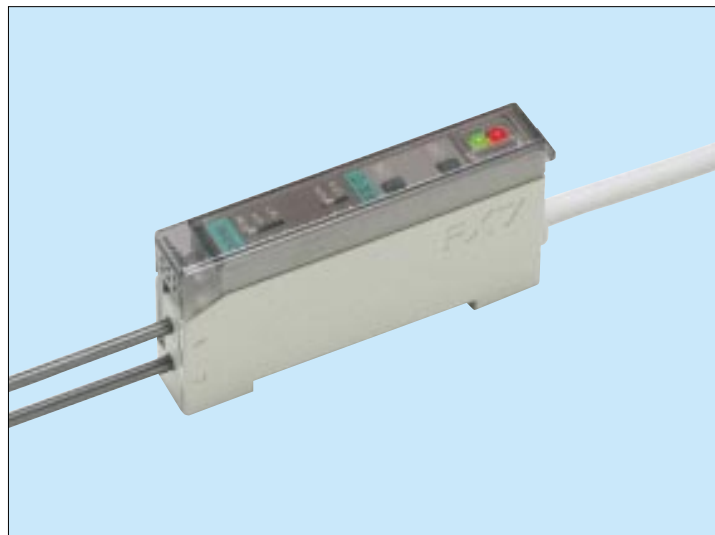


FX-7

SERIES

Slim Body with Automatic Sensitivity Setting



**Compact Size with
Advanced Sensing
Technology**

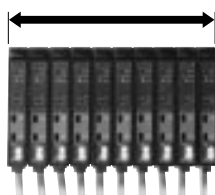
CE Marked

Conforming to EMC directive

Thickness : 10mm

Just 10mm thick. Even a number of FX-7 amplifiers save space.

Only 100mm wide with 10 units

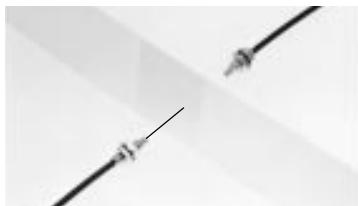


W10 × H31.5 × D59mm

Sensitivity : 8 Times Higher than Before

The FX-7 amplifier performs precise and accurate sensing 8 times greater than a conventional model. It can be used not only to detect the presence of an object, but also to discriminate color, or find a thin film overlap. Complicated and sophisticated application needs are relied on the FX-7.

The FX-7 series also provides the green LED amplifier that is eligible for applications much delicate.



Easily detects translucent film overlap.

Long Sensing Range

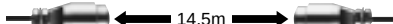
The standard M4 fiber offers the sensing range of 600mm.

Thru-beam mode

M4 standard • long sensing range fiber FT-B8



With lens attachments
(FX-LE2 + FT-FM10)



Reflective mode

M6 standard • long sensing range fiber FD-B8



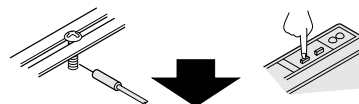
Sensitivity Shift

If either one of the Light state or the Dark state is unstable but the other is stationary, the threshold level can be shifted from the center between the set ON and OFF levels to the stationary side.

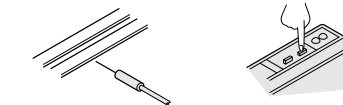
Automatic Sensitivity Setting

Anyone can set on optimum sensitivity by just pressing buttons. Even if its power is turned off, the EEPROM memory saves your set sensitivity.

Press the "ON" button with an object



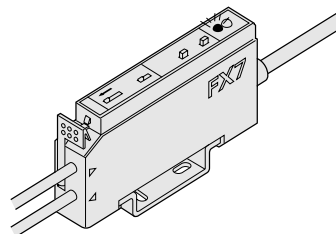
Press the "OFF" button with no object



Stability Margin Indication

The number of blinks of the stability indicator represents the stability margin that you have set the sensitivity.

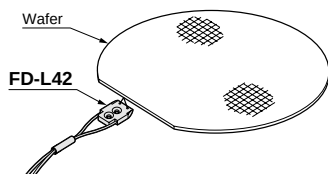
Number of blinks	0	1	2	3	4	5
Margin (%)		15 to 30	30 to 45	45 to 60	60 to 75	Over 75
Margin near by (threshold level)	Under 15					



APPLICATIONS

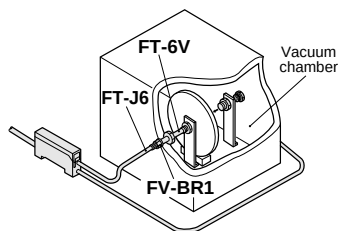
Detecting wafer

The **FD-L42** convergent sensing fiber securely detects a wafer without any affection of color or glossiness of the surface.



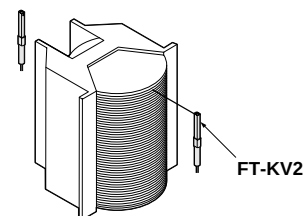
Wafer in vacuum chamber

The vacuum fiber kit composed of the inner fiber, the joint fiber, and the outer fiber detects a wafer inside a vacuum chamber with air-tightness.



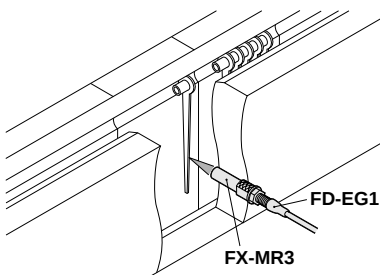
Detecting wafers in cassette

The opening angle of the **FT-K2** or the **FT-KV2** is only 4° so that it securely detects wafers in a cassette individually.



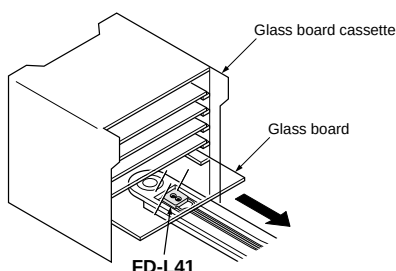
Detecting clock hands

The **FD-EG1** fiber and the **FX-MR3** spot lens produce the smallest projection area of 0.3mm diameter.



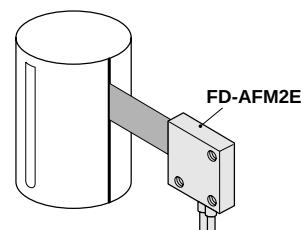
Presence of glass board

The **FD-L41** securely detects the nearest glass board only.



Seam on can

The **FD-AFM2E** array fiber accurately detects a seam on a can because of its line focusing.

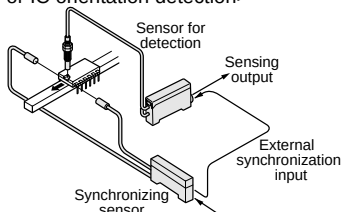


External Synchronization (FX-75 only)

The **FX-75** is incorporated with the trigger function, either gate or edge trigger is available.

With only a synchronizing sensor directly connected to the **FX-75**, the synchronous detection is realized without any other controller.

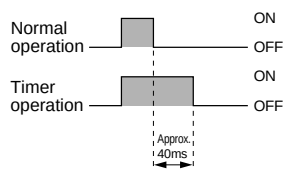
<For IC orientation detection>



Off-delay Timer (FX-7 & FX-77 only)

Each of the **FX-7** and the **FX-77** is incorporated with the OFF-delay timer, for approx. 40ms fixed.

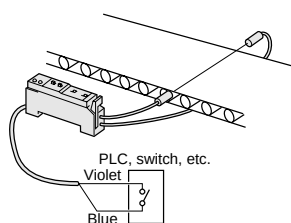
It is useful when the output signals are so quick and short that a connected device can not take in, for example, by slow scanning time of a device or miniature object detection on a fast production line.



Test Input (FX-75 only)

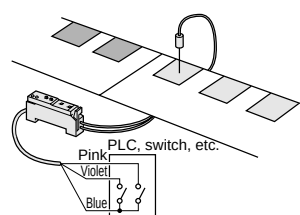
The **FX-75** is incorporated with the test input that makes beam emission stop. It is useful to check for the operability before start-up.

<When using thru-beam fiber>



Remote Sensitivity Adjustment (FX-77 only)

As the sensitivity can be set with two remote switches from the amplifier, your production change-over becomes smooth.



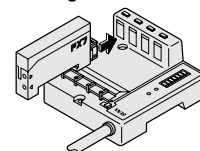
New Fibers

The **FD-L41** for detecting glass boards, the **FD-L42** for detecting wafers or specular objects, the **FT-K2** for detecting wafers in a cassette by the sharp beam (opening angle 4°), and the **FT-KV2** as the side-view type of the **FT-K2**.

Plug-in Connector Type

The **FX-7** amplifier with the plug-in connector on the tail can be connected with the **SL-BM** or the **SL-BX** of the sensor & wire-saving link system **S-LINK**; the **SL-BMW** or the **SL-BW** of the sensor block for simple wiring; or the **CN-54-C2** or the **CN-54-C5** mating cable at a touch.

Refer to the details of the **S-LINK** system on P.582~, the sensor block for simple wiring on P.626~.



FX-7

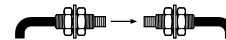
ORDER GUIDE

For general use fibers [Thru-beam mode (One pair of two fibers a set)]



Type	Shape of fiber head (mm)	Sensing range (*1) ■ : Red LED type □ : Green LED type	Min. sensing object [on optimum condition (*2)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber cable length	Model No.
Standard	Lens applicable 	40mm 600mm	③ ϕ 0.16mm opaque object ⑥ ϕ 0.16mm opaque object	• Twice longer sensing range than before	Free Cut 2m	FT-B8
	Lens applicable 					FT-FM2
	With sleeve 	25mm 320mm	③ ϕ 0.08mm opaque object ⑥ ϕ 0.08mm opaque object	• Free-cut type	Free Cut 2m	FT-FM2S With sleeve 90mm FT-FM2S4 With sleeve 40mm
						FT-SFM2
Small fiber head	Lens applicable 	25mm 320mm	③ ϕ 0.08mm opaque object ⑥ ϕ 0.08mm opaque object	• Miniature but the same sensing range as the standard type	Free Cut 2m	FT-T80
Small diameter						FT-NFM2
	With sleeve 	80mm 7mm	③ ϕ 0.05mm opaque object ⑥ ϕ 0.03mm opaque object	• Mountable in a tight area or a narrow space • Free-cut type	Free Cut 2m	FT-NFM2S With sleeve 90mm FT-NFM2S4 With sleeve 40mm
						FT-SNFM2
Flexible	Lens applicable Small diameter 	90mm 6mm	③ ϕ 0.05mm opaque object ⑥ ϕ 0.08mm opaque object	• Small diameter fiber head with coiled cable	2m	FT-C4
	Lens applicable 	25mm 320mm	③ ϕ 0.08mm opaque object ⑥ ϕ 0.08mm opaque object		Free Cut 2m	FT-P80
	Small diameter 	100mm 6mm	③ ϕ 0.05mm opaque object ⑥ ϕ 0.08mm opaque object	• Allowable bending radius : R4mm or more • Bending durability : One million times or more		FT-P40
	Small diameter 	120mm 7mm	③ ϕ 0.08mm opaque object ⑥ ϕ 0.08mm opaque object		1m	FT-P2 (*3)

Environmental-resistant fibers [Thru-beam mode (One pair of two fibers a set)]



Type	Shape of fiber head (mm)	Sensing range (*1) ■ : Red LED type □ : Green LED type	Min. sensing object [on optimum condition (*2)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber cable length	Model No.
Heat-resistant	Lens applicable 			• Heat-resistant : 350°C • Cold-resistant : - 60°C	2m	FT-H35-M2
	With sleeve 	270mm 20mm	③ ϕ 0.12mm opaque object ⑥ ϕ 0.08mm opaque object			FT-H35-M2S6 With sleeve 60mm
	Lens applicable 			• Flexible cable with silicon jacket • Heat-resistant : 200°C • Cold-resistant : - 60°C	1m	FT-H20-M1
		37mm 320mm	③ ϕ 0.12mm opaque object ⑥ ϕ 0.12mm opaque object	• Heat-resistant : 130°C • Cold-resistant : - 60°C • Free-cut type	Free Cut 2m	FT-H13-FM2
Chemical-resistant		1,500mm	③ ϕ 1mm opaque object	• Applicable in chemical solvent • Heat-resistant specification (115°C) • Long sensing range with lenses	2m (Bending R : 30mm)	FT-L8Y
		300mm	③ ϕ 1mm opaque object	• Applicable in chemical solvent • Heat-resistant specification (115°C) • Side-view type		FT-V8Y
Vacuum	Lens applicable 	200mm	③ ϕ 0.1mm opaque object	• Applicable in vacuum chamber • Heat-resistant : 120°C	1m (Bending R : 200mm)	FT-6V
		100mm	③ ϕ 0.1mm opaque object		1m (Bending R : 30mm)	FT-60V

(*1) : The free-cut fibers may reduce the sensing ranges 20% lower than the above specified according to how they are cut off.

(*2) : The optimum condition is specified that the sensitivity is adjusted to have the operation indicator exactly light up at a certain distance in the Light-ON mode.

(*3) : Its model No. has been changed because the shorter plug attachments are provided for the FX-7 connection. The specifications including the sensing range are identical as before.

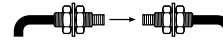
The vacuum fiber must be used with both the followings.

