






## Thrubeam Fiber Optics

The FT series of thrubeam fiber optics is a wide-ranging family of sensing heads that are suitable for use in all SUNX fiber amplifiers. Fiber types include standard, high flexibility, special use, and environmentally resistant. Each type is broken down further to include various configurations such as side-view, ultra-small diameter, high precision, and wide beam.

Model Name	Model Pic	Type	Fiber Length (mm)	Bending Radius (mm)	Sensing Range (mm)
Sort ▲ ▼		Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼
FT-B8		M4 Threaded Head	2000	25	1600
FT-FM2		M4 Threaded Head	2000	25	1000
FT-R80		M4 Threaded Head, 90 Degree Elbow	2000	25	740

LIST OF FIBERS

FX-305 / FX-301 (Red LED type) sensing range (Note 1)

Thru-beam type (one pair set)




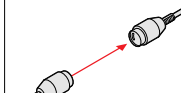

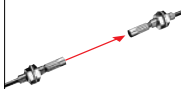
The FX-305 and FX-301(-HS) have different sensing modes.  
 FX-305: H-SP, FAST, STD, STDF, LONG, U-LG (no S-D mode)  
 FX-301(-HS): S-D, H-SP, FAST, STD, LONG (no STDF or U-LG mode)

Type	Shape of fiber head (mm in)	Sensing range (mm in)(Note 2)	<span style="color:red">■</span> : U-LG <span style="color:yellow">■</span> : FAST <span style="color:orange">■</span> : LONG <span style="color:grey">■</span> : H-SP <span style="color:blue">■</span> : STDF <span style="color:purple">■</span> : S-D <span style="color:lightblue">■</span> : STD	Min. sensing object (Note 3)	Fiber cable length Free-cut	Bending radius	Model No.	
M4	Lens mountable	1,600 62.992 1,100 43.307 700 27.559 530 20.866	400 15.748 200 7.874 180 7.087	φ0.04 mm φ0.0016 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-B8	
	Lens mountable					R25 mm R0.984 in	FT-FM2	
	Sleeve 90 mm 3.543 in	1,000 39.370 780 30.709 500 19.685 400 15.748	280 11.024 150 5.906 130 5.118	φ0.03 mm φ0.0012 in opaque object		Fiber R25 mm R0.984 in Sleeve	FT-FM2S	
	Sleeve 40 mm 1.575 in					R10 mm R0.394 in	FT-FM2S4	
	Lens mountable	750 29.528 570 22.441 350 13.780 290 11.417	200 7.874 90 3.543 100 3.937	φ0.03 mm φ0.0012 in opaque object		R1 mm R0.039 in	FT-W8	
	Lens mountable	900 35.433 650 25.591 400 15.748 320 12.598	230 9.055 100 3.937 110 4.331	φ0.04 mm φ0.0016 in opaque object		R4 mm R0.157 in	FT-P80	
	Lens mountable	900 35.433 650 25.591 380 14.961 320 12.598	230 9.055 100 3.937 110 4.331	φ0.05 mm φ0.0020 in opaque object		1 m 3.281 ft	R10 mm R0.394 in	FT-P81X
	Tough flexible							
	Lens mountable	550 21.654 400 15.748 250 9.843 190 7.480	140 5.512 70 2.756 80 3.150	φ0.04 mm φ0.0016 in opaque object		2 m 6.562 ft	R4 mm R0.157 in	FT-P60
	Threaded type	Nut type	Lens mountable	750 29.528 570 22.441 350 13.780 290 11.417		200 7.874 90 3.543 100 3.937	φ0.06 mm φ0.0024 in opaque object	2 m 6.562 ft
With lens			1,500 59.055 1,200 47.244 750 29.528 600 23.622	420 16.535 200 7.874 210 8.268	φ0.04 mm φ0.0016 in opaque object		FT-WR80L	
Elbow		Lens mountable	740 29.134 530 20.866 320 12.598 230 9.055	150 5.906 75 2.953 80 3.150	φ0.04 mm φ0.0016 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-R80
		Lens mountable (except FX-LE2)	1,000 39.370 780 30.709 500 19.685 400 15.748	280 11.024 150 5.906 130 5.118	φ0.03 mm φ0.0012 in opaque object		R25 mm R0.984 in	FT-T80
M3						2 m 6.562 ft		FT-NFM2
		Sleeve 90 mm 3.543 in	400 15.748 270 10.630 200 7.874 140 5.512	100 3.937 55 2.165 49 1.929	φ0.025 mm φ0.0010 in opaque object		Fiber R25 mm R0.984 in Sleeve	FT-NFM2S
		Sleeve 40 mm 1.575 in					R10 mm R0.394 in	FT-NFM2S4
			220 8.661 160 6.299 100 3.937 80 3.150	55 2.165 25 0.984 28 1.102	φ0.02 mm φ0.0008 in opaque object		R1 mm R0.039 in	FT-W4
			350 13.780 250 9.843 150 5.906 100 3.937	75 2.953 30 1.181 35 1.378			R4 mm R0.157 in	FT-P40
		With lens	19,500 767.715 19,500 767.715 19,500 767.715 14,000 551.180	10,000 393.700 3,500 137.795 3,800 149.606	φ0.4 mm φ0.016 in opaque object		10 m 32.808 ft	R25 mm R0.984 in

