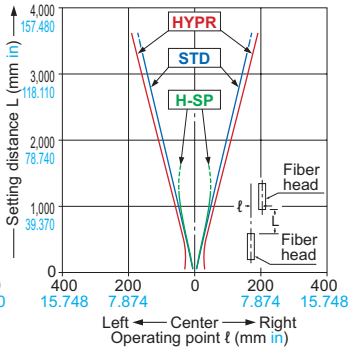


FT-42 Thru-beam type

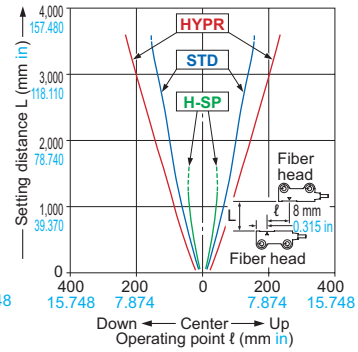


FT-A8 Thru-beam type

• Horizontal direction

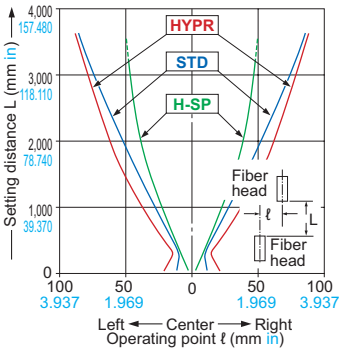


• Vertical direction

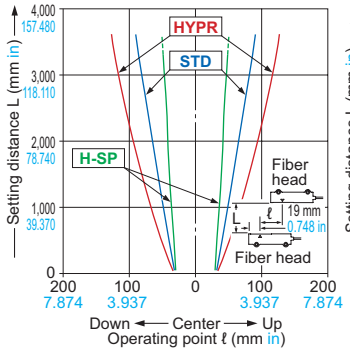


FT-A30 FT-WA30 Thru-beam type

• Horizontal direction

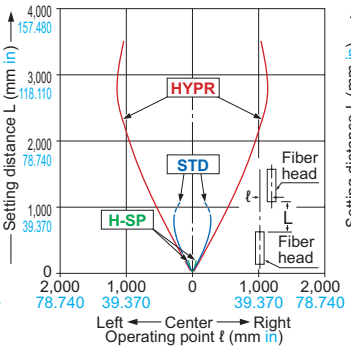


• Vertical direction

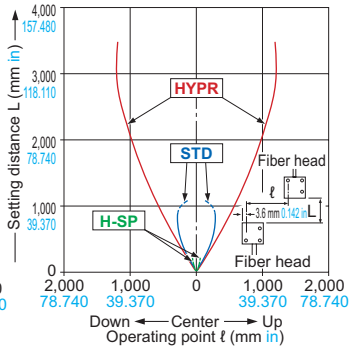


FT-AFM2 Thru-beam type

• Horizontal direction

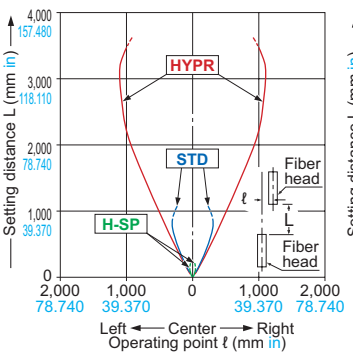


• Vertical direction

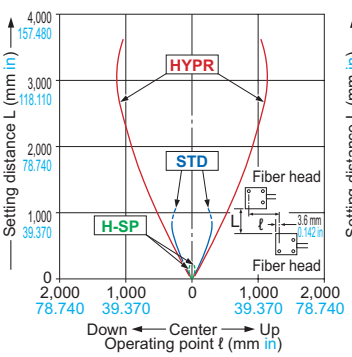


FT-AFM2E Thru-beam type

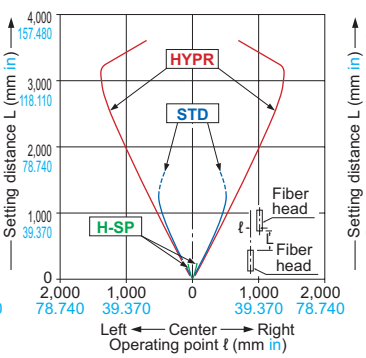
• Horizontal direction



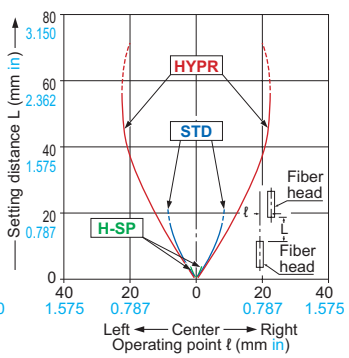
• Vertical direction



FT-B8 Thru-beam type



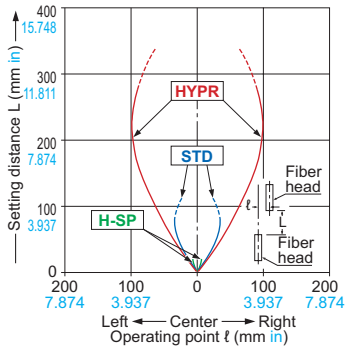
FT-E13 Thru-beam type



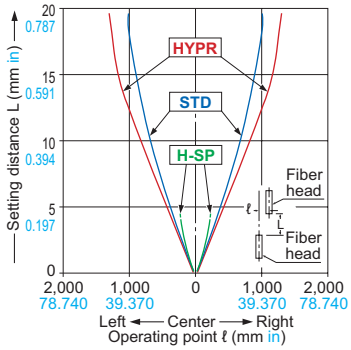
SENSING CHARACTERISTICS (TYPICAL)

Thru-beam type Parallel deviation Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

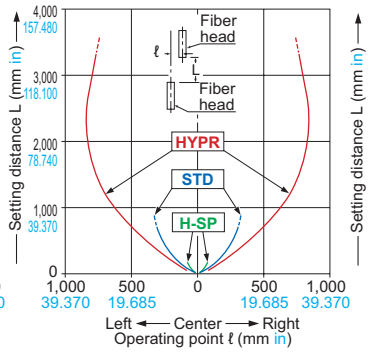
FT-E23 Thru-beam type



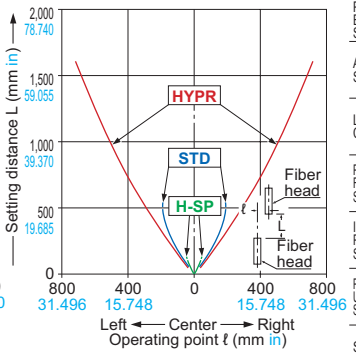
FT-FM10L Thru-beam type



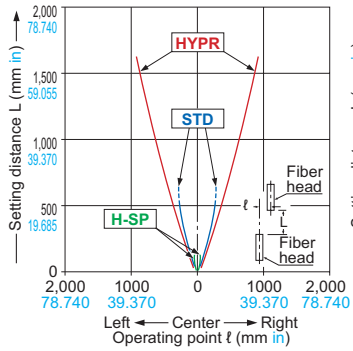
FT-H13-FM2 Thru-beam type



FT-H20-J20-S FT-H20-J30-S FT-H20-J50-S Thru-beam type

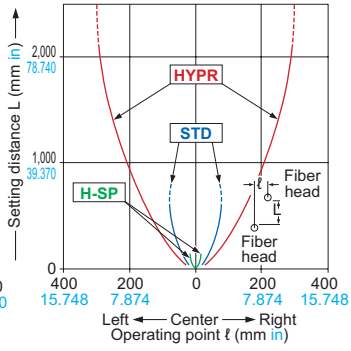


FT-H20-M1 Thru-beam type

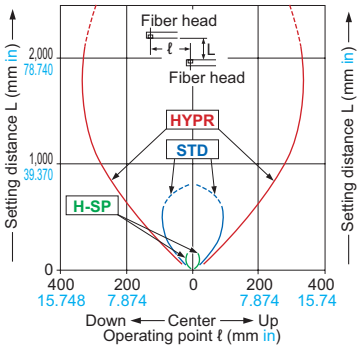


FT-H20-VJ50-S FT-H20-VJ80-S Thru-beam type

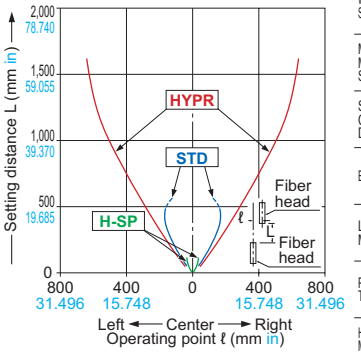
• Horizontal direction



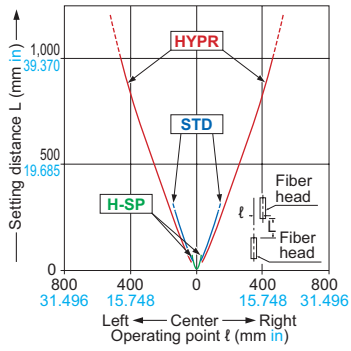
• Vertical direction



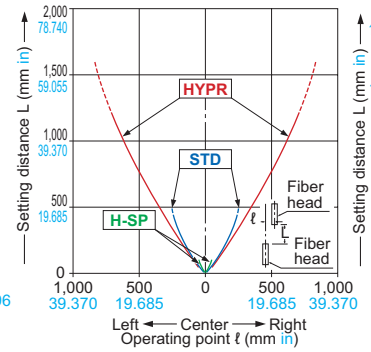
FT-H20W-M1 Thru-beam type



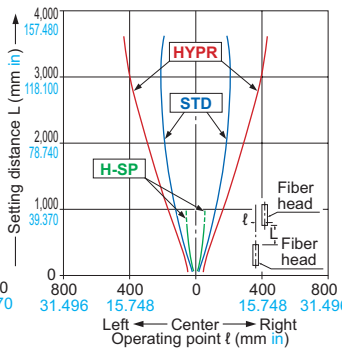
FT-H30-M1V-S Thru-beam type



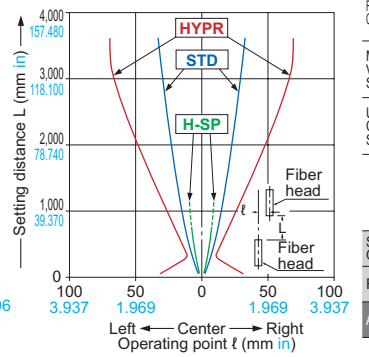
FT-H35-M2 FT-H35-M2S6 Thru-beam type



FT-HL80Y Thru-beam type

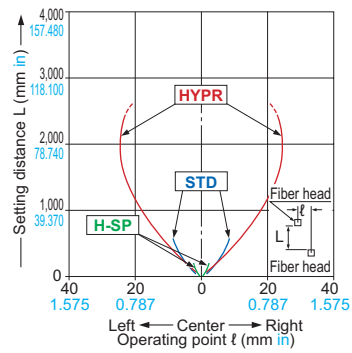


FT-K8 Thru-beam type

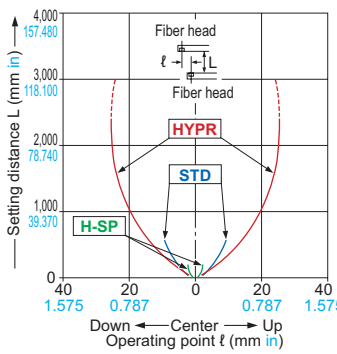


FT-KV1 Thru-beam type

• Horizontal direction

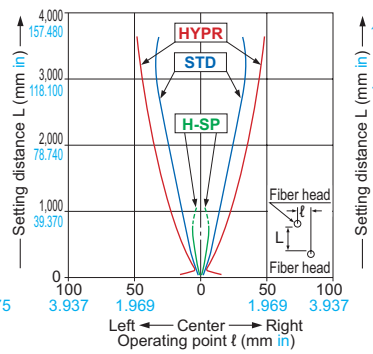


• Vertical direction

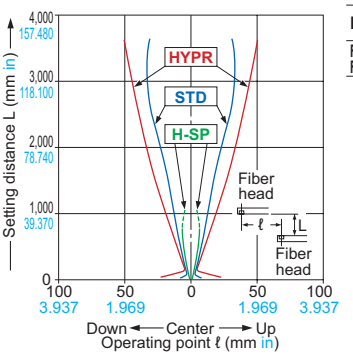


FT-KV8 Thru-beam type

• Horizontal direction



• Vertical direction

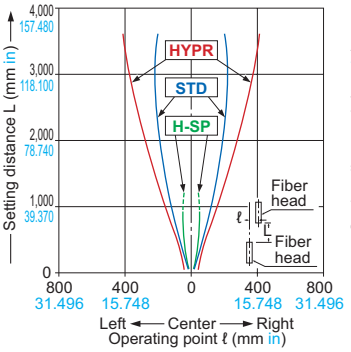


SENSING CHARACTERISTICS (TYPICAL)