FT-J6 : Outer fibers in the atmosphere (One pair of two fibers a set)

FV-BR1 : Terminal joints (One pair of two joints a set)

ORDER GUIDE

For special use fibers [Thru-beam mode (One pair of two fibers a set)]



Type	Shape of fiber head (mm)	Sensing range (*1) ■ : Red LED type □ : Green LED type	Min. sensing object [on optimum condition (*2)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber cable length	Model No.
Long sensing range with lenses			③ ϕ 0.5mm opaque object ⑥ ϕ 0.5mm opaque object	• Large lenses on the tops of the fiber heads expand the sensing range significantly. • Fiber cable length 10m each	Free Cut 10m	FT-FM10L
			③ ϕ 0.1mm opaque object ⑥ ϕ 0.08mm opaque object	• Small fiber heads of ϕ 2.5mm with lenses expand the sensing range.	Free Cut 2m	FT-SFM2L
Array	Top sensing 	210mm	③ Horizontal ϕ 0.05mm opaque object Vertical ϕ 0.3mm opaque object ⑥ Horizontal ϕ 0.03mm opaque object Vertical ϕ 0.3mm opaque object	• The wide beam stripe detects an object at any place within the area.	Free Cut 2m	FT-AFM2
	Side sensing 	180mm	③ Horizontal ϕ 0.05mm opaque object Vertical ϕ 0.3mm opaque object ⑥ Horizontal ϕ 0.03mm opaque object Vertical ϕ 0.3mm opaque object			FT-AFM2E
Elbow	Lens applicable 	210mm	③ ϕ 0.08mm opaque object ⑥ ϕ 0.08mm opaque object	• The fiber head is bent at a right angle of 5mm radius at the neck.	Free Cut 2m	FT-R80
Side-view	Small diameter 	85mm	③ ϕ 0.05mm opaque object	• The side-view sensing enables to use in a tight space.	Free Cut 2m	FT-V22 (*3)
	Sleeve part can not be bent. (ϕ 2 for FT-V22) 	45mm	③ ϕ 0.05mm opaque object			FT-V41
		120mm	③ ϕ 0.05mm opaque object ⑥ ϕ 0.08mm opaque object			FT-SFM2SV2
Ultra-small diameter		5mm	③ ϕ 0.01mm opaque object	• Ultra-small diameter heads produce the sharp beam envelope of ϕ 0.125mm.	500mm	FT-E10 (*3)
		24mm	③ ϕ 0.03mm opaque object	• Ultra-small diameter heads produce the sharp beam envelope of ϕ 0.25mm.	1m	FT-E20 (*3)
Narrow beam		650mm	③ ϕ 0.3mm copper wire ⑥ ϕ 0.3mm copper wire	• Beam-opening angle 4° • Equivalent quality as the laser ray	1m	NEW FT-K2
		275mm	③ ϕ 0.3mm copper wire	• Beam-opening angle 4° • Side-view type	1m	NEW FT-KV2
		120mm	③ ϕ 0.05mm opaque object	• The narrow beam-opening angle, one-sixth of a conventional model, reduces cross-talking.	1m	FT-KM1S2

(*1) : The free-cut fibers may reduce the sensing ranges 20% lower than the above specified according to how they are cut off.

(*2) : The optimum condition is specified that the sensitivity is adjusted to have the operation indicator exactly light up at a certain distance in the Light-ON mode.

(*3) : Its model No. has been changed because the shorter plug attachments are provided for the FX-7 connection. The specifications including the sensing range are identical as before.

Semi-standard fibers (Custom-order made)

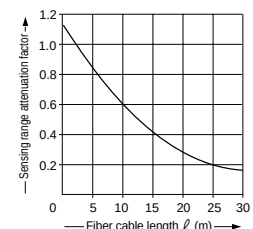
The standard fibers can be modified in fiber cable length or in sleeve length based on your request. Select the fiber cable length (symbolized with $\square$) or the sleeve length (symbolized with $\triangle$) you need from the below table.

Type	Basic model No.	$\square$ Fiber cable length (Unit : m)	$\triangle$ Sleeve length (Unit : cm)
Standard of threaded head (Free-cut)	FT-FM $\square$	3, 4, 5, 10, 15, 20, 25, 30	—
With sleeve	FT-FM $\square$ -S $\triangle$	2 (*1), 3, 4, 5, 10, 15, 20, 25, 30	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
With large diameter lens	FT-FM $\square$ L	20, 30	—
Small diameter of threaded head with sleeve (Free-cut)	FT-NFM2-S $\triangle$	—	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
200°C heat-resistant	FT-H20-M $\square$	2, 3	—
350°C heat-resistant	FT-H35-M $\square$	3	—

(*1) : The standard fiber features 2m in fiber cable length and 4cm or 9cm in sleeve length.

Correlation between attenuation factor of sensing range and fiber cable length

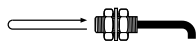
The longer the fiber cable is the shorter the sensing range becomes.



FX-7

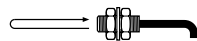
ORDER GUIDE

For general use fibers [Reflective mode]



Type	Shape of fiber head (mm)	Sensing range (*1) (*2) ■ : Red LED type □ : Green LED type	Min. sensing object [at the maximum sensitivity (*3)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber cable length	Model No.
Standard	Long sensing range		③ ϕ 0.01mm gold wire ⑥ ϕ 0.16mm copper wire	• Long sensing range	Free Cut 2m	FD-B8
	Coaxial			• Suitable for green LED type	500mm	FD-5 (*4)
	With sleeve		③ ϕ 0.01mm gold wire ⑥ ϕ 0.08mm copper wire	• Free-cut type	Free Cut 2m	FD-FM2 FD-FM2S With sleeve 90mm FD-FM2S4 With sleeve 40mm
Small fiber head			③ ϕ 0.01mm gold wire ⑥ ϕ 0.4mm copper wire			FD-T80
	Small diameter		③ ϕ 0.01mm gold wire ⑥ ϕ 0.4mm copper wire	• Miniature but the same sensing range as the standard type	Free Cut 2m	FD-T40
			③ ϕ 0.01mm gold wire ⑥ ϕ 0.4mm copper wire			FD-S80
Small diameter						FD-NFM2
	With sleeve		③ ϕ 0.01mm gold wire ⑥ ϕ 0.4mm copper wire	• Mountable in a tight area or a narrow space • Free-cut type	Free Cut 2m	FD-NFM2S With sleeve 90mm FD-NFM2S4 With sleeve 40mm
						FD-SNFM2
Flexible			③ ϕ 0.01mm gold wire ⑥ ϕ 2.1mm stainless steel bar		Free Cut 2m	FD-P80
	Small diameter		③ ϕ 0.01mm gold wire	• Allowable bending radius : R4mm or more • Bending durability : One million times or more		FD-P40
	Small diameter		③ ϕ 0.01mm gold wire ⑥ ϕ 0.4mm copper wire		1m	FD-P2 (*4)

Environmental-resistant fibers [Reflective mode]



Type	Shape of fiber head (mm)	Sensing range (*1) (*2) ■ : Red LED type □ : Green LED type	Min. sensing object [at the maximum sensitivity (*3)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber cable length	Model No.
Heat-resistant	Coaxial			• Heat-resistant : 350°C • Cold-resistant : -60°C	2m	FD-H35-M2
	With sleeve		③ ϕ 0.01mm gold wire ⑥ ϕ 0.025mm gold wire			FD-H35-M2S6 With sleeve 60mm
	Coaxial			• Flexible cable with silicon jacket • Heat-resistant : 200°C • Cold-resistant : -60°C	1m	FD-H20-M1
			③ ϕ 0.01mm gold wire ⑥ ϕ 1.45mm stainless steel bar	• Heat-resistant : 130°C • Cold-resistant : -60°C • Free-cut type	Free Cut 2m	FD-H13-FM2
Vacuum			③ ϕ 0.1mm copper wire	• Applicable in vacuum chamber • Heat-resistant : 120°C	1m	FD-6V

(*1) : The sensing range is specified with using white non-glossy paper (50 × 50mm). (**FD-B8** : 100 × 100mm, **FD-SFM2SV2** : 30 × 30mm, **FD-KM1S2** : 10 × 10mm)

(*2) : The free-cut fibers may reduce the sensing ranges 20% lower than the above specified according to how they are cut off.

(*3) : The minimum sensing object is obtainable with the maximum sensitivity, but at the ideal sensing distance within the rated sensing range.

(*4) : Its model No. has been changed because the shorter plug attachments are provided for the **FX-7** connection. The specifications including the sensing range are identical as before.

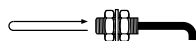
The vacuum fiber must be used with both the followings.

FT-J6 : Outer fibers in the atmosphere (One pair of two fibers a set)

FV-BR1 : Terminal joints (One pair of two joints a set)

ORDER GUIDE

For special use fibers [Reflective mode]



Type	Shape of fiber head (mm)	Sensing range (*1) (*2) ■ : Red LED type □ : Green LED type	Min. sensing object [at the maximum sensitivity (*3)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber cable length	Model No.
Convergent reflective	18 × 14	4.5 to 8mm (Center : 6mm)	③ φ0.01mm gold wire	• The optical system cancels affection by color or surface condition of an object.	Free Cut 2m	FD-L4
	24 × 21	3 to 13mm (Center : 8mm)	③ φ0.2mm copper wire	• Just 4mm thick • Glass board is securely detected.		NEW FD-L41
	15 × 19	Center : 2mm	③ φ0.5mm copper wire	• Just 3mm thick • Wafer is securely detected.		NEW FD-L42
High precision	Lens applicable Coaxial	M4 44mm	③ φ0.01mm gold wire	• The coaxial fiber gives precise and symmetrical sensing.	Free Cut 2m	FD-G4
	Lens applicable Coaxial • Small diameter	M3 13mm	③ φ0.01mm gold wire	• The combination with the FX-MR3 lens gives the smallest spot diameter of approx. φ0.3mm.	500mm	FD-G500
					500mm	FD-EG1
Array	Top sensing	20 66mm	③ Horizontal φ0.01mm gold wire Vertical φ0.05mm copper wire	• Its wide and flat detection area enables to detect objects traveling through inexactly.	Free Cut 2m	FD-AFM2
	Side sensing	4mm 66mm	⑥ Horizontal φ0.08mm copper wire Vertical φ1.45mm stainless steel bar			FD-AFM2E
Elbow		M6 66mm 5mm	③ φ0.01mm gold wire ⑥ φ2.1mm stainless steel bar	• The fiber head is bent at a right angle of 5mm radius at the neck.	Free Cut 2m	FD-R80
Side-view	Small diameter	φ1.5 φ3 15mm	③ φ0.02mm gold wire	• The side view sensing enables to use in a tight space.	Free Cut 2m	FD-V41
	Sleeve part can not be bent.	φ2 φ5 24mm 2mm	③ φ0.02mm gold wire ⑥ φ2.1mm stainless steel bar			FD-SFM2SV2
Ultra-small diameter	Sleeve part can not be bent.	φ0.5 M3 1.5mm	③ φ0.01mm gold wire	• Mountable in a complex area	500mm	FD-EN500S1
	Coaxial Sleeve part can not be bent.	φ0.8 M3 13mm	③ φ0.01mm gold wire	• The coaxial fiber gives precise and symmetrical sensing.	1m	FD-ENM1S1
Narrow-view	Coaxial Sleeve part can not be bent.	φ2 M5 9mm	③ φ0.02mm gold wire	• The narrow beam-opening angle, one-sixth of a conventional model, makes a small detecting area.	1m	FD-KM1S2
Liquid level detection		φ6 φ5	③ (Liquid)	• Liquid drop on the top never affects the sensing.	Free Cut 2m	NEW FD-F8Y
	Mountable on pipe	25 × 20	③ (Liquid)	• Liquid surface is securely detected from the outside of a pipe.	Free Cut 2m Free Cut 5m	NEW FD-F4 NEW FD-F9

(*1) : The sensing range is specified with using white non-glossy paper (50 × 50mm). (FD-B8 : 100 × 100mm, FD-SFM2SV2 : 30 × 30mm, FD-KM1S2 : 10 × 10mm)

(*2) : The free-cut fibers may reduce the sensing ranges 20% lower than the above specified according to how they are cut off.

(*3) : The minimum sensing object is obtainable with the maximum sensitivity, but at the ideal sensing distance within the rated sensing range.

Semi-standard fibers (Custom-order made)

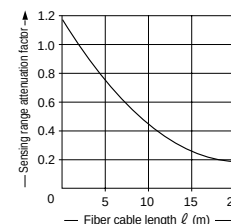
The standard fibers can be modified in fiber cable length or in sleeve length based on your request. Select the fiber cable length (symbolized with □) or the sleeve length (symbolized with ▢) you need from the below table.

Type	Basic model No.	□ Fiber cable length (Unit : m)	▢ Sleeve length (Unit : cm)
Standard of threaded head (Free-cut)	FD-FM	3, 4, 5, 10, 15, 20	—
With sleeve	FD-FM-S	2 (*1), 3, 4, 5, 10, 15, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Small diameter of threaded head with sleeve (Free-cut)	FD-NFM2-S	—	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
200°C heat-resistant	FD-H20-M	2, 3	—
350°C heat-resistant	FD-H35-M	3	—

(*1) : The standard fiber features 2m in fiber cable length and 4cm or 9cm in sleeve length.

Correlation between attenuation factor of sensing range and fiber cable length

The longer the fiber cable is, the shorter the sensing range becomes.



FX-7

ORDER GUIDE

Amplifiers

Type	Appearance	Model No.	Functions (● : Incorporated)							Emitting element	Output
			Sensitivity shift	Stability margin indication	External synchronization	Test input	Remote sensitivity adjustment	OFF-delay timer	Crosstalk prevention		
Standard type		FX-7	●	●	—	—	—	●	●	Red LED	NPN open-collector transistor
		FX-7P									PNP open-collector transistor
		FX-7G								Green LED	NPN open-collector transistor
		FX-7GP									PNP open-collector transistor
External synchronization input type		FX-75	●	●	●	●	—	—	●	Red LED	NPN open-collector transistor
		FX-75G	Green LED								
Remote sensitivity adjustment type		FX-77	●	●	—	—	●	●	●	Red LED	
		FX-77G	Green LED								

Plug-in connector type

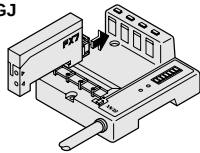
Integrated plug-in connector is available on the standard type. (Standard : Cable type)

Model No. : **FX-7J, FX-7PJ** (Red LED type)

FX-7GJ, FX-7GPJ (Green LED type)

Applicable with the **SL-BM** or the **SL-BX** of the sensor & wire-saving link system **S-LINK**; the **SL-BMW** or the **SL-BW** of the sensor block for simple wiring; or the **CN-54-C2** or the **CN-54-C5** mating cable.

FX-7J
FX-7GJ

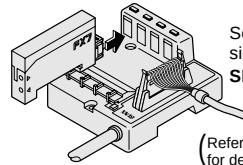


Sensor & wire-saving link system, **S-LINK**

(Refer to P.582 for details.)

PNP output type amplifier can not be connected.

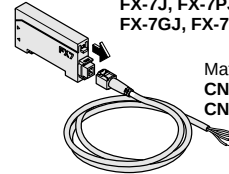
FX-7J, FX-7PJ
FX-7GJ, FX-7GPJ



Sensor block for simple wiring **SL-BMW/SL-BW**

(Refer to P.626 for details.)

