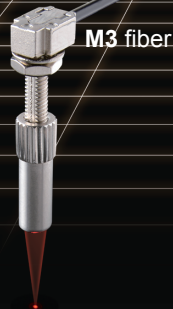


**Delivering super-high-precision detection
with 3 times more light received and
1.3 times the S/N ratio!** (compared to previous models)

Finest spot lens **FX-MR7**



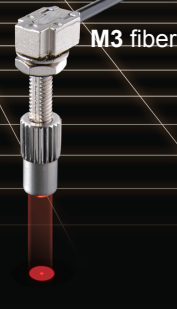
FX-MR8

ø0.4 to ø3.5 mm
ø0.016 to ø0.138 in
Variable spot light



FX-MR7

ø0.1 mm
ø0.004 in
Finest spot light



FX-MR9

ø4 mm
ø0.157 in
Parallel light

The product line includes three lenses for chip component detection applications: a finest spot lens, a zoom lens, and a parallel light lens.

Featuring an extensive selection of spot diameters and the ability to save space when used with square head fiber

Products accommodate a variety of target objects with different shapes, colors, and surface characteristics.

<Spot diameter>

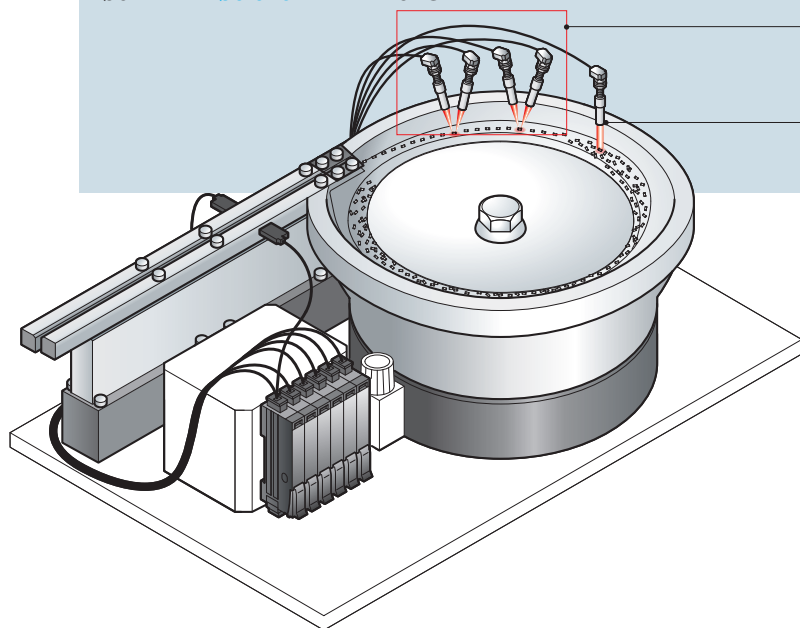
Combination with **FX-MR7**

ø0.1 mm ø0.004 in : **FD-R33EG**

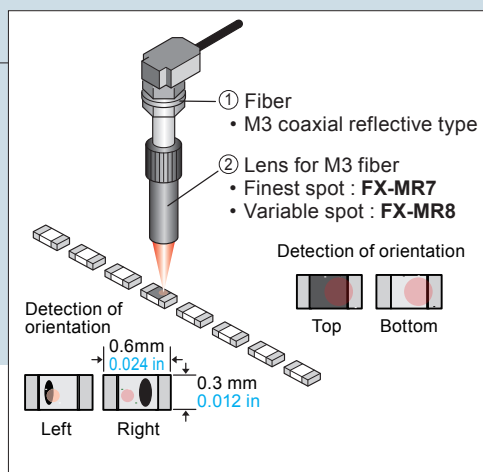
ø0.15 mm ø0.006 in : **FD-R34EG**

ø0.2 mm ø0.008 in : **FD-R32EG**

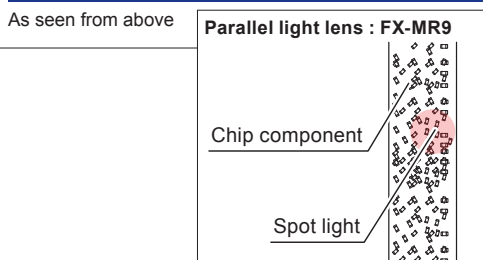
ø0.4 mm ø0.016 in : **FD-R31G**



Application: Detection of chip component orientation and direction



Application: Verification of chip component supply quantity



Finest spot lens FX-MR7

About 3 times more light received (compared to previous models)

