

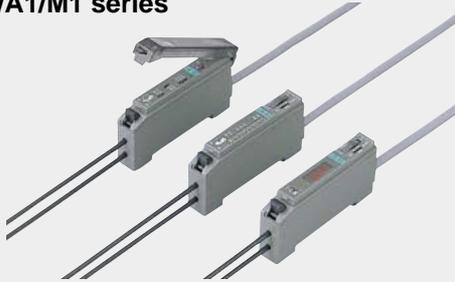
# Information of Discontinued Models

## Slim body digital / auto / manual setting fiber sensor FX-D1/A1/M1 series

Stopping taking order date: **30, Sep, 2005**  
Date of production discontinuance: **31, Dec, 2005**

### Discontinued models

#### Slim body digital / auto / manual setting fiber sensor FX-D1/A1/M1 series



### Recommended replacements

#### Digital fiber sensor FX-300 series



#### Manually set fiber sensor FX-311 series



※Confirm that table in

Main points of difference between recommended replacements and discontinued models for details on model numbers for each type.

Refer to 'Manually set fiber sensor FX-311 series catalog' or 'Digital fiber sensor FX-300 series catalog' for details.

## Advantages of switching to recommended replacements

### Increased sensing ranges

A double coupling lens has been adopted, so that light emitting efficiency has been increased to maximum limits. Sensing ranges with small diameter fibers and ultra-small diameter fibers, have been increased by 50 % over previous values achieved with other amplifiers.

### Stable sensing

The red LED type utilizes a 'four-chemical emitting element' to maintain a stable light emitting amount over long periods. In addition, the digital fiber sensors are provided with an APC (auto power control) circuit to ensure light emitting amounts are stable over short periods, so that stable sensing can be obtained.

### Digital display

The digital fiber sensors are equipped with a 4-digit display. This can be used for confirming incident light intensity, threshold value settings and a variety of other function displays.

### MODE NAVI

The digital fiber sensors utilize a MODE NAVI function that is both multifunctional and easy operation. Basic sensor operations are indicated by means of six indicators, so even a first time user can easily operate the amplifier without becoming confused.

### Wire-saving

A main cable and a sub cable enable the amount of wiring used to be reduced when the sensors are mounted close together.

## Notes on using recommended replacements

Recommended replacements	Sensing performance	Specifications	Output circuit	Mounting dimensions	Dimensions	Enclosure color
FX-300 series	◎	◎	○	○	※	※
FX-311 series	◎	◎	○	○	※	※

◎: Highly interchangeable    ○: Almost no difference  
※: Large differences        -: No corresponding item or model

- High degree of interchangeability in specifications, mounting dimensions and operability, so that replacement of the FX-D1/A1/M1 series with the FX-300/311 series can be carried out smoothly.
- The FX-A1/M1 series is equipped with self-diagnosis output, but the FX-300/311 series is not.
- Cable types and connector types both must be changed to quick-connection cables.

