

Fiber head 114 models

Stopping taking order date: 31 Mar., 2012

Advantages of switching to recommended replacements

- The quality of many models has been improved by shortening their bending radii and achieving better bending performance.
- The number of part numbers has been reduced, letting you reduce the part numbers to keep track of and service parts to keep on hand.
- We have reduced our environmental impact further by making fiber end bracket out of stainless steel and plastic, which contain no RoHS substances.

Subjected models

Type	Discontinued models					Recommended replacements	Main points of difference from discontinued models				
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)			Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability
Reflective type	FD-A15	W7×H15×D30	R25	—	200 7.874	Tough FD-A16	W7×H15×D30	R4	○	200 7.874	
	FD-AFM2	Top sensing W5×H20×D20	R25	—	280 11.024	Tough FD-AL11	W5×H20×D20	R2	○	320 12.598	• Cable lead out orientation changed • Metal case material (brass) ⇒ Changed to plastic (PPS)
	FD-AFM2E	Side sensing W5×H20×D20	R25	—	280 11.024	Tough FD-AL11	W5×H20×D20	R2	○	320 12.598	• Cable lead out orientation changed • Metal casing material (brass) ⇒ Changed to plastic (PPS)
	FD-B8	M6 15	R25	—	490 19.291	FD-62	M6 17	R4	○	520 20.472	• End bracket total length for the M6 part only: 15 mm ⇒ Changed to 17 mm (M6 part/15 mm + ø4.5 area/2 mm)
	FD-E12	φ1.5 φ0.5 15 3 Sleeve part cannot be bent.	R10	—	12 0.472	FD-E13	φ1.5 φ0.48 15 3 Sleeve part cannot be bent.	R4	—	12 0.472	• Split amplifier insertion section configuration ⇒ Changed to integrated light emitting/receiving configuration
	FD-E22	Coaxial φ3 φ0.65 15 5 Sleeve part cannot be bent.	R25	—	55 2.165	FD-E23	φ3 φ0.65 15 5 Sleeve part cannot be bent.	R4	—	55 2.165	• Split amplifier insertion section configuration ⇒ Changed to integrated light emitting/receiving configuration
	FD-EG1	High precision • Coaxial Lens mountable (FX-MR3, FX-MR6) M3 17	R25	—	40 1.575	FD-EG30	Coaxial, Lens mountable M3 16	R4	—	48 1.890	• Split amplifier insertion section configuration ⇒ Changed to integrated light emitting / receiving configuration • End bracket total length 17 mm ⇒ Changed to 16 mm
	FD-EG2	High precision • Coaxial Lens mountable (FX-MR3, FX-MR6) Light emitting fiber element φ0.125 M3 17	R10	—	24 0.945	FD-EG31	Coaxial, Lens mountable M3 16	R4	—	20 0.787	• Split amplifier insertion section configuration ⇒ Changed to integrated light emitting/receiving configuration • End bracket total length 17 mm ⇒ Changed to 16 mm • Protective tube outside diameter ø1.6 ⇒ Changed to ø1.2
	FD-EG3	High precision • Coaxial Lens mountable (FX-MR3, FX-MR6) Light emitting fiber element φ0.125 M3 17	R10	—	20 0.787	FD-EG31	Coaxial, Lens mountable M3 16	R4	—	20 0.787	• Split amplifier insertion section configuration ⇒ Changed to integrated light emitting/receiving configuration • End bracket total length 17 mm ⇒ Changed to 16 mm • Protective tube outside diameter ø1.6 ⇒ Changed to ø1.2
	FD-EN500S1	M3 φ0.5 15 15 Sleeve part cannot be bent.	R25	—	—	FD-EG30S	Sleeve 15 mm M3 φ0.8 15 Sleeve part cannot be bent.	R4	—	50 1.969	• Split amplifier insertion section configuration ⇒ Changed to integrated light emitting/receiving configuration • Sleeve size ø0.5 ⇒ Changed to ø0.8
	FD-ENM1S1	Coaxial M3 φ0.8 15 15 Sleeve part cannot be bent.	R25	—	50 1.969	FD-EG30S	Sleeve 15 mm M3 φ0.8 15 Sleeve part cannot be bent.	R4	—	50 1.969	• Split amplifier insertion section configuration ⇒ Changed to integrated light emitting/receiving configuration
	FD-F705	SEMI S2 compliant W20×H30×D10 W20×H30×D10	R4 (Protective tube R20)	○	Liquid leak detection	Tough FD-F71	SEMI S2 compliant W20×H30×D10 W20×H30×D10	R4 (Protective tube R20)	○	Liquid leak detection	
	FD-FA90	Mountable on pipe • Array fiber W6.5×H28.3×D17	R10	—	Liquid detection	Tough FD-FA93	Array fiber W6.5×H28.3×D17	R4	○	Liquid detection	