Notes: 1) Refer to p.27 for the sensing ranges for the FX-301(-HS) in H-SP mode and for the FX-301B/G/H.  
 2) Please take care that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.  
 3) The minimum sensing object size is the value for red LED type. Please contact our office for information on the minimum sensing object size if using amplifiers other than red LED type.  
 The optimum condition is the condition when the sensitivity is set so that the sensing output just changes to light incident operation in the object absent condition.

FIBER OPTIONS

Lens (For thru-beam type fiber)

Designation	Model No.	Description	
For thru-beam type fiber	Expansion lens (Note 1)	 <p><b>FX-LE1</b></p>	<p>Increases the sensing range by 5 times or more.</p> <ul style="list-style-type: none"> <li>Ambient temperature: -60 to +350 °C -76 to +662 °F</li> </ul>
	Super-expansion lens (Note 1)	 <p><b>FX-LE2</b></p>	<p>Tremendously increases the sensing range with large diameter lenses.</p> <ul style="list-style-type: none"> <li>Ambient temperature: -60 to +350 °C -76 to +662 °F</li> </ul>
	Side-view lens	 <p><b>FX-SV1</b></p>	<p>Beam axis is bent by 90 °.</p> <ul style="list-style-type: none"> <li>Ambient temperature: -60 to +300 °C -76 to +572 °F</li> </ul>
	Expansion lens for vacuum fiber (Note 1)	 <p><b>FV-LE1</b></p>	<p>Sensing range increases by 10 times or more.</p> <ul style="list-style-type: none"> <li>Ambient temperature: -40 to +120 °C -40 to +248 °F</li> </ul>

Sensing range for red LED type (mm) [Lens on both sides] (Note 3)								
Fiber	Mode	U-LG	LONG	STDF	STD	FAST	S-D	H-SP
FT-B8		3,500	3,500	3,000	2,500	2,000	1,000	1,000
FT-FM2		3,500	3,500	3,500	3,500	2,500	1,300	1,000
FT-T80		3,500	3,500	3,500	3,500	2,500	1,300	1,000
FT-R80		3,500	3,500	3,500	2,300	1,600	800	750
FT-W8		3,500	3,500	3,500	2,900	2,000	1,000	900
FT-P80		3,500	3,500	3,500	3,500	2,500	1,100	1,000
FT-P60		3,500	3,500	3,500	3,500	1,500	900	800
FT-P81X		1,600	1,600	1,600	1,600	1,600	1,100	950
FT-H35-M2		3,500	3,500	2,500	2,000	1,500	750	700
FT-H20W-M1		1,600	1,600	1,600	1,300	900	500	400
FT-H20-M1		1,600	1,600	1,600	1,600	1,100	900	600