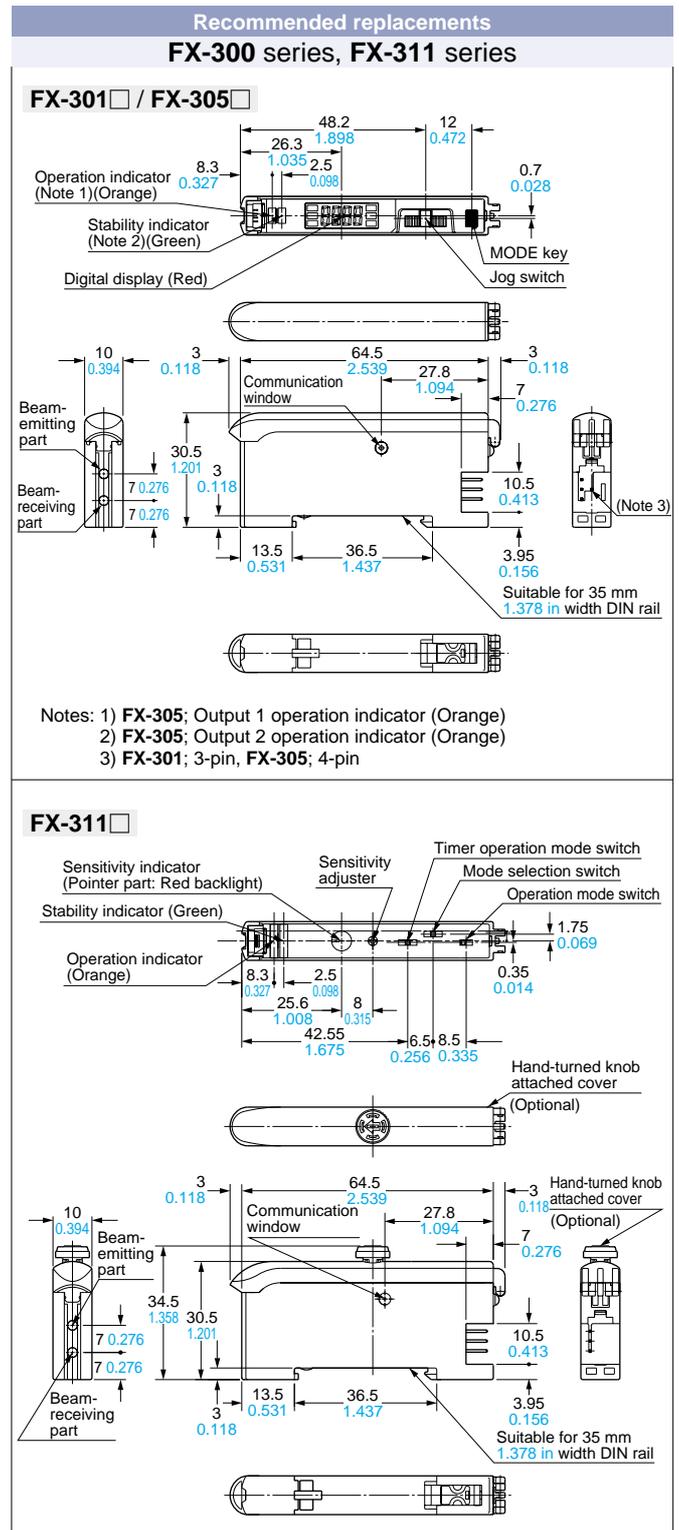
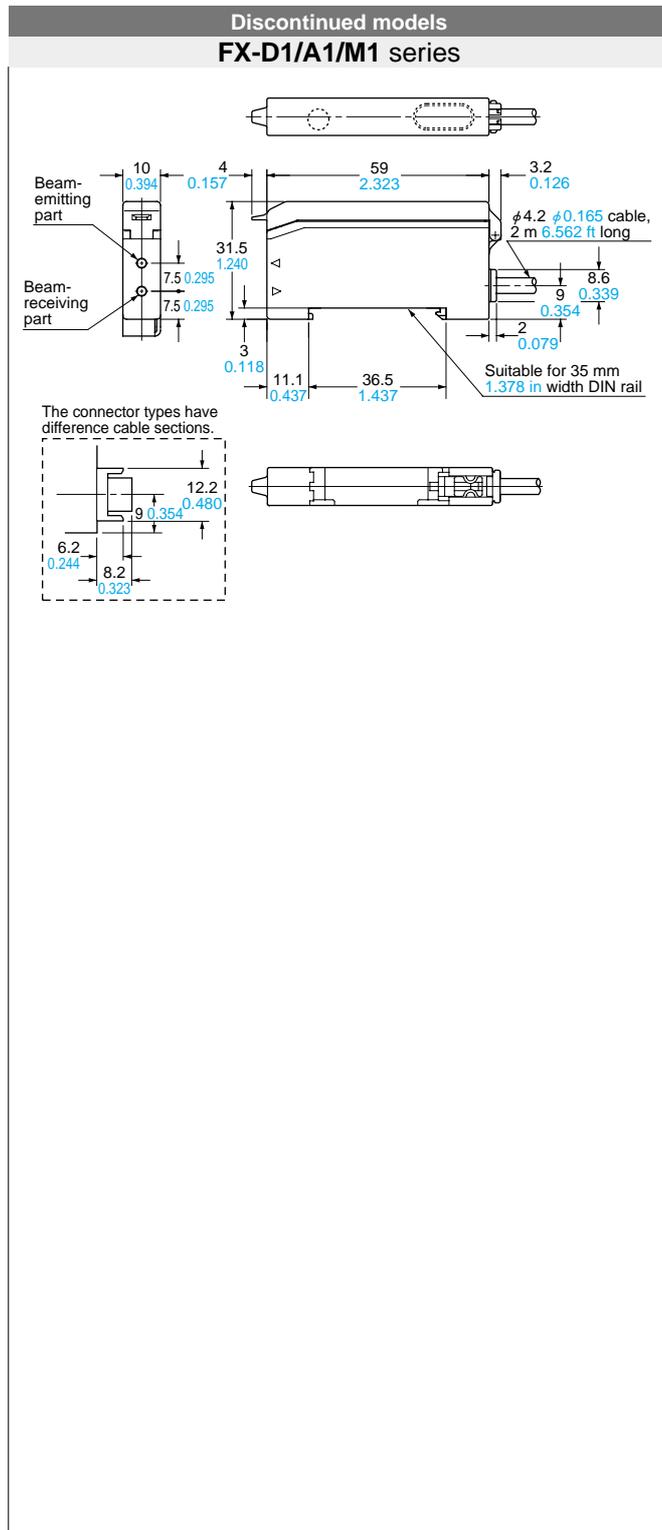
## Main points of difference between recommended replacements and discontinued models

