

LIST OF FIBERS

Pliable fibers (flexible and sharp bending fibers) are marked with light blue in the table.

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

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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Thru-beam type (one pair set)



Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2)	■ U-LG ■ FAST ■ LONG ■ H-SP ■ STDF ■ S-D ■ STD	Min. sensing object (Note 3)	Fiber cable length : Free-cut	Bending radius	Model No.	Dimensions	
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	ø0.04 mm ø0.0016 in opaque object	 2 m 6.562 ft	R25 mm R0.984 in	FT-B8	P.106	
	Lens mountable					R25 mm R0.984 in	FT-FM2	P.106	
	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	ø0.03 mm ø0.0012 in opaque object		Fiber R25 mm R0.984 in Sleeve	FT-FM2S	P.106	
	Sleeve 40 mm 1.575 in	1,000 39.370 780 30.709 500 19.685 400 15.748	280 11.024 150 5.906 130 5.118	ø0.03 mm ø0.0012 in opaque object		R10 mm R0.394 in	FT-FM2S4	P.106	
	Lens mountable	750 29.528 570 22.441 350 13.780 290 11.417	200 7.874 90 3.543 100 3.937	ø0.03 mm ø0.0012 in opaque object		R1 mm R0.039 in	FT-W8	P.110	
	Lens mountable	900 35.433 650 25.591 400 15.748 320 12.598	230 9.055 100 3.937 110 4.331	ø0.04 mm ø0.0016 in opaque object		R4 mm R0.157 in Flexible	FT-P80	P.108	
	Lens mountable	900 35.433 650 25.591 380 14.961 320 12.598	230 9.055 100 3.937 110 4.331	ø0.05 mm ø0.0020 in opaque object		1 m 3.281 ft R10 mm R0.394 in	FT-P81X	P.108	
	Lens mountable	550 21.654 400 15.748 250 9.843 190 7.480	140 5.512 70 2.756 80 3.150	ø0.04 mm ø0.0016 in opaque object		 2 m 6.562 ft R4 mm R0.157 in Flexible	FT-P60	P.108	
	Square head type	W7 x H9 x D13.9 W0.276 x H0.354 x D0.547	750 29.528 570 22.441 350 13.780 290 11.417	200 7.874 90 3.543 100 3.937		ø0.06 mm ø0.0024 in opaque object	 2 m 6.562 ft R1 mm R0.039 in	NEW FT-WR80 (Note 4)	P.110
	With lens	W7 x H9 x D14.6 W0.276 x H0.354 x D0.575	1,500 59.055 1,200 47.244 750 29.528 600 23.622	420 16.535 200 7.874 210 8.268		ø0.04 mm ø0.0016 in opaque object	NEW FT-WR80L (Note 4)	P.110	
Elbow	Lens mountable	740 29.134 530 20.866 320 12.598 230 9.055	150 5.906 75 2.953 80 3.150	ø0.04 mm ø0.0016 in opaque object	 2 m 6.562 ft	R25 mm R0.984 in	FT-R80	P.109	
	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	ø0.03 mm ø0.0012 in opaque object	 2 m 6.562 ft	R25 mm R0.984 in	FT-T80	P.109	
						FT-NFM2	P.108		
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	ø0.025 mm ø0.0010 in opaque object	Fiber R25 mm R0.984 in Sleeve		FT-NFM2S	P.108		
Sleeve 40 mm 1.575 in	400 15.748 270 10.630 200 7.874 140 5.512	100 3.937 55 2.165 49 1.929	ø0.025 mm ø0.0010 in opaque object	R10 mm R0.394 in		FT-NFM2S4	P.108		
Lens mountable	220 8.661 160 6.299 100 3.937 80 3.150	55 2.165 25 0.984 28 1.102	ø0.02 mm ø0.0008 in opaque object	R1 mm R0.039 in		FT-W4	P.109		
Lens mountable	350 13.780 250 9.843 150 5.906 100 3.937	75 2.953 30 1.181 35 1.378	ø0.02 mm ø0.0008 in opaque object	R4 mm R0.157 in Flexible		FT-P40	P.108		
Long sensing range	With lens M14	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	ø0.4 mm ø0.016 in opaque object		 10 m 32.808 ft	R25 mm R0.984 in	FT-FM10L	P.106

- Notes: 1) For sensing range, refer to p.76 for the H-SP mode of FX-301-HS, and FX-301B/G/H, p.127 for the FX-100 series, p.161~ for the FX-410 series, and p.174~ for the FX-311 series.
 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.
 4) Refer to p.79~ for details.

LIST OF FIBERS

Pliable fibers (flexible and sharp bending fibers) are marked with light blue in the table.

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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2)	<ul style="list-style-type: none"> ■ U-LG ■ LONG ■ STDF ■ STD 	<ul style="list-style-type: none"> ■ FAST ■ H-SP ■ S-D 	Min. sensing object (Note 3)	Fiber cable length Free-cut	Bending radius	Model No.	Dimensions					
Cylindrical type	With lens • Long sensing range ø3 ø0.118	1,500 59.055	420 16.535	ø0.02 mm ø0.0008 in opaque object	2 m 6.562 ft	R1 mm R0.039 in	FT-WS8L	P.110						
		750 29.528	200 7.874	ø0.05 mm ø0.0020 in opaque object	2 m 6.562 ft				FT-WS3	P.110				
		600 23.622	210 8.268											
	ø2.5 ø0.098	With lens • Long sensing range ø2.5 ø0.098	2,000 78.740	580 22.835	ø0.02 mm ø0.0008 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-SFM2L	P.109					
			1,600 62.992	170 6.693						ø0.03 mm ø0.0012 in opaque object	2 m 6.562 ft	FT-SFM2	P.109	
			820 32.284	280 11.024										
		ø1.5 ø0.059	With lens • Long sensing range ø1.5 ø0.059	1,000 39.370	280 11.024	ø0.025 mm ø0.0010 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-SNFM2	P.109				
				780 30.709	150 5.906						ø0.02 mm ø0.0008 in opaque object	1 m 3.281 ft	FT-WS4	P.110
				400 15.748	130 5.118									
	Side-view	ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	400 15.748	100 3.937	ø0.02 mm ø0.0008 in opaque object	500 mm 19.685 in	Flexible	FT-PS1	P.109				
				270 10.630	55 2.165						ø0.05 mm ø0.0020 in opaque object	2 m 6.562 ft	FT-V10	P.109
				200 7.874	49 1.929									
Ultra small diameter		ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	220 8.661	55 2.165	ø0.02 mm ø0.0008 in opaque object	500 mm 19.685 in	R5 mm R0.197 in	FT-E12	P.106				
				160 6.299	25 0.984						ø0.05 mm ø0.0020 in opaque object	1 m 3.281 ft	FT-E22	P.106
				100 3.937	28 1.102									
		ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	350 13.780	90 3.543	ø0.02 mm ø0.0008 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-V22	P.109				
				280 11.024	40 1.575						ø0.05 mm ø0.0020 in opaque object	1 m 3.281 ft	FT-V41	P.109
				160 6.299	42 1.654									
Ultra small diameter		ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	100 3.937	30 1.181	ø0.02 mm ø0.0008 in opaque object	2 m 6.562 ft	R1 mm R0.039 in	FT-WV42	P.110				
				80 3.150	13 0.512						ø0.05 mm ø0.0020 in opaque object	1 m 3.281 ft	FT-V22	P.109
				50 1.969	17 0.669									
	ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	2,350 92.520	800 31.496	ø0.05 mm ø0.0020 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-V10	P.109					
			2,000 78.740	340 13.386						ø0.05 mm ø0.0020 in opaque object	1 m 3.281 ft	FT-V22	P.109	
			1,400 55.118	350 13.780										
Ultra small diameter	ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	550 21.654	140 5.512	ø0.02 mm ø0.0008 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-V22	P.109					
			400 15.748	65 2.559						ø0.05 mm ø0.0020 in opaque object	1 m 3.281 ft	FT-V41	P.109	
			240 9.449	70 2.756										
	ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	410 16.142	125 4.921	ø0.02 mm ø0.0008 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-V22	P.109					
			390 15.354	60 2.362						ø0.05 mm ø0.0020 in opaque object	1 m 3.281 ft	FT-V41	P.109	
			220 8.661	63 2.480										
Ultra small diameter	ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	220 8.661	60 2.362	ø0.02 mm ø0.0008 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-V22	P.109					
			175 6.890	25 0.984						ø0.05 mm ø0.0020 in opaque object	1 m 3.281 ft	FT-V41	P.109	
			100 3.937	27 1.063										
	ø1 ø0.039	With lens • Long sensing range ø1 ø0.039	120 4.724	30 1.181	ø0.02 mm ø0.0008 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-V22	P.109					
			90 3.543	13 0.512						ø0.05 mm ø0.0020 in opaque object	1 m 3.281 ft	FT-V41	P.109	
			55 2.165	15 0.591										