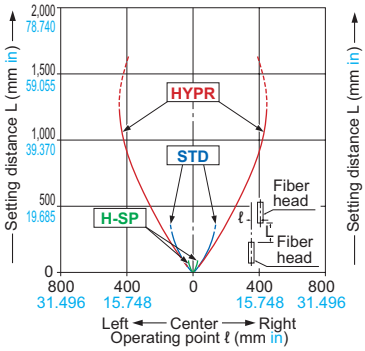
Thru-beam type Parallel deviation

Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

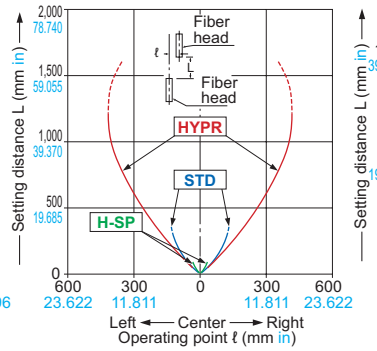
FT-L80Y — Thru-beam type



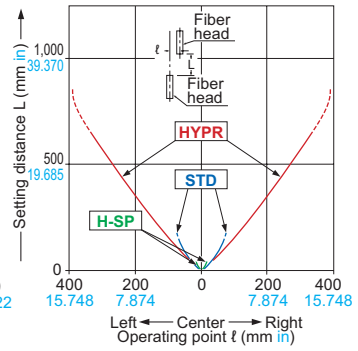
FT-NFM2 FT-NFM2S FT-NFM2S4 FT-SNFM2 — Thru-beam type



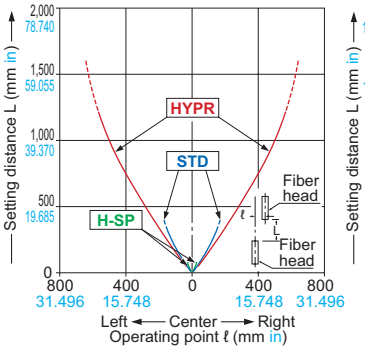
FT-P2 — Thru-beam type



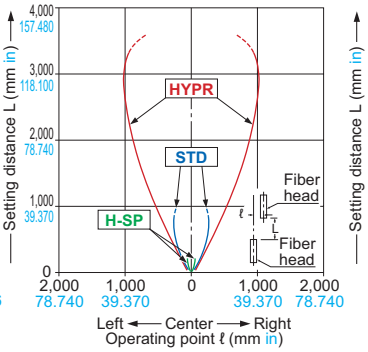
FT-P40 — Thru-beam type



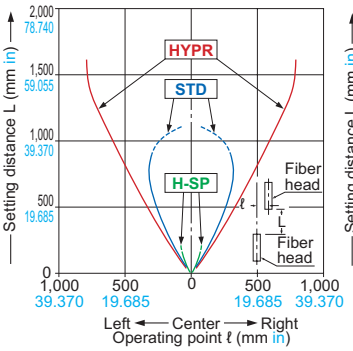
FT-P60 — Thru-beam type



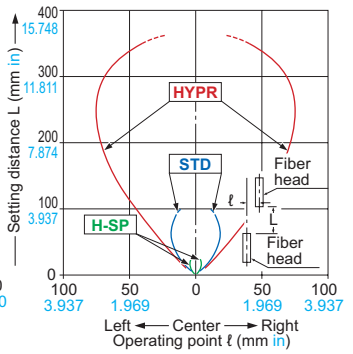
FT-P80 — Thru-beam type



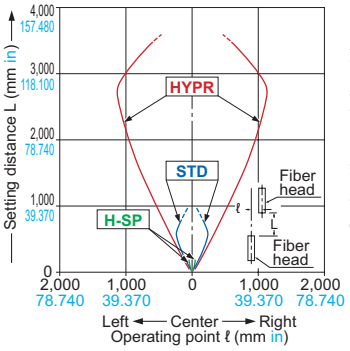
FT-P81X — Thru-beam type



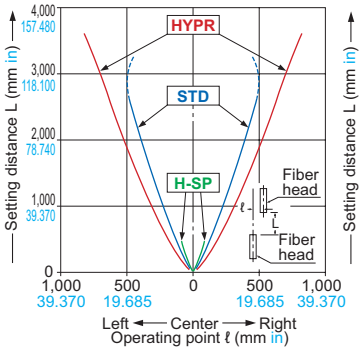
FT-PS1 — Thru-beam type



FT-R80 — Thru-beam type

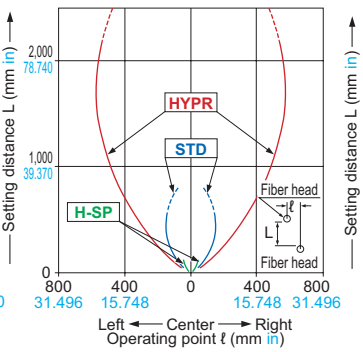


FT-SFM2L — Thru-beam type

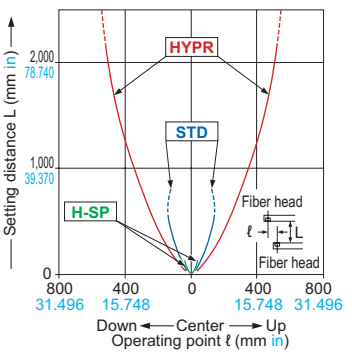


FT-SFM2SV2 — Thru-beam type

• Horizontal direction

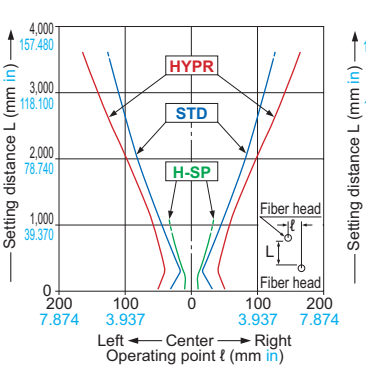


• Vertical direction

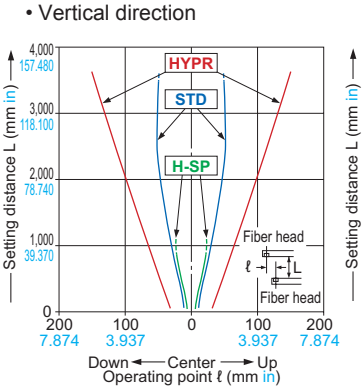


FT-V10 — Thru-beam type

• Horizontal direction

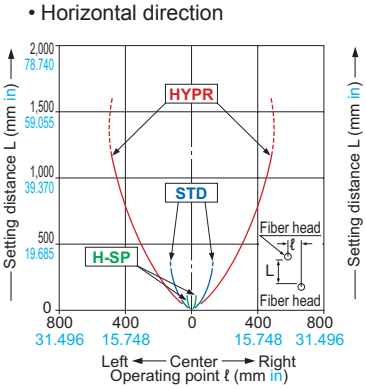


• Vertical direction

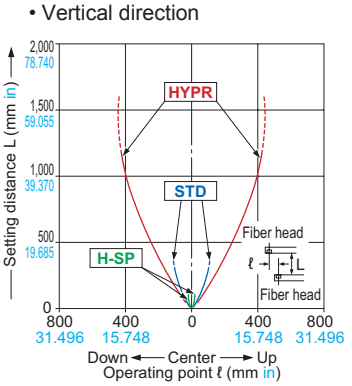


FT-V22 — Thru-beam type

• Horizontal direction



• Vertical direction

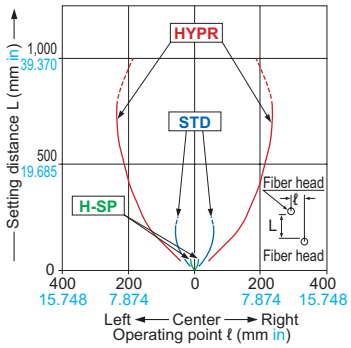


SENSING CHARACTERISTICS (TYPICAL)

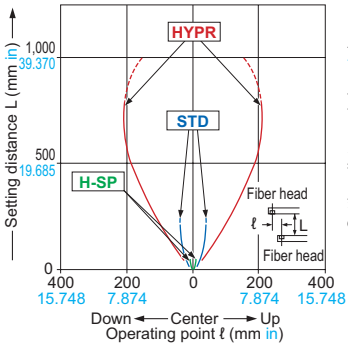
Thru-beam type Parallel deviation Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

FT-V41 Thru-beam type

• Horizontal direction

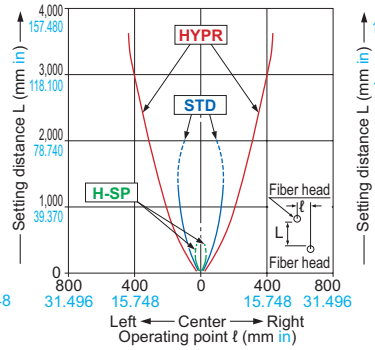


• Vertical direction

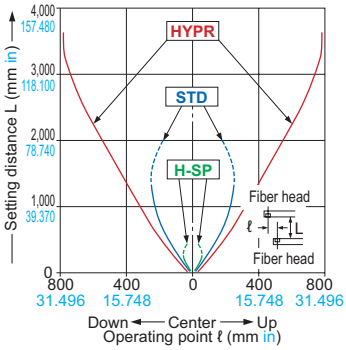


FT-V80Y Thru-beam type

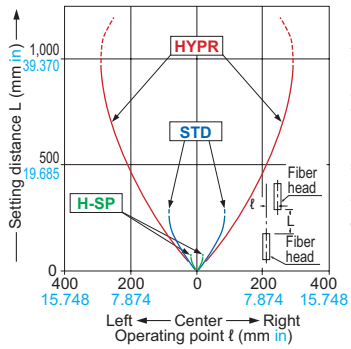
• Horizontal direction



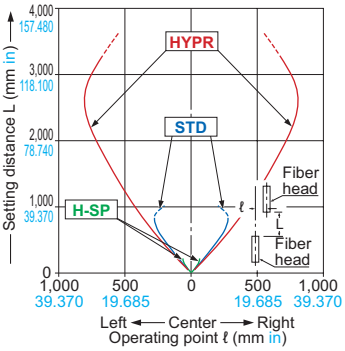
• Vertical direction



FT-W4 FT-WS4 Thru-beam type

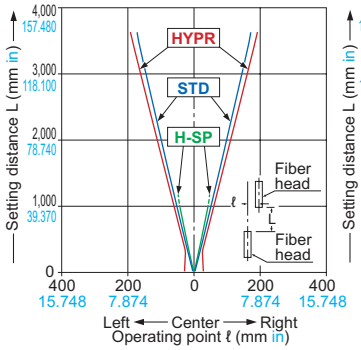


FT-W8 FT-WS8 Thru-beam type

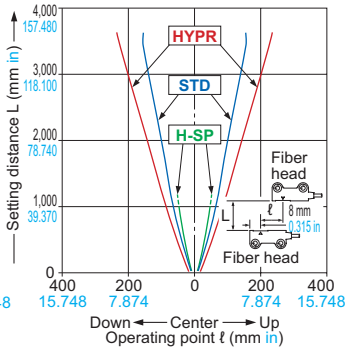


FT-WA8 Thru-beam type

• Horizontal direction

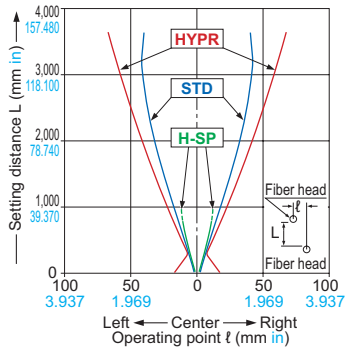


• Vertical direction

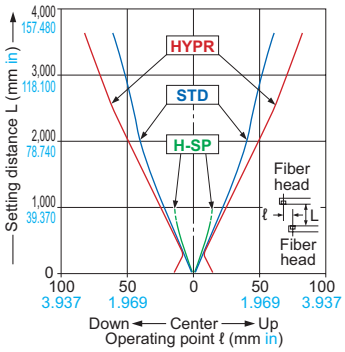


FT-WKV8 Thru-beam type

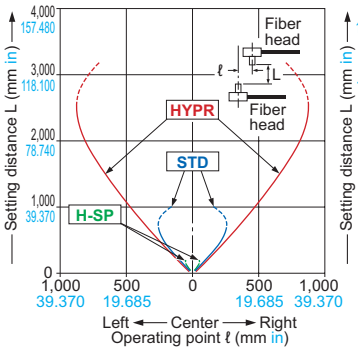
• Horizontal direction



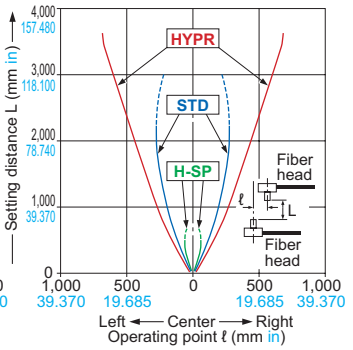
• Vertical direction



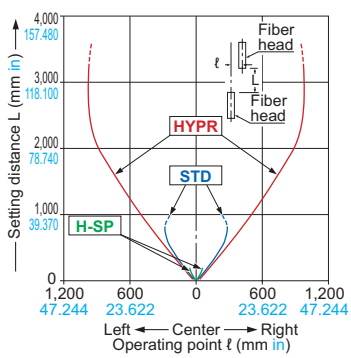
FT-WR80 Thru-beam type



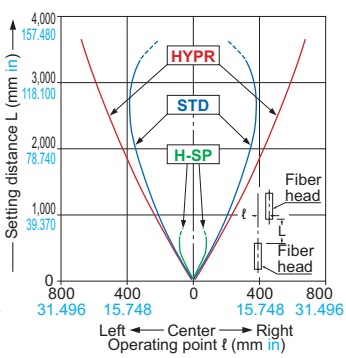
FT-WR80L Thru-beam type



FT-WS3 Thru-beam type

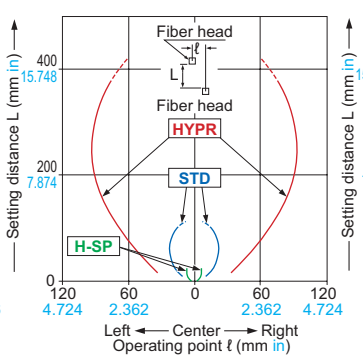


FT-WS8L Thru-beam type

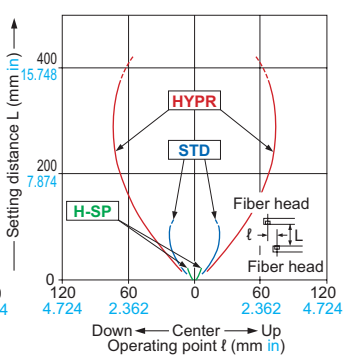


FT-WV42 Thru-beam type

• Horizontal direction



• Vertical direction

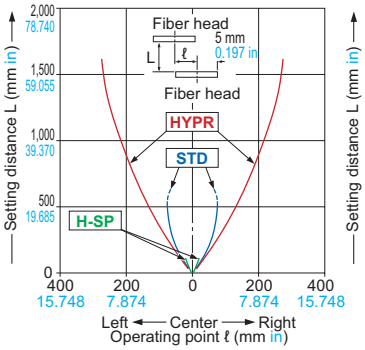


SENSING CHARACTERISTICS (TYPICAL)