Sensing range for red LED type (mm) [Lens on both sides] (Note 3)								
Fiber	Mode	U-LG	LONG	STDF	STD	FAST	S-D	H-SP
FT-B8		3,500	3,500	3,500	3,500	3,500	3,500	3,500
FT-FM2		3,500	3,500	3,500	3,500	3,500	3,500	3,500
FT-T80		3,500	3,500	3,500	3,500	3,500	3,500	3,500
FT-W8		3,500	3,500	3,500	3,500	3,500	3,500	3,500
FT-P80		3,500	3,500	3,500	3,500	3,500	3,500	3,500
FT-P60		3,500	3,500	3,500	3,500	3,500	3,500	3,500
FT-P81X		1,600	1,600	1,600	1,600	1,600	1,600	1,600
FT-H35-M2		3,500	3,500	3,500	3,500	3,500	3,500	3,500
FT-H20W-M1		1,600	1,600	1,600	1,600	1,600	1,500	1,600
FT-H20-M1		1,600	1,600	1,600	1,600	1,600	1,600	1,600
FT-H13-FM2		3,500	3,500	3,500	3,500	3,500	3,500	3,500


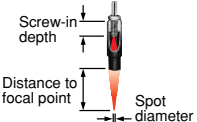
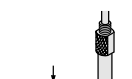
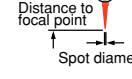
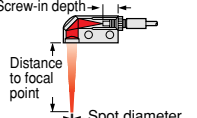
Sensing range for red LED type (mm) [Lens on both sides] (Note 3)					
Fiber	Mode	LONG	STD	FAST	S-D
FT-B8		1,100	530	400	186
FT-FM2		1,200	600	440	210
FT-T80		1,200	600	440	210
FT-W8		900	450	330	160
FT-P80		1,200	600	440	210
FT-P60		650	300	200	130
FT-P81X		1,200	600	440	200
FT-H35-M2		550	280	200	90
FT-H20W-M1		310	140	100	50
FT-H20-M1		550	280	200	90

Sensing range for red LED type (mm) [Lens on both sides] (Note 3, 4)								
Fiber	Mode	U-LG	LONG	STDF	STD	FAST	S-D	H-SP
FT-H30-M1V		1,600	1,200	650	450	300	150	200

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 3,500 mm 137.795 in long (FT-H20W-M1, FT-P81X and FT-H20-M1: 1,600 mm 62.992 in).  
 3) The sensing ranges are the values for red LED type amplifier. Please contact our office for details on sensing ranges for other types of amplifiers.  
 4) The fiber cable length for the FT-H30-M1V is 1 m 3.281 ft. The sensing ranges in U-LG and LONG modes take into account the length of the FT-J8 atmospheric side fiber.

Lens (For reflective type fiber)

Designation	Model No.	Description	
For reflective type fiber	Pinpoint spot lens	 <p><b>FX-MR1</b></p>	<p>Pinpoint spot of <math>\phi 0.5</math> mm <math>\phi 0.020</math> in. Enables detection of minute objects or small marks.</p> <ul style="list-style-type: none"> <li>Distance to focal point: <math>6 \pm 1</math> mm <math>0.236 \pm 0.039</math> in</li> <li>Applicable fibers: FD-WG4, FD-G4</li> <li>Ambient temperature: -40 to +70 °C -40 to +158 °F</li> </ul>
	Zoom lens	 <p><b>FX-MR2</b></p>	<p>The spot diameter is adjustable from <math>\phi 0.7</math> mm to <math>\phi 2</math> mm <math>\phi 0.028</math> in to <math>\phi 0.079</math> in according to how much the fiber is screwed in.</p> <ul style="list-style-type: none"> <li>Applicable fibers: FD-WG4, FD-G4</li> <li>Ambient temperature: -40 to +70 °C -40 to +158 °F</li> <li>Accessory: MS-EX-3 (mounting bracket)</li> </ul>
	Finest spot lens	 <p><b>FX-MR3</b></p>	<p>Extremely fine spot of <math>\phi 0.3</math> mm <math>\phi 0.012</math> in approx. achieved.</p> <ul style="list-style-type: none"> <li>Applicable fibers: FD-WG4, FD-G4, FD-EG1, FD-EG2, FD-EG3, FD-G6X, FD-G6</li> <li>Ambient temperature: -40 to +70 °C -40 to +158 °F</li> </ul>
	Finest spot lens	 <p><b>FX-MR6</b></p>	<p>Extremely fine spot of <math>\phi 0.1</math> mm <math>\phi 0.004</math> in approx. achieved.</p> <ul style="list-style-type: none"> <li>Applicable fibers: FD-WG4, FD-G4, FD-EG1, FD-EG2, FD-EG3, FD-G6X, FD-G6</li> <li>Ambient temperature: -20 to +60 °C -4 to +140 °F</li> </ul>
	Zoom lens (Side-view) type	 <p><b>FX-MR5</b></p>	<p>FX-MR2 is converted into a side-view type and can be mounted in a very small space.</p> <ul style="list-style-type: none"> <li>Applicable fibers: FD-WG4, FD-G4</li> <li>Ambient temperature: -40 to +70 °C -40 to +158 °F</li> </ul>