Notes: 1) For sensing range, refer to p.76 for the H-SP mode of **FX-301-HS**, and **FX-301B/G/H**, p.127 for the **FX-100** series, p.161~ for the **FX-410** series, and p.174~ for the **FX-311** series.
 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 SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY COMPONENTS

PRESSURE SENSORS

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Selection Guide

Fibers

FT / FD / FR

Fiber Sensor Amplifiers

FX-100

FX-300

FX-410

FX-311

FX-11A

FX-301-F

Other Products

LIST OF FIBERS

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

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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Thru-beam type (one pair set)



Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2)	<ul style="list-style-type: none"> ■ U-LG ■ LONG ■ STDF ■ STD 	<ul style="list-style-type: none"> ■ FAST ■ H-SP ■ S-D 	Min. sensing object (Note 3)	Fiber cable length Free-cut	Bending radius	Model No.	Dimensions	
Rectangular Compact	Easy mounting • Top sensing W3 × H8 × D12 W0.118 × H0.315 × D0.472	3,500 137.795	850 33.465	0.08 mm 0.0032 in		2 m 6.562 ft	R1 mm R0.039 in	FT-WZ8H	P.111	
		2,500 98.425	400 15.748	0.03 mm 0.0012 in			R4 mm R0.157 in	FT-Z8H	P.111	
		1,600 62.992	410 16.142	0.05 mm 0.0020 in			R1 mm R0.039 in	FT-WZ8E	P.111	
	Easy mounting • Side sensing W3 × H12 × D8 W0.118 × H0.472 × D0.315	3,100 122.047	1,000 39.370	0.03 mm 0.0012 in		2 m 6.562 ft	R4 mm R0.157 in	FT-Z8E	P.111	
		2,700 106.299	420 16.535	0.03 mm 0.0012 in			R4 mm R0.157 in	FT-Z8E	P.111	
		1,550 61.024	490 19.291	0.04 mm 0.0016 in			R1 mm R0.039 in	FT-WZ8	P.111	
	Easy mounting • Front sensing W8.5 × H12 × D3 W0.335 × H0.472 × D0.118	2,100 82.677	500 19.685	0.03 mm 0.0012 in		2 m 6.562 ft	R4 mm R0.157 in	FT-Z8	P.111	
		1,500 59.055	200 7.874	0.08 mm 0.0032 in			R1 mm R0.039 in	FT-WZ4	P.110	
		950 37.402	210 8.268	0.08 mm 0.0032 in			R1 mm R0.039 in	FT-WZ4HB	P.111	
	Narrow beam	Front sensing W10 × H7 × D2 W0.394 × H0.276 × D0.079	300 11.811	70 2.756	0.08 mm 0.0032 in		1 m 3.281 ft	R1 mm R0.039 in	FT-WZ7	P.111
			200 7.874	40 1.575	0.03 mm 0.0012 in			R1 mm R0.039 in	FT-WZ7HB	P.111
		Fiber bending type W2 × H10 × D10 W0.079 × H0.394 × D0.394	220 8.661	50 1.969	0.08 mm 0.0032 in		2 m 6.562 ft	R1 mm R0.039 in	FT-K8	P.108
150 5.906			30 1.181	0.06 mm 0.0024 in	R1 mm R0.039 in			FT-WKV8	P.110	
Side-view type with small light dispersion W3.5 × H14 × D11 W0.138 × H0.551 × D0.433		870 34.252	210 8.268	0.02 mm 0.0008 in		2 m 6.562 ft	R10 mm R0.394 in	FT-KV1	P.108	
		406 15.984	110 4.331	0.3 mm 0.012 in			R1 mm R0.039 in	FT-WA30	P.110	
Special Wide beam	Wide area sensing W5 × H69 × D20 W0.197 × H2.717 × D0.787	(Note 4) 3,500 137.795	(Note 4) 3,500 137.795	0.06 mm 0.0024 in		2 m 6.562 ft	R1 mm R0.039 in	FT-WA8	P.110	
		(Note 4) 3,500 137.795	(Note 4) 3,500 137.795	0.25 mm 0.010 in			R1 mm R0.039 in	FT-A8	P.106	
	Top sensing W5 × H15 × D15 W0.197 × H0.591 × D0.591	850 33.465	220 8.661	Horizontal: 0.025 mm 0.0010 in		2 m 6.562 ft	R25 mm R0.984 in	FT-AFM2	P.106	
		380 14.961	100 3.937	Vertical: 0.45 mm 0.018 in			R25 mm R0.984 in	FT-AFM2E	P.106	
	Side sensing W5 × H15 × D15 W0.197 × H0.591 × D0.591	800 31.496	200 7.874			2 m 6.562 ft				
		590 23.228	90 3.543							

Notes: 1) For sensing range, refer to p.76 for the H-SP mode of FX-301-HS, and FX-301B/G/H, p.127 for the FX-100 series, p.161~ for the FX-410 series, and p.174~ for the FX-311 series.

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.

4) The fiber cable length practically limits the sensing range to 3,500 mm 137.795 in long.


5) Refer to p.79~ for details.




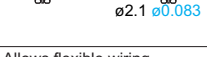
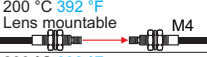

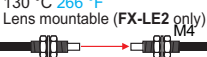
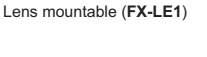
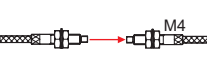


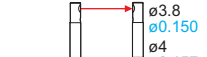
6) Refer to p.87 for details.