FX-7J, FX-7PJ
FX-7GJ, FX-7GPJ



Mating cable
CN-54-C2 (2m long)
CN-54-C5 (5m long)

OPTION

Designation	Model No.	Description					
Protective tube (For thru-beam fiber)	FTP-500 (0.5m)	For M4 thread	Applicable fibers	FT-B8	FT-P80	The protective tube made of non-corrosive stainless steel protects the inner fiber cable from any stress.	
	FTP-1000 (1m)			FT-FM2	FT-H13-FM2		
	FTP-1500 (1.5m)			FT-FM2S	FT-FM2S4		
	FTP-N500 (0.5m)	For M3 thread		FT-T80	FT-P40		
	FTP-N1000 (1m)			FT-NFM2	FD-T40		
	FTP-N1500 (1.5m)			FT-NFM2S	FD-P40		
Protective tube (For reflective fiber)	FDP-500 (0.5m)	For M6 thread		FD-B8	FD-P80		
	FDP-1000 (1m)			FD-FM2	FD-H13-FM2		
	FDP-1500 (1.5m)			FD-FM2S			
	FDP-N500 (0.5m)	For M4 thread		FD-T80			
	FDP-N1000 (1m)			FD-NFM2			
	FDP-N1500 (1.5m)			FD-NFM2S	FD-NFM2S4		
Fiber bender	FB-1	The fiber bender curves the sleeve part of the fiber head at the proper radius. (*1)					
Universal sensor mounting stand (*2)	MS-AJ-F	Fiber assemblies (For M3, M4 or M6 threaded head fiber)					

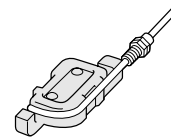
(*1) : Do not bend the sleeve part of any side-view fiber, ultra-small diameter head fiber, or narrow-view fiber.

(*2) : Refer to P.242~ for details of the universal sensor mounting stand.

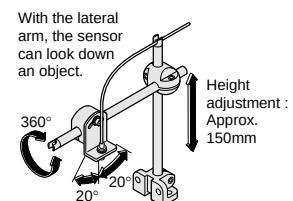
Protective tube



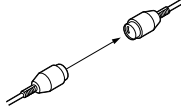
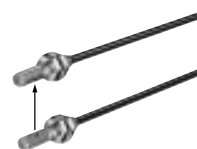
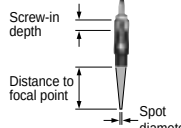
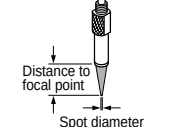
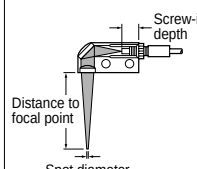
Fiber bender



Universal sensor mounting stand



OPTION

Designation		Model No.	Description																																						
For thru-beam fiber	Expansion lens	FX-LE1		Six times longer or more • Ambient temperature : - 60 to + 350°C	Sensing range (mm) [Two lenses on both sides] <table><tr><th>Fiber</th><th>Applicable amplifier</th><th>Red LED type</th><th>Green LED type</th></tr><tr><td>FT-B8</td><td></td><td>2,500</td><td>230</td></tr><tr><td>FT-FM2</td><td></td><td>2,000</td><td>200</td></tr><tr><td>FT-T80</td><td></td><td>2,000</td><td>200</td></tr><tr><td>FT-C4</td><td></td><td>540</td><td>90</td></tr><tr><td>FT-P80</td><td></td><td>2,000</td><td>200</td></tr><tr><td>FT-H35-M2</td><td></td><td>1,600</td><td>140</td></tr><tr><td>FT-H20-M1</td><td></td><td>1,600</td><td>140</td></tr><tr><td>FT-R80</td><td></td><td>1,600</td><td>190</td></tr></table>	Fiber	Applicable amplifier	Red LED type	Green LED type	FT-B8		2,500	230	FT-FM2		2,000	200	FT-T80		2,000	200	FT-C4		540	90	FT-P80		2,000	200	FT-H35-M2		1,600	140	FT-H20-M1		1,600	140	FT-R80		1,600	190
	Fiber	Applicable amplifier	Red LED type	Green LED type																																					
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	FT-FM2		2,000	200																																					
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FT-C4		540	90																																						
FT-P80		2,000	200																																						
FT-H35-M2		1,600	140																																						
FT-H20-M1		1,600	140																																						
FT-R80		1,600	190																																						
Super-expansion lens	FX-LE2		The farthest expansion with large aperture lenses • Ambient temperature : - 60 to + 350°C	Sensing range (mm) [Two lenses on both sides] <table><tr><th>Fiber</th><th>Applicable amplifier</th><th>Red LED type</th><th>Green LED type</th></tr><tr><td>FT-B8</td><td></td><td>3,500 (*1)</td><td>1,400</td></tr><tr><td>FT-FM2</td><td></td><td>3,500 (*2)</td><td>1,700</td></tr><tr><td>FT-P80</td><td></td><td>3,500 (*1)</td><td>1,300</td></tr><tr><td>FT-H35-M2</td><td></td><td>3,500 (*3)</td><td>800</td></tr><tr><td>FT-H20-M1</td><td></td><td>1,600 (*1)</td><td>900</td></tr><tr><td>FT-H13-FM2</td><td></td><td>3,500 (*1)</td><td>800</td></tr><tr><td>FT-R80</td><td></td><td>3,500 (*1)</td><td>1,400</td></tr></table>	Fiber	Applicable amplifier	Red LED type	Green LED type	FT-B8		3,500 (*1)	1,400	FT-FM2		3,500 (*2)	1,700	FT-P80		3,500 (*1)	1,300	FT-H35-M2		3,500 (*3)	800	FT-H20-M1		1,600 (*1)	900	FT-H13-FM2		3,500 (*1)	800	FT-R80		3,500 (*1)	1,400					
Fiber	Applicable amplifier	Red LED type	Green LED type																																						
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FT-H20-M1		1,600 (*1)	900																																						
FT-H13-FM2		3,500 (*1)	800																																						
FT-R80		3,500 (*1)	1,400																																						
Side-view lens	FX-SV1		Beam axis is bent by 90°. • Ambient temperature : - 60 to + 300°C	Sensing range (mm) [Two lenses on both sides] <table><tr><th>Fiber</th><th>Applicable amplifier</th><th>Red LED type</th><th>Green LED type</th></tr><tr><td>FT-B8</td><td></td><td>750</td><td>40</td></tr><tr><td>FT-FM2</td><td></td><td>400</td><td>35</td></tr><tr><td>FT-T80</td><td></td><td>400</td><td>35</td></tr><tr><td>FT-C4</td><td></td><td>120</td><td>—</td></tr><tr><td>FT-P80</td><td></td><td>400</td><td>35</td></tr><tr><td>FT-H35-M2</td><td></td><td>300</td><td>25</td></tr><tr><td>FT-H20-M1</td><td></td><td>300</td><td>25</td></tr></table>	Fiber	Applicable amplifier	Red LED type	Green LED type	FT-B8		750	40	FT-FM2		400	35	FT-T80		400	35	FT-C4		120	—	FT-P80		400	35	FT-H35-M2		300	25	FT-H20-M1		300	25					
Fiber	Applicable amplifier	Red LED type	Green LED type																																						
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FT-T80		400	35																																						
FT-C4		120	—																																						
FT-P80		400	35																																						
FT-H35-M2		300	25																																						
FT-H20-M1		300	25																																						
Expansion lens for vacuum fiber	FV-LE1		Six times longer or more • Ambient temperature : - 60 to + 350°C	Sensing range (mm) [Two lenses on both sides] <table><tr><th>Fiber</th><th>Applicable amplifier</th><th>Red LED type</th></tr><tr><td>FT-6V</td><td></td><td>1,200</td></tr><tr><td>FT-60V</td><td></td><td>600</td></tr></table>	Fiber	Applicable amplifier	Red LED type	FT-6V		1,200	FT-60V		600																												
Fiber	Applicable amplifier	Red LED type																																							
FT-6V		1,200																																							
FT-60V		600																																							
For reflective fiber	Pinpoint spot lens	FX-MR1		Pinpoint spot of $\phi 0.5\text{mm}$ • Applicable amplifiers : Red LED type • Applicable fibers : FD-G4 or FD-G500 • Distance to focal point : $6 \pm 1\text{mm}$ • Ambient temperature : - 60 to + 300°C																																					
	Zoom lens	FX-MR2		The spot diameter is adjustable from $\phi 0.7$ to $\phi 2\text{mm}$ according to how much it is screwed in. • Applicable amplifiers : Red LED type • Applicable fibers : FD-G4 & FD-G500 • Ambient temperature : - 40 to + 70°C <table><tr><th>Screw-in depth</th><th>Distance to focal point</th><th>Spot diameter</th></tr><tr><td>7mm</td><td>Approx. 18.5mm</td><td>$\phi 0.7\text{mm}$</td></tr><tr><td>12mm</td><td>Approx. 27mm</td><td>$\phi 1.2\text{mm}$</td></tr><tr><td>14mm</td><td>Approx. 43mm</td><td>$\phi 2.0\text{mm}$</td></tr></table>	Screw-in depth	Distance to focal point	Spot diameter	7mm	Approx. 18.5mm	$\phi 0.7\text{mm}$	12mm	Approx. 27mm	$\phi 1.2\text{mm}$	14mm	Approx. 43mm	$\phi 2.0\text{mm}$																									
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14mm	Approx. 43mm	$\phi 2.0\text{mm}$																																							
Finest spot lens	FX-MR3		Finest spot of $\phi 0.3\text{mm}$ (with FD-EG1) • Applicable amplifiers : Red LED type • Applicable fibers : FD-EG1 & FD-G4 • Ambient temperature : - 40 to + 70°C <table><tr><th>Screw-in depth</th><th>Distance to focal point</th><th>Spot diameter</th></tr><tr><td>FD-EG1</td><td>$7.5 \pm 0.5\text{mm}$</td><td>Approx. $\phi 0.3\text{mm}$</td></tr><tr><td>FD-G4</td><td>$7.5 \pm 0.5\text{mm}$</td><td>Approx. $\phi 0.5\text{mm}$</td></tr></table>	Screw-in depth	Distance to focal point	Spot diameter	FD-EG1	$7.5 \pm 0.5\text{mm}$	Approx. $\phi 0.3\text{mm}$	FD-G4	$7.5 \pm 0.5\text{mm}$	Approx. $\phi 0.5\text{mm}$																													
Screw-in depth	Distance to focal point	Spot diameter																																							
FD-EG1	$7.5 \pm 0.5\text{mm}$	Approx. $\phi 0.3\text{mm}$																																							
FD-G4	$7.5 \pm 0.5\text{mm}$	Approx. $\phi 0.5\text{mm}$																																							
Zoom lens (Side-view type)	FX-MR5		The side-view spot lens FX-MR5 contributes space saving. • Applicable amplifiers : Red LED type • Applicable fibers : FD-G4 & FD-G500 • Ambient temperature : - 40 to + 70°C <table><tr><th>Screw-in depth</th><th>Distance to focal point</th><th>Spot diameter</th></tr><tr><td>8mm</td><td>Approx. 13mm</td><td>$\phi 0.5\text{mm}$</td></tr><tr><td>10mm</td><td>Approx. 15mm</td><td>$\phi 0.8\text{mm}$</td></tr><tr><td>14mm</td><td>Approx. 30mm</td><td>$\phi 3.0\text{mm}$</td></tr></table>	Screw-in depth	Distance to focal point	Spot diameter	8mm	Approx. 13mm	$\phi 0.5\text{mm}$	10mm	Approx. 15mm	$\phi 0.8\text{mm}$	14mm	Approx. 30mm	$\phi 3.0\text{mm}$																										
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10mm	Approx. 15mm	$\phi 0.8\text{mm}$																																							
14mm	Approx. 30mm	$\phi 3.0\text{mm}$																																							

(*1) : The fiber cable length practically limits the sensing range at 3,500mm long (FT-H20-M1 : 1,600mm).

(*2) : The sensing range can be expanded up to 14.5m with fiber cables 10m long each.

(*3) : The sensing range can be expanded up to 5.5m with fiber cables 3m each.

FX-7

SPECIFICATIONS

Fibers

Item \ Type		Standard, Small fiber head, Small diameter, Flexible, Long sensing range with lenses, Array, Elbow, High precision, Thru-beam of ultra-small diameter	Heat-resistant			Chemical-resistant	Vacuum	Convergent reflective	Side-view, Narrow beam, Narrow-view, Reflective of ultra-small diameter	Liquid level detection	
			350°C type	200°C type	130°C type						Mountable on pipe
Allowable bending radius		R25mm or more (Flexible : R4mm or more, Thru-beam of ultra-small diameter : R5mm or more)				R30mm or more	R200mm or more (FT-60V : R30mm or more)	R10mm or more	R25mm or more (FT-K2 and FT-KV2 : R10mm or more)	Protective tube : R40mm or more Fiber cable : R15mm or more	R10mm or more
Ambient temperature		− 40 to + 70°C (FD-EG1 : − 20 to + 60°C)	− 60 to + 350°C (*1)	− 60 to + 200°C	− 60 to + 130°C	− 40 to + 115°C	− 40 to + 120°C	− 40 to + 70°C (FD-L42 : − 40 to + 60°C)	− 20 to + 60°C (FT-V41, FD-V41, FT-K2, and FT-KV2 : − 40 to + 60°C)	− 40 to + 125°C (*2)	− 40 to + 100°C (*2)
Ambient humidity		35 to 85%RH (No dew condensation nor icing allowed)									
Material	Fiber core	Acrylic	Multi-component glass (*3)		Acrylic		Quartz glass (*3)	Acrylic			
	Sheath	Polyethylene (Thru-beam of ultra-small diameter and Flexible except for FT-C4 and FD-P2 : Vinyl chloride)	SUS	Silicone (SUS spiral tube inside)	Fluorine resin	Protective tube : Fluorine resin (*4) Fiber sheath : Polypropylene	Fluorine resin	Polyethylene (Reflective of narrow-view type : Polyurethane, FT-K2 and FT-KV2 : Polyolefine)		Polypropylene	
	Fiber head	Brass : Threaded part of (Nickel plated) Threaded part of small diameter, High precision, FT-C4, Threaded part of thru-beam of ultra-small diameter, FT-P80, FD-P80, Array, Threaded part of FT-R80		Brass (Nickel plated)	Brass (Nickel plated)			ABS : FD-L4, FD-L41, (Lens : Acrylic) Aluminum : FD-L42 (Lens : Acrylic)	SUS (FT-KV2 and Thru-beam of FD-EN500S1, FD-ENM1S1, FT-KM1S2 and FD-KM1S2 : Brass Lens of FT-K2 : Glass Lens of FT-KV2 : Acrylic)		Protective tube : Fluorine resin Sheath : Polypropylene
		SUS : FT-SFM2, Small fiber head, FT-SNFM2, FD-SNFM2, FT-SFM2L, FT-P40, FT-P2, FD-P40, FD-P2, Sleeve part of sleeve-attached fiber ABS : FT-FM10L (Lens : Acrylic) Zinc alloy die-casted : Threaded part of FD-R80									
Accessories		Threaded head fiber : 2 pcs. of nuts (thru-beam type : 4 pcs.) and 1 pc. of toothed lock washer (thru-beam type : 2pcs.) Free-cut type, flexible coiled fiber, chemical-resistant fiber and liquid level detection fiber : 1 pc. of FX-CT1 (Fiber cutter) Small diameter of free-cut fiber, convergent reflective fiber, high precision of free-cut fiber, FD-F4 and FD-F9 : 2 sets of plug attachments (FD-L41, FD-L42, FD-F4 and FD-F9 : 1 set of attachments) FD-F4 and FD-F9 : 4 pcs. of tying bands and 2 pcs. of anti-slip tubes FD-L4 : 2 pcs. of M2.6 × 12mm screws with washers and 2 pcs. of nuts									

(*1) : If the fiber is used under — 30°C, its resistable maximum temperature drops to + 200°C. If the side-view lens FX-SV1 is put on the fiber head, the allowable maximum temperature comes down to + 300°C. (The ambient temperature range of the FX-SV1 is from — 60 to + 300°C.)