Since there is a large difference in the amount of light received in applications such as direction detection, it is easy to set a threshold that will allow stable detection. Additionally, these products offer an S/N ratio that is 1.3 times better than previous models.



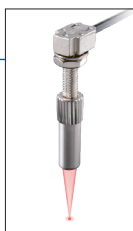
Typical FX-501 performance (STD mode)

	White	Black
FX-MR7 + FD-R33EG	3,200 digits	1,030 digits
FX-MR6 (compared to previous models) + FD-R33EG	1,000 digits	435 digits

Zoom lens FX-MR8

Variable spot diameter

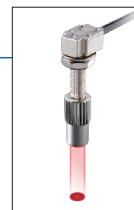
Spot diameters ranging from ø0.4 to ø3.5 mm ø0.016 to ø0.138 in can be achieved by combining the lens with a variety of fibers.



Parallel light lens FX-MR9

Long-range parallel light

Depending on the fiber with which it is used, this lens creates parallel light with a spot diameter of approximately ø4 mm ø0.157 in at a sensing range of 0 to 30 mm 0 to 1.181 in.



All models

Tightening torque 5 times (compared to previous models)

The standard aluminum body has been changed to stainless steel (SUS 303) to reduce the likelihood of damage from over-tightening.

All models

Standard lens outer diameter of ø4.3 mm (ø0.169 in)

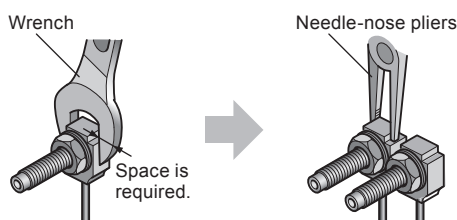
Use of the same mounting hardware across the product line means less inventory and lower costs.

New square head fiber models for the Tough Series (break-free and bendable*)

* These fibers provide a combination of break-free (10 million times bending durability [typical value, when bent back and forth at 180° with a bending radius of R10 mm [R0.394 in](#)]) and bendable (bending radius of R2 to R4 mm [R0.079 to R0.157 in](#)) characteristics.

Compact, space-saving

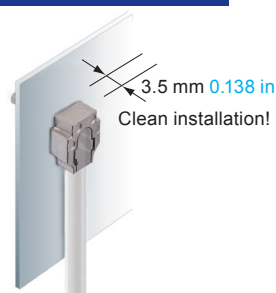
Fiber can be installed at a minimum pitch of M3: 6.5 mm [0.256 in](#) or M4: 8.5 mm [0.335 in](#) using needle-nose pliers.



Compact installation

Square head fiber heads can be installed cleanly on the side of a conveyor belt. The design makes it less likely for tools and other objects to catch on the fiber cable during installation.

FT-R□ / FD-R□



Standard fiber



Extensive selection of product variants

We offer an extensive selection of variants representing a total of seven models. The **FD-□EG** features higher coaxial precision for increased precision when used with lenses.

Thru-beam type: 2 models



M4 : FT-R43
M3 : FT-R31

Reflective type: 5 models

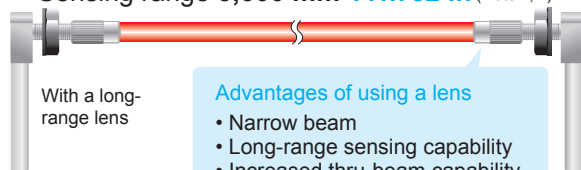


M4 : FD-R41
M3 : FD-R31G (Fiber core : $\varnothing 0.5$ mm [\$\varnothing 0.020\$ in](#))
FD-R32EG (Fiber core : $\varnothing 0.25$ mm [\$\varnothing 0.010\$ in](#))
FD-R34EG (Fiber core : $\varnothing 0.175$ mm [\$\varnothing 0.007\$ in](#))
FD-R33EG (Fiber core : $\varnothing 0.125$ mm [\$\varnothing 0.005\$ in](#))