LIST OF FIBERS

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

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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Thru-beam type (one pair set) 

Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2)	■ U-LG ■ FAST ■ LONG ■ H-SP ■ STDF ■ S-D ■ STD	Min. sensing object (Note 3)	Fiber cable length  Free-cut	Bending radius	Model No.	Dimensions		
Special	Heat-resistant	350 °C 662 °F Lens mountable 	750 29.528 550 21.654 330 12.992 280 11.024	200 7.874 85 3.346 90 3.543	ø0.04 mm ø0.0016 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-H35-M2	P.107	
		350 °C 662 °F Sleeve 60 mm 2.362 in ø2.1 ø0.083 	750 29.528 550 21.654 330 12.992 280 11.024	200 7.874 85 3.346 90 3.543	ø0.04 mm ø0.0016 in opaque object	2 m 6.562 ft	R25 mm R0.984 in Fiber Sleeve R10 mm R0.394 in	FT-H35-M2S6	P.107	
		Allows flexible wiring 200 °C 392 °F Lens mountable 	420 16.535 310 12.205 180 7.087 140 5.512	100 3.937 40 1.575 50 1.969	ø0.02 mm ø0.0008 in opaque object	1 m 3.281 ft	R10 mm R0.394 in	FT-H20W-M1	P.107	
		200 °C 392 °F Lens mountable 	750 29.528 550 21.654 320 12.598 280 11.024	200 7.874 85 3.346 90 3.543	ø0.04 mm ø0.0016 in opaque object	1 m 3.281 ft	R25 mm R0.984 in	FT-H20-M1	P.107	
		130 °C 266 °F Lens mountable (FX-LE2 only) 	1,200 47.244 880 34.646 550 21.654 440 17.323	300 11.811 150 5.906 155 6.102	ø0.06 mm ø0.0024 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-H13-FM2	P.106	
	Heat-resistant • Joint	Lens mountable (FX-LE1) 	530 20.866 390 15.354 225 8.858 200 7.874	140 5.512 60 2.362 60 2.362	ø0.12 mm ø0.005 in opaque object	200 mm 7.874 in (Note 4) 300 mm 11.811 in (Note 4) 500 mm 19.685 in (Note 4)	Heat-resistant fiber R18 mm R0.709 in (Note 5)	NEW FT-H20-J20-S (Note 6) NEW FT-H20-J30-S (Note 6) NEW FT-H20-J50-S (Note 6)	P.107	
		Side-view 	840 33.071 550 21.654 370 14.567 280 11.024	200 7.874 90 3.543 90 3.543	ø0.16 mm ø0.006 in opaque object	500 mm 19.685 in (Note 4) 800 mm 31.496 in (Note 4)		NEW FT-H20-VJ50-S (Note 6) NEW FT-H20-VJ80-S (Note 6)	P.107	
		Chemical-resistant	Easy mounting • Rectangular head SEMI S2 compliant W7 × H15 × D13 W0.276 × H0.591 × D0.512 	3,500 137.795 3,500 137.795 3,000 118.110 1,500 59.055	1,000 39.370 500 19.685 530 20.866	ø4 mm ø0.157 in opaque object	2 m 6.562 ft	R25 mm R0.984 in	FT-Z802Y (Note 7)	P.111
			Heat-resistant 115 °C 239 °F ø5.5 ø0.217 	3,500 137.795 3,500 137.795 1,800 70.866 1,350 53.150	900 35.433 450 17.717 480 18.898	ø0.2 mm ø0.008 in opaque object	2 m 6.562 ft (Note 8)	R30 mm R1.181 in	NEW FT-HL80Y FT-L80Y	P.107 P.108
			Side-view ø5.5 ø0.217 	1,000 39.370 800 31.496 500 19.685 400 15.748	280 11.024 120 4.724 140 5.512				FT-V80Y	P.109
Vacuum-resistant	300 °C 572 °F Lens mountable (FV-LE1/SV2 only) M4 	350 13.780 250 9.843 150 5.906 125 4.921	90 3.543 50 1.969 40 1.575	ø0.03 mm ø0.0012 in opaque object	1 m 3.281 ft	R18 mm R0.709 in	FT-H30-M1V-S (Note 9)	P.107		

- Notes: 1) Contact our office for details regarding the sensing ranges of the **FX-301-HS** in H-SP mode and the **FX-301B/G/H**. For other sensing ranges, please refer to p.127 for the **FX-100** series, p.161~ for the **FX-410** series, and p.174~ for the **FX-311** series.
 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.
 4) This is the fiber length (fixed length) for heat-resistant fibers. The ordinary-temperature fibers are free-cut to 2 m 6.562 ft.
 5) The bending radius for the ordinary-temperature fiber is R25 mm R0.984 in or more.
 6) Heat-resistant joint fibers and ordinary-temperature fibers (**FT-FM2**) are sold as a set. Please refer to p.93~ for details.
 7) Refer to p.88~ for details.
 8) The allowable cutting range is 500 mm 19.685 in from the end that the amplifier inserted.
 9) Sold as a set comprising vacuum type fiber + photo-terminal (**FV-BR1**) + fiber at atmospheric side (**FT-J8**). Please refer to p.91~ for details.

Model No. when ordering heat-resistant joint fibers individually as replacement parts

- **FT-H20-J20** (one pair set)
- **FT-H20-J30** (one pair set)
- **FT-H20-J50** (one pair set)
- **FT-H20-VJ50** (one pair set)
- **FT-H20-VJ80** (one pair set)

Model No. when ordering vacuum-resistant fibers individually as replacement parts

- Vacuum-resistant fiber
FT-H30-M1V (one pair set)
- Photo-terminal
FV-BR1 (one pair set)
- Fiber at atmospheric side
FT-J8 (one pair set)

FIBER SENSORS

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Pliable fibers (flexible and sharp bending fibers) are marked with light blue in the table.

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

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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Retroreflective type



Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2, 3)	<ul style="list-style-type: none"> ■ U-LG ■ LONG ■ STDF ■ STD 	<ul style="list-style-type: none"> ■ FAST ■ H-SP ■ S-D 	Min. sensing object (Note 4)	Fiber cable length Free-cut	Bending radius	Model No.	Dimensions
Sharp bending With polarizing fibers	W8.5 × H5.2 × D15 W0.374 × H0.205 × D0.581	<ul style="list-style-type: none"> 100 to 910 3.937 to 35.827 100 to 730 3.937 to 28.740 100 to 600 3.937 to 23.622 100 to 520 3.937 to 20.472 (Note 3) 	<ul style="list-style-type: none"> Cannot use Cannot use 	<ul style="list-style-type: none"> 100 to 460 3.937 to 18.110 	<ul style="list-style-type: none"> ∅0.3 mm ∅0.012 in 	<ul style="list-style-type: none"> 2 m 6.562 ft 	R1 mm R0.039 in	FR-WKZ11 (Note 5)	P.112
	W30 × H30 × D0.5 W1.181 × H1.181 × D0.020	<ul style="list-style-type: none"> 200 7.874 200 7.874 200 7.874 200 7.874 	<ul style="list-style-type: none"> 200 7.874 200 7.874 200 7.874 	<ul style="list-style-type: none"> Horizontal: ∅5.5 mm ∅0.217 in opaque object Vertical: ∅0.06 mm ∅0.0024 in opaque object 	<ul style="list-style-type: none"> 2 m 6.562 ft 	R10 mm R0.394 in	FR-KZ21 (Note 5)	P.112	
Narrow beam Top sending	W9.5 × H25 × D5.2	<ul style="list-style-type: none"> 200 7.874 200 7.874 200 7.874 	<ul style="list-style-type: none"> 200 7.874 200 7.874 200 7.874 	<ul style="list-style-type: none"> 200 7.874 200 7.874 	<ul style="list-style-type: none"> Horizontal: ∅5.5 mm ∅0.217 in opaque object Vertical: ∅0.06 mm ∅0.0024 in opaque object 	<ul style="list-style-type: none"> 2 m 6.562 ft 	R10 mm R0.394 in	FR-KZ21E (Note 5)	P.112
	W10.6 × H28 × D10.1 W0.417 × H1.102 × D0.398	<ul style="list-style-type: none"> 200 7.874 200 7.874 200 7.874 	<ul style="list-style-type: none"> 200 7.874 200 7.874 200 7.874 	<ul style="list-style-type: none"> 200 7.874 200 7.874 	<ul style="list-style-type: none"> Horizontal: ∅5.5 mm ∅0.217 in opaque object Vertical: ∅0.06 mm ∅0.0024 in opaque object 	<ul style="list-style-type: none"> 2 m 6.562 ft 	R10 mm R0.394 in	FR-KV1 (Note 5)	P.112
Water mapping	W7.5 × H2.2 × D11.2 W0.295 × H0.087 × D0.441	<ul style="list-style-type: none"> 15 to 370 0.591 to 14.567 15 to 330 0.591 to 12.992 15 to 240 0.591 to 9.449 15 to 210 0.591 to 8.268 	<ul style="list-style-type: none"> 15 to 170 0.591 to 6.693 15 to 80 0.591 to 3.150 15 to 90 0.591 to 3.543 	<ul style="list-style-type: none"> 15 to 170 0.591 to 6.693 15 to 80 0.591 to 3.150 15 to 90 0.591 to 3.543 	<ul style="list-style-type: none"> ∅0.12 mm ∅0.005 in opaque object 	<ul style="list-style-type: none"> 2 m 6.562 ft 	R10 mm R0.394 in	FR-KV1 (Note 5)	P.112
	W4 × H2 × D21.5 W0.157 × H0.079 × D0.846	<ul style="list-style-type: none"> 15 to 370 0.591 to 14.567 15 to 330 0.591 to 12.992 15 to 240 0.591 to 9.449 15 to 210 0.591 to 8.268 	<ul style="list-style-type: none"> 15 to 170 0.591 to 6.693 15 to 80 0.591 to 3.150 15 to 90 0.591 to 3.543 	<ul style="list-style-type: none"> ∅0.12 mm ∅0.005 in opaque object 	<ul style="list-style-type: none"> 2 m 6.562 ft 	R10 mm R0.394 in	FR-KV1 (Note 5)	P.112	

- Notes: 1) Contact our office for details regarding the sensing ranges of the **FX-301-HS** in H-SP mode and the **FX-301B/G/H**. For other sensing ranges, please refer to p.128 for the **FX-100** series, p.163 for the **FX-410** series, and p.176 for the **FX-311** series.
 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. The sensing range of **FR-WKZ11** is specified for the **RF-13**. The sensing range of **FR-KZ21**, **FR-KZ21E** is specified for the attached reflector **RF-003**. The sensing range of **FR-KV1** is specified for the attached reflector.
 3) The sensing range of **FR-KV1** is the possible setting range for the reflector. The fiber can detect an object less than 15 mm 0.591 in away. The sensing range of **FR-KZ21** and **FR-KZ21E** is the possible setting range for the reflector. However, if setting the fiber to detect objects passing within 0 to 20 mm 0 to 0.787 in from the fiber head, unstable detection may result. The sensing range of **FR-WKZ11** is the possible setting range for the reflective tape. The fiber can detect an object less than 100 mm 3.937 in away. However, note that if there are any white or highly-reflective surfaces near the fiber head, reflected incident light may affect the fiber head. If this occurs, adjust the threshold value of the amplifier unit before use.
 4) The minimum sensing object size is the value for 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.
 5) Refer to p.84~ for details.

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

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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Reflective type



Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2, 3)	<ul style="list-style-type: none"> ■ U-LG ■ LONG ■ STDF ■ STD 	<ul style="list-style-type: none"> ■ FAST ■ H-SP ■ S-D 	Min. sensing object (Note 4)	Fiber cable length Free-cut	Bending radius	Model No.	Dimensions
Threaded type M6	M6	<ul style="list-style-type: none"> 600 23.622 480 18.898 280 11.024 220 8.661 	<ul style="list-style-type: none"> 160 6.299 85 3.346 75 2.953 	<ul style="list-style-type: none"> ∅0.02 mm ∅0.0008 in gold wire 	<ul style="list-style-type: none"> 2 m 6.562 ft 	R25 mm R0.984 in	FD-B8	P.113	
	Coaxial M6	<ul style="list-style-type: none"> 410 16.142 310 12.205 200 7.874 140 5.512 	<ul style="list-style-type: none"> 100 3.937 55 2.165 47 1.850 	FD-FM2			P.114		
	Sleeve 90 mm 3.543 in	<ul style="list-style-type: none"> 370 14.567 270 10.630 170 6.693 110 4.331 	<ul style="list-style-type: none"> 85 3.346 45 1.772 39 1.535 	Fiber R25 mm R0.984 in Sleeve			FD-FM2S	P.114	
	Sleeve 40mm 1.575 in	<ul style="list-style-type: none"> 370 14.567 270 10.630 170 6.693 110 4.331 	<ul style="list-style-type: none"> 85 3.346 45 1.772 39 1.535 	R10 mm R0.394 in			FD-FM2S4	P.114	
	M6	<ul style="list-style-type: none"> 250 9.843 190 7.480 110 4.331 90 3.543 	<ul style="list-style-type: none"> 60 2.362 25 0.984 32 1.260 	R1 mm R0.039 in		FD-W8	P.118		
	M6	<ul style="list-style-type: none"> 300 11.811 220 8.661 130 5.118 100 3.937 	<ul style="list-style-type: none"> 70 2.756 30 1.181 35 1.378 	R4 mm R0.157 in Flexible		FD-P80	P.117		
	M6	<ul style="list-style-type: none"> 270 10.630 185 7.283 100 3.937 80 3.150 	<ul style="list-style-type: none"> 60 2.362 30 1.181 35 1.378 	1 m 3.281 ft		R10 mm R0.394 in	FD-P81X	P.117	
	Tough flexible	<ul style="list-style-type: none"> 240 9.449 185 7.283 110 4.331 85 3.346 	<ul style="list-style-type: none"> 60 2.362 25 0.984 30 1.181 	∅0.02 mm ∅0.0008 in gold wire		2 m 6.562 ft	R25 mm R0.984 in	FD-R80	P.117
Elbow	M6	<ul style="list-style-type: none"> 240 9.449 185 7.283 110 4.331 85 3.346 	<ul style="list-style-type: none"> 60 2.362 25 0.984 30 1.181 	∅0.02 mm ∅0.0008 in gold wire	2 m 6.562 ft	R25 mm R0.984 in	FD-R80	P.117	

- Notes: 1) For sensing range, refer to p.76 for the H-SP mode of **FX-301-HS**, and **FX-301B/G/H**, p.128~ for the **FX-100** series, p.163~ for the **FX-410** series, and p.176~ for the **FX-311** series.
 2) The sensing range is specified for white non-glossy paper [400 × 400 mm 15.748 × 15.748 in] as the object.
 3) 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.
 4) The minimum sensing object size is the value for red LED type at maximum sensitivity. Note that the corresponding setting distance is different from the rated sensing distance.