Discontinued models	Recommended replacements	Main points of difference from discontinued models																																				
<b>• Digital setting · Equipped with two sensing outputs</b> <table border="1"> <thead> <tr> <th>Model No.</th> <th>Light source</th> </tr> </thead> <tbody> <tr><td>FX-D1</td><td>Red LED</td></tr> <tr><td>FX-D1-C5</td><td>Red LED</td></tr> <tr><td>FX-D1J</td><td>Red LED</td></tr> <tr><td>FX-D1P</td><td>Red LED</td></tr> <tr><td>FX-D1PJ</td><td>Red LED</td></tr> </tbody> </table>	Model No.	Light source	FX-D1	Red LED	FX-D1-C5	Red LED	FX-D1J	Red LED	FX-D1P	Red LED	FX-D1PJ	Red LED	<table border="1"> <thead> <tr> <th>Model No.</th> <th>Light source</th> </tr> </thead> <tbody> <tr><td>FX-305</td><td>Red LED</td></tr> <tr><td>FX-305 (Note)</td><td>Red LED</td></tr> <tr><td>FX-305</td><td>Red LED</td></tr> <tr><td>FX-305P</td><td>Red LED</td></tr> <tr><td>FX-305P</td><td>Red LED</td></tr> </tbody> </table>	Model No.	Light source	FX-305	Red LED	FX-305 (Note)	Red LED	FX-305	Red LED	FX-305P	Red LED	FX-305P	Red LED	<ul style="list-style-type: none"> <li>• Recommended replacements are connector types.</li> <li>• Recommended replacements require the use of a quick-connection cable (CN-74-C□).</li> </ul> <p>Note: The recommended replacement for the FX-D1-C5 requires the use of a quick-connection cable (CN-74-C5).</p>												
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# Information of Discontinued Models