Type	Discontinued models				
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)
Reflective type	FD-FM2	Coaxial M6 20	R25	—	420 16.535
	FD-FM2S	Sleeve 90 mm M6 20 φ2.5	R25 (Sleeve R10)	—	380 14.961
	FD-FM2S4	Sleeve 40 mm M6 20 φ2.5	R25 (Sleeve R10)	—	380 14.961
	FD-G4	Minute objects can be detected due to the small spot beam. Coaxial · Lens mountable (FX-MR1/MR2/MR3/MR5/MR6) M4 25	R25	—	140 5.512
	FD-G6	Lens mountable (FX-MR3, FX-MR6) Coaxial M3 17	R25	—	140 5.512
	FD-G6X	Metal-jacketed Lens mountable (FX-MR3, FX-MR6) Coaxial M3 18	R25	—	170 6.693
	FD-L4	W6×H18×D14	R25	—	15.5 0.610
	FD-L41	Glass substrate detection W24×H21×D4	R10	—	1.5 to 16 0.059 to 0.630
	FD-L43	Glass substrate detection · Alignment W17×H29×D3.8	R4	—	0 to 24 0 to 0.945
	FD-L44	Glass substrate detection · Seating confirmation W12×H19×D3	R10	—	0 to 9.5 0 to 0.374
	FD-L44S	Glass substrate detection · Seating confirmation W12×H19×D3	R10	—	0 to 5 0 to 0.197
	FD-L45	Glass substrate detection · Alignment W20×H29×D3.8	R4	—	0 to 40 0 to 1.575
	FD-L45A	Glass substrate detection · Alignment W23.5×H29×D4.5	R25	—	4 to 44 0.157 to 1.732
	FD-L46	Glass substrate detection · Mapping W25×H7.3×D30	R25	—	1 to 56 0.039 to 2.205
	FD-L47	Glass substrate detection · Seating confirmation W18×H29×D3.8	R4	—	0 to 29 0 to 1.142
	FD-NFM2	M4 17	R25	—	120 4.724
	FD-NFM2S	Sleeve 90 mm M4 12 φ1.48	R25 (Sleeve R10)	—	120 4.724

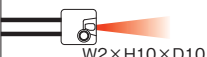

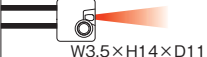

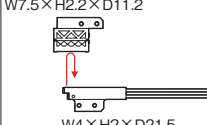
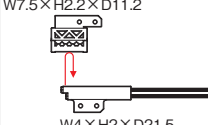
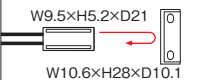
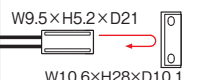
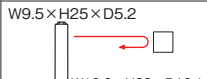
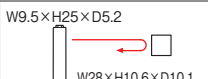
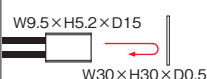
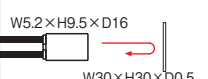
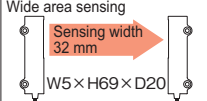
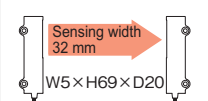
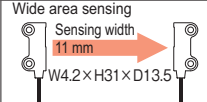
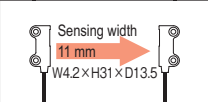
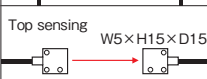
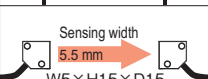
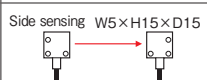
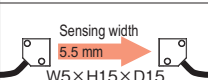