LIST OF FIBERS

Pliable fibers (flexible and sharp bending fibers) are marked with light blue in the table.

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

Reflective type



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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2, 3)	■: U-LG ■: LONG ■: STDF ■: STD	■: FAST ■: H-SP ■: S-D	Min. sensing object (Note 4)	Fiber cable length ✂: Free-cut	Bending radius	Model No.	Dimensions	
Threaded type	M4		370 14.567 270 10.630 170 6.693 110 4.331	85 3.346 45 1.772 39 1.535	ø0.02 mm ø0.0008 in gold wire	2 m 6.562 ft	R25 mm R0.984 in	FD-T80	P.118	
							R25 mm R0.984 in	FD-NFM2	P.117	
			140 5.512 90 3.543 60 2.362 45 1.772	35 1.378 16 0.630 16 0.630			Fiber R25 mm R0.984 in Sleeve R10 mm R0.394 in	FD-NFM2S	P.117	
							R10 mm R0.394 in	FD-NFM2S4	P.117	
							Fiber R1 mm R0.039 in Sleeve R10 mm R0.394 in	FD-W44	P.118	
			40 1.575 30 1.181 18 0.709 15 0.591	12 0.472 4.5 0.177 5 0.197			R1 mm R0.039 in R10 mm R0.394 in	FD-WT8	P.119	
			250 9.843 190 7.480 110 4.331 90 3.543	60 2.362 25 0.984 32 1.260			R1 mm R0.039 in	FD-WG4	P.118	
		Minute objects can be detected due to the small spot beam. Coaxial • Lens mountable	85 3.346 65 2.559 37 1.457 32 1.260	25 0.984 10 0.394 11 0.433	R2 mm R0.079 in	FD-G4	P.114			
			150 5.906 110 4.331 65 2.559 55 2.165	42 1.654 15 0.591 19 0.748	R25 mm R0.984 in	FD-G4	P.114			
			130 5.118 90 3.543 55 2.165 45 1.772	30 1.181 13 0.512 16 0.630	R4 mm R0.157 in Flexible	FD-P60	P.117			
		M3		140 5.512 90 3.543 60 2.362 45 1.772	35 1.378 16 0.630 16 0.630	ø0.02 mm ø0.0008 in gold wire	2 m 6.562 ft	R25 mm R0.984 in	FD-T40	P.118
					R1 mm R0.039 in			FD-WT4	P.119	
			40 1.575 30 1.181 18 0.709 15 0.591	12 0.472 4.5 0.177 5 0.197	R4 mm R0.157 in Flexible			FD-P40	P.117	
			50 1.969 36 1.417 20 0.787 18 0.709	14 0.551 5.5 0.217 6 0.236	R25 mm R0.984 in			FD-G6	P.114	
	150 5.906 110 4.331 65 2.559 55 2.165		42 1.654 15 0.591 19 0.748	R25 mm R0.984 in	FD-G6			P.114		
	150 5.906 90 3.543 48 1.890 45 1.772		35 1.378 12 0.472 20 0.787	R10 mm R0.394 in	FD-G6X			P.114		
	50 1.969 38 1.496 25 0.984 18 0.709		14 0.551 5 0.197 6 0.236	R25 mm R0.984 in	FD-EG1			P.113		
		40 1.575 25 0.984 14 0.551 12 0.472	9 0.354 3 0.118 5 0.197	ø0.04 mm ø0.0016 in gold wire	500 mm 19.685 in	R10 mm R0.394 in	FD-EG2	P.113		
		20 0.787 15 0.591 9 0.354 8 0.315	5 0.197 2.5 0.098 3 0.118			FD-EG3	P.113			
		6.5 0.256 5 0.197 3 0.118 3 0.118	2 0.079 Cannot use Cannot use	ø0.02 mm ø0.0008 in gold wire	1 m 3.281 ft	R25 mm R0.984 in	FD-EN500S1	P.113		
		50 1.969 38 1.496 20 0.787 18 0.709	14 0.551 5 0.197 6 0.236			FD-ENM1S1	P.114			

- Notes: 1) For sensing range, refer to p.76 for the H-SP mode of **FX-301-HS**, and **FX-301B/G/H**, p.128~ for the **FX-100** series, p.163~ for the **FX-410** series, and p.176~ for the **FX-311** series.
 2) The sensing range is specified for white non-glossy paper [200 × 200 mm 7.874 × 7.874 in (**FD-T80**, **FD-WT8**): 400 × 400 mm 15.748 × 15.748 in, **FD-W44**, **FD-WT4**, **FD-P40**, **FD-G6**, **FD-EG1**, **FD-EG2**, **FD-EG3**, **FD-EN500S1**, **FD-ENM1S1**: 100 × 100 mm 3.937 × 3.937 in] as the object.
 3) 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.
 4) The minimum sensing object size is the value for red LED type at maximum sensitivity.
 Note that the corresponding setting distance is different from the rated sensing distance.
 5) The allowable cutting range is 700 mm 27.559 in from the end that the amplifier inserted.

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LIST OF FIBERS

Pliable fibers (flexible and sharp bending fibers) are marked with light blue in the table.

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

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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Reflective type



Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2, 3)	■: U-LG ■: LONG ■: STDF ■: STD	■: FAST ■: H-SP ■: S-D	Min. sensing object (Note 4)	Fiber cable length Free-cut	Bending radius	Model No.	Dimensions			
Cylindrical type	 ø3 ø0.118	 370 14.567 270 10.630 170 6.693 110 4.331	 85 3.346 45 1.772 39 1.535	 2 m 6.562 ft	ø0.02 mm ø0.0008 in gold wire	 2 m 6.562 ft	R25 mm R0.984 in	FD-S80	P.117			
		 250 9.843 190 7.480 110 4.331 90 3.543	 60 2.362 25 0.984 32 1.260				R1 mm R0.039 in	FD-WS8	P.119			
		Coaxial	 85 3.346 65 2.559 37 1.457 32 1.260				 25 0.984 10 0.394 11 0.433	R2 mm R0.079 in	FD-WSG4	P.119		
		 ø3 ø0.118	 130 5.118 90 3.543 55 2.165 45 1.772				 30 1.181 13 0.512 16 0.630	R4 mm R0.157 in	FD-P50	P.117		
		 ø2.5 ø0.098	 140 5.512 90 3.543 60 2.362 45 1.772				 35 1.378 16 0.630 16 0.630	Flexible	FD-SNFM2	P.118		
	Ultra-small diameter	 ø1.5 ø0.059	 80 3.150 50 1.969 30 1.181 25 0.984	 19 0.748 7.5 0.295 9 0.354	ø0.02 mm ø0.0008 in gold wire	1 m 3.281 ft	R4 mm R0.157 in	FD-P2	P.117			
			 ø1.5 ø0.059	 15 0.591 11 0.433 8 0.315 6 0.236			 4 0.157 2 0.079 1 0.039	R10 mm R0.394 in	FD-E12	P.113		
		Coaxial	 65 2.559 45 1.772 28 1.102 23 0.906	 17 0.669 8 0.315 7 0.276			ø0.02 mm ø0.0008 in gold wire	1 m 3.281 ft	R25 mm R0.984 in	FD-E22	P.113	
		 ø3 ø0.118 ø0.65 ø0.026	 80 3.150 55 2.165 30 1.181 25 0.984	 8 0.315 9 0.354					R25 mm R0.984 in	FD-V41	P.118	
		 ø3 ø0.118 ø2 ø0.079	 20 0.787 15 0.591 8.5 0.335 7 0.276	 5 0.197 Cannot use Cannot use					R1 mm R0.039 in	FD-WV42	P.119	
Side-view	 ø5 ø0.197 ø2 ø0.079	 170 6.693 100 3.937 55 2.165 45 1.772	 32 1.260 15 0.591 16 0.630	ø0.02 mm ø0.0008 in gold wire	2 m 6.562 ft	R25 mm R0.984 in	FD-SFM2SV2	P.117				
	 ø3 ø0.118 ø2 ø0.079	 12 to 50 0.472 to 1.969 12.5 to 37.5 0.492 to 1.476 15 to 36 0.591 to 1.417 15 to 35 0.591 to 1.378	 16 to 29 0.630 to 1.142 Cannot use Cannot use			ø0.3 mm ø0.012 in gold wire	4 m 13.123 ft	R25 mm R0.984 in	FD-L46	P.116		
Rectangular	Glass substrate detection • Mapping	 W25 × H7.3 × D30 W0.984 × H0.287 × D1.18	 0 to 50 0 to 1.969 0 to 36 0 to 1.417 0 to 33 0 to 1.299 0 to 30 0 to 1.181	 0 to 30 0 to 1.181 0 to 15 0 to 0.591 0 to 21 0 to 0.827	(LCD glass)	 3 m 9.843 ft	R4 mm R0.157 in	FD-L45 (Note 5)	P.116			
		Glass substrate detection • Alignment	 W17 × H29 × D3.8 W0.787 × H1.142 × D0.150	 0 to 23 0 to 0.906			 0 to 2.36 0 to 0.906	2 m 6.562 ft	R4 mm R0.157 in	FD-L43 (Note 5)	P.116	
		Glass substrate detection • Seating confirmation	 W12 × H19 × D3 W0.472 × H0.748 × D0.118	 0 to 8.2 0 to 0.323 0 to 7 0 to 0.276 0 to 6.5 0 to 0.256 0 to 6 0 to 0.236			 0 to 5.7 0 to 0.224 0 to 5 0 to 0.197 0 to 5.2 0 to 0.205	ø0.03 mm ø0.0012 in gold wire	2 m 6.562 ft	R10 mm R0.394 in	FD-L44 (Note 5)	P.116
	Convergent reflective type	Glass substrate detection	 W24 × H21 × D4 W0.945 × H0.827 × D0.157	 6.5 to 14.5 0.256 to 0.571 (Convergent point 8 0.315) 6.5 to 14 0.256 to 0.551 (Convergent point 8 0.315) 7 to 14 0.276 to 0.551 (Convergent point 8 0.315) 7 to 12 0.276 to 0.472 (Convergent point 8 0.315)	 7.5 to 12 0.285 to 0.472 (Convergent point 8 0.315) Cannot use Cannot use	ø1.9 mm ø0.075 in metal pipe (gray)	 2 m 6.562 ft	R1 mm R0.039 in	FD-WL41	P.118		
			 W6 × H18 × D14 W0.236 × H0.709 × D0.551	 2 to 19 0.079 to 0.748 (Convergent point 8 0.315) 2.5 to 18 0.098 to 0.709 (Convergent point 8 0.315) 3 to 16 0.118 to 0.630 (Convergent point 8 0.315) 3 to 16 0.118 to 0.630 (Convergent point 8 0.315)	 3.5 to 15 0.138 to 0.591 (Convergent point 8 0.315) Cannot use Cannot use			ø0.06 mm ø0.0024 in gold wire	2 m 6.562 ft	R10 mm R0.394 in	FD-L41	P.116
		Glass substrate detection	 W7.2 × H7.5 × D2 W0.283 × H0.295 × D0.079	 2 to 20 0.079 to 0.787 (Convergent point 6 0.236) 2.5 to 18 0.098 to 0.709 (Convergent point 6 0.236) 4 to 12 0.157 to 0.472 (Convergent point 6 0.236) 4 to 12 0.157 to 0.472 (Convergent point 6 0.236)	 4.5 to 11 0.177 to 0.433 (Convergent point 6 0.236) 5 to 8.5 0.197 to 0.335 (Convergent point 6 0.236) 4.8 to 9.5 0.189 to 0.374 (Convergent point 6 0.236)			ø0.02 mm ø0.0008 in gold wire	1 m 3.281 ft	R1 mm R0.039 in	FD-L4	P.116
			 W7.2 × H7.5 × D2 W0.283 × H0.295 × D0.079	 0.5 to 8.5 0.020 to 0.335 0.5 to 7.5 0.020 to 0.295 1 to 6.5 0.039 to 0.256 1 to 5.5 0.039 to 0.217	 1 to 5 0.039 to 0.197 Cannot use Cannot use			ø0.3 mm ø0.012 in copper wire		1 m 3.281 ft	R1 mm R0.039 in	FD-WL48

- Notes: 1) For sensing range, refer to p.76 for the H-SP mode of FX-301(-HS), and FX-301B/G/H, p.128~ for the FX-100 series, p.163~ for the FX-410 series, and p.176~ for the FX-311 series.
- 2) The sensing range is specified for white non-glossy paper (FD-S80, FD-WS8: 400 × 400 mm 15.748 × 15.748 in, FD-WSG4, FD-P50, FD-SNFM2, FD-V41, FD-SFM2SV2: 200 × 200 mm 7.874 × 7.874 in, FD-P2, FD-E12, FD-E22, FD-WV42, FD-L4, FD-WL48: 100 × 100 mm 3.937 × 3.937 in, FD-L46: 100 × 100 × t 0.7 mm 3.937 × 3.937 × t 0.028 in R edge of LCD glass substrates, FD-L43, FD-L44 and FD-L45: 100 × 100 × t 0.7 mm 3.937 × 3.937 × t 0.028 in LCD glass substrates, FD-L44S: silicon wafers polished surface, FD-WL41, FD-L41: 100 × 100 × t 2 mm 3.937 × 3.937 × t 0.079 in glass substrates) as the object.
- 3) 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.
- 4) The minimum sensing object size is the value for red LED type at maximum sensitivity. Note that the corresponding setting distance is different from the rated sensing distance. However, with the convergent reflective type, when the sensitivity is at MAX., it is only possible to detect the minimum size of the sensing object at a distance corresponding to the convergent point.
- 5) Refer to p.85 for details.

LIST OF FIBERS

Pliable fibers (flexible and sharp bending fibers) are marked with light blue in the table.