## Slim body digital / auto / manual setting fiber sensor FX-D1/A1/M1 series

### Dimensions (Unit: mm in)



# Information of Discontinued Models

## Slim body digital / auto / manual setting fiber sensor FX-D1/A1/M1 series

### Sensing performance

Discontinued models FX-D1/A1/M1 series		
Fiber	Sensing range (mm in) (Note)	Min. sensing object
Thru-beam type <b>FT-FM2</b>	380 14.961	$\phi$ 0.12 mm $\phi$ 0.005 in opaque object
Reflective type <b>FD-FM2</b>	140 5.512	$\phi$ 0.01 mm $\phi$ 0.0004 in gold wire

Recommended replacements FX-300 series, FX-311 series		
Fiber	Sensing range (mm in) (Note) : LONG : STD	Min. sensing object
Thru-beam type <b>FT-FM2</b>	780 30.709 400 15.748	$\phi$ 0.03 mm $\phi$ 0.0011 in opaque object
Reflective type <b>FD-FM2</b>	310 12.205 140 5.512	$\phi$ 0.02 mm $\phi$ 0.0008 in gold wire

Note: The sensing range is the value for red LED type.

### Examples of product configurations

Discontinued models FX-D1/A1/M1 series
<p><b>Cable connection type</b></p>
<p><b>Connector connection type</b></p> <p>※The <b>CN-54-C</b> cable with connector must be used.</p>

Recommended replacements FX-300 series, FX-311 series
<p><b>Connector connection type</b></p> <p>※The <b>CN-71-C</b> (FX-305: <b>CN-74-C</b>) quick-connection cable must be used. Quick-connection cable is not supplied with the amplifier. Please order it separately.                      ※When mounting close together, you can reduce the amount of wiring used by using the <b>CN-71-C</b> (FX-305: <b>CN-72-C</b>) quick-connection cable.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Main cable <b>CN-73-C</b></p> </div> <div style="text-align: center;"> <p>Sub cable <b>CN-71-C</b></p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p>Main cable <b>CN-74-C</b></p> </div> <div style="text-align: center;"> <p>Sub cable <b>CN-72-C</b></p> </div> </div>