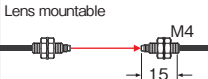
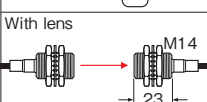
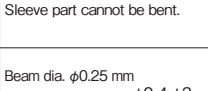
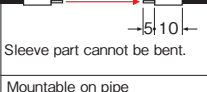
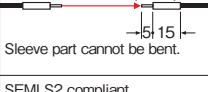
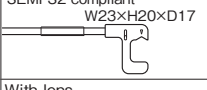
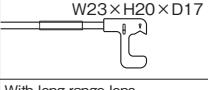
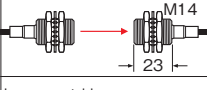
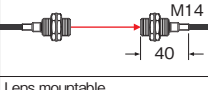
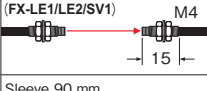
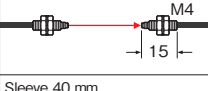
Type	Recommended replacements					Main points of difference from discontinued models
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)	
Reflective type	Tough FD-61	M6 17	R4	○	450 17.717	• End bracket total length of 20 mm for the (M6 part/15 mm + ø3.5 area/5 mm) ⇒ Changed to 17 mm (M6 part/15 mm + ø4.5 area/2 mm) • Coaxial cable used for wiring ⇒ Changed to parallel type
	Tough FD-61G	Coaxial M6 17	R4	○	420 16.535	• End bracket total length of 20 mm for the (M6 part/15 mm + ø3.5 area/5 mm) ⇒ Changed to 17 mm (M6 part/15 mm + ø4.5 area/2 mm)
	Tough FD-61S	Sleeve 40 mm M6 20 φ2.5	R4 (Sleeve R10)	○	420 16.535	• The sleeve length 90 mm type supports semi-custom products.
	Tough FD-61S	Sleeve 40 mm M6 20 φ2.5	R4 (Sleeve R10)	○	420 16.535	
	Tough FD-42G	Coaxial · Lens mountable M4 25	R2	○	200 7.874	
	Tough FD-32G	Coaxial · Lens mountable M3 17	R2	○	200 7.874	
	Tough FD-32GX	Coaxial · Lens mountable Stainless-jacketed M3 18	R2	—	200 7.874	• Stainless steel mesh jacket covering the stainless steel spiral tube used as a protective cover for the fiber ⇒ Changed to plastic (polyolefin)
	Tough FD-L20H	W6×H18×D14	R2	○	23 0.906	
	Tough FD-L21	W24×H21×D4	R2	○	1.5 to 16 0.059 to 0.630	
	Tough FD-L22A	Alignment W17×H29×D3.8	R2	○	0 to 24 0 to 0.945	
	Tough FD-L11	Seating confirmation W12×H19×D3	R4	○	0 to 9.5 0 to 0.374	
	Tough FD-L10	Seating confirmation W12×H19×D3	R4	○	0 to 5 0 to 0.197	
	Tough FD-L30A	Alignment W20×H29×D3.8	R4	○	0 to 43 0 to 1.693	
	Tough FD-L31A	Alignment W23.5×H29×D4.5	R4	○	4 to 33 0.157 to 1.299	• Previous no flexing distance specifications ⇒ Specification wording changed to state flexing ±2 degrees (Reference: Discontinued model ±2 degrees specification is 10 mm to 32 mm)
	Tough FD-L32H	Mapping W25×H7.3×D30	R4	○	0 to 56 0 to 2.205	
	Tough FD-L23	Seating confirmation W18×H29×D3.8	R2	○	0 to 29 0 to 1.142	
	Tough FD-41	M4 14	R2	○	125 4.921	• End bracket total length of 17 mm for the (M4 part/12 mm + ø2.5 area/5 mm) ⇒ Changed to 14 mm (M4 part/12 mm + ø2.5 area/2 mm)
	Tough FD-41S	Sleeve 40 mm M4 12 φ1.48	R2 (Sleeve R10)	○	125 4.921	• The sleeve length 90 mm type supports semi-custom products.

Type	Discontinued models				
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)
Reflective type	FD-NFM2S4	Sleeve 40 mm 	R25 (Sleeve R10)	—	120 4.724
	FD-P2		R4	○	80 3.150
	FD-P40		R4	○	45 1.772
	FD-P50		R4	○	120 4.724
	FD-P60		R4	○	120 4.724
	FD-P80		R4	○	280 11.024
	FD-P81X	Metal-jacketed M6 	R10	—	270 10.630
	FD-R80		R25	—	220 8.661
	FD-S80		R25	—	380 14.961
	FD-SFM2SV2		R25	—	120 4.724
	FD-SNFM2		R25	—	120 4.724
	FD-T40		R25	—	120 4.724
	FD-T80		R25	—	380 14.961
	FD-V41		R25	—	65 2.559

Type	Recommended replacements					Main points of difference from discontinued models
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)	
Reflective type	Tough FD-41S	Sleeve 40 mm 	R2 (Sleeve R10)	○	125 4.921	
	Tough FD-S21		R2	○	80 3.150	<ul style="list-style-type: none"> Split amplifier insertion section configuration ⇒ Changed to integrated light emitting/receiving configuration End bracket total length 15 mm ⇒ Changed to 10 mm PVC outer covering material for fiber ⇒ Changed to PE
	Tough FD-31		R2	○	125 4.921	<ul style="list-style-type: none"> End bracket shape is 12 mm for the M3 part only ⇒ Changed to a total length of 12 mm (M3 part/10 mm + ø2 area/2 mm) PVC outer covering material for fiber ⇒ Changed to PE
	Tough FD-S32		R4	○	420 16.535	<ul style="list-style-type: none"> PVC outer covering material for fiber ⇒ Changed to PE
	Tough FD-41		R2	○	125 4.921	<ul style="list-style-type: none"> End bracket total length of 15 mm for the (M4 part/12 mm + ø3 area/3 mm) ⇒ Changed to 14 mm (M4 part/12 mm + ø2.5 area/2 mm) PVC outer covering material for fiber ⇒ Changed to PE
	Tough FD-61		R4	○	450 17.717	<ul style="list-style-type: none"> End bracket total length of 15 mm for the M6 part only ⇒ Changed to 17 mm (M6 part/15 mm + ø4.5 area/2 mm) PVC outer covering material for fiber ⇒ Changed to PE
	FD-64X	Stainless-jacketed M6 	R4	—	280 11.024	<ul style="list-style-type: none"> End bracket total length of 19 mm for the (M6 part/15 mm + crimped area/4 mm) ⇒ Changed to 22 mm (ø4.5 area/2 mm + M6 part/15 mm + crimped area/5 mm) Split amplifier insertion section configuration ⇒ Changed to integrated light emitting/receiving configuration Stainless steel mesh jacket covering the stainless steel spiral tube used as a protective cover for the fiber ⇒ Changed to plastic (polyolefin)
	Tough FD-R60		R4	○	290 11.417	
	Tough FD-S32		R4	○	420 16.535	
	Tough FD-V50		R4	○	120 4.724	<ul style="list-style-type: none"> From sleeve end to optical axis center position is 0.8 mm ⇒ Changed to 2.3 mm A D-shaped surface that makes it easy to align with the optical axis has been added
	Tough FD-S31		R2	○	125 4.921	<ul style="list-style-type: none"> End bracket shape is 8 mm for the ø2.5 part only ⇒ Changed to 10 mm (ø3 part/ 8 mm + ø2 area/2 mm)
	Tough FD-31		R2	○	125 4.921	<ul style="list-style-type: none"> End bracket shape is 12 mm for the M3 part only ⇒ Changed to a total length of 12 mm (M3 part/ 10 mm + ø2 area/2 mm)
	Tough FD-61		R4	○	450 17.717	<ul style="list-style-type: none"> End bracket shape is 12 mm for the M4 part only ⇒ Changed to a total length of 17 mm (M6 part/15 mm + ø4.5 area/2 mm) Fiber cable outside diameter ø1.3 ⇒ Changed to ø2.2
	Tough FD-41		R2	○	125 4.921	<ul style="list-style-type: none"> End bracket total length is 12 mm for the M4 part only ⇒ Changed to 14 mm (M4 part/12 mm + ø2.5 area/2 mm) Fiber cable outside diameter ø1.3 ⇒ Changed to ø1
	Tough FD-V30		R2	○	65 2.559	<ul style="list-style-type: none"> From sleeve end to optical axis center position is 0.7 mm ⇒ Changed to 2 mm End sleeve length of 10 mm ⇒ Changed to 15 mm