(*2) : With the liquid level detection fiber, also make sure of the temperature of the liquid in which the fiber is immersed.

(*3) : Keep the fiber composed of multi-component glass or quartz glass from vibration or impact.

SPECIFICATIONS

Amplifiers

Type		NPN output					PNP output			
		Standard type		External synchronization input type		Remote sensitivity adjustment type		Standard type		
Item	Model No.	FX-7	FX-7G	FX-7S	FX-7SG	FX-77	FX-77G	FX-7P	FX-7GP	
Supply voltage		12 to 24V DC ± 10% Ripple P-P 10% or less								
Current consumption		30mA or less								
Sensing output		NPN open-collector transistor • Maximum sink current : 100mA • Applied voltage : 30V DC or less • Residual voltage : 1.0V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)						PNP open-collector transistor • Maximum source current : 100mA • Applied voltage : 30V DC or less • Residual voltage : 2.0V or less (at 100mA source current) 1.0V or less (at 16mA source current)		
		Utilization category		DC-12 or DC-13						
		Output operation		Selectable either Light-ON or Dark-ON with the order of pressing ON and OFF buttons (Selectable with the external inputs on the FX-77 or the FX-77G)						
		Short-circuit protection		Incorporated						
Self-diagnosis output		NPN open-collector transistor • Maximum sink current : 50mA • Applied voltage : 30V DC or less • Residual voltage : 1.0V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)						PNP open-collector transistor • Maximum source current : 50mA • Applied voltage : 30V DC or less • Residual voltage : 2.0V or less (at 50mA source current) 1.0V or less (at 16mA source current)		
		Output operation		ON under the unstable sensing condition and it is restored automatically after approx. 40ms; also ON if the sensing output is short-circuited until it is removed (The remote sensitivity adjustment type makes it turned ON for approx. 40ms after the remote sensitivity input is received.)						
		Short-circuit protection		Incorporated						
Response time		0.5ms or less (0.7ms or less when the crosstalk prevention function is used)								
Operation indicator		Red LED (lights up when the sensing output is activated)								
Stability indicator		Green LED “RUN” mode : Lights up at the stable Light condition or the stable Dark condition “SET” mode : Blinks twice when the difference between ON and OFF levels is greater than the hysteresis, but 15 times when it is equal to or less than the hysteresis after the completion of the sensitivity setting. Also blinks twice after the crosstalk prevention is set “SET” mode→“SIF” or “RUN” mode : Blinks from 0 to 5 times according to the operation margin								
Test input function		_____		Incorporated		_____				
External synchronization function		_____		Incorporated (Either gate or edge trigger is selectable)		_____				
Remote sensitivity adjustment function		_____				Incorporated		_____		
Sensitivity shift function		Shifts the sensitivity setting level								
Crosstalk prevention function		Incorporated								
Timer function		Fixed OFF-delay timer approx. 40ms (switchable either effective or ineffective)		_____		Fixed OFF-delay timer approx. 40ms (switchable either effective or ineffective)				
Environmental resistance	Pollution degree		3 (Industrial environment)							
	Ambient temperature		－ 10 to + 50°C (No dew condensation nor icing allowed), Storage : － 20 to + 70°C							
	Ambient humidity		35 to 85%RH, Storage : 35 to 85% RH							
	Ambient illuminance (Extraneous light immunity)		Sun light : 10,000ℓx at the light-receiving face, Incandescent light : 3,000ℓx at the light-receiving face							
	EMC		Emission : EN50081-2, Immunity : EN50082-2							
	Voltage withstandability		1,000V AC for one min. between all terminals connected and enclosure (*1)							
	Insulation resistivity		20MΩ or more at 250V DC Megger between all terminals connected and enclosure (*1)							
	Vibration-proof		10 to 150Hz frequency, 0.75mm amplitude, and X, Y, and Z directions each for two hours (unenergized)							
	Shock-proof		98m/s ² acceleration (approx. 10G), and X, Y, and Z directions each for five times (unenergized)							
Emitting element		Red LED (modulated)	Green LED (modulated)	Red LED (modulated)	Green LED (modulated)	Red LED (modulated)	Green LED (modulated)	Red LED (modulated)	Green LED (modulated)	
Material		Enclosure : Heat-resistant ABS, Case cover : Polycarbonate, Fiber lock lever : PPS								
Cable		Cabtyre cable 2m long with six 0.15mm ² conductors (FX-7, FX-7G, FX-7P or PX-7GP : four 0.2mm ² conductors)								
Cable extension		Maximum extension is 100m overall with an equivalent cable with conductors 0.3mm ² or more								
Weight		Approx. 65g								
Accessory		MS-DIN-2 (Mounting bracket) : 1pc.								

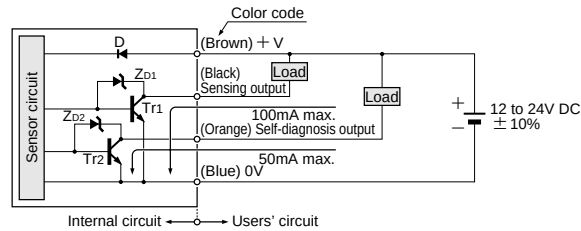
(*1) : The voltage withstandability and the insulation resistivity described in the above table are inherent in the amplifier only.

FX-7

I/O CIRCUIT AND WIRING DIAGRAMS

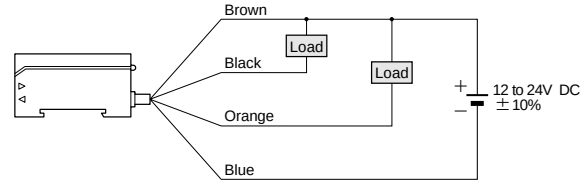
**FX-7 FX-7G
FX-7J FX-7GJ** Standard type·NPN output

I/O circuit diagram



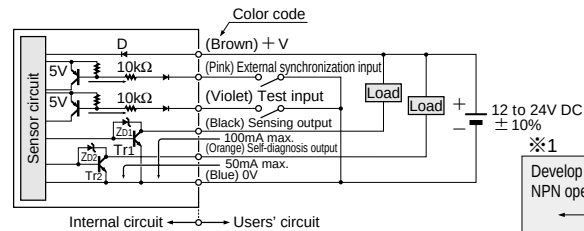
Symbol . . . D : Reverse polarity protection diode
ZD1, ZD2 : Surge absorption zener diode
Tr1, Tr2 : NPN output transistor

Wiring diagram



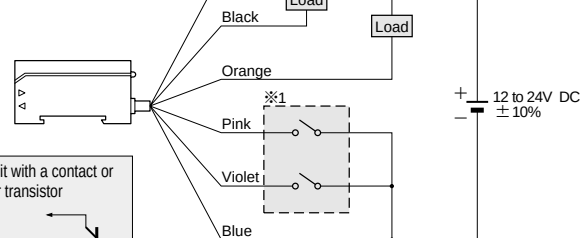
**FX-75
FX-75G** External synchronization input type

I/O circuit diagram



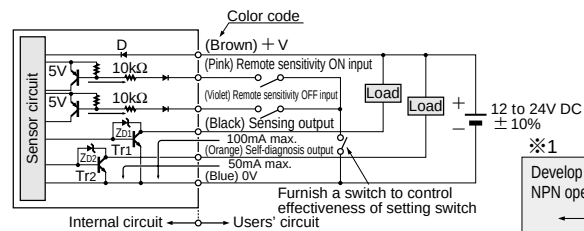
Symbol . . . D : Reverse polarity protection diode
ZD1, ZD2 : Surge absorption zener diode
Tr1, Tr2 : NPN output transistor

Wiring diagram



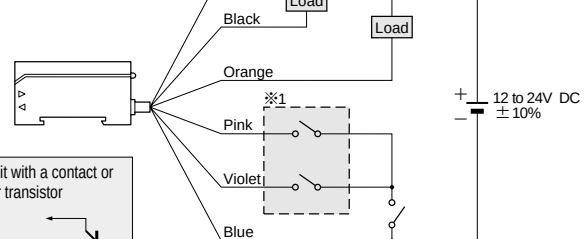
**FX-77
FX-77G** Remote sensitivity adjustment type

I/O circuit diagram



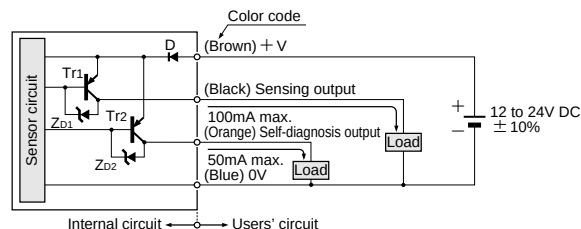
Symbol . . . D : Reverse polarity protection diode
ZD1, ZD2 : Surge absorption zener diode
Tr1, Tr2 : NPN output transistor

Wiring diagram



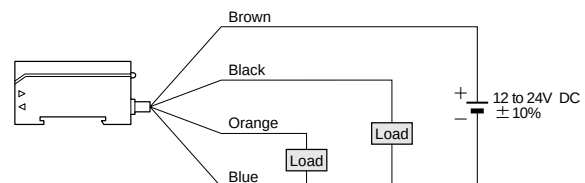
**FX-7P FX-7GP
FX-7PJ FX-7GPJ** Standard type·PNP output

I/O circuit diagram



Symbol . . . D : Reverse polarity protection diode
ZD1, ZD2 : Surge absorption zener diode
Tr1, Tr2 : PNP output transistor

Wiring diagram



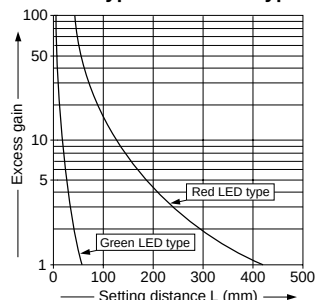
SENSING FIELDS (TYPICAL)

Correlation between setting distance and excess gain

FT-FM2

Thru-beam

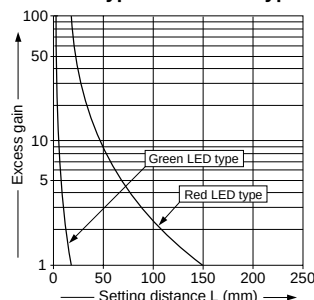
Red LED type•Green LED type



FD-FM2

Reflective

Red LED type•Green LED type

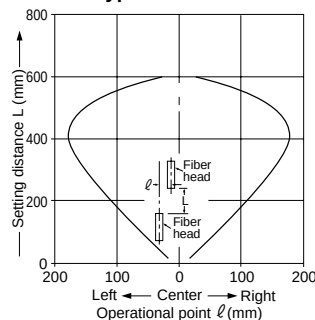


Parallel deviations

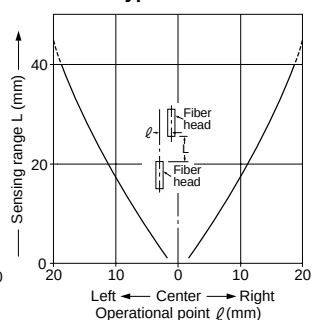
FT-B8

Thru-beam

Red LED type



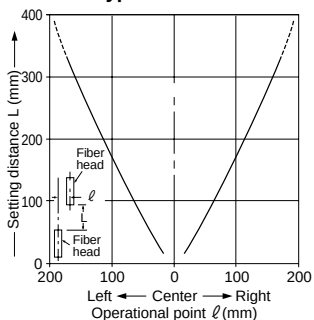
Green LED type



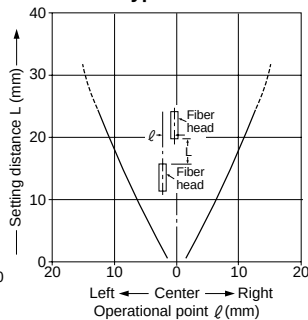
FT-FM2 FT-FM2S FT-FM2S4
FT-SFM2 FT-T80

Thru-beam

Red LED type



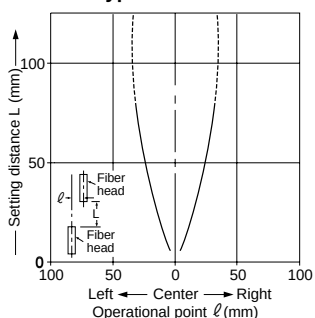
Green LED type



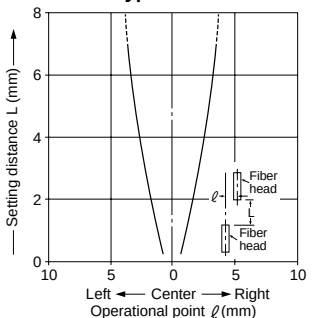
FT-NFM2 FT-NFM2S
FT-NFM2S4 FT-SNFM2

Thru-beam

Red LED type



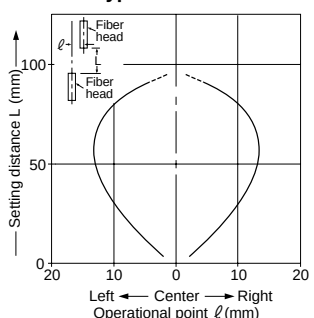
Green LED type



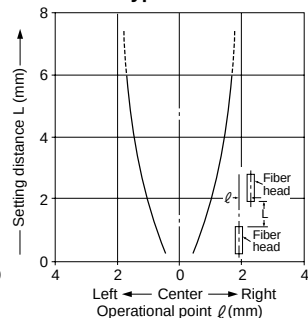
FT-C4

Thru-beam

Red LED type



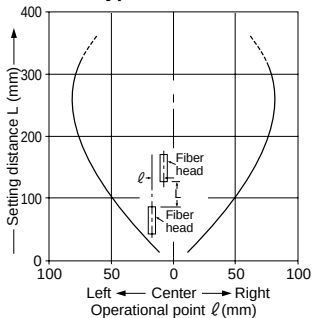
Green LED type



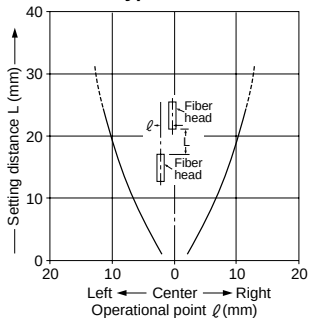
FT-P80

Thru-beam

Red LED type



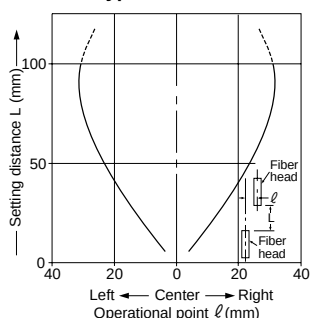
Green LED type



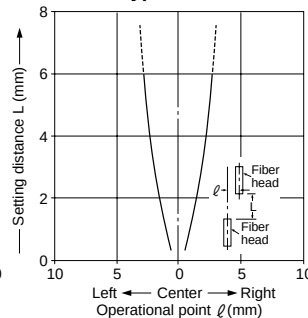
FT-P40

Thru-beam

Red LED type



Green LED type



FX-7

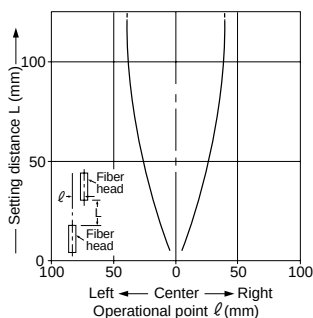
SENSING FIELDS (TYPICAL)