Sensing range for red LED type (Note)		
Screw-in depth	Distance to focal point	Spot diameter
7 mm	18.5 mm approx.	$\phi 0.7$ mm
12 mm	27 mm approx.	$\phi 1.2$ mm
14 mm	43 mm approx.	$\phi 2.0$ mm

Sensing range for red LED type (Note)		
Fiber model No.	Distance to focal point	Spot diameter
FD-EG3	$7.5 \pm 0.5$ mm	$\phi 0.15$ mm approx.
FD-EG2	$7.5 \pm 0.5$ mm	$\phi 0.2$ mm approx.
FD-EG1	$7.5 \pm 0.5$ mm	$\phi 0.3$ mm approx.
FD-WG4/G4/G6X/G6	$7.5 \pm 0.5$ mm	$\phi 0.5$ mm approx.

Sensing range for red LED type (Note)		
Fiber model No.	Distance to focal point	Spot diameter
FD-EG3	$7 \pm 0.5$ mm	$\phi 0.1$ mm approx.
FD-EG2	$7 \pm 0.5$ mm	$\phi 0.15$ mm approx.
FD-EG1	$7 \pm 0.5$ mm	$\phi 0.2$ mm approx.
FD-WG4/G4/G6X/G6	$7 \pm 0.5$ mm	$\phi 0.4$ mm approx.

Sensing range for red LED type (Note)		
Screw-in depth	Distance to focal point	Spot diameter
8 mm	13 mm approx.	$\phi 0.5$ mm
10 mm	15 mm approx.	$\phi 0.8$ mm
14 mm	30 mm approx.	$\phi 3.0$ mm

Note: The sensing ranges are the values when used in combination with red LED type amplifier. Please contact our office for details on sensing ranges for other types of amplifier.