Type	Discontinued models			
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability
Reflective type	FD-W44	Sleeve 40 mm M4 φ1.48 12	R1 (Sleeve R10)	—
	FD-W8	M6 15	R1	—
	FD-WG4	Minute objects can be detected due to the small spot beam. Coaxial • Lens mountable (FX-MR1/MR2/MR3/MR5/MR6) M4 25	R2	—
	FD-WKZ1	Long sensing range • Rectangular head W5.2×H9.5×D15	R1	—
	FD-WL41	Glass substrate detection W24×H21×D4	R1	—
	FD-WL48	W7.2×H7.5×D2	R1	—
	FD-WS8	φ3 15	R1	—
	FD-WSG4	Coaxial φ3 15	R2	—
	FD-WT4	M3 12	R1	—
	FD-WT8	M4 14	R1	—
	FD-WV42	15 15 φ3 φ2 Sleeve part cannot be bent.	R1	—
				Sensing range FX-500 STD (mm in)
			80 3.150	
			250 9.843	
			150 5.906	
			20 to 490 0.787 to 19.291	
			2.5 to 14 0.098 to 0.551	
			7.5 0.295	
			250 9.843	
			150 5.906	
			80 3.150	
			250 9.843	
			16 0.630	

Recommended replacements					Main points of difference from discontinued models
Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)	
Tough FD-41S	Sleeve 40 mm M4 φ1.48 12	R2 (Sleeve R10)	○	125 4.921	
FD-41SW	Sleeve 40 mm M4 φ1.48 12	R1 (Sleeve R10)	—	80 3.150	
Tough FD-61	M6 17	R4	○	450 17.717	• End bracket total length is 15 mm for the M6 part only ⇒ Changed to 17 mm (M6 part/ 15 mm + ø4.5 area/2 mm)
FD-61W	M6 17	R1	—	270 10.630	• End bracket total length is 15 mm for the M6 part only ⇒ Changed to 17 mm (M6 part/ 15 mm + ø4.5 area/2 mm)
Tough FD-42G	Coaxial • Lens mountable M4 25	R2	○	200 7.874	
FD-42GW	Coaxial • Lens mountable M4 25	R1	—	150 5.906	
FD-Z50HW	W5.2×H9.5×D15	R1	—	10 to 650 0.394 to 25.591	• Stainless steel unit casing material ⇒ Changed to plastic (PC)
Tough FD-L21	W24×H21×D4	R2	○	1.5 to 16 0.059 to 0.630	
FD-L21W	W24×H21×D4	R1	—	3 to 14 0.118 to 0.551	
FD-L12W	W7.2×H7.5×D2	R1	—	8 0.315	
Tough FD-S32	φ3 15	R4	○	420 16.535	
FD-S32W	φ3 15	R1	—	270 10.630	
FD-S33GW	Coaxial φ3 15	R1	—	150 5.906	
Tough FD-31	M3 12	R2	○	125 4.921	• End bracket total length is 12 mm for the M3 part only ⇒ Changed to 12 mm (M3 part/ 10 mm + ø2 area/2 mm)
FD-31W	M3 12	R1	—	80 3.150	• End bracket total length is 12 mm for the M3 part only ⇒ Changed to 12 mm (M3 part/ 10 mm + ø2 area/2 mm)
Tough FD-41	M4 14	R2	○	125 4.921	• End bracket total length is 12 mm for the M4 part only ⇒ Changed to 14 mm (M4 part/12 mm + ø3 area/2 mm)
FD-41W	M4 14	R1	—	270 10.630	• End bracket total length is 12 mm for the M4 part only ⇒ Changed to 14 mm (M4 part/12 mm + ø3 area/2 mm)
Tough FD-V30	Small diameter 15 15 φ3 φ1.5 Sleeve part cannot be bent.	R2	○	65 2.559	• From sleeve end to optical axis center position is 1 mm ⇒ Changed to 2 mm • End sleeve thickness of ø2 ⇒ Changed to ø1.5 • A D-shaped surface that makes it easy to align with the optical axis has been added
FD-V30W	15 15 φ3 φ1.5 Sleeve part cannot be bent.	R1	—	20 0.787	• From sleeve end to optical axis center position is 1 mm ⇒ Changed to 2 mm • End sleeve thickness of ø2 ⇒ Changed to ø1.5 • A D-shaped surface that makes it easy to align with the optical axis has been added