Parallel deviations

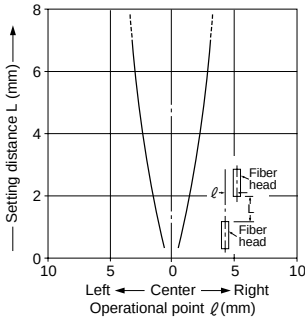
FT-P2

Thru-beam

Red LED type



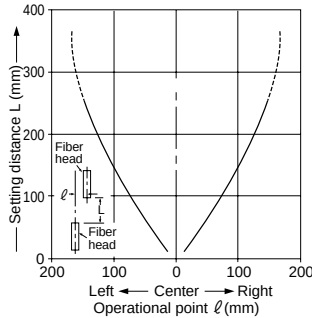
Green LED type



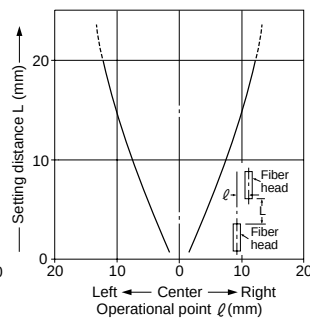
FT-H35-M2 FT-H35-M2S6 FT-H20-M1

Thru-beam

Red LED type



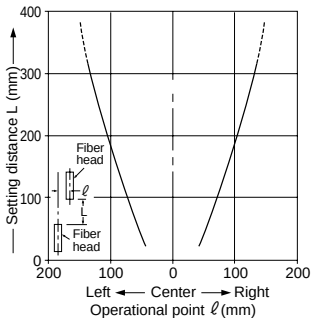
Green LED type



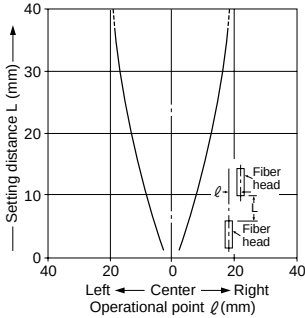
FT-H13-FM2

Thru-beam

Red LED type



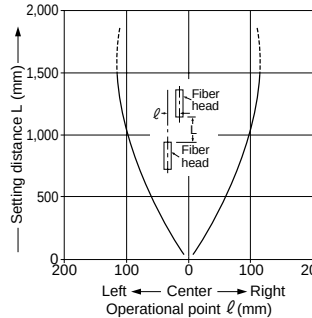
Green LED type



FT-L8Y

Thru-beam

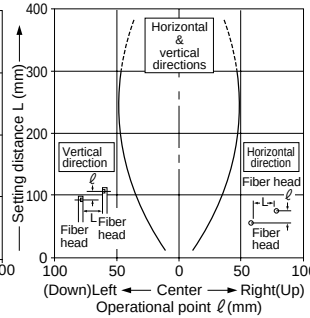
Red LED type



FT-V8Y

Thru-beam

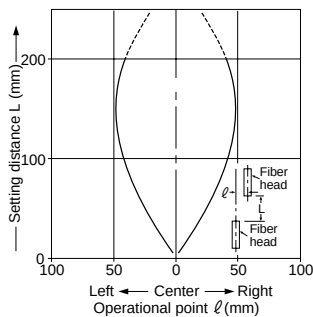
Red LED type



FT-6V

Thru-beam

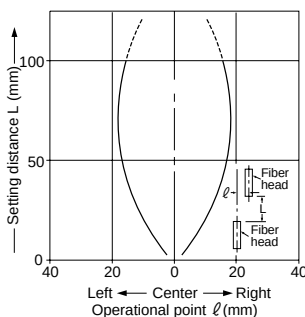
Red LED type



FT-60V

Thru-beam

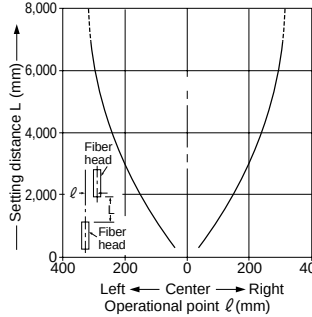
Red LED type



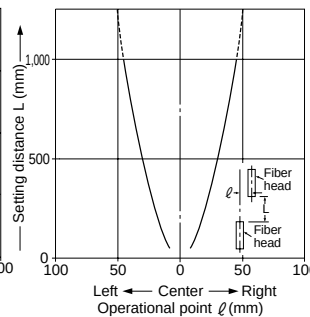
FT-FM10L

Thru-beam

Red LED type



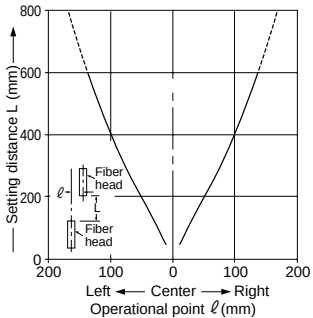
Green LED type



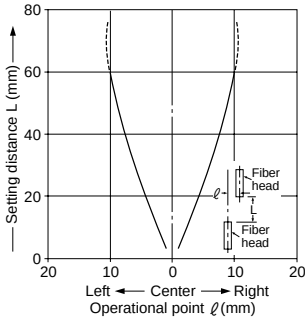
FT-SFM2L

Thru-beam

Red LED type



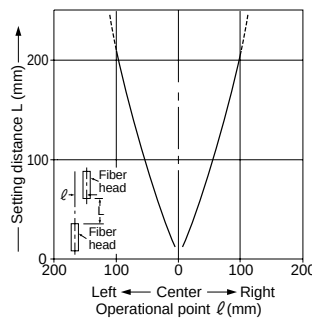
Green LED type



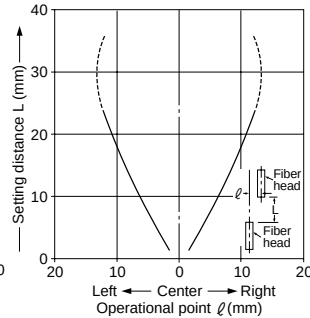
FT-R80

Thru-beam

Red LED type



Green LED type



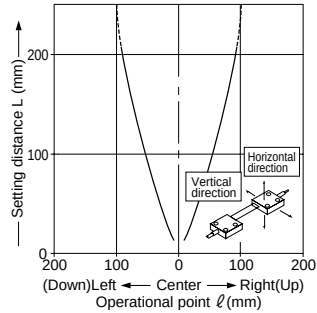
SENSING FIELDS (TYPICAL)

Parallel deviations

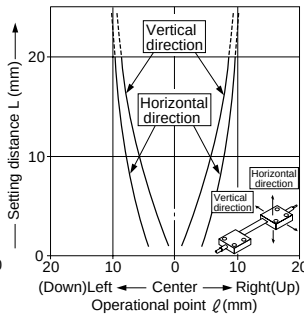
FT-AFM2

Thru-beam

Red LED type



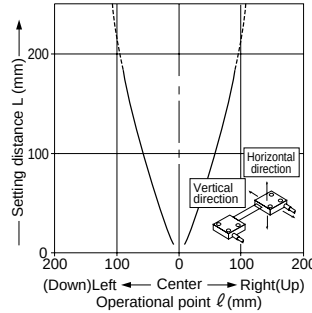
Green LED type



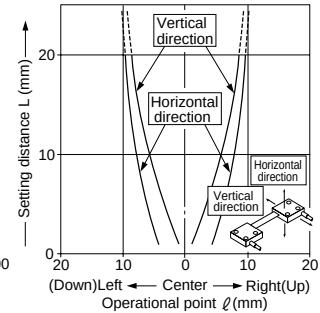
FT-AFM2E

Thru-beam

Red LED type



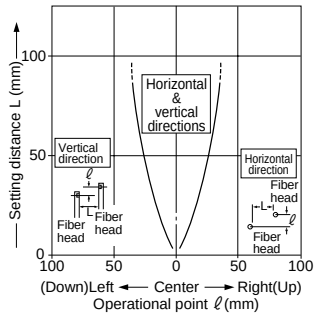
Green LED type



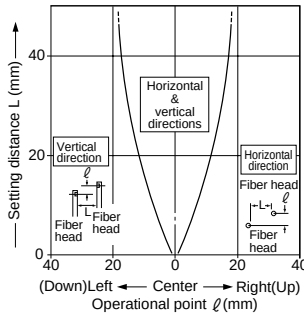
FT-V22

Thru-beam

Red LED type



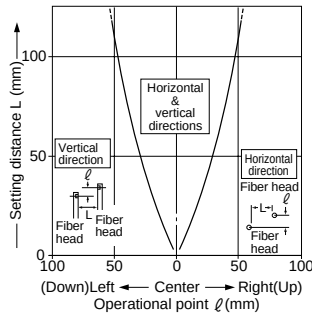
Red LED type



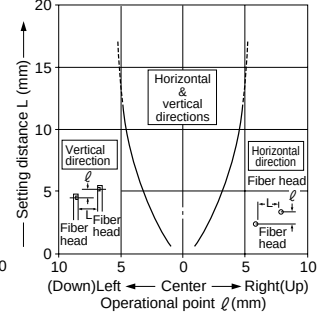
FT-SFM2SV2

Thru-beam

Red LED type



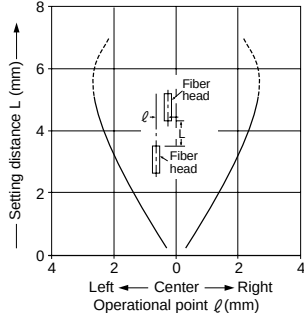
Green LED type



FT-E10

Thru-beam

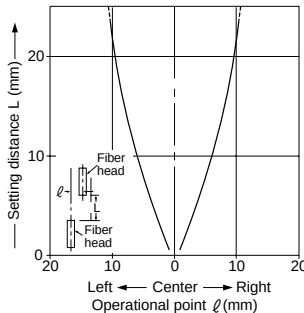
Red LED type



FT-E20

Thru-beam

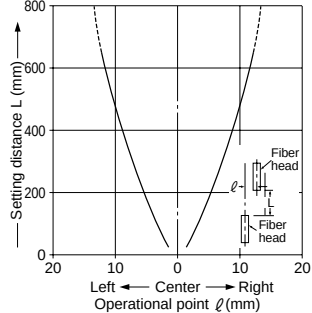
Red LED type



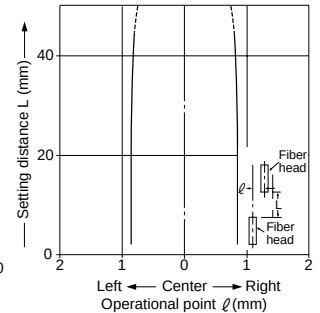
FT-K2

Thru-beam

Red LED type



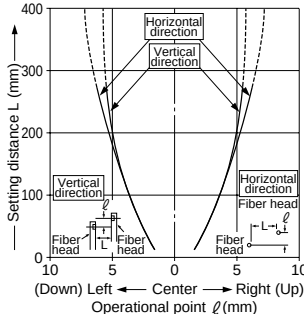
Green LED type



FT-KV2

Thru-beam

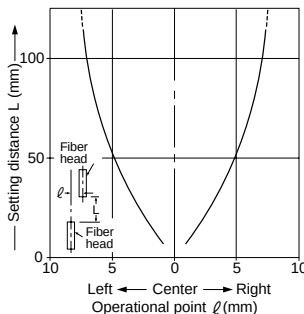
Red LED type



FT-KM1S2

Thru-beam

Red LED type



PHOTOELECTRIC SENSOR

Fiber Sensor

FZ-10

FX-7

FX-10

FX-11A

CX-20

CX-30

CX-ND300R

Amplifier Built-in Type

EX-10

EQ-20

EQ-30

EX-40

RX

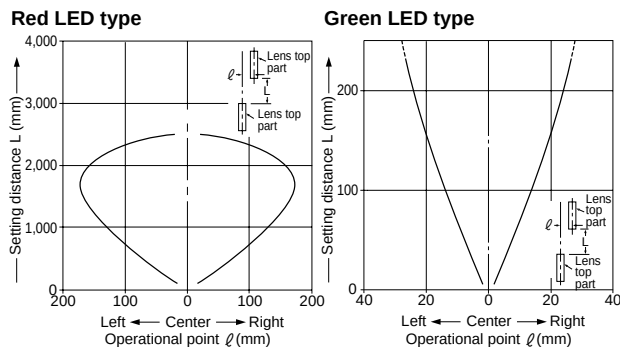
RX-LS200

FX-7

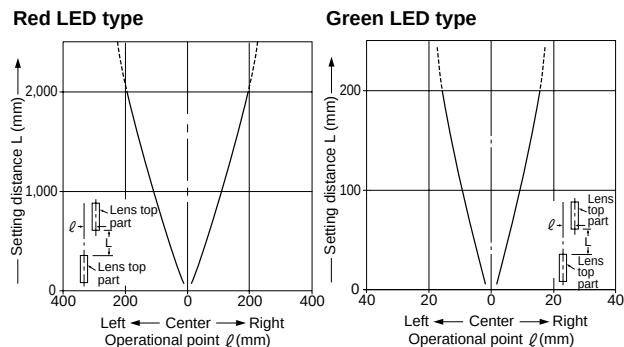
SENSING FIELDS (TYPICAL)