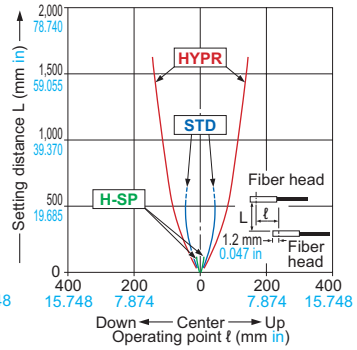
Thru-beam type Parallel deviation Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

FT-WZ4 — Thru-beam type

• Horizontal direction

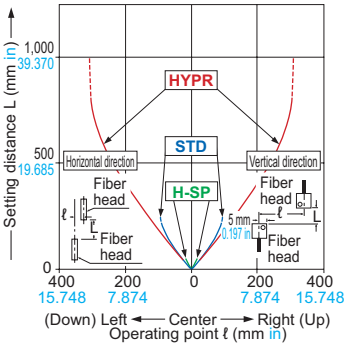


• Vertical direction



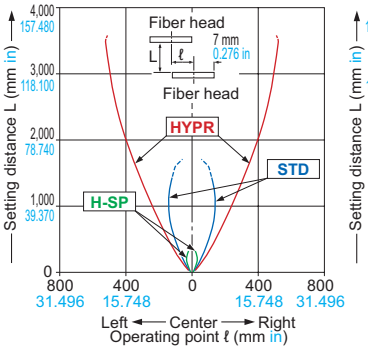
FT-WZ4HB — Thru-beam type

• Common for horizontal and vertical direction

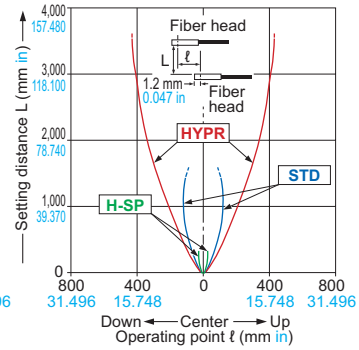


FT-WZ7 — Thru-beam type

• Horizontal direction

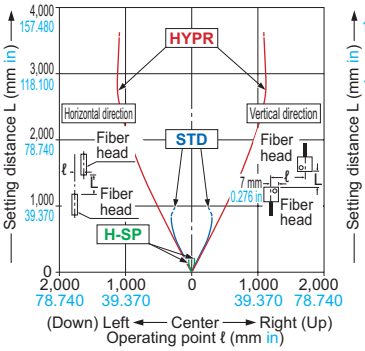


• Vertical direction



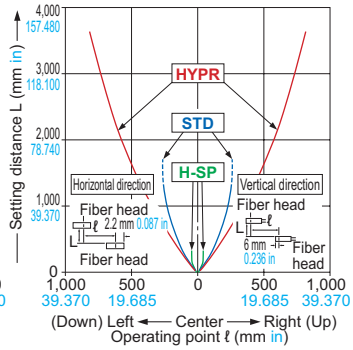
FT-WZ7HB — Thru-beam type

• Common for horizontal and vertical direction



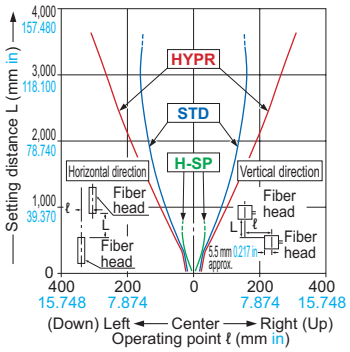
FT-WZ8 — Thru-beam type

• Common for horizontal and vertical direction



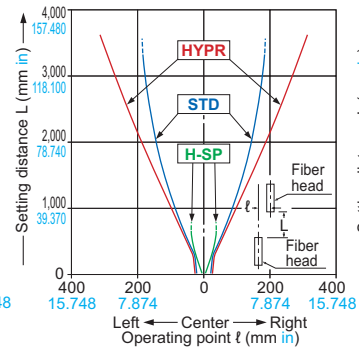
FT-WZ8E — Thru-beam type

• Common for horizontal and vertical direction

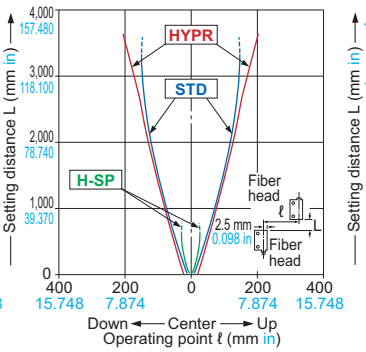


FT-WZ8H — Thru-beam type

• Horizontal direction

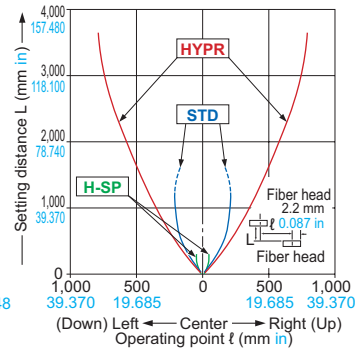


• Vertical direction



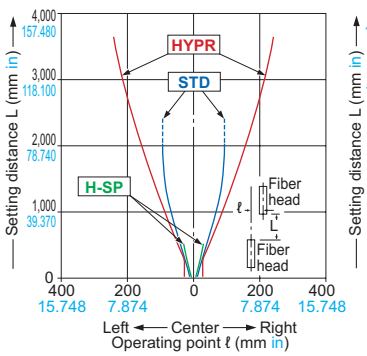
FT-Z8 — Thru-beam type

• Common for horizontal and vertical direction

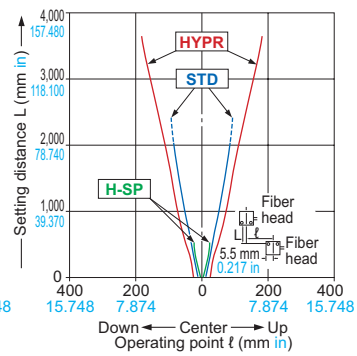


FT-Z8E — Thru-beam type

• Horizontal direction

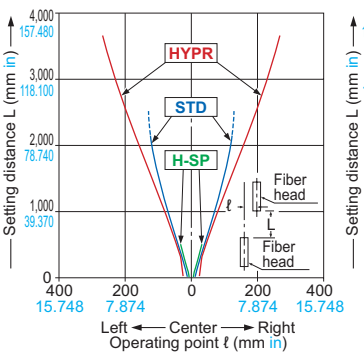


• Vertical direction

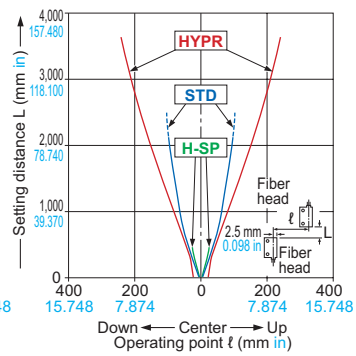


FT-Z8H — Thru-beam type

• Horizontal direction



• Vertical direction

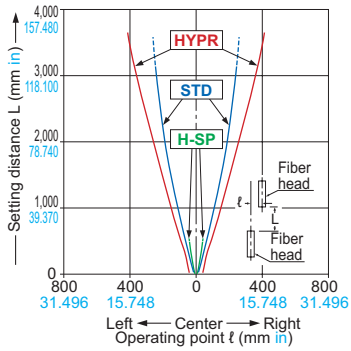


SENSING CHARACTERISTICS (TYPICAL)

Thru-beam type Parallel deviation

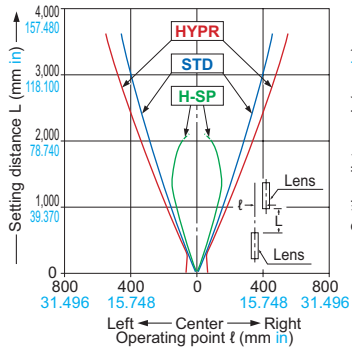
Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

FT-Z802Y — Thru-beam type

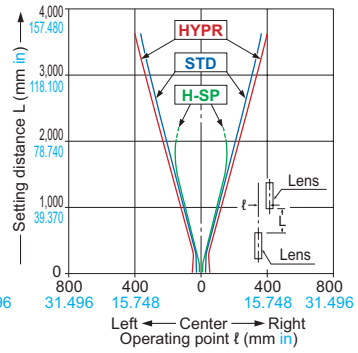


Thru-beam type Parallel deviation with FX-LE1 (expansion lens) applied on both sides

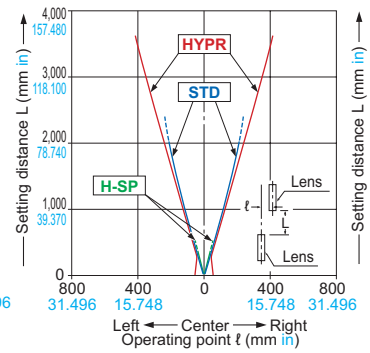
FT-B8 — Thru-beam type



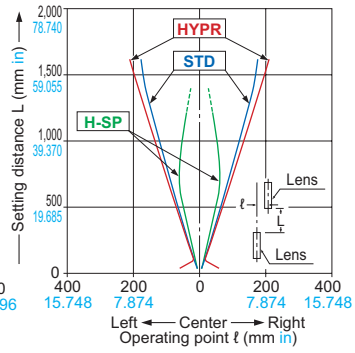
FT-FM2 FT-T80 — Thru-beam type



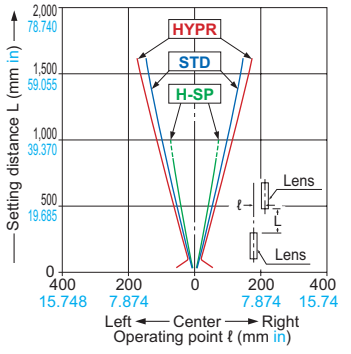
FT-H20-J20-S FT-H20-J30-S FT-H20-J50-S — Thru-beam type