Type	Discontinued models					Recommended replacements					Main points of difference from discontinued models
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)	
Reflective type	FD-WZ4HB	Fiber bending type  W2×H10×D10	R1	—	2.5 to 65 0.098 to 2.559	FD-Z20HBW	Fiber bending type  W2×H10×D10	R1	—	2 to 85 0.079 to 3.346	
	FD-WZ7HB	Fiber bending type  W3.5×H14×D11	R1	—	1 to 150 0.039 to 5.906	FD-Z40HBW	Fiber bending type  W3.5×H14×D11	R1	—	260 10.236	
Retroreflective type	FR-KV1	 W7.5×H2.2×D11.2 W4×H2×D21.5	R10	—	20 to 310 0.787 to 12.205	Tough FR-KZ22E	 W7.5×H2.2×D11.2 W4×H2×D21.5	R2	○	15 to 310 0.591 to 12.205	• Unit side installation screw positions have been moved back 1 mm from the front edge
	FR-KZ21	 W9.5×H5.2×D21 W10.6×H28×D10.1	R10	—	20 to 200 0.787 to 7.874	Tough FR-KZ50H	 W9.5×H5.2×D21 W10.6×H28×D10.1	R2	○	20 to 300 0.787 to 11.811	
	FR-KZ21E	 W9.5×H25×D5.2 W10.6×H28×D10.1	R10	—	20 to 200 0.787 to 7.874	Tough FR-KZ50E	 W9.5×H25×D5.2 W28×H10.6×D10.1	R2	○	20 to 300 0.787 to 11.811	
	FR-WKZ11	 W9.5×H5.2×D15 W30×H30×D0.5	R1	—	100 to 990 3.937 to 38.976	FR-Z50HW	 W5.2×H9.5×D16 W30×H30×D0.5	R1	○	100 to 990 3.937 to 38.976	
Thru-beam type	FT-A30	Wide area sensing Sensing width 32 mm  W5×H69×D20	R10	—	3600 141.732	Tough FT-A32	Wide area sensing Sensing width 32 mm  W5×H69×D20	R2	○	3600 141.732	• Fiber cable outside diameter $\phi 2.2$ \Rightarrow Changed to $\phi 1.3$ • Optical cable diameter of 3 × 32 \Rightarrow Changed to 3.2 × 32
	FT-A8	Wide area sensing Sensing width 11 mm  W4.2×H31×D13.5	R10	—	3600 141.732	Tough FT-A11	Wide area sensing Sensing width 11 mm  W4.2×H31×D13.5	R2	○	3600 141.732	• Fiber cable outside diameter $\phi 2.2$ \Rightarrow Changed to $\phi 1.3$
	FT-AFM2	Top sensing  W5×H15×D15	R25	—	860 33.858	Tough FT-AL05	Top sensing Sensing width 5.5 mm  W5×H15×D15	R2	○	860 33.858	• Cable lead out orientation changed • Metal casing material (brass) \Rightarrow Changed to plastic (PPS)
	FT-AFM2E	Side sensing  W5×H15×D15	R25	—	860 33.858	Tough FT-AL05	Side sensing Sensing width 5.5 mm  W5×H15×D15	R2	○	860 33.858	• Cable lead out direction changed • Metal casing material (brass) \Rightarrow Changed to plastic (PPS)
	FT-B8	Lens mountable (FX-LE1/LE2/SV1)  M4 15	R25	—	1250 49.213	FT-43	Lens mountable  M4 15	R4	○	1400 55.118	
	FT-E12	Beam dia. $\phi 0.125$ mm $\phi 0.25$ $\phi 3$ Sleeve part cannot be bent.	R5	—	—	Tough FT-E13	Beam dia. $\phi 0.125$ mm $\phi 0.25$ $\phi 3$ Sleeve part cannot be bent. 	R2	○	15 0.591	• Fiber length 500 mm /set length type \Rightarrow Changed to fiber length 1 m/free cut type • Fiber cable outside diameter $\phi 1.2$ \Rightarrow Changed to $\phi 1$ • End bracket length of 10 mm \Rightarrow Changed to 15 mm
	FT-E22	Beam dia. $\phi 0.25$ mm $\phi 0.4$ $\phi 3$ Sleeve part cannot be bent.	R5	—	—	Tough FT-E23	Beam dia. $\phi 0.25$ mm $\phi 0.4$ $\phi 3$ Sleeve part cannot be bent. 	R2	○	75 2.953	• Set length type \Rightarrow Changed to free cut type • Fiber cable outside diameter $\phi 1.2$ \Rightarrow Changed to $\phi 1$ • End bracket length of 10 mm \Rightarrow Changed to 15 mm
	FT-F902	Mountable on pipe SEMI S2 compliant W23×H20×D17	R4 (Protective tube R20)	○	Liquid detection	Tough FT-F93	SEMI S2 compliant W23×H20×D17	R2 (Protective tube R20)	○	Liquid detection	
	FT-FM10L	With lens  M14 23	R25	—	19600 771.654	Tough FT-140	With long range lens  M14 40	R4	○	19600 771.654	
	FT-FM2	Lens mountable (FX-LE1/LE2/SV1)  M4 15	R25	—	1100 43.307	Tough FT-42	Lens mountable  M4 15	R4	○	1130 44.488	
	FT-FM2S	Sleeve 90 mm  M4 $\phi 1.48$ 12	R25 (Sleeve R10)	—	1100 43.307	Tough FT-42S	Sleeve 40 mm  M4 $\phi 1.48$ 12	R4 (Sleeve R10)	○	1130 44.488	• The sleeve length 90 mm type supports semi-custom products.
	FT-FM2S4	Sleeve 40 mm  M4 $\phi 1.48$ 12	R25 (Sleeve R10)	—	1100 43.307	Tough FT-42S	Sleeve 40 mm  M4 $\phi 1.48$ 12	R4 (Sleeve R10)	○	1130 44.488	