## FIBER OPTIONS

### Others

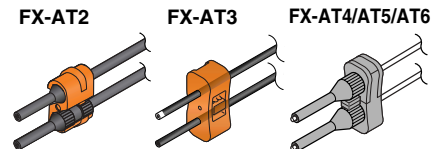
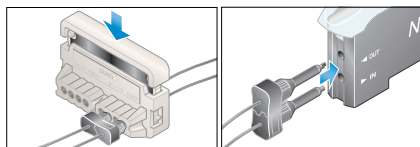
Designation	Model No.	Description	
Protective tube (For thru-beam type fiber)	FTP-500 (0.5 m 1.640 ft)	For M4 thread	Applicable fibers  The protective tube, made of non-corrosive stainless steel, protects the inner fiber cable from any external forces.
	FTP-1000 (1 m 3.281 ft)		
	FTP-1500 (1.5 m 4.921 ft)		
	FTP-N500 (0.5 m 1.640 ft)	For M3 thread	
	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	FT-B8 FT-P80 FT-FM2 FT-P60 FT-FM2S FT-FM2S4 FT-H13-FM2
	FDP-1000 (1 m 3.281 ft)		FT-T80 FT-P40 FT-NFM2 FD-T40 FT-NFM2S FD-P40 FT-NFM2S4
	FDP-1500 (1.5 m 4.921 ft)		FD-B8 FD-P80 FD-FM2 FT-H13-FM2 FD-FM2S FD-FM2S4
	FDP-N500 (0.5 m 1.640 ft)	For M4 thread	FD-T80 FD-NFM2 FD-NFM2S FD-NFM2S4
	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)	
Universal sensor mounting stand	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	
Fiber cutter	FX-CT2	The free-cut type fiber can be easily cut.	
	FX-CT1	Accessory. FX-CT1 is attached with the FT-P80 or the FD-P80. The FX-CT2 is provided with fibers other than this.	
Attachment for fixed-length fiber	FX-AT2	This is the attachment for the fixed length fiber. (Accessory)	
Attachment for $\phi 2.2$ mm $\phi 0.087$ in fiber	FX-AT3	This is the attachment for the $\phi 2.2$ mm $\phi 0.087$ in fiber. (Accessory. Does not attach with the FT-P80 or the FD-P80.)	
Attachment for $\phi 1$ mm $\phi 0.039$ in fiber	FX-AT4	This is the attachment for the $\phi 1$ mm $\phi 0.039$ in fiber. (Accessory)	
Attachment for $\phi 1.3$ mm $\phi 0.051$ in fiber	FX-AT5	This is the attachment for the $\phi 1.3$ mm $\phi 0.051$ in fiber. (Accessory)	
Attachment for $\phi 1$ mm $\phi 0.039$ in / $\phi 1.3$ mm $\phi 0.051$ in mixed fiber	FX-AT6	This is the attachment for the $\phi 1$ mm $\phi 0.039$ in / $\phi 1.3$ mm $\phi 0.051$ in mixed fiber. (Accessory)	

Note: Do not bend the sleeve part of any side-view type fiber or ultra-small diameter head type fiber.

### Fiber attachment

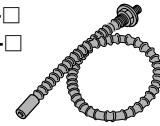
#### It's possible to simultaneously cut two fibers to the same length

Each fiber (with some exceptions) has a newly developed two-in-one fiber attachment (FX-AT3/AT4/AT5/AT6) which enables two fibers to be cut simultaneously to the same length with the new fiber cutter (FX-CT2). Also, since the fibers can be attached to the amplifier while being fixed in position in the two-in-one fiber attachment, sensitivity changes resulting from variation in the amount of fiber insertion do not occur.



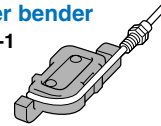
### Protective tube

- FTP-□
- FDP-□



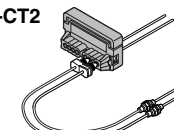
### Fiber bender

- FB-1



### Fiber cutter

- FX-CT2



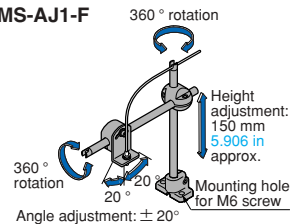
- FX-CT1



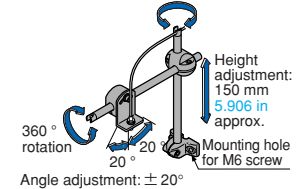
### Universal sensor mounting stand

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

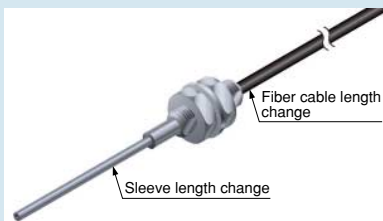
- MS-AJ1-F



- MS-AJ2-F



### Guide to interchanging fiber length and sleeve length



Custom-ordered products are available with different fiber lengths and sleeve lengths in order to respond quickly to different requirements.

#### Custom-ordered product (Typical)

- Fiber length can be set up to 30 m 98.425 ft in units of 1 m 3.281 ft ..... FT-B8, FT-AFM2 etc.
- Sleeve length can be set up to 12 cm 4.724 in units of 1 cm 0.394 in ..... FT-FM2S4, FD-NFM2S4 etc.

Please contact us.