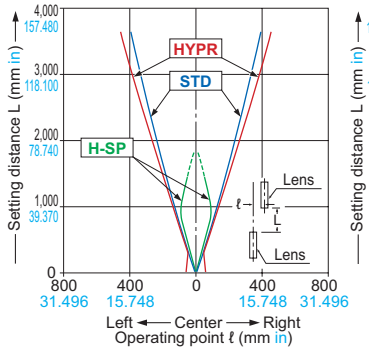
FT-H20-M1 — Thru-beam type



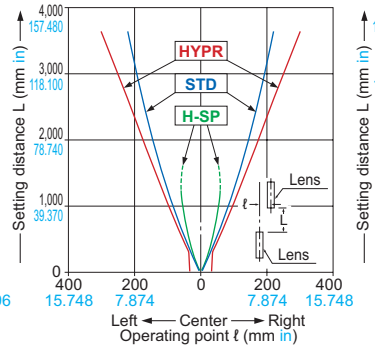
FT-H20W-M1 — Thru-beam type



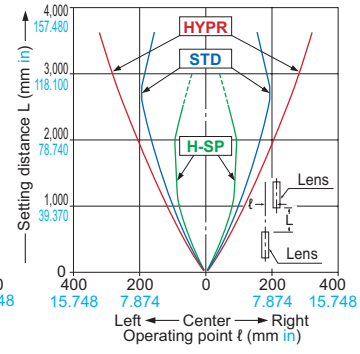
FT-H35-M2 — Thru-beam type



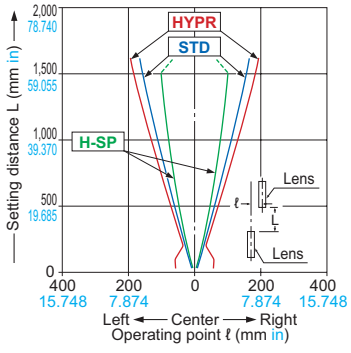
FT-P60 — Thru-beam type



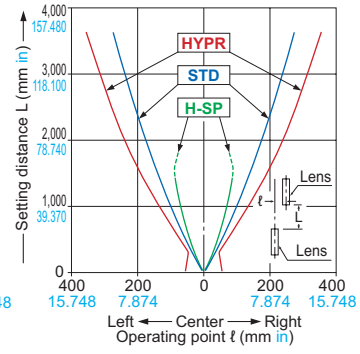
FT-P80 — Thru-beam type



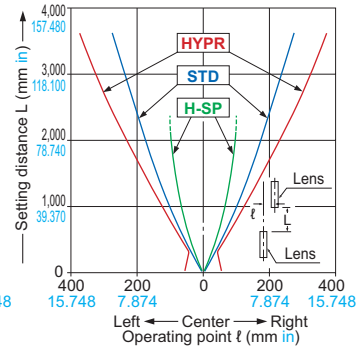
FT-P81X — Thru-beam type



FT-R80 — Thru-beam type



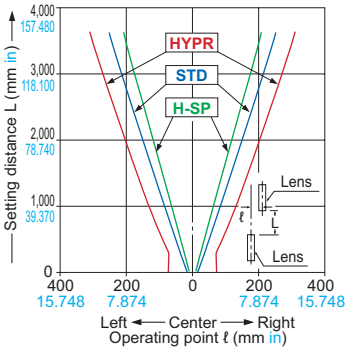
FT-W8 — Thru-beam type



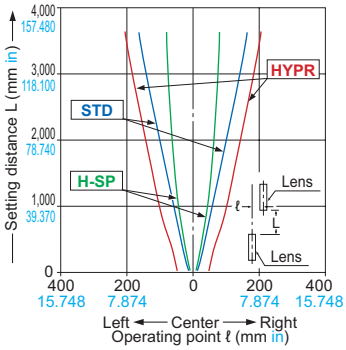
SENSING CHARACTERISTICS (TYPICAL)

Thru-beam type Parallel deviation with FX-LE2 (super-expansion lens) applied on both sides

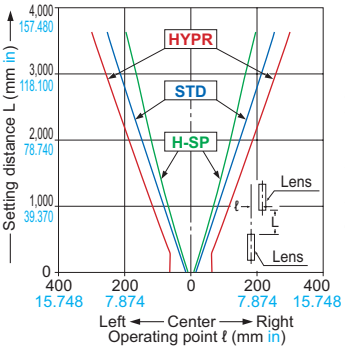
FT-B8 — Thru-beam type



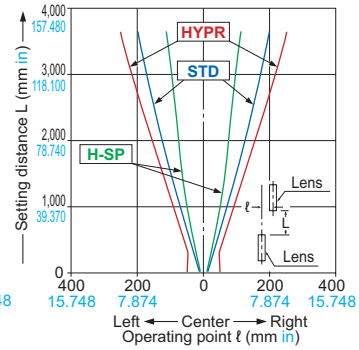
FT-FM2 — Thru-beam type



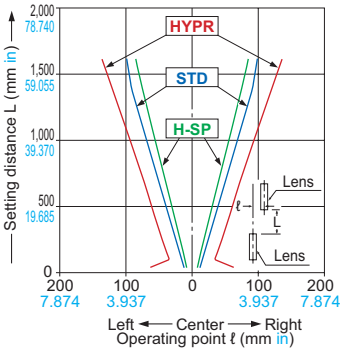
FT-H13-FM2 — Thru-beam type



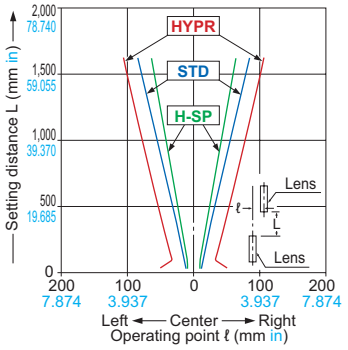
FT-H20-J20-S FT-H20-J30-S FT-H20-J50-S — Thru-beam type



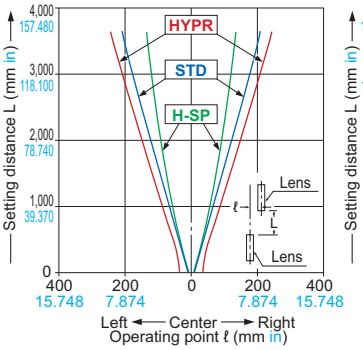
FT-H20-M1 — Thru-beam type



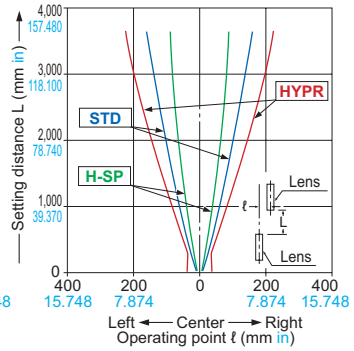
FT-H20W-M1 — Thru-beam type



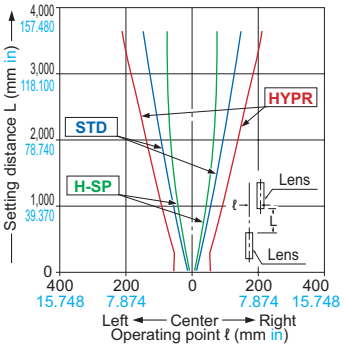
FT-H35-M2 — Thru-beam type



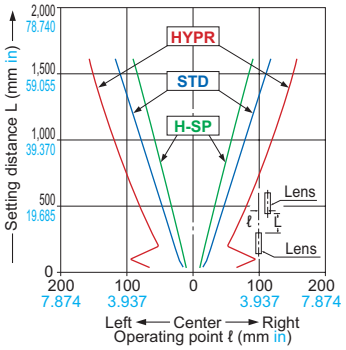
FT-P60 — Thru-beam type



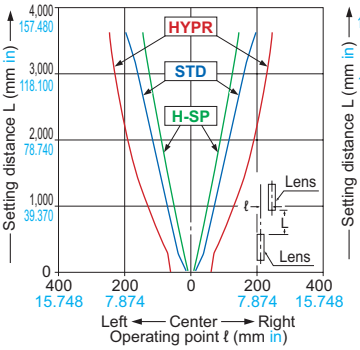
FT-P80 — Thru-beam type



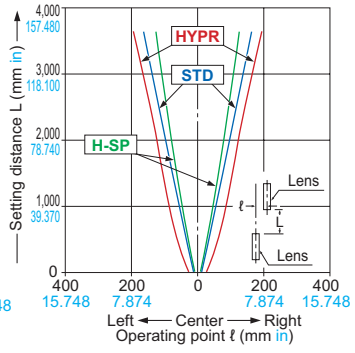
FT-P81X — Thru-beam type



FT-R80 — Thru-beam type



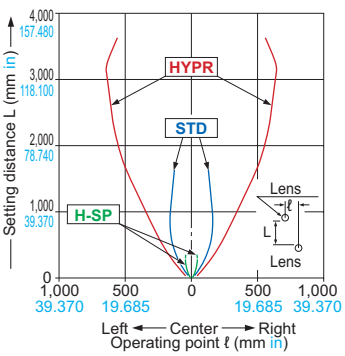
FT-W8 — Thru-beam type



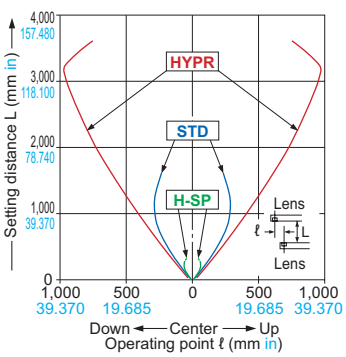
Thru-beam type Parallel deviation with FX-SV1 (side-view lens) applied on both sides

FT-B8 — Thru-beam type

• Horizontal direction

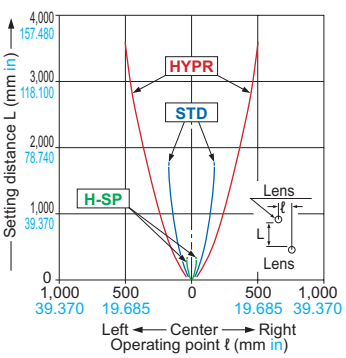


• Vertical direction

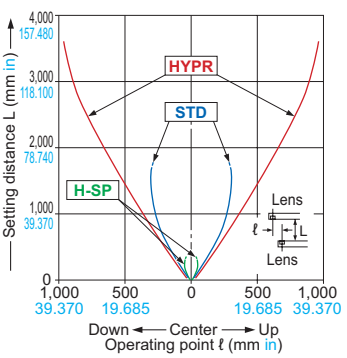


FT-FM2 FT-T80 — Thru-beam type

• Horizontal direction



• Vertical direction

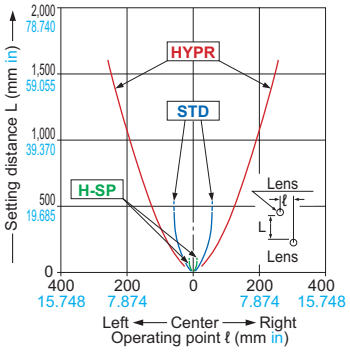


SENSING CHARACTERISTICS (TYPICAL)

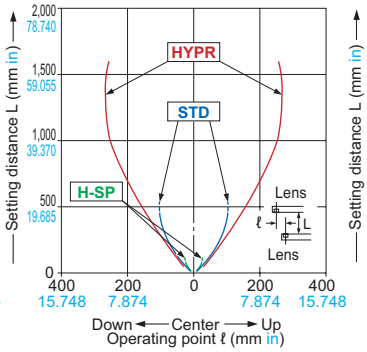
Thru-beam type Parallel deviation with FX-SV1 (side-view lens) applied on both sides