Use for long-range sensing or spot detection by attaching a lens

Thru-beam type fibers

Sensing range 3,600 mm [141.732 in](#) (Note 1, 2)



Advantages of using a lens

- Narrow beam
- Long-range sensing capability
- Increased thru-beam capability

Lens (For thru-beam type fiber)

Sensing range (mm in) (Note 1) [Lens on both sides]	Beam axis dia. (mm in)	Lens		Applicable fiber
		Designation	Model No.	
3,600 141.732 (Note 2)	$\varnothing 3.6$ $\varnothing 0.142$	Expansion lens	FX-LE1	FT-R43
	$\varnothing 9.8$ $\varnothing 0.386$	Super-expansion lens	FX-LE2	
950 37.402	$\varnothing 2.8$ $\varnothing 0.110$	Side-view lens	FX-SV1	

Notes: 1) The sensing ranges are the values when used in combination with an **FX-500** series amplifier (in STD mode).

2) The fiber cable length practically limits the sensing range.

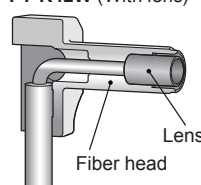
Introducing square R1 mm (R0.039 in) (sharp bending) fiber

We now offer a sharp bending fiber featuring a low level of light fluctuations, even when bent at R1 mm [R0.039 in](#). It is also available with a lens capable of long-range sensing.

FT-R41W FT-R42W



FT-R42W (With lens)



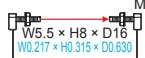
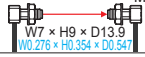
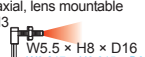
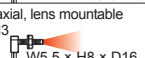
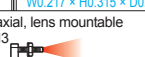
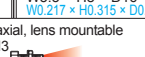
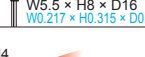
- Resistant to dust and particulate matter.
- Tip dimensions can be shortened.

Semi-custom fibers that flexibly meet diverse needs

Custom-ordered products are available with different fiber lengths and sleeve lengths in order to respond quickly to different requirements. Contact your nearest our office for details on model numbers, standard prices and delivery periods.

ORDER GUIDE

Square head fiber

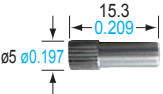
Type		Shape of fiber head (mm in)	Model No.	Bending radius	Fiber cable length ✂ : Free-cut	Sensing range (mm in) (Note 1, 2)			Beam axis (Fiber core) dia. (mm in)	Protection	Ambient temp.			
						FX-500 series	U-LG LONG FAST H-SP	FX-101 (Upper value) FX-102 (Lower value)						
Thru-beam	M3		Tough NEW FT-R31	 R2 mm R0.079 in Bending durability	 2 m 6.562 ft	STD 270 10.630	580 22.835 440 17.323	100 3.937 340 1.6299	ø0.5 ø0.020	IP67	-55 to +80 °C -67 to +176 °F			
		HYPR 1,000 39.370	55 2.165	13.386										
		Lens mountable	Tough NEW FT-R43	 R4 mm R0.157 in Bending durability		STD 720 28.346	1,600 62.992 1,100 43.307	210 8.268 640 25.197						
						HYPR 3,000 118.110	430 16.929 130 5.118	25.197						
	M4		FT-R41W	 R1 mm R0.039 in		STD 800 31.496	1,800 70.866 1,400 55.118	250 9.843 710 27.953	ø1 ø0.039	IP40	-40 to +60 °C -40 to +140 °F			
		With expansion lens	FT-R42W			STD 2,200 86.614	3,600 141.732 (Note 3) 3,500 137.795	510 20.079 2,000 78.740						
	Square head	M3		Tough NEW FD-R31G		 R2 mm R0.079 in Bending durability	 2 m 6.562 ft	STD 170 6.693	310 12.205 260 10.236	45 1.772 150 5.906	Emitter ø0.5 ø0.020	IP40	-55 to +80 °C -67 to +176 °F	
			HYPR 530 20.866	27 1.063		5.906								
				NEW FD-R32EG	 R4 mm R0.157 in	STD 45 1.772		110 4.331 92 3.622	20 0.787 68 2.677	Emitter ø0.25 ø0.010				-40 to +70 °C -40 to +158 °F
			HYPR 170 6.693	9 0.354		2.677								
M3			NEW FD-R34EG	 R4 mm R0.157 in	STD 38 1.496	90 3.543 70 2.756		17 0.669 60 2.362	Emitter ø0.175 ø0.007	IP40	-20 to +60 °C -4 to +140 °F			
		HYPR 130 5.118	23 0.906 7 0.276		2.362									
M3			NEW FD-R33EG	 R2 mm R0.079 in	STD 19 0.748	44 1.732 33 1.299		7 0.276 22 0.866	Emitter ø0.125 ø0.005	IP40	-20 to +60 °C -4 to +140 °F			
		HYPR 84 3.307	11 0.433 3 0.118		0.866									
M4			Tough NEW FD-R41	 R2 mm R0.079 in Bending durability	 2 m 6.562 ft	STD 210 8.268	430 16.929 320 12.598	60 2.362 170 6.693	ø0.75 ø0.030	IP67	-55 to +80 °C -67 to +176 °F			
		HYPR 710 27.953	100 3.937 34 1.339	170 6.693										