Type	Discontinued models				
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)
Thru-beam type	FT-K8		R25	—	3600 141.732
	FT-KV1	W2×H1.5×D20 	R10	—	540 21.260
	FT-KV8	Side-view type with small light dispersion 	R25	—	3600 141.732
	FT-NFM2		R25	—	310 12.205
	FT-NFM2S	Sleeve 90 mm 	R25 (Sleeve R10)	—	310 12.205
	FT-NFM2S4	Sleeve 40 mm 	R25 (Sleeve R10)	—	310 12.205
	FT-P2		R4	○	330 12.992
	FT-P40		R4	○	160 6.299
	FT-P60	Lens mountable (FX-LE1/LE2/SV1) 	R4	○	350 13.780
	FT-P80	Lens mountable (FX-LE1/LE2/SV1) 	R4	○	810 31.890
	FT-P81X	Lens mountable (FX-LE1/LE2/SV1) Metal-jacketed 	R10	—	880 34.646
	FT-PS1		R4	○	90 3.543
	FT-R80	Lens mountable (FX-LE1/LE2) 	R25	—	780 30.709
	FT-SFM2		R25	—	1100 43.307
	FT-SFM2L	Long sensing range · with lens 	R25	—	2600 102.362
	FT-SFM2SV2	 Sleeve part cannot be bent.	R25	—	570 22.441
	FT-SNFM2		R25	—	310 12.205
	FT-T80	Lens mountable (FX-LE1/SV1) 	R25	—	1100 43.307
	FT-V10		R25	—	3500 137.795