FT-H20-J20-S FT-H20-J30-S FT-H20-J50-S Thru-beam type

• Horizontal direction

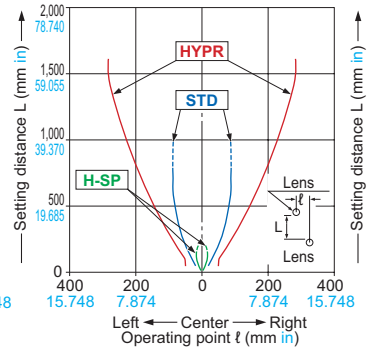


• Vertical direction

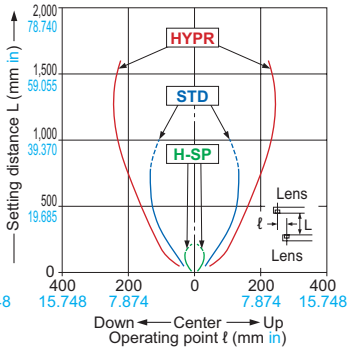


FT-H20-M1 Thru-beam type

• Horizontal direction

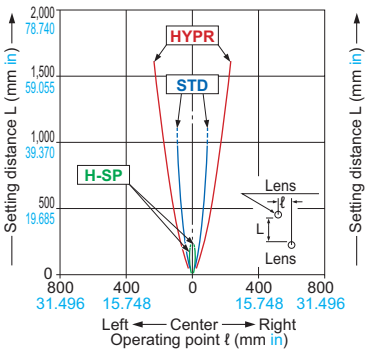


• Vertical direction

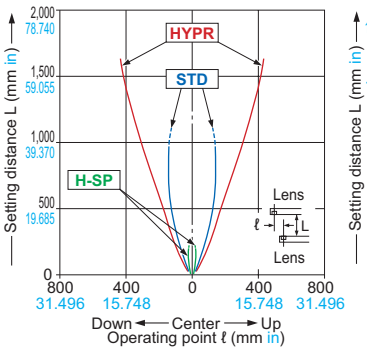


FT-H20W-M1 Thru-beam type

• Horizontal direction

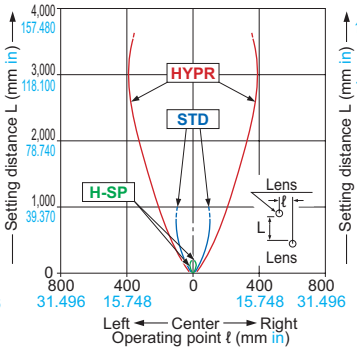


• Vertical direction

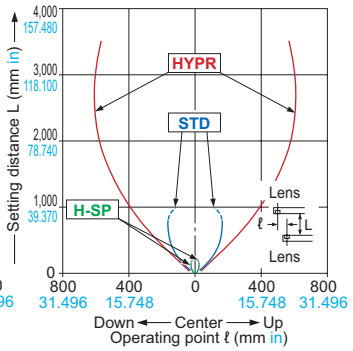


FT-H35-M2 Thru-beam type

• Horizontal direction

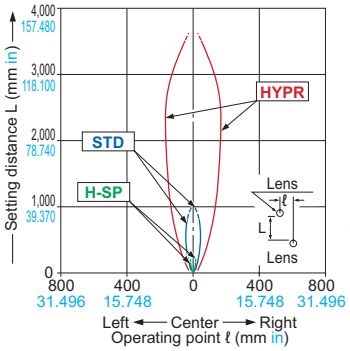


• Vertical direction

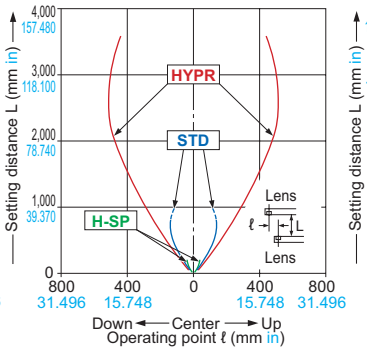


FT-P60 Thru-beam type

• Horizontal direction

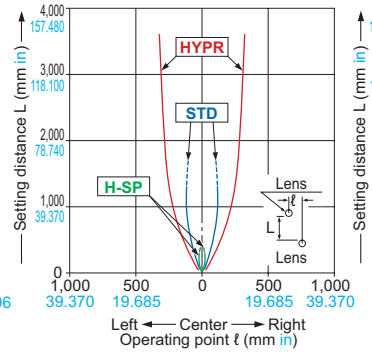


• Vertical direction

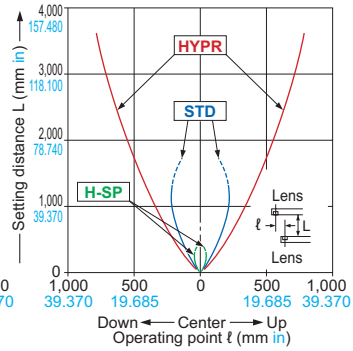


FT-P80 Thru-beam type

• Horizontal direction

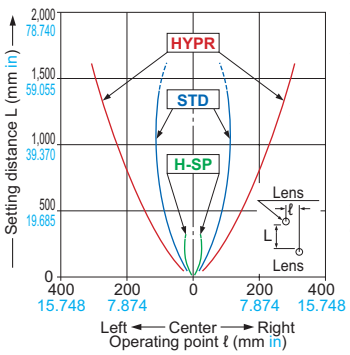


• Vertical direction

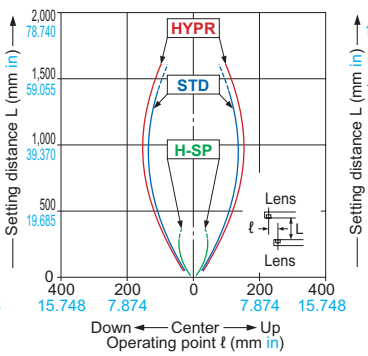


FT-P81X Thru-beam type

• Horizontal direction

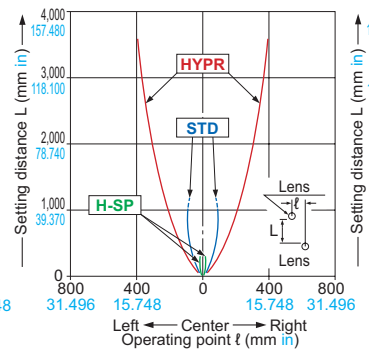


• Vertical direction

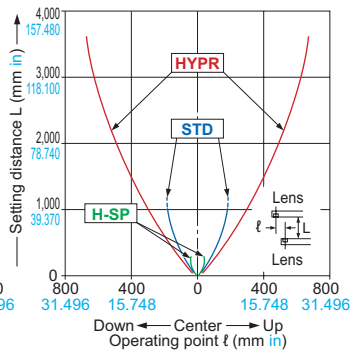


FT-W8 Thru-beam type

• Horizontal direction



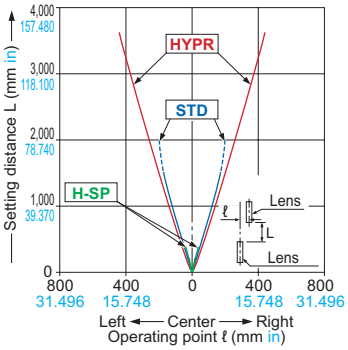
• Vertical direction



SENSING CHARACTERISTICS (TYPICAL)

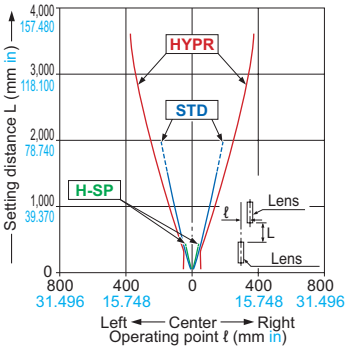
Thru-beam type Parallel deviation with FV-LE1 (expansion lens for vacuum fiber) applied on both sides

FT-H30-M1V-S Thru-beam type



Thru-beam type Parallel deviation with FV-SV2 (vacuum-resistant side-view lens) applied on both sides

FT-H30-MV1-S Thru-beam type

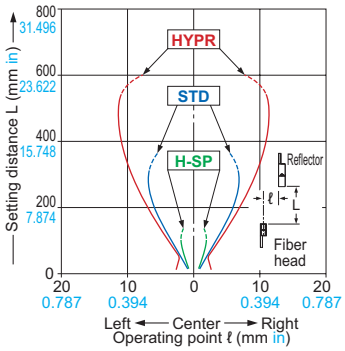


Retroreflective type Parallel deviation / Angular deviation

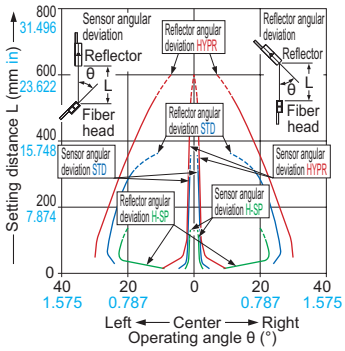
Sensing characteristics diagram is listed in alphabetical order of model No.

FR-KV1 Retroreflective type

• Parallel deviation

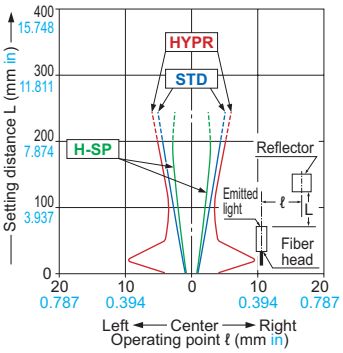


• Angular deviation

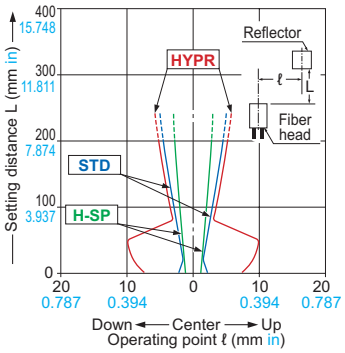


FR-KZ21 Retroreflective type

• Parallel deviation / Horizontal direction

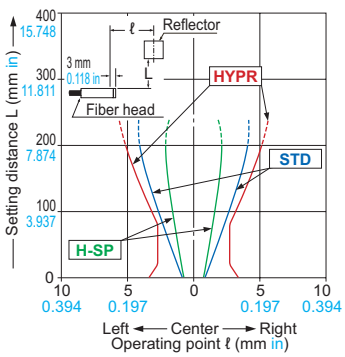


• Parallel deviation / Vertical direction

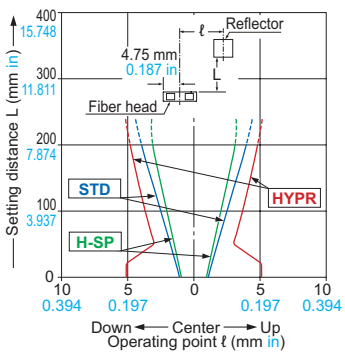


FR-KZ21E Retroreflective type

• Parallel deviation / Horizontal direction

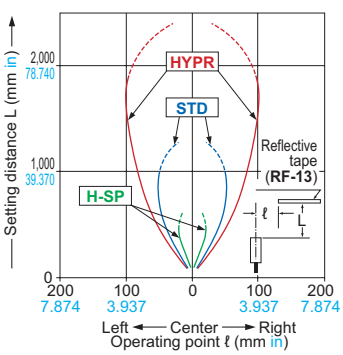


• Parallel deviation / Vertical direction

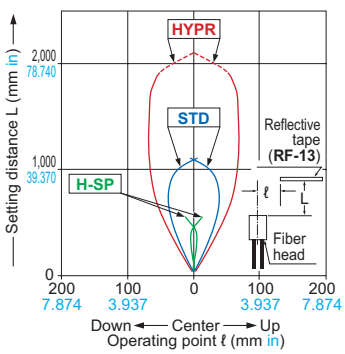


FR-WKZ11 Retroreflective type

• Parallel deviation / Horizontal direction



• Parallel deviation / Vertical direction

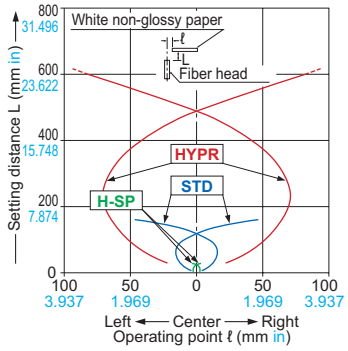


SENSING CHARACTERISTICS (TYPICAL)