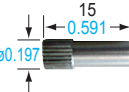
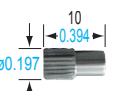
Notes: 1) Note that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.

2) The sensing range of reflective type is specified for white non-glossy paper.

Tough : These fibers provide a combination of break-free (when bent back and forth at 180° with a bending radius of R10 mm R0.394 in) and bendable (bending radius of R4 mm R0.157 in or less) characteristics.

Lens (For M3 Fiber)

Type	Spot diameter (mm in)	Distance to focal point (mm in)	Lens		Fiber		
			Shape (mm in)	Model No.	Shape	Emitting fiber core (mm in)	Model No.
Finest spot lens	ø0.1 ø0.004 approx.	7 ± 0.5 0.276 ± 0.020		FX-MR7		ø0.125 ø0.005	FD-R33EG
					ø0.125 ø0.005	FD-EG31	
					ø0.175 ø0.007	FD-R34EG	
					ø0.25 ø0.010	FD-R32EG	
					ø0.25 ø0.010	FD-EG30	
					ø0.5 ø0.020	FD-R31G	
					ø0.5 ø0.020	FD-32G	
					ø0.5 ø0.020	FD-32GX	
					ø0.5 ø0.020	FD-42G	
					ø0.5 ø0.020	FD-42GW	

Type	Spot diameter (mm in)	Sensing range (mm in)	Lens		Applicable fibers	
			Shape (mm in)	Model No.	Emitting fiber core (mm in)	Model No.
Zoom lens	ø0.4 to ø2.0 ø0.016 to ø0.079 approx.	10 to 30 0.394 to 1.181	 ø5 ø0.197	FX-MR8	ø0.125 ø0.005	FD-R33EG, FD-EG31
	ø0.4 to ø2.2 ø0.016 to ø0.087 approx.				ø0.175 ø0.007	FD-R34EG
	ø0.5 to ø2.5 ø0.020 to ø0.098 approx.				ø0.25 ø0.010	FD-R32EG, FD-EG30
	ø0.8 to ø3.5 ø0.031 to ø0.138 approx.				ø0.5 ø0.020	FD-R31G, FD-32G, FD-32GX, FD-42G, FD-42GW
Parallel light lens	ø4.0 ø0.157 approx.	0 to 30 0 to 1.181	 ø5 ø0.197	FX-MR9	ø0.125 ø0.005	FD-R33EG, FD-EG31
					ø0.175 ø0.007	FD-R34EG
					ø0.25 ø0.010	FD-R32EG, FD-EG30
					ø0.5 ø0.020	FD-R31G, FD-32G, FD-32GX, FD-42G, FD-42GW