Type	Recommended replacements					Main points of difference from discontinued models
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)	
Thru-beam type	Tough FT-KS40		R2	○	3600 141.732	• Fiber cable outside diameter $\phi 2.2$ ⇒ Changed to $\phi 1$
	Tough FT-KV26	1.5×2 	R2	○	710 27.953	
	Tough FT-KV40		R2	○	3600 141.732	• Fiber cable outside diameter $\phi 2.2$ ⇒ Changed to $\phi 1$ • Metal end material (stainless steel) ⇒ Changed to plastic (LCP), set screw fastening specifications ⇒ Changed to MS-FD-3 fastener specifications
	Tough FT-31		R2	○	315 12.402	• End bracket total length of 15 mm for the (M3 part/10 mm + $\phi 2$ area/5 mm) ⇒ Changed to 12 mm (M3 part/10 mm + $\phi 2$ area/2 mm)
	Tough FT-31S	Sleeve 40 mm 	R2 (Sleeve R10)	○	315 12.402	• The sleeve length 90 mm type supports semi-custom products.
	Tough FT-31S	Sleeve 40 mm 	R2 (Sleeve R10)	○	315 12.402	
	Tough FT-S21		R2	○	315 12.402	• Fiber length 1 m/Set length type ⇒ Changed to fiber length 2 m/free cut type • Fiber exterior cover material of PVC ⇒ Changed to PE
	Tough FT-31		R2	○	315 12.402	• End bracket total length of 10 mm for the M3 part ⇒ Changed to 12 mm (M3 part/10 mm + $\phi 2$ area/2 mm) • Fiber exterior cover material of PVC ⇒ Changed to PE
	Tough FT-42	Lens mountable 	R4	○	1130 44.488	• Fiber exterior cover material of PVC ⇒ Changed to PE • Fiber cable outside diameter $\phi 1.25$ ⇒ Changed to $\phi 2.2$
	Tough FT-42	Lens mountable 	R4	○	1130 44.488	• Fiber exterior cover material of PVC ⇒ Changed to PE
	Tough FT-45X	Lens mountable · Stainless-jacketed 	R4	—	1200 47.244	• Stainless steel mesh jacket covering the stainless steel spiral tube used as a protective cover for the fiber ⇒ Changed to plastic (polyolefin)
	Tough FT-S11		R2	○	90 3.543	
	Tough FT-R40	Lens mountable 	R4	○	930 36.614	• End bracket total length of 14 mm for the (M2.6 part/3 mm + M4 part/11 mm) ⇒ Changed to 15 mm (M2.6 part/3 mm + M4 part/12 mm)
	Tough FT-S32	Long sensing range · with lens 	R10	○	3100 122.047	• Optical cable diameter of $\phi 1$ ⇒ Changed to $\phi 2.2$
	Tough FT-S32	Long sensing range · with lens 	R10	○	3100 122.047	
	Tough FT-V30	 Sleeve part cannot be bent.	R4	○	680 26.772	• From sleeve end to optical axis center position is 0.8 ⇒ Changed to 1.3 mm • D-shaped surface that makes it easy to align with the optical axis has been added
	Tough FT-S21		R2	○	315 12.402	• End bracket total length of $\phi 1.5/8$ mm ⇒ Changed to 12 mm ($\phi 1$ area/2 mm + $\phi 1.5/8$ mm)
	Tough FT-42	Lens mountable 	R4	○	1130 44.488	• End bracket total length of 12.5 mm for the (M2.6 part/2.5 mm + M3 part/10 mm) ⇒ Changed to 15 mm (M2.6 part/3 mm + M4 part/12 mm) • Fiber cable outside diameter $\phi 1.3$ ⇒ Changed to $\phi 2.2$
	Tough FT-V40		R4	○	3500 137.795	

Type	Discontinued models			
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability
Thru-beam type	FT-V22		R25	—
	FT-V41		R25	—
	FT-W4		R1	—
	FT-W8		R10	—
	FT-WA30		R1	—
	FT-WA8		R1	—
	FT-WK8		R1	—
	FT-WR80		R1	—
	FT-WR80L		R1	—
	FT-WS3		R1	—
				Sensing range FX-500 STD (mm in)
				300 11.811
				200 7.874
				250 9.843
				790 31.102
				3600 141.732
				3600 141.732
				3600 141.732
				3600 141.732
				660 25.984
				2200 86.614
				790 31.102

Type	Recommended replacements				Main points of difference from discontinued models
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	
Thru-beam type	Tough FT-V23		R4	○	<ul style="list-style-type: none"> Fiber length 1 m/Set length type ⇒ Changed to fiber length 2 m/free cut type From sleeve end to optical axis center position is 0.6 ⇒ Changed to 1.1 mm D-shaped surface that makes it easy to align with the optical axis has been added
	Tough FT-V25		R2	○	<ul style="list-style-type: none"> End bracket outside diameter of phi2.5 ⇒ Changed to phi2 From sleeve end to optical axis center position is 0.6 ⇒ Changed to 1 mm
	Tough FT-31		R2	○	<ul style="list-style-type: none"> End bracket total length of 15 mm for the (M3 part/10 mm + crimped area/5 mm) ⇒ Changed to 12 mm (phi2 area/2 mm + M3 part/10 mm) Fiber cable outside diameter phi2.2 ⇒ Changed to phi1
	Tough FT-31W		R1	—	<ul style="list-style-type: none"> End bracket total length of 15 mm for the (M3 part/10 mm + crimped area/5 mm) ⇒ Changed to 12 mm (phi2 area/2 mm + M3 part/10 mm) Fiber cable outside diameter phi2.2 ⇒ Changed to phi1
	Tough FT-42		R4	○	
	Tough FT-42W		R1	—	
	Tough FT-A32		R2	○	<ul style="list-style-type: none"> Fiber cable outside diameter phi2.2 ⇒ Changed to phi1.3 Optical cable diameter of 3 x 32 ⇒ Changed to 3.2 x 32
	Tough FT-A32W		R1	—	<ul style="list-style-type: none"> Fiber cable outside diameter phi2.2 ⇒ Changed to phi1.3 Optical cable diameter of 3 x 32 ⇒ Changed to 3.2 x 32
	Tough FT-A11		R2	○	<ul style="list-style-type: none"> Fiber cable outside diameter phi2.2 ⇒ Changed to phi1.3
	Tough FT-A11W		R1	—	<ul style="list-style-type: none"> Fiber cable outside diameter phi2.2 ⇒ Changed to phi1.3
Tough FT-KV40		R2	○	<ul style="list-style-type: none"> Fiber cable outside diameter phi2.2 ⇒ Changed to phi1 Metal end material (stainless steel) ⇒ Changed to plastic (LCP), set screw fastening specifications ⇒ Changed to MS-FD-3 fastener specifications 	
Tough FT-KV40W		R1	—	<ul style="list-style-type: none"> Fiber cable outside diameter phi2.2 ⇒ Changed to phi1 Metal end material (stainless steel) ⇒ Changed to plastic (LCP), set screw fastening specifications ⇒ Changed to MS-FD-3 fastener specifications 	
Tough FT-R41W		R1	—		
Tough FT-R42W		R1	—		
Tough FT-S31W		R1	—	<ul style="list-style-type: none"> End bracket total length of 15 mm ⇒ Changed to 10 mm 	
				Sensing range FX-500 STD (mm in)	
				450 17.717	
				240 9.449	
				315 12.402	
				260 10.236	
				1130 44.488	
				800 31.496	
				3600 141.732	
				3600 141.732	
				3600 141.732	
				3600 141.732	
				800 31.496	
				2200 86.614	
				800 31.496	