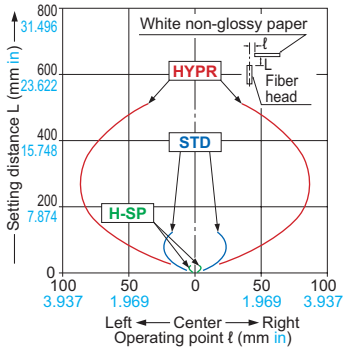
Reflective type Sensing field

Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

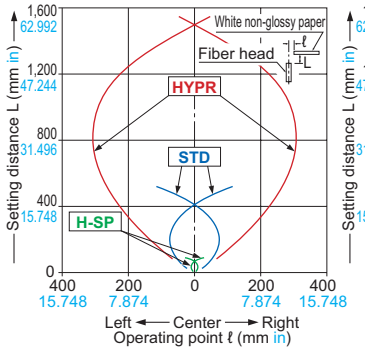
FD-30 FD-40 FD-S30 — Reflective type



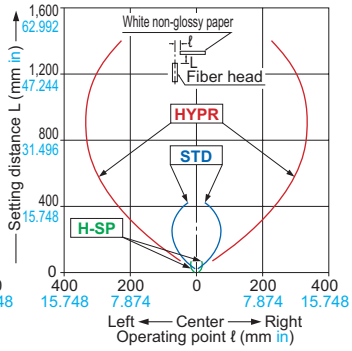
FD-31 FD-41 FD-S31 — Reflective type



FD-60 — Reflective type

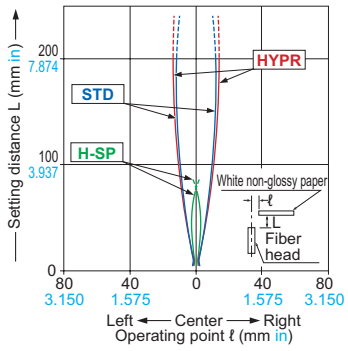


FD-61 — Reflective type

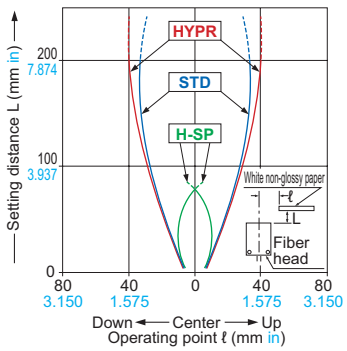


FD-A15 — Reflective type

• Horizontal direction

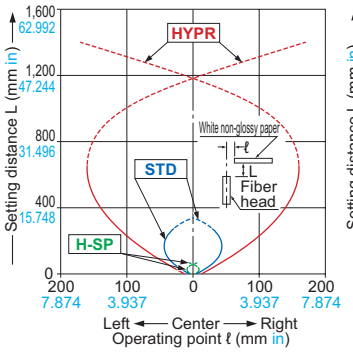


• Vertical direction

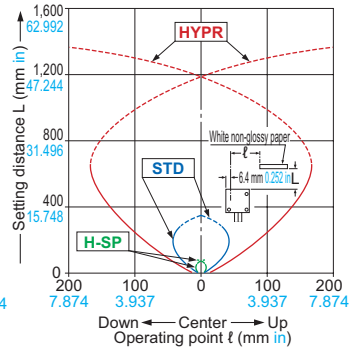


FD-AFM2 FD-AFM2E — Reflective type

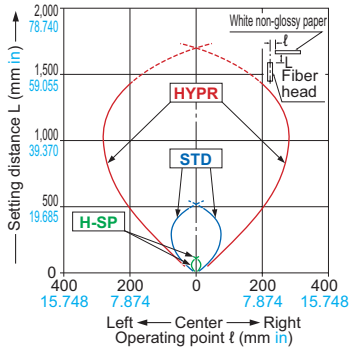
• Horizontal direction



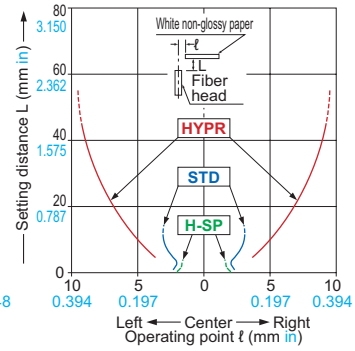
• Vertical direction



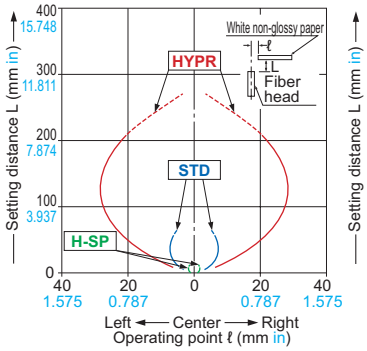
FD-B8 — Reflective type



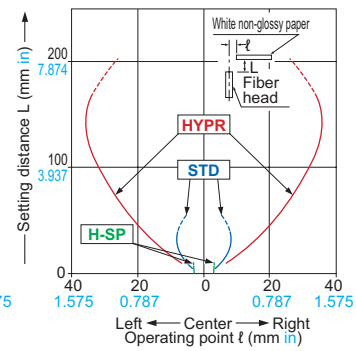
FD-E12 — Reflective type



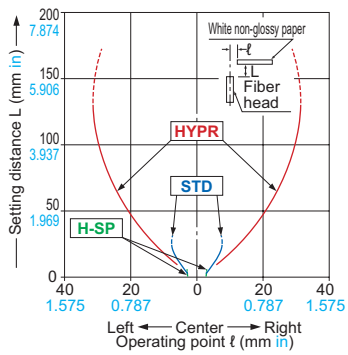
FD-E22 — Reflective type



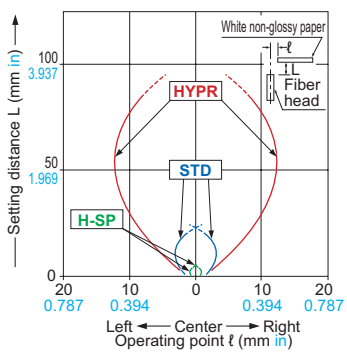
FD-EG1 — Reflective type



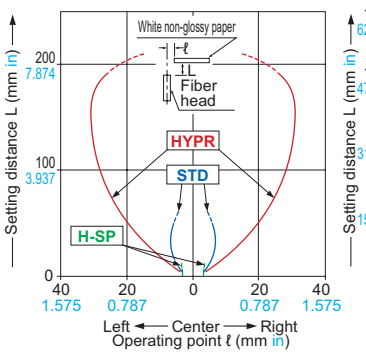
FD-EG2 — Reflective type



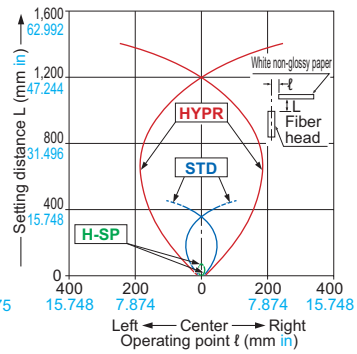
FD-EG3 — Reflective type



FD-ENM1S1 — Reflective type



FD-FM2 FD-G60 — Reflective type

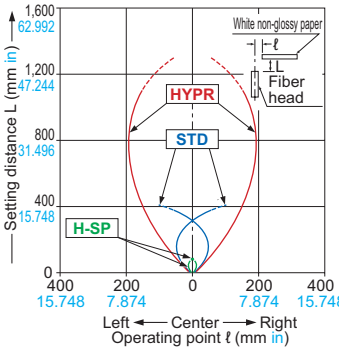


SENSING CHARACTERISTICS (TYPICAL)

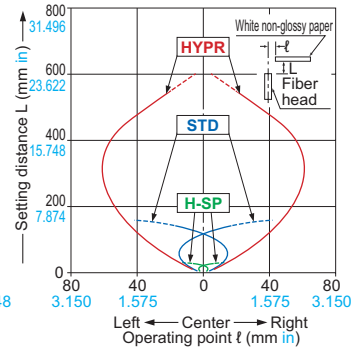
Reflective type Sensing field

Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

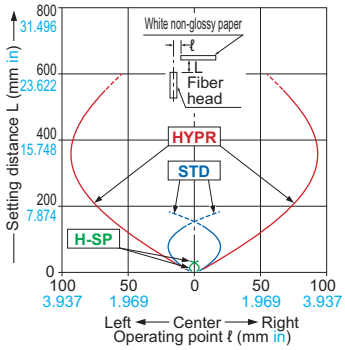
FD-FM2 FD-FM2S4 FD-S80 FD-T80 Reflective type



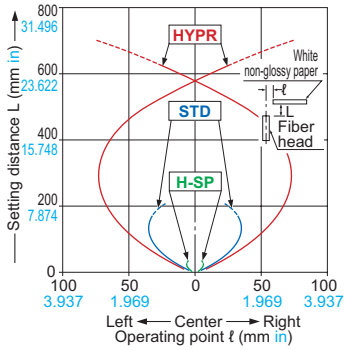
FD-G4 FD-G40 Reflective type



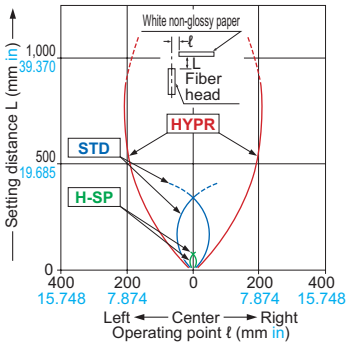
FD-G6 Reflective type



FD-G6X Reflective type

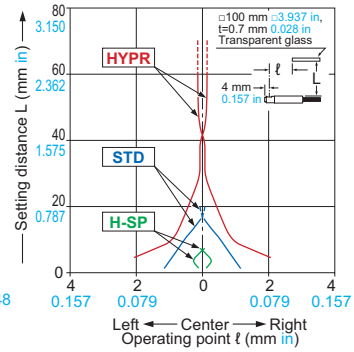


FD-H13-FM2 Reflective type

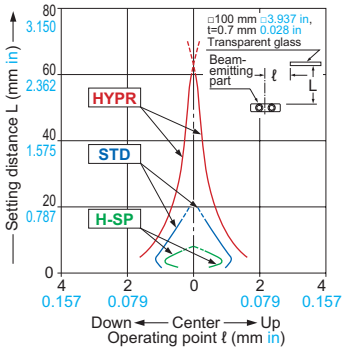


FD-H18-L31 Reflective type

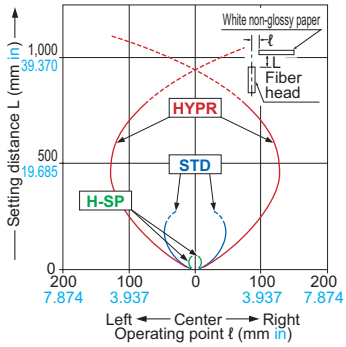
• Horizontal direction



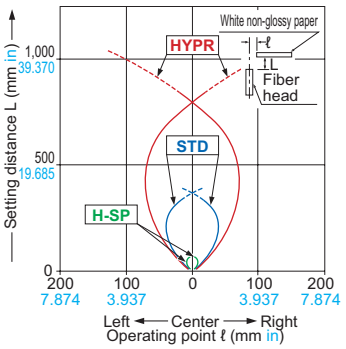
• Vertical direction



FD-H20-21 Reflective type

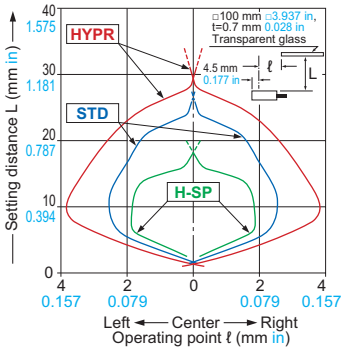


FD-H20-M1 Reflective type

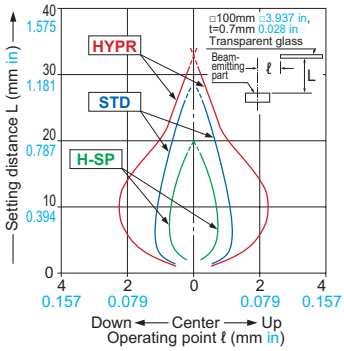


FD-H25-L43 Reflective type

• Horizontal direction

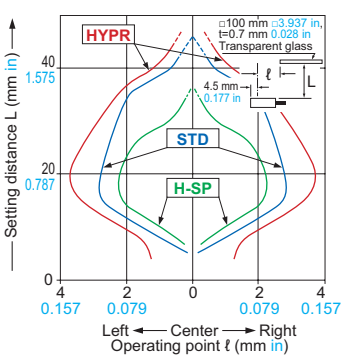


• Vertical direction

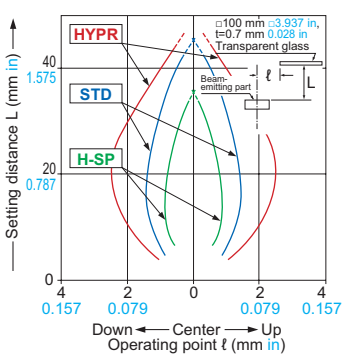


FD-H25-L45 Reflective type

• Horizontal direction

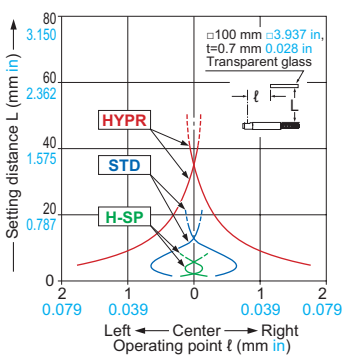


• Vertical direction

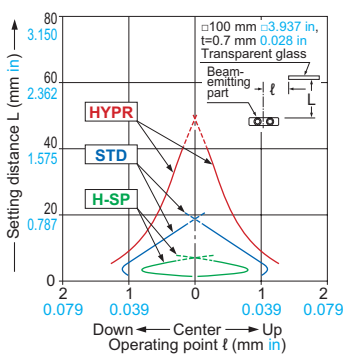


FD-H30-L32 Reflective type

• Horizontal direction



• Vertical direction

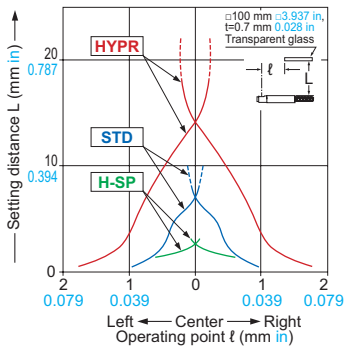


SENSING CHARACTERISTICS (TYPICAL)

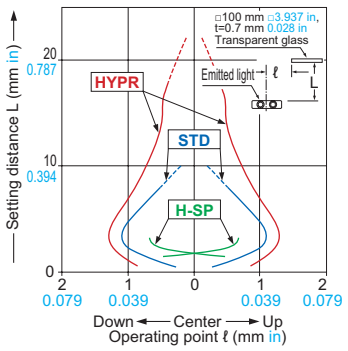
Reflective type Sensing field Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