## Slim body digital / auto / manual setting fiber sensor FX-D1/A1/M1 series

### Main points of difference in rated specifications

Item	Basic model No.	Type	Discontinued models	Recommended replacements
		NPN output	Digital setting	High-functional type
		PNP output	FX-D1	FX-305
			FX-D1P	FX-305P
Emitting element		Red LED		
Supply voltage		12 to 24 V DC $\pm$ 10 % Ripple P-P 10 % or less		
Current / Power consumption		45 mA or less Normal operation: 960 mW or less (Current consumption 40 mA or less at 24 V supply voltage) ECO mode: 600 mW or less (Current consumption 25 mA or less at 24 V supply voltage)		
Sensing output		<p>&lt;NPN output type&gt; NPN open-collector transistor 2 outputs</p> <ul style="list-style-type: none"> <li>• Maximum sink current: 100 mA each</li> <li>• Applied voltage: 30 V DC or less (between output and 0 V)</li> <li>• Residual voltage: 1 V or less (at 100 mA sink current.) 0.4 V or less (at 16 mA sink current.)</li> </ul> <p>&lt;PNP output type&gt; PNP open-collector transistor 2 outputs</p> <ul style="list-style-type: none"> <li>• Maximum source current: 100 mA each</li> <li>• Applied voltage: 30 V DC or less (between output and + V)</li> <li>• Residual voltage: 1 V or less (at 100 mA source current.) 0.4 V or less (at 16 mA source current.)</li> </ul> <p>&lt;NPN output type&gt; NPN open-collector transistor 2 outputs</p> <ul style="list-style-type: none"> <li>• Maximum sink current: 50 mA each (25 mA each, if five, or more, amplifiers are connected in cascade.)</li> <li>• Applied voltage: 30 V DC or less (between output and 0 V)</li> <li>• Residual voltage: 1.5 V or less [at 50 mA (at 25 mA, if five, or more, amplifiers are connected in cascade) sink current.]</li> </ul> <p>&lt;PNP output type&gt; PNP open-collector transistor 2 outputs</p> <ul style="list-style-type: none"> <li>• Maximum source current: 50 mA each (25 mA each, if five, or more, amplifiers are connected in cascade.)</li> <li>• Applied voltage: 30 V DC or less (between output and + V)</li> <li>• Residual voltage: 1.5 V or less [at 50 mA (at 25 mA, if five, or more, amplifiers are connected in cascade) source current.]</li> </ul>		
Output operation		Selectable either Light-ON or Dark-ON, with jog switch		
Response time		0.5 ms or less (Emission Frequency 1) 0.65 ms or less (Emission Frequency 2) 0.75 ms or less (Emission Frequency 3) 65 $\mu$ s or less (H-SP), 150 $\mu$ s or less (FAST), 250 $\mu$ s or less (STD), 700 $\mu$ s or less (STDF), 2.5 ms or less (LONG), 4.5 ms or less (U-LG), selectable with jog switch		
Sensitivity adjuster		_____		
Timer function		Incorporated with ON-delay / OFF-delay timer, switchable either effective or ineffective. Incorporated with variable ON-delay / OFF-delay / ONE SHOT / ON-delay • OFF-delay / ON-delay • ONE SHOT timer, switchable either effective or ineffective. (Timer period: Output 1; 0.5 ms, 1 to 9999 ms, ) Output 2; 0.5 ms, 1 to 500 ms		
Automatic interference prevention function		Incorporated (Three units of sensors can be mounted close together.) Incorporated [Up to 4 sets of fiber heads can be mounted close together. (However, up to 8 sets of fiber heads in U-LG mode and up to 2 sets of fiber heads in H-SP mode.)] (Note)		
Sensitivity setting		2-level teaching / Limit teaching / Full-auto teaching Normal mode: 2-level teaching / Limit teaching / Full-auto teaching / Max. sensitivity teaching / Manual adjustment Window comparator mode: Teaching (1-level / 2-level / 3-level) / Manual adjustment		
Ambient temperature		0 to +50 °C 32 to +122 °F (No dew condensation or icing allowed), Storage: -20 to +70 °C -4 to +158 °F -10 to +55 °C +14 to +131 °F (If 4 to 7 units are connected in cascade: -10 to +50 °C +14 to +122 °F, if 8 to 16 units are connected in cascade: -10 to +45 °C +14 to +113 °F (No dew condensation or icing allowed), Storage: -20 to +70 °C -4 to +158 °F		
Material		Enclosure: Heat-resistant ABS, Case cover: Polycarbonate Fiber lock lever: PES Enclosure: Heat-resistant ABS, Case cover: Polycarbonate MODE key: Acrylic, Jog switch: Heat-resistant ABS		
Connecting method		Cable type 0.2 mm <sup>2</sup> 4-core cabtyre cable, 2 m 6.562 ft long Connector (The quick-connection cable is a 4-core or 2-core cable.)		
Weight		70 g approx. 20 g approx.		
Accessories		MS-DIN-2 (Amplifier mounting bracket): 1 No.		

Note: When the interference prevention function 'P-2' is set, the number of mountable fiber heads becomes double. Furthermore, take care that the response time also becomes double.

Refer to 'Digital fiber sensor **FX-305** series catalog' for details.