Parallel deviations with FX-LE1 (Expansion lens) applied on both sides

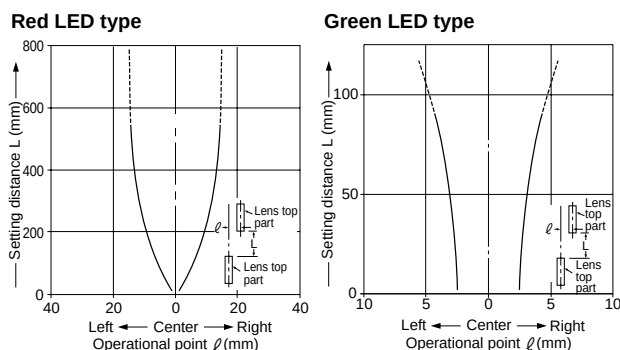
FT-B8 Thru-beam



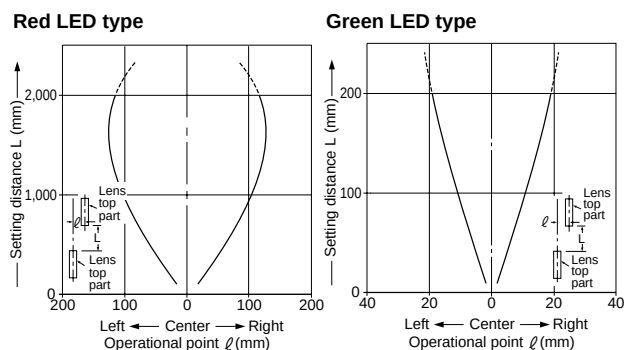
FT-FM2
FT-T80 Thru-beam



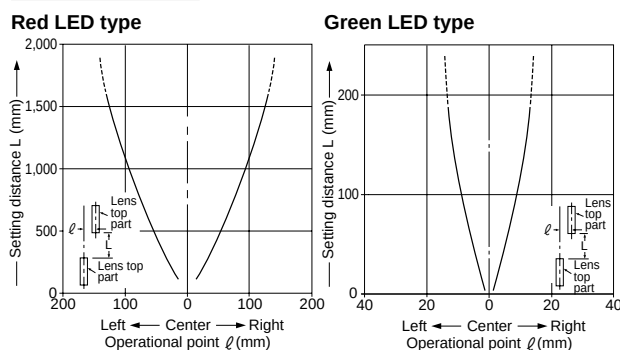
FT-C4 Thru-beam



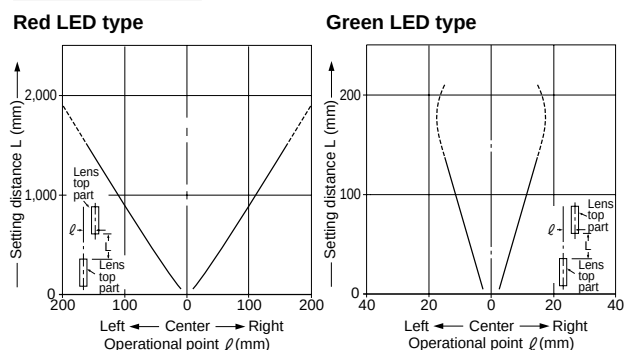
FT-P80 Thru-beam



FT-R80 Thru-beam

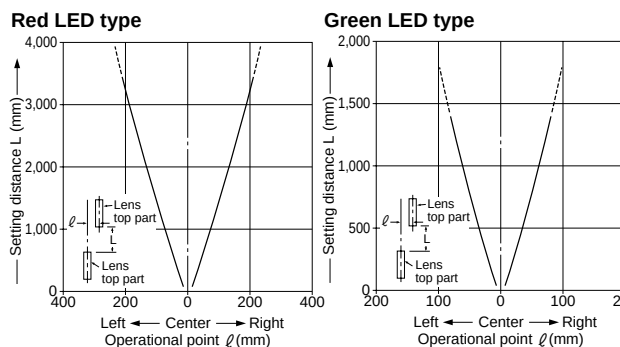


FT-H35-M2
FT-H20-M1 Thru-beam

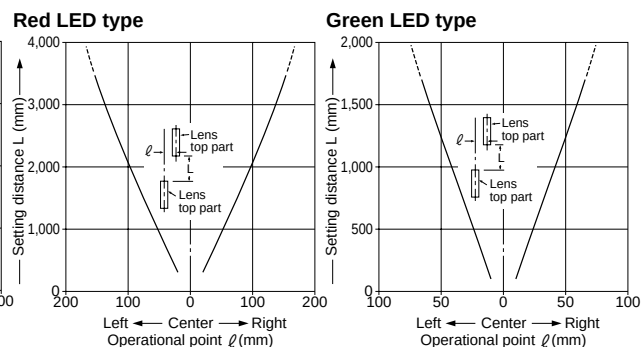


Parallel deviations with FX-LE2 (Super-expansion lens) applied on both sides

FT-B8 Thru-beam

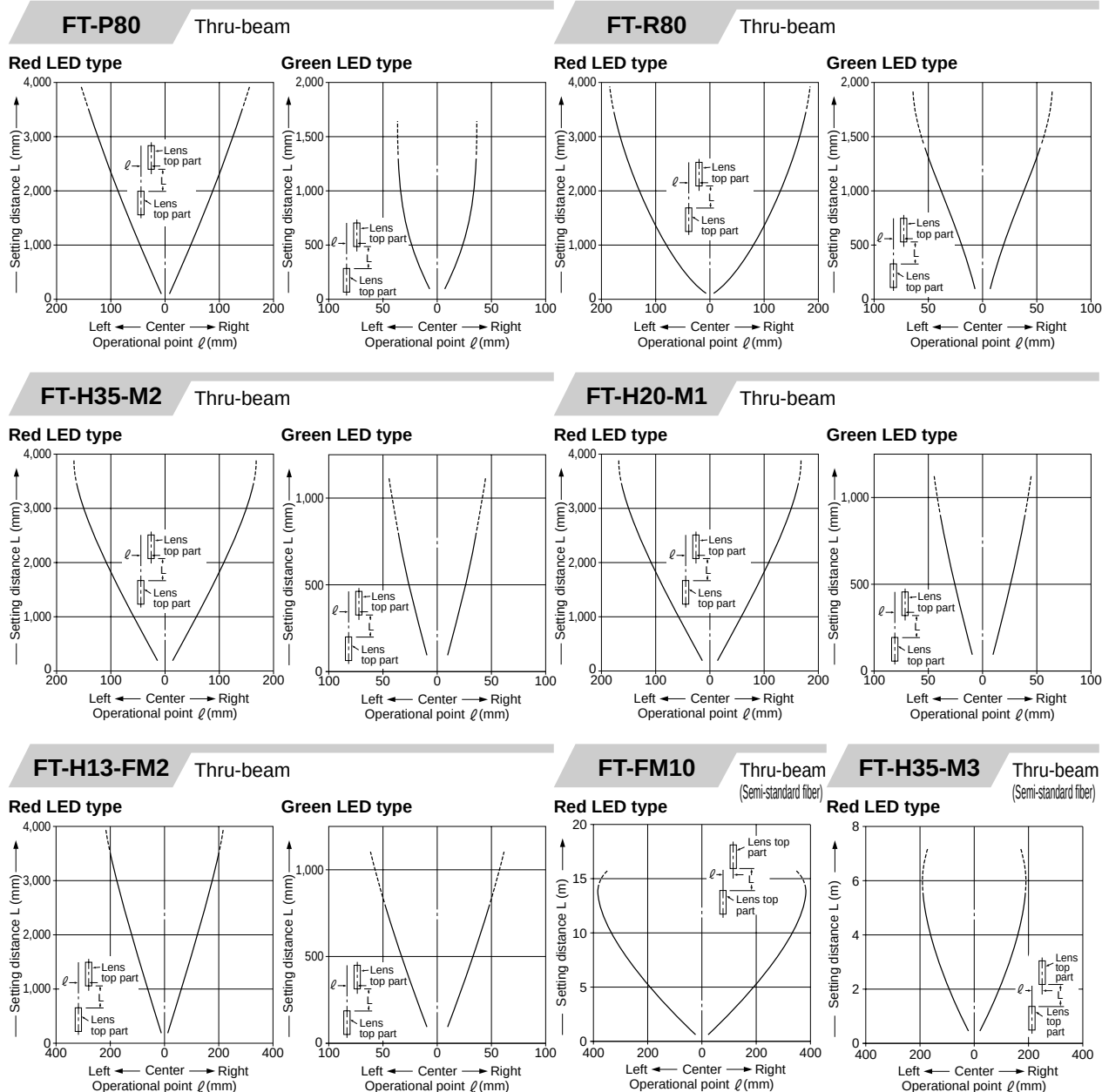


FT-FM2 Thru-beam

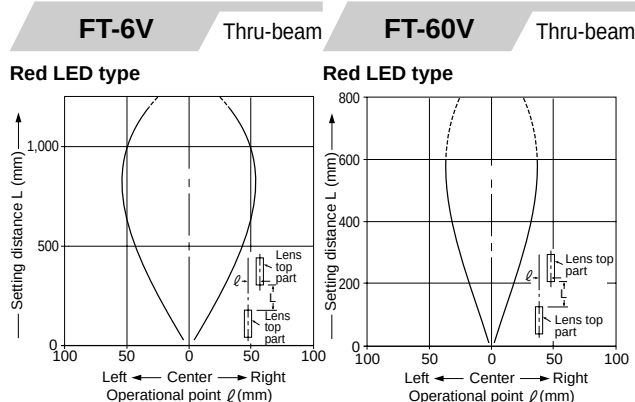


SENSING FIELDS (TYPICAL)

Parallel deviations with FX-LE2 (Super-expansion lens) applied on both sides



Parallel deviations with FV-LE1 (Vacuum-expansion lens) applied on both sides



PHOTOELECTRIC SENSOR

FZ-10

Fiber Sensor
FX-7

FX-10

FX-11A

CX-20

CX-30

CX-ND300R

EX-10

EQ-20

EQ-30

EX-40

RX

RX-LS200

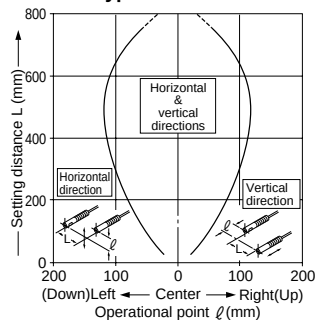
FX-7

SENSING FIELDS (TYPICAL)

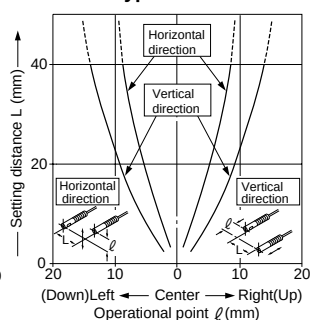
Parallel deviations with FX-SV1 (Side-view lens) applied on both sides