FD-H30-L32V-S — Reflective type

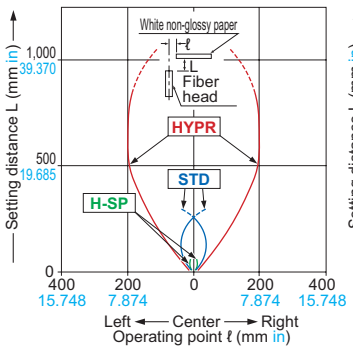
• Horizontal direction



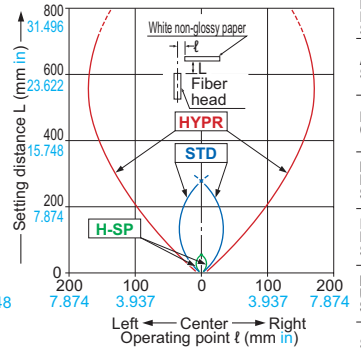
• Vertical direction



FD-H35-20S — Reflective type

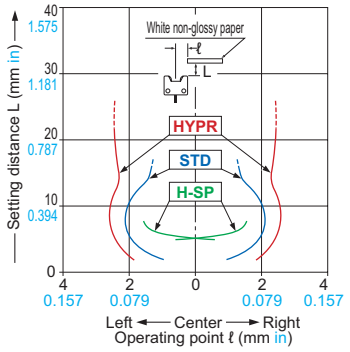


FD-H35-M2 FD-H35-M2S6 — Reflective type

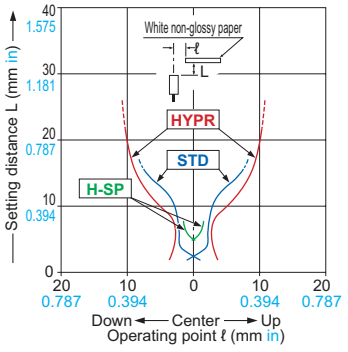


FD-L4 — Reflective type

• Horizontal direction

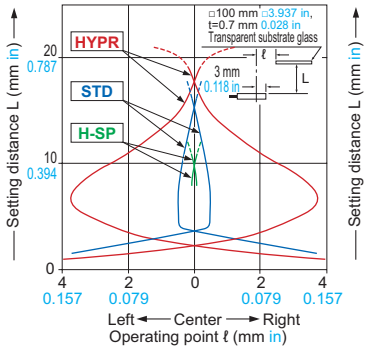


• Vertical direction

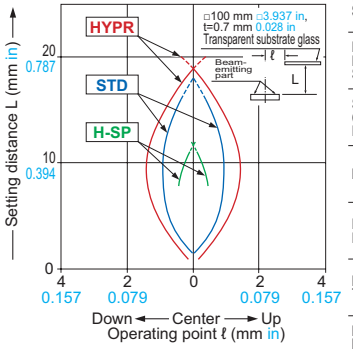


FD-L41 — Reflective type

• Horizontal direction

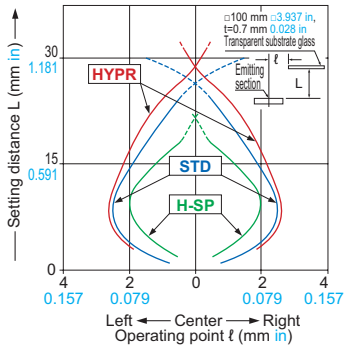


• Vertical direction

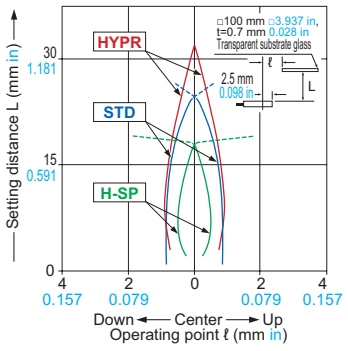


FD-L43 — Reflective type

• Horizontal direction

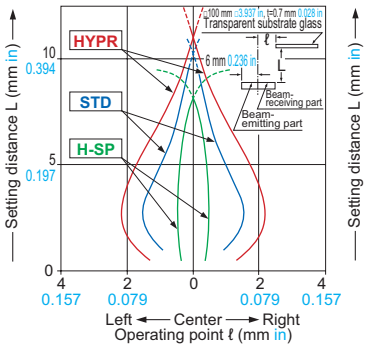


• Vertical direction

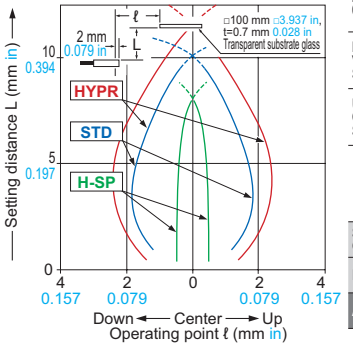


FD-L44 — Reflective type

• Horizontal direction

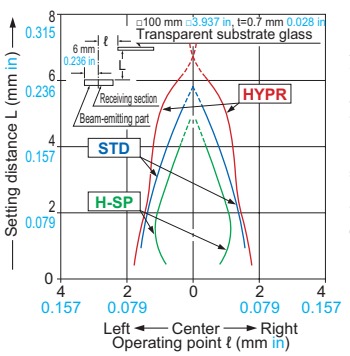


• Vertical direction

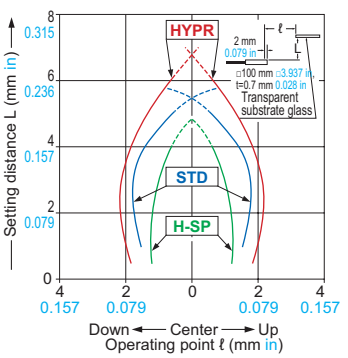


FD-L44S — Reflective type

• Horizontal direction

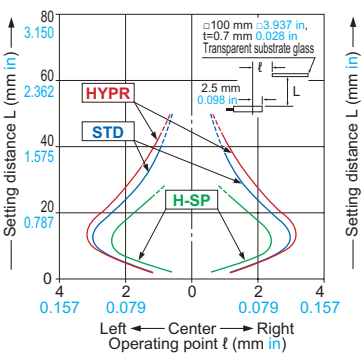


• Vertical direction

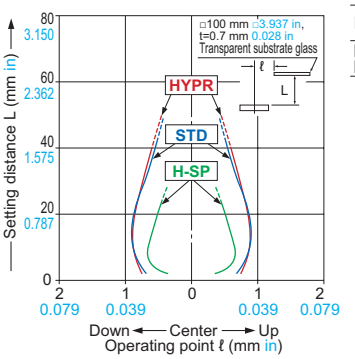


FD-L45 — Reflective type

• Horizontal direction



• Vertical direction

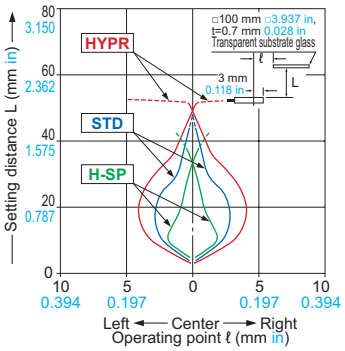


SENSING CHARACTERISTICS (TYPICAL)

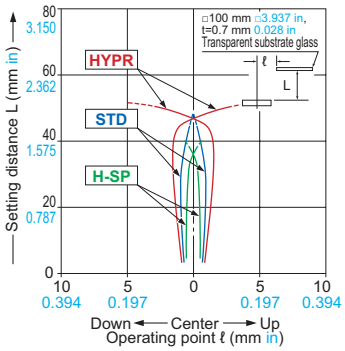
Reflective type Sensing field Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

FD-L45A — Reflective type

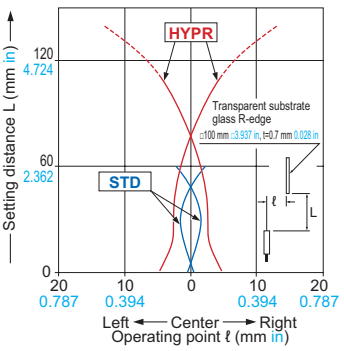
• Horizontal direction



• Vertical direction

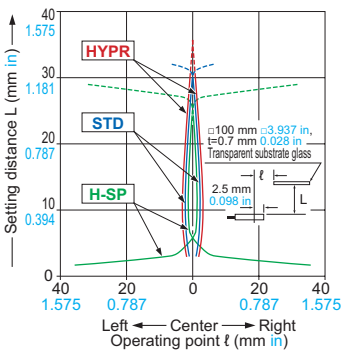


FD-L46 — Reflective type

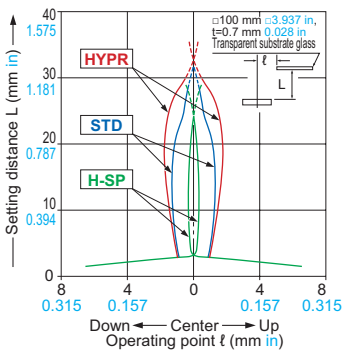


FD-L47 — Reflective type

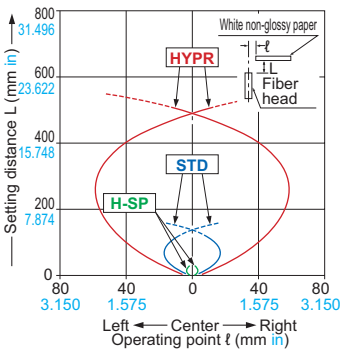
• Horizontal direction



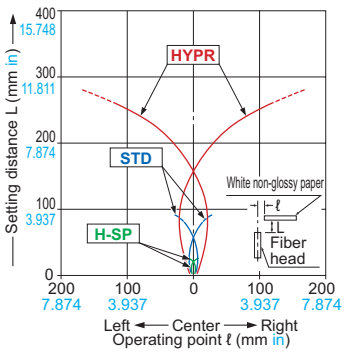
• Vertical direction



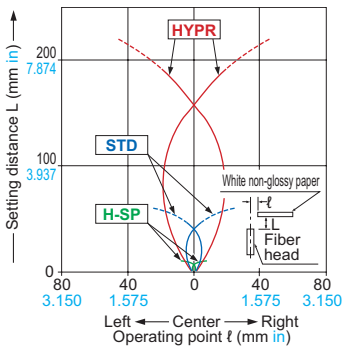
FD-NFM2 FD-NFM2S FD-NFM2S4 FD-SNFM2 FD-T40 — Reflective type



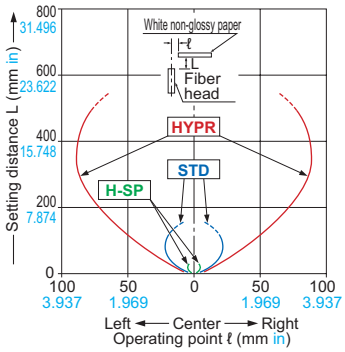
FD-P2 — Reflective type



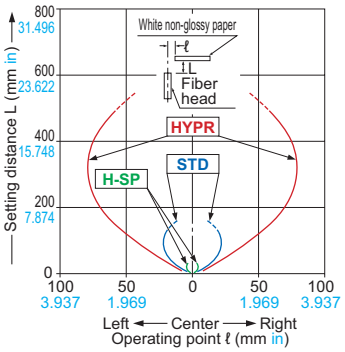
FD-P40 — Reflective type



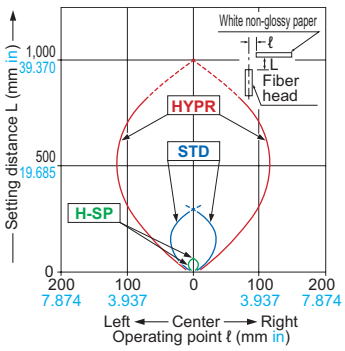
FD-P50 — Reflective type



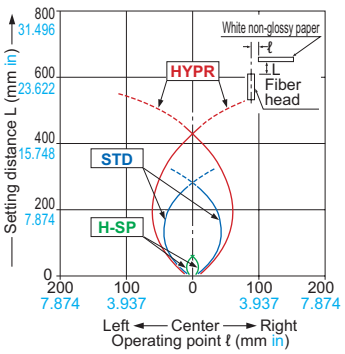
FD-P60 — Reflective type



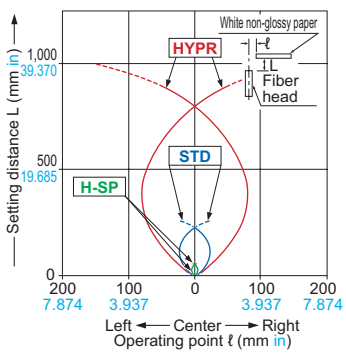
FD-P80 — Reflective type



FD-P81X — Reflective type

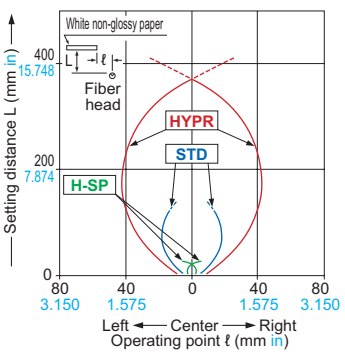


FD-R80 — Reflective type

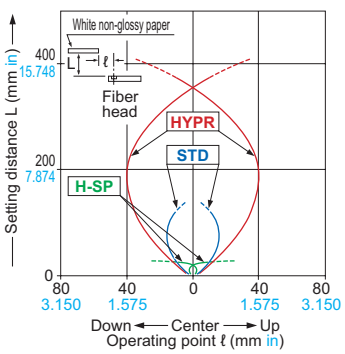


FD-SFM2SV2 — Reflective type

• Horizontal direction



• Vertical direction

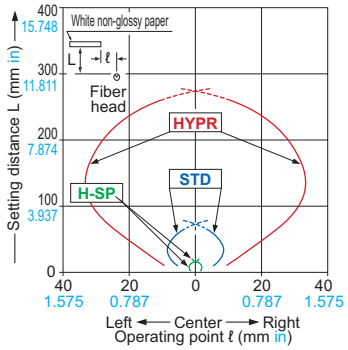


SENSING CHARACTERISTICS (TYPICAL)

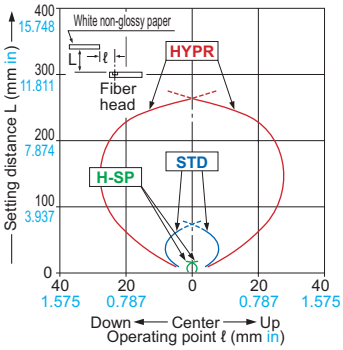
Reflective type Sensing field Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