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

Reflective type



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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2, 3)	■ U-LG ■ FAST ■ LONG ■ H-SP ■ STDF ■ S-D ■ STD	Min. sensing object (Note 4)	Fiber cable length Free-cut	Bending radius	Model No.	Dimensions	
Rectangular	Small	Front sensing W10 × H7 × D2 W0.394 × H0.276 × D0.079	■ 1 to 50 0.039 to 1.969 ■ 1.5 to 34 0.059 to 1.339 ■ 2 to 24 0.079 to 0.945 ■ 3 to 17 0.118 to 0.669	■ 3 to 10 0.118 to 0.394 Cannot use Cannot use	ø0.16 mm ø0.006 in copper wire	 1 m 3.281 ft	NEW FD-WZ4 (Note 5)	P.119	
		Fiber bending type W12 × H10 × D10 W0.787 × H0.394 × D0.394	■ 1 to 70 0.039 to 2.756 ■ 1 to 46 0.039 to 1.811 ■ 1 to 32.2 0.039 to 1.268 ■ 2.5 to 23 0.098 to 0.906	■ 2.5 to 15 0.098 to 0.591 ■ 3 to 7 0.118 to 0.276 ■ 3 to 7 0.118 to 0.276	ø0.03 mm ø0.0012 in gold wire	 2 m 6.562 ft	R1 mm R0.039 in	NEW FD-WZ4HB (Note 5)	P.119
	Front sensing W14 × H7 × D3.5 W0.551 × H0.276 × D0.138	■ 200 7.874 ■ 120 4.724 ■ 1 to 84 0.039 to 3.307 ■ 1 to 60 0.039 to 2.362	■ 1.5 to 35 0.059 to 1.378 ■ 2.5 to 18 0.098 to 0.709 ■ 2.5 to 18 0.098 to 0.709	ø0.03 mm ø0.0012 in gold wire	 2 m 6.562 ft	R1 mm R0.039 in	NEW FD-WZ7 (Note 5)	P.119	
	Fiber bending type W3.5 × H14 × D11 W0.138 × H0.551 × D0.433	■ 0.5 to 270 0.020 to 10.630 ■ 0.5 to 180 0.020 to 7.087 ■ 1 to 126 0.039 to 4.961 ■ 1 to 90 0.039 to 3.543	■ 1 to 70 0.039 to 2.756 ■ 1 to 35 0.039 to 1.378 ■ 1 to 35 0.039 to 1.378	ø0.3 mm ø0.012 in copper wire	 2 m 6.562 ft	R1 mm R0.039 in	NEW FD-WZ7HB (Note 5)	P.119	
Long sensing range	Long sensing range • Rectangular head W5.2 × H9.5 × D15 W0.206 × H0.374 × D0.591	■ 20 to 660 0.787 to 25.984 ■ 20 to 480 0.787 to 18.898 ■ 20 to 300 0.787 to 11.811 ■ 20 to 230 0.787 to 9.055	■ 20 to 170 0.787 to 6.693 ■ 25 to 90 0.984 to 3.543 ■ 25 to 100 0.984 to 3.937	ø0.3 mm ø0.012 in copper wire	 2 m 6.562 ft	R1 mm R0.039 in	FD-WKZ1	P.118	
Wide beam	Wide beam W7 × H15 × D30 W0.276 × H0.591 × D1.181	■ 230 9.055 ■ 200 7.874 ■ 150 5.906 ■ 150 5.906	■ 100 3.937 ■ 45 1.772 ■ 50 1.969	ø0.02 mm ø0.0008 in gold wire	 2 m 6.562 ft	R25 mm R0.984 in	FD-A15	P.113	
	Array	Top sensing W5 × H20 × D20 W0.197 × H0.787 × D0.787	■ 290 11.417 ■ 220 8.661 ■ 135 5.315 ■ 110 4.331	■ 78 3.071 ■ 35 1.387 ■ 39 1.535	ø0.02 mm ø0.0008 in gold wire	 2 m 6.562 ft	R25 mm R0.984 in	FD-AFM2	P.113
		Side sensing W5 × H20 × D20 W0.197 × H0.787 × D0.787							FD-AFM2E
Special	Contact type ø6 ø0.236				2 m 6.562 ft (Note 6)	Protective tube R40 mm R1.575 in Fiber R15 mm R0.591 in	FD-F8Y (Note 7)	P.114	
	Mountable on pipe • Standard W25 × H13 × D20 W0.984 × H0.512 × D0.787	Applicable pipe diameter: Outer dia. ø6 to ø26 mm ø0.236 to ø1.024 in transparent pipe [PVC (vinyl chloride), fluorine resin, polycarbonate, acrylic, glass,] wall thickness 1 to 3 mm 0.039 to 0.118 in		(Liquid)	2 m 6.562 ft	R10 mm R0.394 in	FD-F41 (Note 7)	P.114	
	Mountable on pipe • For PFA, wall thickness 1 mm 0.039 in pipe W25 × H13 × D20 W0.984 × H0.512 × D0.787	Applicable pipe diameter: Outer dia. ø6 to ø26 mm ø0.236 to ø1.024 in transparent pipe [PFA (fluorine resin) or equivalently transparent pipe,] wall thickness 1 mm 0.039 in		(Liquid)	2 m 6.562 ft	R4 mm R0.157 in	FD-F4 (Note 7)	P.114	
	Mountable on pipe SEMI S2 compliant W23 × H20 × D17 W0.906 × H0.787 × D0.669	Applicable pipe diameter: Outer dia. ø3 to ø10 mm ø0.118 to ø0.394 in transparent pipe [PFA (fluorine resin) or equivalently transparent pipe,] wall thickness 0.3 to 1 mm 0.012 to 0.039 in		(Liquid)	2 m 6.562 ft	Protective tube R20 mm R0.787 in Fiber R4 mm R0.157 in	FT-F902 (Note 8)	P.106	
	SEMI S2 compliant W20 × H30 × D10 W0.787 × H1.181 × D0.394			(Liquid)	5 m 16.404 ft (Protective tube) 3 m 9.843 ft	Protective tube R20 mm R0.787 in Fiber R4 mm R0.157 in	FD-F705 (Note 8)	P.114	

- Notes: 1) For sensing range, refer to p.76 for the H-SP mode of FX-301-HS, and FX-301B/G/H, p.128~ for the FX-100 series, p.163~ for the FX-410 series, and p.176~ for the FX-311 series.
 2) The sensing range is specified for white non-glossy paper [200 × 200 mm 7.874 × 7.874 in (FD-WKZ1, FD-AFM2, FD-AFM2E: 400 × 400 mm 15.748 × 15.748 in)] as the object.
 3) 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.
 4) The minimum sensing object size is the value for red LED type at maximum sensitivity. Note that the corresponding setting distance is different from the rated sensing distance.
 5) Refer to p.79~ for details.
 6) The allowable cutting range is 1,000 mm 39.370 in from the end that the amplifier inserted.
 7) Refer to p.90 for details.
 8) The dedicated amplifier FX-301-F must be used with FT-F902 and FD-F705. Refer to p.191~ for details.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE- SAVING SYSTEMS

MEASURE- MENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

Selection Guide

Fibers

FT / FD / FR

Fiber Sensor Amplifiers

FX-100

FX-300

FX-410

FX-311

FX-11A

FX-301-F

Other Products

LIST OF FIBERS

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

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 (Note 1), FAST, STD, LONG (no STDF or U-LG mode)