FT-B8 Thru-beam

Red LED type

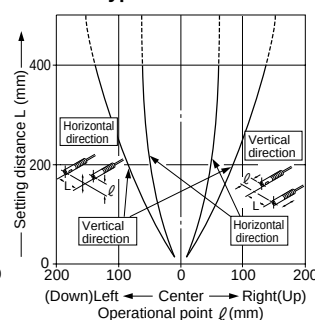


Green LED type

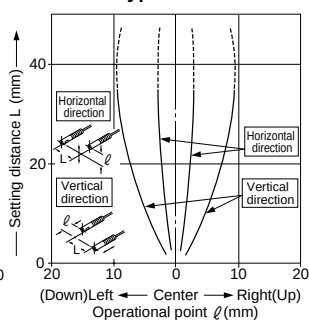


FT-FM2 FT-T80 Thru-beam

Red LED type

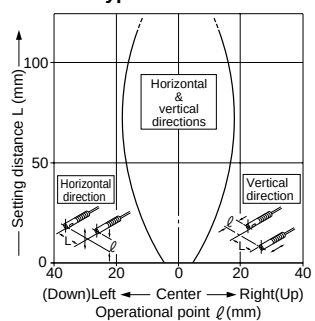


Green LED type

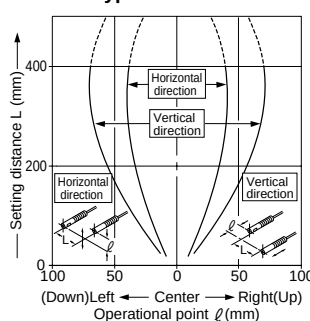


FT-C4 Thru-beam

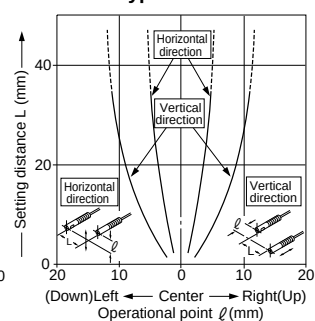
Red LED type



Red LED type

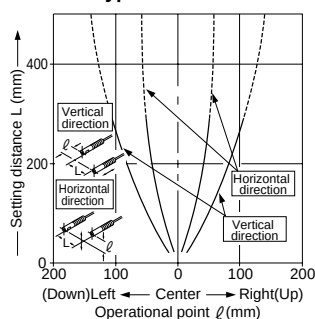


Green LED type

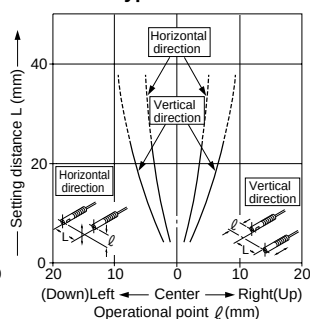


FT-H35-M2 FT-H20-M1 Thru-beam

Red LED type



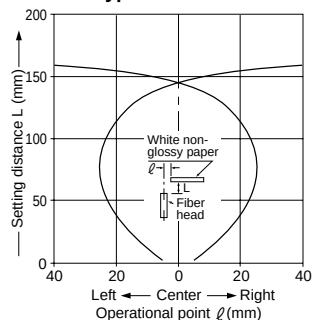
Green LED type



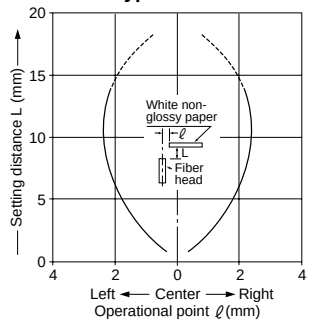
Sensing fields

FD-B8 Reflective

Red LED type

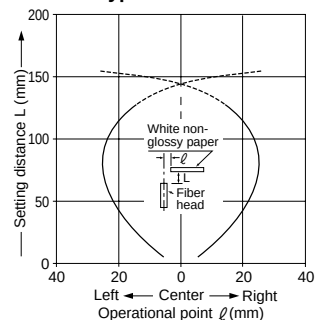


Green LED type

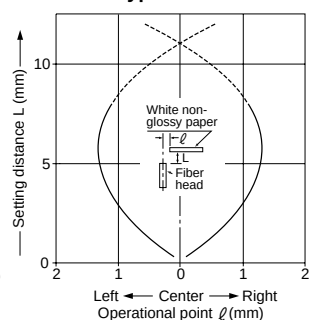


FD-5 FD-FM2 FD-FM2S FD-FM2S4 FD-T80 FD-S80 Reflective

Red LED type

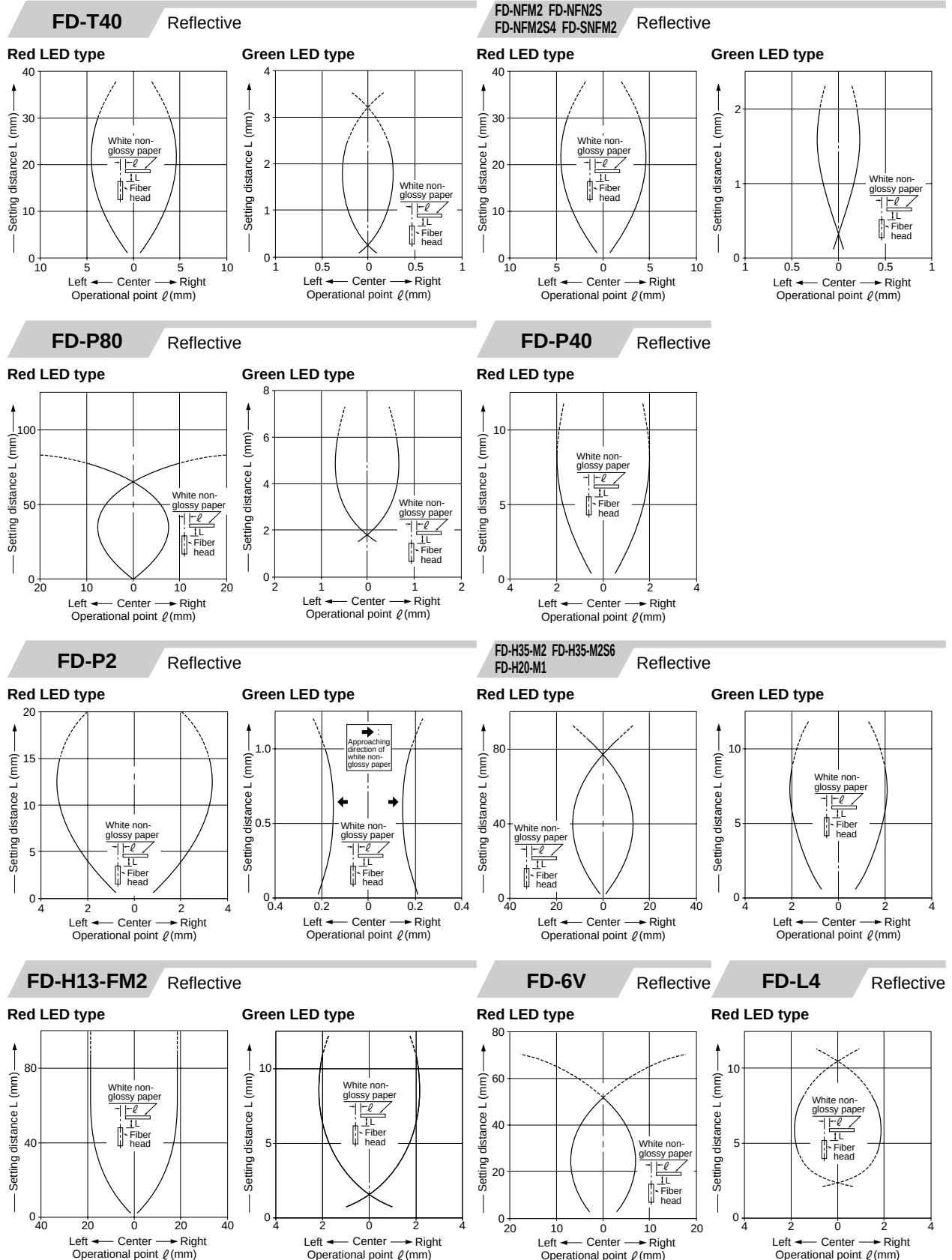


Green LED type



SENSING FIELDS (TYPICAL)

Sensing fields



FX-7

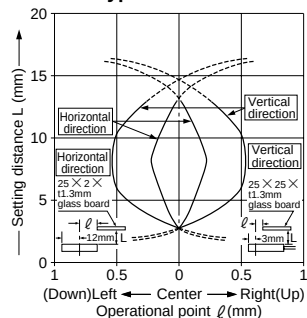
SENSING FIELDS (TYPICAL)

Sensing fields

FD-L41

Reflective

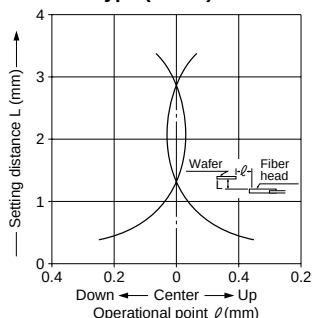
Red LED type



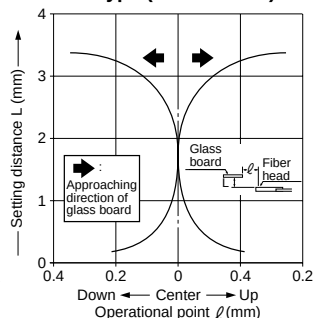
FD-L42

Reflective

Red LED type (Wafer)



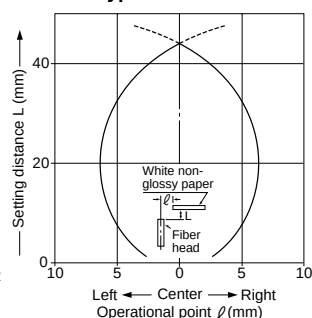
Red LED type (Glass board)



FD-G4

Reflective

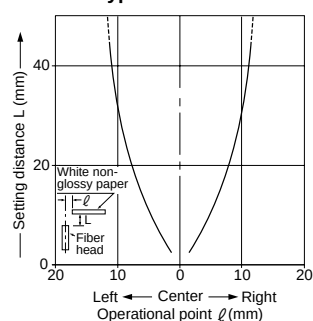
Red LED type



FD-G500

Reflective

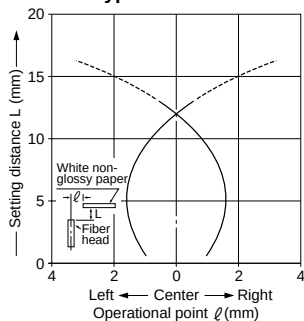
Red LED type



FD-EG1

Reflective

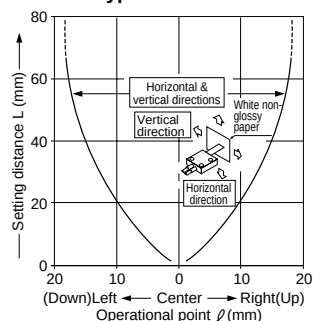
Red LED type



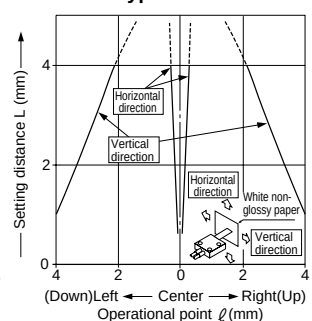
FD-AFM2 FD-AFM2E

Reflective

Red LED type



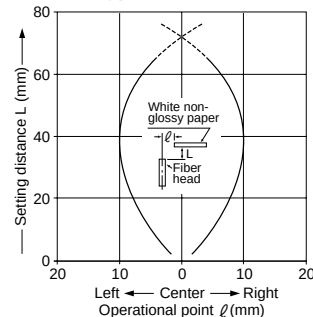
Green LED type



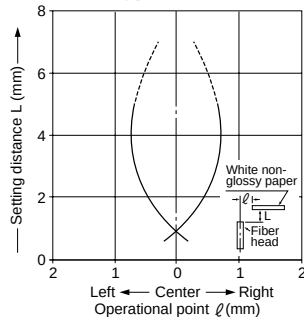
FD-R80

Reflective

Red LED type



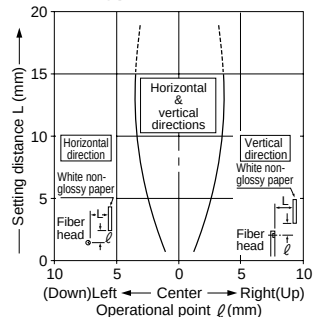
Green LED type



FD-V41

Reflective

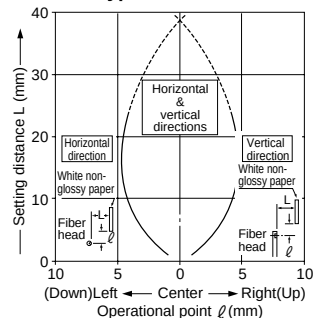
Red LED type



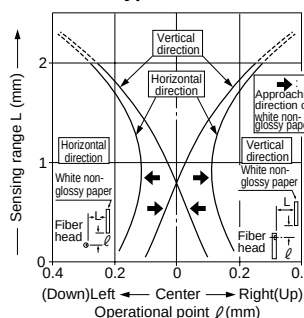
FD-SFM2SV2

Reflective

Red LED type



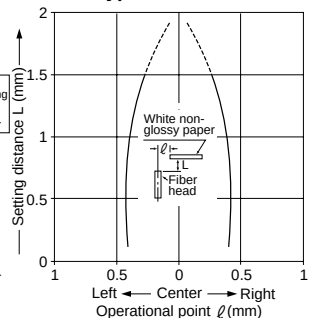
Green LED type



FD-EN500S1

Reflective

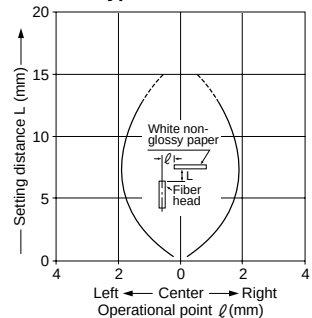
Red LED type



FD-ENM1S1

Reflective

Red LED type

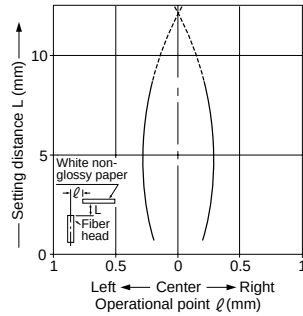


SENSING FIELDS (TYPICAL)

Sensing fields

FD-KM1S2 Reflective

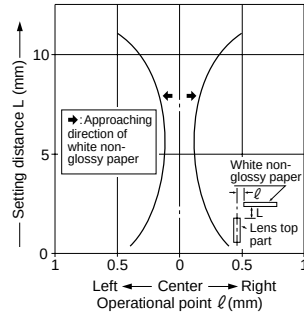
Red LED type



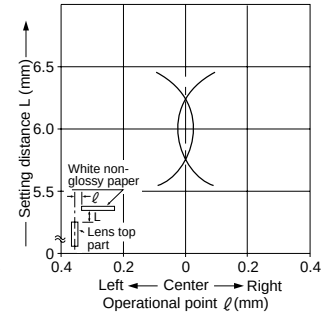
Sensing fields with FX-MR1 (Pinpoint spot lens) applied

FD-G4 Reflective FD-G500 Reflective

Red LED type



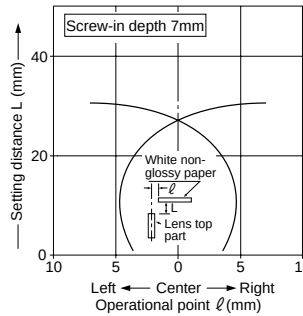
Red LED type



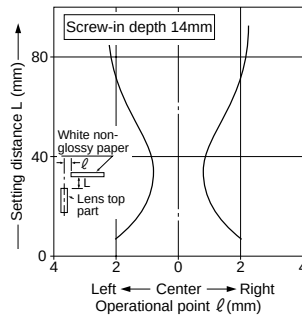
Sensing fields with FX-MR2 (Zoom lens) applied

FD-G4 Reflective

Red LED type

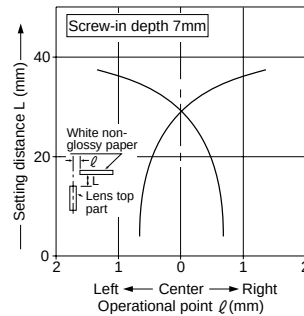


Red LED type

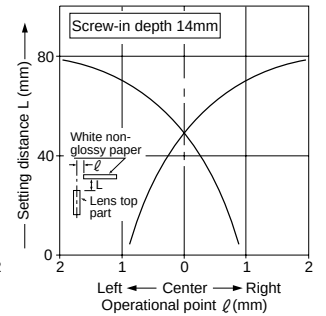


FD-G500 Reflective

Red LED type



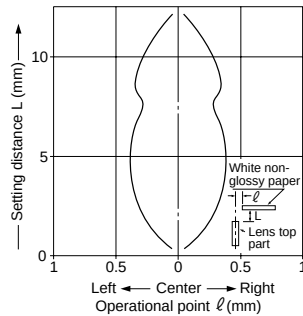
Red LED type



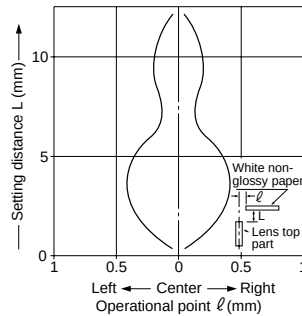
Sensing fields with FX-MR3 (Finest spot lens) applied

FD-G4 Reflective FD-EG1 Reflective

Red LED type



Red LED type



PHOTOELECTRIC SENSOR

Fiber Sensor
FX-10
FX-7
FX-10
FX-11A
CX-20
CX-30
CX-ND300R
CX-ND300R
EX-10
EX-20
EQ-20
EQ-30
EQ-40
EX-40
RX
RX-LS200

FX-7

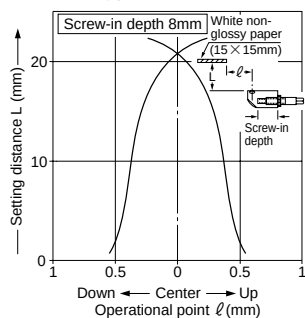
SENSING FIELDS (TYPICAL)