# Information of Discontinued Models

## Slim body digital / auto / manual setting fiber sensor FX-D1/A1/M1 series

### Main rated specifications

Item	Basic model No.	Type		Discontinued models		Recommended replacements	
		NPN output	PNP output	Auto-setting	Manual setting	Digital (Auto) setting	Manual setting
		FX-A1	FX-A1P	FX-M1	FX-M1P	FX-301	FX-311
Emitting element		Red LED					
Supply voltage		12 to 24 V DC $\pm$ 10 %				Ripple P-P 10 % or less	
Current / Power consumption		50 mA or less		45 mA or less		Normal operation: 960 mW or less (Current consumption 40 mA or less at 24 V supply voltage) ECO mode: 600 mW or less (Current consumption 25 mA or less at 24 V supply voltage)	
Sensing output		<NPN output type> NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1 V or less (at 100 mA sink current.) 0.4 V or less (at 16 mA sink current.)  <PNP output type> PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and + V) • Residual voltage: 1 V or less (at 100 mA source current.) 0.4 V or less (at 16 mA source current.)				<NPN output type> NPN open-collector transistor • Maximum sink current: 100 mA (50 mA, if five, or more, amplifiers are connected in cascade.) • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1.5 V or less [at 100 mA (at 50 mA, if five, or more, amplifiers are connected in cascade) sink current.]  <PNP output type> PNP open-collector transistor • Maximum source current: 100 mA (50 mA, if five, or more, amplifiers are connected in cascade.) • Applied voltage: 30 V DC or less (between output and + V) • Residual voltage: 1.5 V or less [at 100 mA (at 50 mA, if five, or more, amplifiers are connected in cascade) source current.]	
Output operation		Selectable either Light-ON or Dark-ON, with jog switch <b>[FX-M1(P): selection switch]</b>					
Response time		0.5 ms or less (Emission Frequency 1) 0.65 ms or less (Emission Frequency 2) 0.75 ms or less (Emission Frequency 3)				65 $\mu$ s or less (H-SP), 150 $\mu$ s or less (FAST), 250 $\mu$ s or less (STD / S-D), 2 ms or less (LONG), selectable with jog switch	
Sensitivity adjuster		_____		Incorporated with 12-turn potentiometer with indicator		_____ 12-turn potentiometer with indicator (Pointer part: red backlight)	
Timer function		Incorporated with approx. 40 ms fixed OFF-delay timer, switchable either effective or ineffective				Incorporated with variable ON-delay / OFF-delay / ONE SHOT timer, switchable either effective or ineffective. [Timer period: Red LED type; 0.5 ms approx., 1 to 9999 ms (Blue LED, Green LED, Infrared LED type; approx. 0.5 to 500 ms)]	
Automatic interference prevention function		Incorporated (Three units of sensors can be mounted close together.)				Incorporated [Up to 4 sets of fiber heads can be mounted close together. However, up to 2 sets of fiber heads in H-SP mode. (Note)]	
Sensitivity setting		2-level teaching / Limit teaching / Full-auto teaching				2-level teaching / Limit teaching / Manual adjustment / Full-auto teaching / Max. sensitivity teaching	
Ambient temperature		0 to +50 °C 32 to +122 °F (Auto-setting type: -10 to +50 °C +14 to +122 °F) (No dew condensation or icing allowed), Storage: -20 to +70 °C -4 to +158 °F				-10 to +55 °C +14 to +131 °F (If 4 to 7 units are connected in cascade: -10 to +50 °C +14 to +122 °F, if 8 to 16 units are connected in cascade: -10 to +45 °C +14 to +113 °F (No dew condensation or icing allowed), Storage: -20 to +70 °C -4 to +158 °F	
Material		Enclosure: Heat-resistant ABS, Case cover: Polycarbonate Fiber lock lever: PES				Enclosure: Heat-resistant ABS Case cover: Polycarbonate MODE key: Acrylic Jog switch: Heat-resistant ABS	
Connecting method		Cable type 0.2 mm <sup>2</sup> 4-core cabtyre cable, 2 m 6.562 ft long					
Weight		70 g approx.				20 g approx. 15 g approx.	
Accessories		<b>MS-DIN-2</b> (Amplifier mounting bracket): 1 No.		<b>MS-DIN-2</b> (Amplifier mounting bracket): 1 No. Adjusting screwdriver: 1 No.		_____	

Note: When the power supply is switched on, the light emission timing is automatically set for interference prevention.

Refer to 'Manually set fiber sensor **FX-311** series catalog' or 'Digital fiber sensor **FX-300** series catalog' for details.