Reflective type

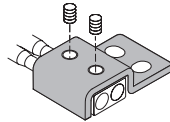


Type	Shape of fiber head (mm in)	Sensing range (mm in) (Note 2, 3)	<ul style="list-style-type: none"> ■ U-LG ■ LONG ■ STDF ■ STD 	<ul style="list-style-type: none"> ■ FAST ■ H-SP ■ S-D 	Min. sensing object (Note 4)	Fiber cable length ✂: Free-cut	Bending radius	Model No.	Dimensions		
Special	Heat-resistant	350 °C 662 °F • Coaxial M6				∅0.02 mm ∅0.0008 in gold wire	2 m 6.562 ft	R25 mm R0.984 in	FD-H35-M2	P.116	
		350 °C 662 °F • Sleeve 60 mm 2.362 in M6 ∅2.8 ∅0.110	<ul style="list-style-type: none"> 300 11.811 270 10.630 150 5.906 140 5.512 	<ul style="list-style-type: none"> 100 3.937 35 1.378 47 1.850 	Fiber R25 mm R0.984 in Sleeve R10 mm R0.394 in			FD-H35-M2S6	P.116		
		200 °C 392 °F • Coaxial M6					1 m 3.281 ft	R25 mm R0.984 in	FD-H20-M1	P.115	
		350 °C 662 °F • Sleeve 90 mm 3.543 in M4 ∅2.1 ∅0.083	<ul style="list-style-type: none"> 190 7.480 160 6.299 80 3.150 80 3.150 	<ul style="list-style-type: none"> 57 2.244 20 0.787 26 1.024 	Fiber R25 mm R0.984 in Sleeve R10 mm R0.394 in			FD-H35-20S	P.116		
		200 °C 392 °F • Coaxial M4	<ul style="list-style-type: none"> 300 11.811 270 10.630 150 5.906 140 5.512 	<ul style="list-style-type: none"> 100 3.937 35 1.378 47 1.850 				FD-H20-21	P.115		
	300 °C 572 °F • Glass substrate detection Convergent reflective type W19 × H27 × D5 W0.748 × H1.063 × D0.197	<ul style="list-style-type: none"> 0 to 20 0 to 0.787 0 to 15 0 to 0.591 0 to 10 0 to 0.394 0 to 10 0 to 0.394 	<ul style="list-style-type: none"> 1 to 8 0.039 to 0.315 Cannot use 2 to 6 0.079 to 0.236 		2 m 6.562 ft		R25 mm R0.984 in	FD-H30-L32	P.115		
	180 °C 356 °F • Glass substrate detection Convergent reflective type W19 × H27 × D5 W0.748 × H1.063 × D0.197	<ul style="list-style-type: none"> 0 to 20 0 to 0.787 0 to 15 0 to 0.591 0 to 10 0 to 0.394 0 to 10 0 to 0.394 	<ul style="list-style-type: none"> 1 to 8 0.039 to 0.315 Cannot use 2 to 6 0.079 to 0.236 		2 m 6.562 ft			FD-H18-L31	P.115		
	130 °C 266 °F M6	<ul style="list-style-type: none"> 410 16.142 310 12.205 200 7.874 140 5.512 	<ul style="list-style-type: none"> 100 3.93 55 2.165 47 1.850 						FD-H13-FM2	P.114	
	Vacuum-resistant	300 °C 572 °F • Rectangular head W9.5 × H5.2 × D15 W0.374 × H0.205 × D0.591	<ul style="list-style-type: none"> 20 to 300 0.787 to 11.811 20 to 200 0.787 to 7.874 20 to 150 0.787 to 5.906 25 to 130 0.984 to 5.118 	<ul style="list-style-type: none"> 30 to 100 1.181 to 3.937 Cannot use Cannot use 			∅0.8 mm ∅0.031 in gold wire	1 m 3.281 ft	R18 mm R0.709 in	FD-H30-KZ1V-S (Note 5)	P.115
		300 °C 572 °F • Glass substrate detection Convergent reflective type W19 × H5 × D27 W0.748 × H0.197 × D1.063	<ul style="list-style-type: none"> 0 to 11 0 to 0.433 0 to 8 0 to 0.315 1.5 to 6 0.059 to 0.236 1.5 to 5 0.059 to 0.197 	<ul style="list-style-type: none"> 2 to 4 0.079 to 0.157 Cannot use Cannot use 				3 m 9.843 ft		FD-H30-L32V-S (Note 5)	P.115

- Notes: 1) For sensing range, refer to p.76 for the H-SP mode of FX-301-HS, and FX-301B/G/H, p.128~ for the FX-100 series, p.163~ for the FX-410 series, and p.176~ for the FX-311 series.
 2) The sensing range is specified for white non-glossy paper [400 × 400 mm 15.748 × 15.748 in (FD-H30-L32, FD-H18-L31: 50 × 50 mm 1.969 × 1.969 in glass substrate, FD-H30-KZ1V-S, FD-H30-L32V-S: 100 × 100 × t 0.7 mm 3.937 × 3.937 × t 0.028 in transparent glass)] as the object.
 3) 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.
 4) The minimum sensing object size is the value for red LED type at maximum sensitivity. Note that the corresponding setting distance is different from the rated sensing distance.
 5) Sold as a set comprising vacuum type fiber + photo-terminal (FV-BR1) + fiber at atmospheric side (FT-J8). Please refer to p.91~ for details.

Model No. when ordering vacuum-resistant fibers individually as replacement parts

- Vacuum-resistant fiber **FD-H30-KZ1V** / **FD-H30-L32V**
- Mounting bracket for **FD-H30-KZ1V** **MS-FD-2**
- Photo-terminal **FV-BR1** (one pair set)
- Fiber at atmospheric side **FT-J8** (one pair set)



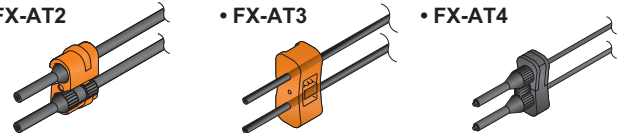
Accessories (attached with fibers)

- RF-003 (FR-KZ21/KZ21E exclusive reflector)
- RF-13 (Reflective tape)
- FX-CT1 (Fiber cutter)
- FX-CT2 (Fiber cutter)
- FX-AT2 (Attachment for fixed-length fiber, Orange)
- FX-AT3 (Attachment for ∅2.2 mm ∅0.087 in fiber, Clear orange)
- FX-AT4 (Attachment for ∅1 mm ∅0.039 in fiber, Black)
- FX-AT5 (Attachment for ∅1.3 mm ∅0.051 in fiber, Gray)
- FX-AT6 (Attachment for ∅1 mm ∅0.039 in / ∅1.3 mm ∅0.051 in mixed fiber, Black / Gray)

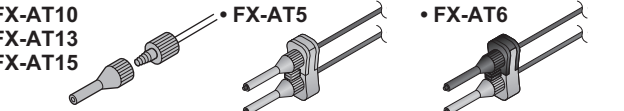
- RF-003
- RF-13
- FX-CT1
- FX-CT2



- FX-AT2
- FX-AT3
- FX-AT4



- FX-AT10
- FX-AT13
- FX-AT15
- FX-AT5
- FX-AT6



If connecting to the FX2 / FX3 series

- FX-AT10 (Attachment for ∅1 mm ∅0.039 in fiber)
- FX-AT13 (Attachment for ∅1.3 mm ∅0.051 in fiber)
- FX-AT15 (Attachment for ∅1 mm ∅0.039 in / ∅1.3 mm ∅0.051 in mixed fiber)