Sensing fields with FX-MR5 (Side-view type zoom lens) applied

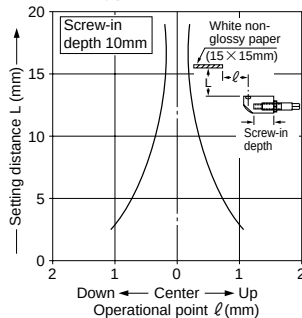
FD-G4
FD-G500

Reflective

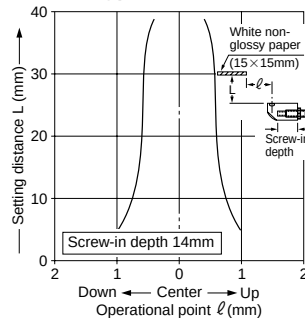
Red LED type



Red LED type



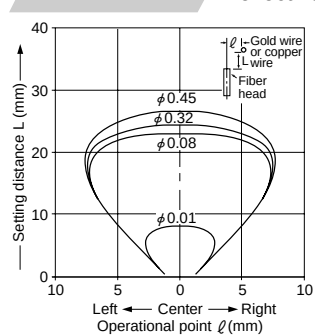
Red LED type



Correlation between diameter of an object and sensing field (Red LED type)

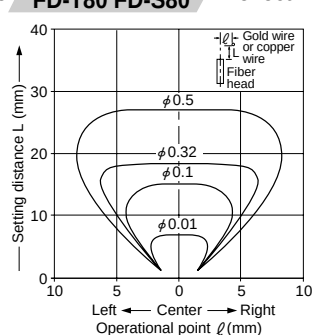
FD-B8

Reflective



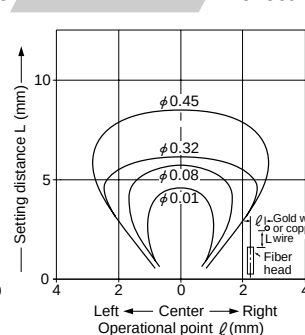
FD-5 FD-FM2
FD-T80 FD-S80

Reflective



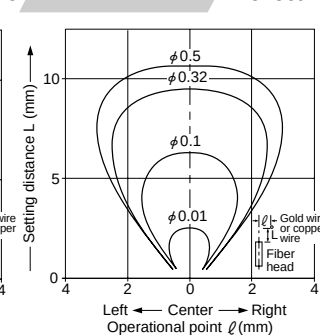
FD-T40

Reflective



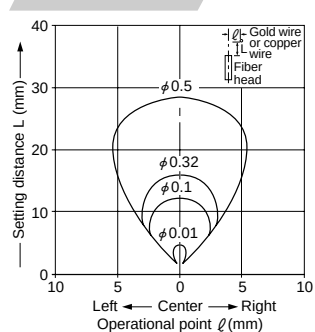
FD-NFM2

Reflective



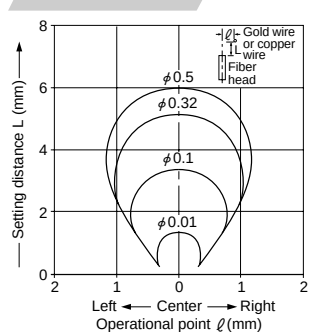
FD-P80

Reflective



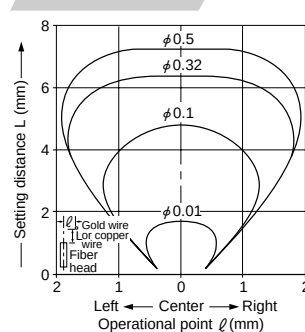
FD-P40

Reflective



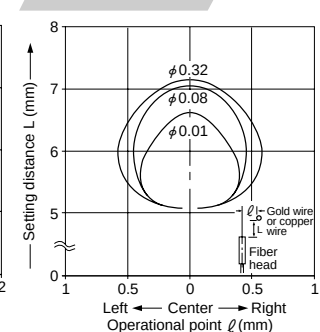
FD-P2

Reflective



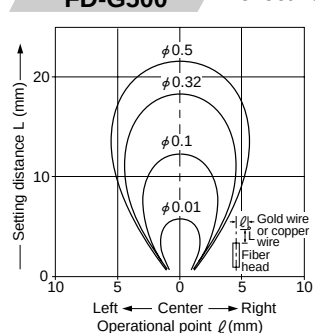
FD-L4

Reflective



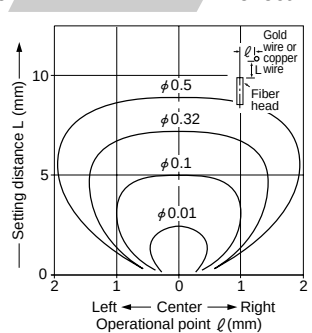
FD-G4
FD-G500

Reflective



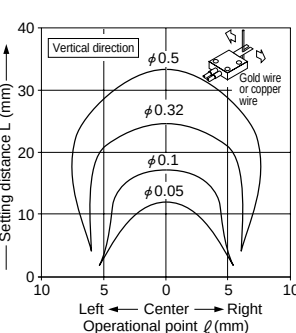
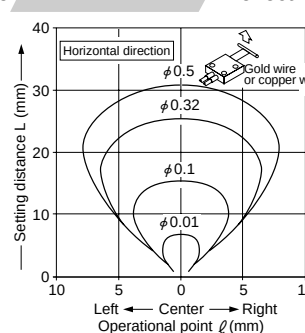
FD-EG1

Reflective



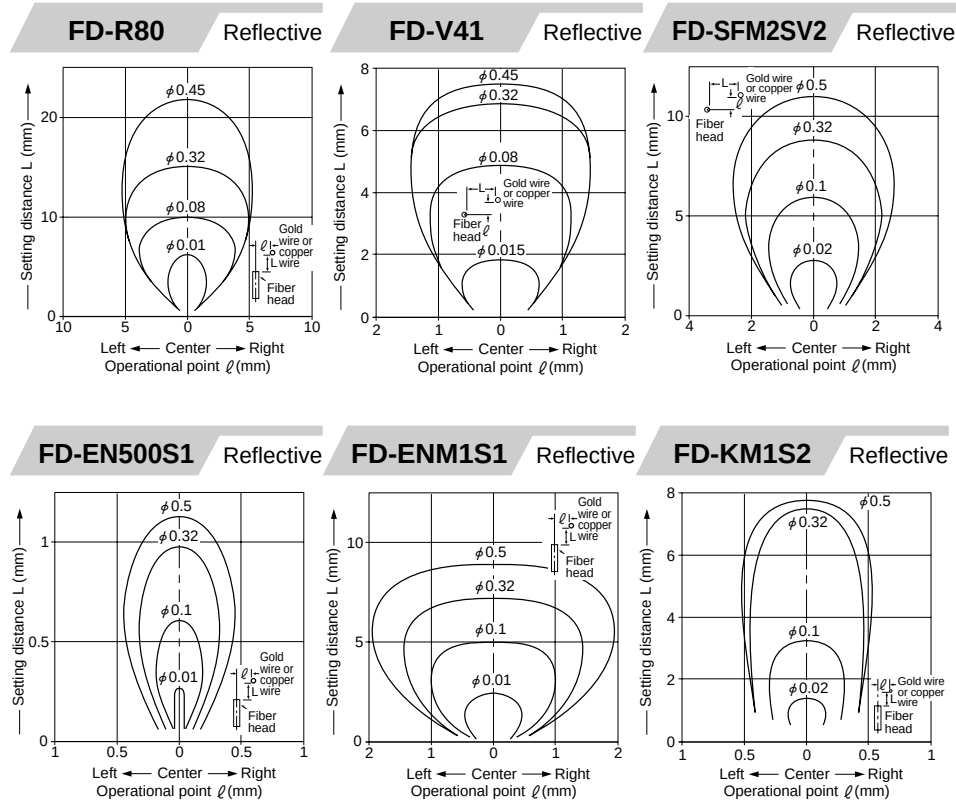
FD-AFM2

Reflective



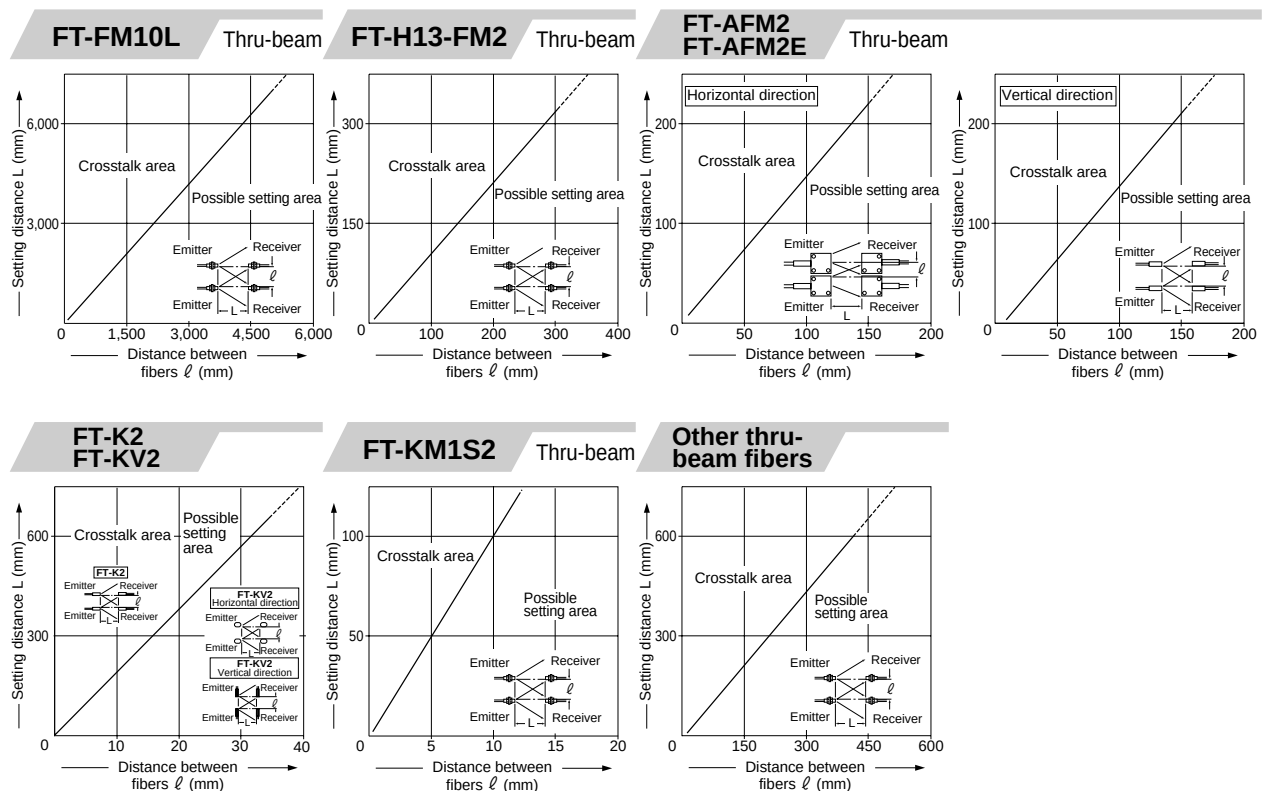
SENSING FIELDS (TYPICAL)

Correlation between diameter of an object and sensing field (Red LED type)



Crosstalk characteristics (Red LED type)

- The following graphs are specified that two sensors are set at the same emitting frequency. If they are set at the distinct frequencies, they can be mounted close together.



FX-7

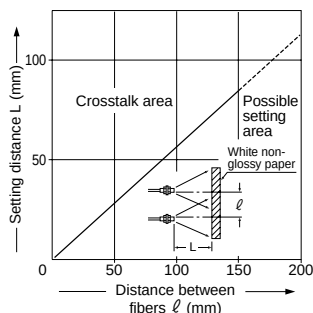
SENSING FIELDS (TYPICAL)

Crosstalk characteristics (Red LED type)

- The following graphs are specified that two sensors are set at the same emitting frequency. If they are set at the distinct frequencies, they can be mounted close together.

FD-H13-FM2

Reflective

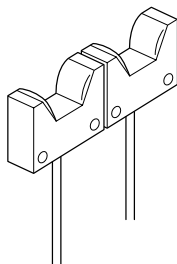


FD-L4

Reflective

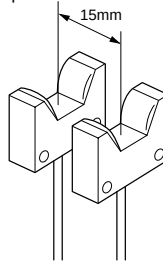
Horizontal direction

The fibers can be mounted closely.



Vertical direction

Keep the distance of 15mm or more.



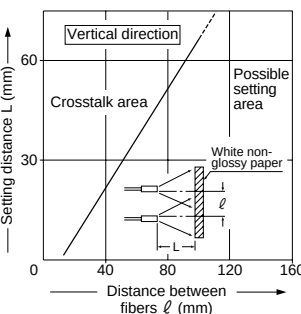
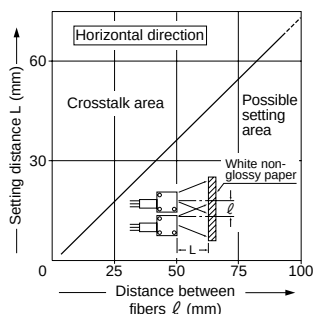
FD-L41 FD-L42 FD-KM1S2

Reflective

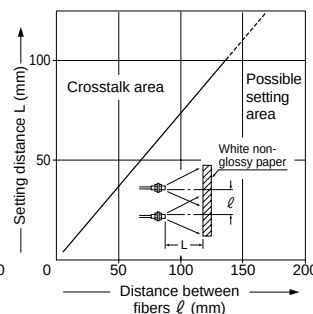
These fibers can be mounted closely.

FD-AFM2 FD-AFM2E

Reflective



Other reflective fibers



PRECAUTIONS FOR PROPER USE

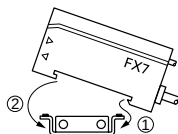
Refer to P.682~ for general cautions

Amplifier



This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

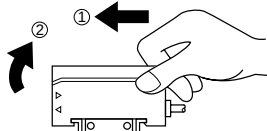
Mounting



- Hook the rear part to the attached mounting bracket (MS-DIN-2) or DIN rail.
- Press the amplifier down on the bracket or DIN rail.

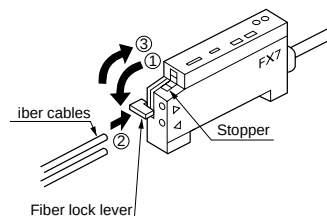
DIN rail or the attached mounting bracket

- ✳ To remove the amplifier, push it forward and lift up the front side.



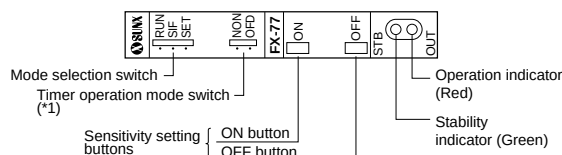
How to connect fiber cables

- The set of fiber cables is connected at a touch.



- Snap the fiber lock lever down.
- Insert both fiber cables into the inlets slowly until fully deepend.
- Snap the fiber lock lever up until a "click" is heard.

Designation



(*1): The external synchronization selection switch is substituted for it on FX-77 or FX-77G.