FD-V41 Reflective type

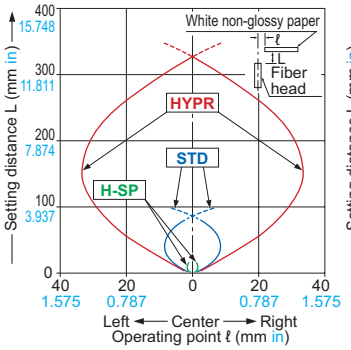
• Horizontal direction



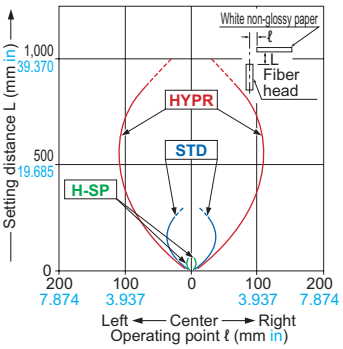
• Vertical direction



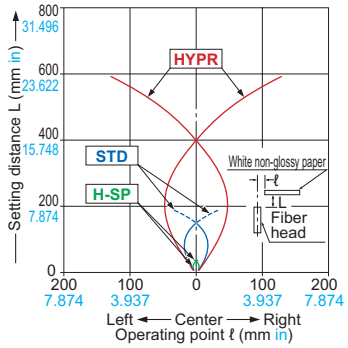
FD-W44 FD-WT4 Reflective type



FD-W8 FD-WS8 FD-WT8 Reflective type

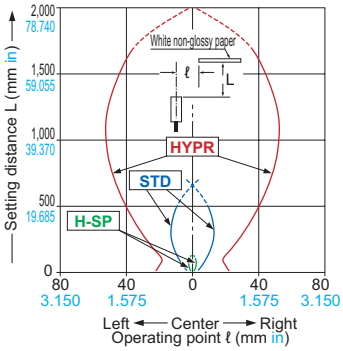


FD-WG4 FD-WSG4 Reflective type

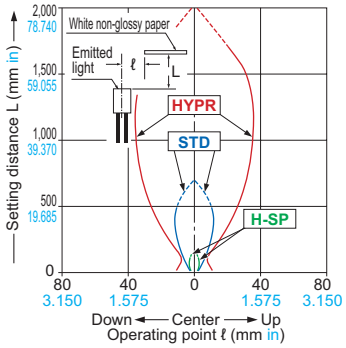


FD-WKZ1 Reflective type

• Horizontal direction

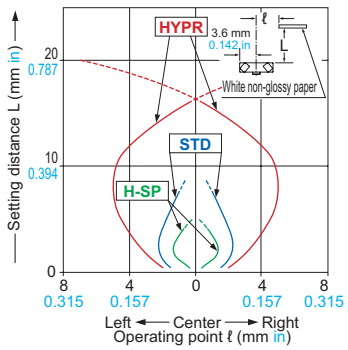


• Vertical direction

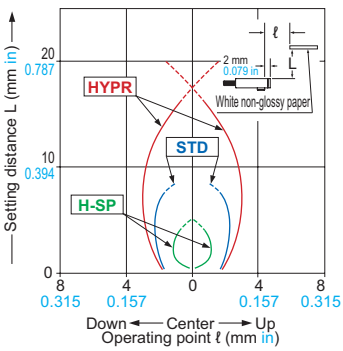


FD-WL48 Reflective type

• Horizontal direction

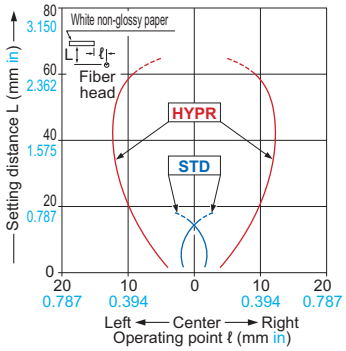


• Vertical direction

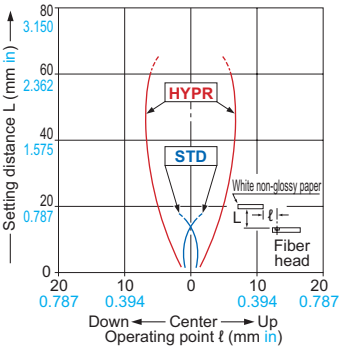


FD-WV42 Reflective type

• Horizontal direction

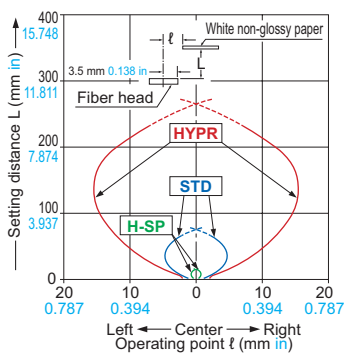


• Vertical direction

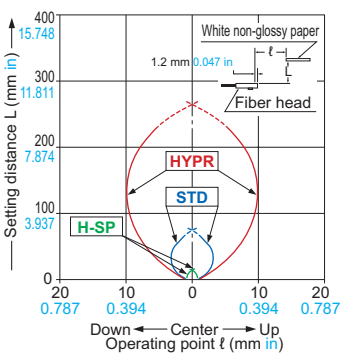


FD-WZ4 Reflective type

• Horizontal direction

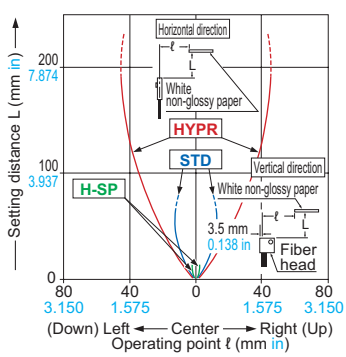


• Vertical direction



FD-WZ4HB Reflective type

• Common for horizontal and vertical direction

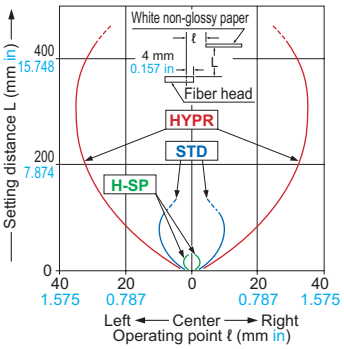


SENSING CHARACTERISTICS (TYPICAL)

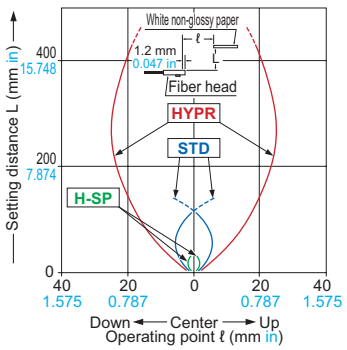
Reflective type Sensing field Sensing characteristics diagram is listed in alphabetical order of model No. (Models with same sensing characteristics are grouped together.)

FD-WZ7 Reflective type

• Horizontal direction

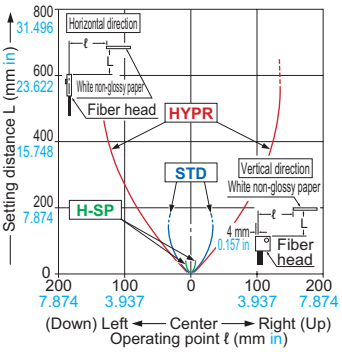


• Vertical direction



FD-WZ7HB Reflective type

• Common for horizontal and vertical direction



PRECAUTIONS FOR PROPER USE

Refer to General precautions, p.80~ for fiber precautions, and to the "PRO mode operation manual on our website for details.

- 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 reted 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 mm^2 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.

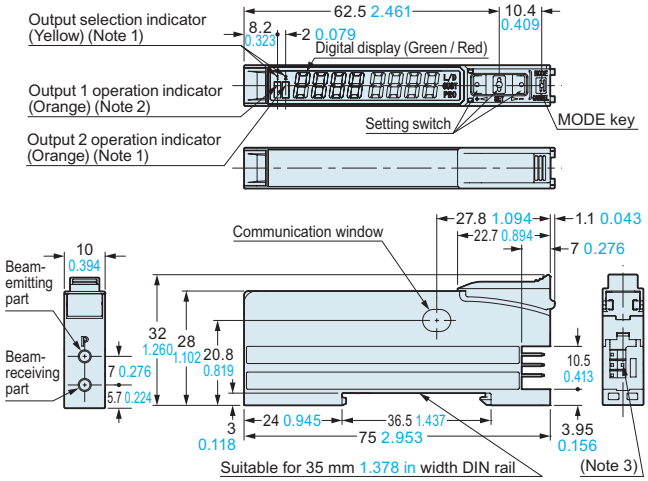
Others

- 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 (H-SP, FAST, STD: 0.5 sec., LONG, 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 100 thousand times or more because of the EEPROM's lifetime.

DIMENSIONS (Unit: mm in)

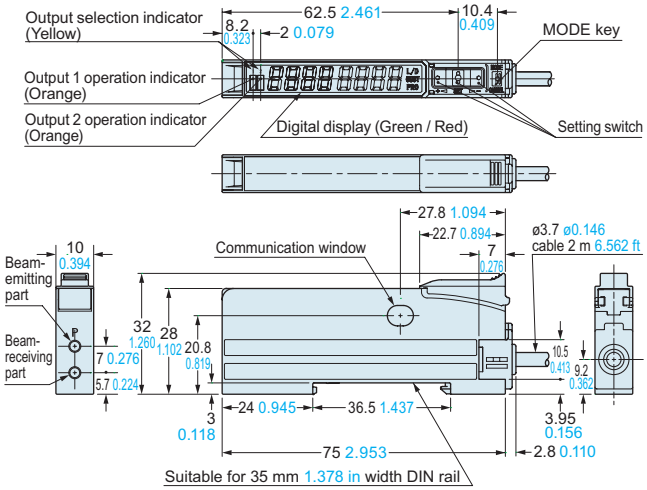
The CAD data in the dimensions can be downloaded from our website.

FX-501(P) FX-502(P) — Amplifier



Notes: 1) **FX-502(P)** only
2) **FX-501(P)**: Operation indicator
3) **FX-501(P)**: 3-pin, **FX-502(P)**: 4-pin

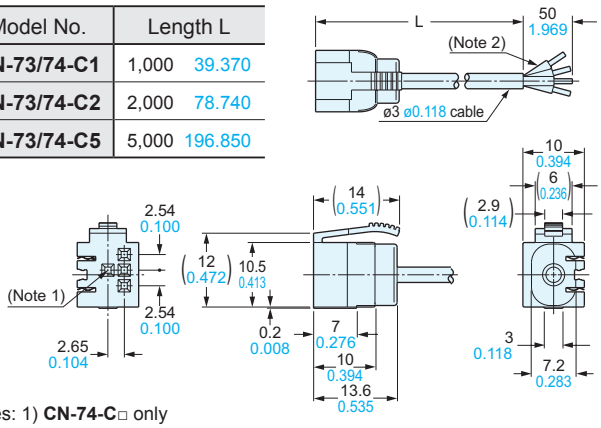
FX-505-C2 FX-505P-C2 — Amplifier



CN-73-C□ CN-74-C□ — Main cable (Optional)

• Length L

Model No.	Length L
CN-73/74-C1	1,000 39.370
CN-73/74-C2	2,000 78.740
CN-73/74-C5	5,000 196.850

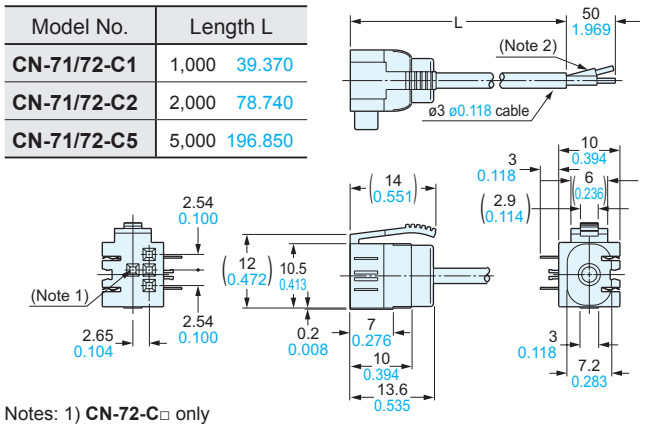


Notes: 1) **CN-74-C□** only
2) **CN-73-C□**: 3-core

CN-71-C□ CN-72-C□ — Sub cable (Optional)

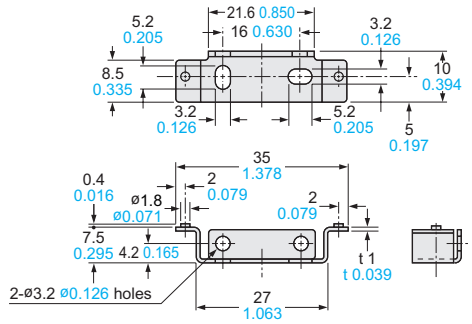
• Length L

Model No.	Length L
CN-71/72-C1	1,000 39.370
CN-71/72-C2	2,000 78.740
CN-71/72-C5	5,000 196.850



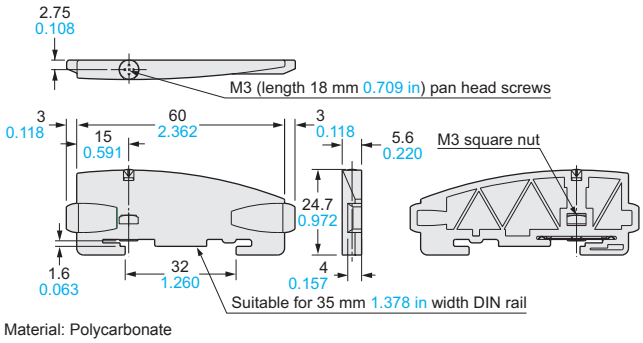
Notes: 1) **CN-72-C□** only
2) **CN-71-C□**: 1-core

MS-DIN-2 — Amplifier mounting bracket (Optional)



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

MS-DIN-E — End plate (Optional)



Material: Polycarbonate