Type	Discontinued models				
	Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)
Thru-beam type	FT-WS4		R1	—	250 9.843
	FT-WS8		R1	—	790 31.102
	FT-WS8L	Long sensing range · with lens 	R1	—	3300 129.921
	FT-WV42	 Sleeve part cannot be bent.	R1	—	100 3.937
	FT-WZ4HB	Fiber bending type W2×H10×D10	R1	—	210 8.268
	FT-WZ7HB	Fiber bending type W3.5×H14×D11	R1	—	790 31.102
	FT-WZ8	Top sensing W8.5×H12×D3	R1	—	1300 51.181
	FT-WZ8E	Side sensing W3×H12×D8	R1	—	3400 133.858
	FT-WZ8H	Top sensing W3×H8×D12	R1	—	3300 129.921
	FT-Z8	Top sensing W8.5×H12×D3	R4	○	1200 47.244
	FT-Z8E	Side sensing W3×H12×D8	R4	○	2000 78.740
	FT-Z8H	Top sensing W3×H8×D12	R4	○	2100 82.677

Recommended replacements						Main points of difference from discontinued models
Model No.	Shape of fiber head (mm)	Bending radius (mm)	Bending durability	Sensing range FX-500 STD (mm in)		
Tough FT-S21		R2	○	315 12.402	• End bracket shape of $\phi 1.5/8$ mm ⇒ Changed to 10 mm ($\phi 1$ part/2 mm + $\phi 1.5$ part/8 mm)	
FT-S21W		R1	—	260 10.236	• End bracket shape of $\phi 1.5/8$ mm ⇒ Changed to 10 mm ($\phi 1$ part/2 mm + $\phi 1.5$ part/8 mm)	
FT-S31W		R1	—	800 31.496	• End bracket shape of $\phi 2.5/8$ mm ⇒ Changed to 10 mm ($\phi 2$ part/2 mm + $\phi 3$ part/8 mm)	
FT-S32	Long sensing range · with lens 	R10	○	3100 122.047	• End bracket shape of $\phi 3$ ⇒ Changed to $\phi 2.5$ • Bending radius of 1 mm ⇒ Changed to 10 mm	
Tough FT-V25	 Sleeve part cannot be bent.	R2	○	240 9.449	• D-shaped surface that makes it easy to align with the optical axis has been added	
FT-V24W	 Sleeve part cannot be bent.	R1	—	110 4.331	• D-shaped surface that makes it easy to align with the optical axis has been added	
FT-Z20HBW	Fiber bending type W2×H10×D10	R1	—	260 10.236		
FT-Z40HBW	Fiber bending type W3.5×H14×D11	R1	—	800 31.496		
Tough FT-Z30	Top sensing W8.5×H12×D3	R2	○	2100 82.677	• Black casing color ⇒ Changed to translucent, protective seal eliminated	
FT-Z30W	Top sensing W8.5×H12×D3	R1	—	1500 59.055	• Black casing color ⇒ Changed to translucent, protective seal eliminated	
Tough FT-Z30E	Side sensing W3×H12×D8	R2	○	3500 137.795		
FT-Z30EW	Side sensing W3×H12×D8	R1	—	3400 133.858		
Tough FT-Z30H	Top sensing W3×H8×D12	R2	○	3500 137.795		
FT-Z30HW	Top sensing W3×H8×D12	R1	—	3500 137.795		
Tough FT-Z30	Top sensing W8.5×H12×D3	R2	○	2100 82.677	• Black casing color ⇒ Changed to translucent, protective seal eliminated	
Tough FT-Z30E	Side sensing W3×H12×D8	R2	○	3500 137.795		
Tough FT-Z30H	Top sensing W3×H8×D12	R2	○	3500 137.795		