

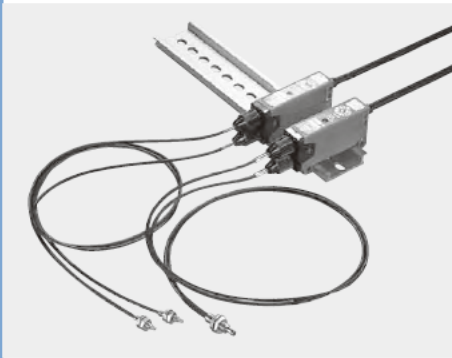
## High-speed / LED Sensing Fiber Sensor

## FX2 SERIES

## Related Information

■ General terms and conditions..... P.1

■ Sensor selection guide ..... P.11~ / P.61~



High-speed response time: 15  $\mu$ s (FX2-A3R)  
LED sensing type (FX2-A3R-LED) is also available

## SPECIFICATIONS

## Fibers

Item	Type Model No.	For high-speed type		For LED sensing type
		Thru-beam type with lens FT-SFM2L	Reflective type FD-G500	
Sensing range		50 mm 1.969 in (Note 2)	4 mm 0.158 in (Convergent point: 1.5 mm 0.059 in) (Note 3)	Using a combination of FT-FM2 and FX-LE1, amber colored LED having a luminous intensity of 2 mcd or more (peak wavelength: 590 nm 0.023 mil) can be detected. (Setting distance: 10 mm 0.394 in, with no extraneous light)
Min. sensing object (Note 4)		$\varnothing$ 2 mm 0.079 in opaque object	$\varnothing$ 0.05 mm 0.002 in copper wire	—————
Hysteresis		—————	10 % or less of operation distance (Note 3)	—————
Fiber cable length		2 m 0.079 ft free-cut	500 mm 19.685 in	2 m 0.079 ft free-cut
Allowable bending radius		R25 mm 0.984 in or more		
Ambient temperature		-40 to +70 °C -40 to +158 °F (No dew condensation or icing allowed), Storage: -40 to +70 °C -40 to +158 °F		
Material		Fiber core: Acrylic, Sheath: Polyethylene		
Fiber head dimensions		$\varnothing$ 2.5 × 8 mm $\varnothing$ 0.098 × 0.315 in	M4 × 25 mm 0.984 in	M4 × 15 mm 0.984 in
Accessories		FX-CT2 (fiber cutter): 1 pc. Fiber attachment: 1 set (Note 6)	M4 Nut: 2 pcs. Toothed lock washer: 1 pc.	M4 Nut: 4 pcs., Toothed lock washer: 2 pcs. FX-CT2 (fiber cutter): 1 pc. Fiber attachment: 1 set (Note 6)

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.  
 2) Please take care that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.  
 3) The sensing range and the hysteresis of reflective type are specified for white non-glossy paper (15 × 15 mm 0.591 × 0.591 in) as the object.  
 4) The minimum sensing object size of reflective type is the value for type at maximum sensitivity. Also, note that the corresponding setting distance is different from the rated sensing distance.  
 5) Two fibers make up one set for the FT-FM2. However, when using it together with the LED sensing type (FX2-A3R-LED), only one fiber is used.  
 6) The fiber attachment is not used with the FX2 series.

**SPECIFICATIONS**



The CAD data in the dimensions can be downloaded from the SUNX website:

**Amplifiers**

Type	High-speed type	LED sensing type
Item	Model No.	Model No.
Supply voltage	12 V DC ± 10 % Ripple P-P 10 % or less	12 to 24 V DC ± 10 % Ripple P-P 10 % or less
Power consumption	55 mA or less	20 mA or less
Output	NPN transistor universal • Maximum sink current: 100 mA • Residual voltage: 1.0 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current)	
Output operation	Selectable either Light-ON or Dark-ON, by the control input	
Response time	In light state: 15 μs or less, In dark state: 35 μs or less	In light state: 50 ms or less, In dark state: 100 ms or less
Operation indicator	Red LED (lights up when the output is ON)	
Sensitivity adjuster	3-turn endless potentiometer	
Protection	IP66 (IEC) (Note 2) (Refer to p.984 for details of standards.)	IP62 (IEC) (Refer to p.984 for details of standards.)
Ambient temperature	-10 to +50 °C <b>-14 to +122 °F</b> (FX2-A3R-LED: 0 to +50°C <b>+32 to +122 °F</b> ) (No dew condensation or icing allowed), Storage: -30 to +70 °C <b>-22 to +158 °F</b>	
Ambient illuminance	500 lx	—
Emitting / Receiving element	Emitting element: Red LED (Peak emission wavelength: 660 nm <b>0.026 mil</b> , non-modulation)	Receiving element: Photodiode (Peak wavelength: 590 nm <b>0.023 mil</b> )
Material	Polycarbonate	
Weight	Net weight: 120 g approx.	
Dimensions	W14 × H30 × D56 mm <b>W0.551 × H1.181 × D2.205 in</b>	
Accessories	<b>MS-FX-1</b> (Amplifier mounting bracket): 1 set, Adjusting screwdriver: 1 pc., Adjusting knob: 1 pc.	

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73.4 °F**.  
 2) This is the value when the combination fiber has been attached. However, the value is IP65 when combined with the free-cut type fiber.  
 3) The voltage withstandability and the insulation resistance values given in the above table are for the amplifier only.

**OPTIONS**

Designation	Model No.	Description	
		Applicable fibers	
Expansion lens	<b>FX-LE1</b>	<b>FT-FM2</b>	<ul style="list-style-type: none"> <li>• Sensing range (FX2-A3R-LED + FT-FM2): 10 mm <b>0.394 in</b></li> <li>• Ambient temperature: -60 to +350 °C <b>-76 to +662 °F</b></li> <li>• Ambient humidity: 35 to 85 % RH</li> </ul> 
Pinpoint spot lens	<b>FX-MR1</b>	<b>FD-G500</b>	Enables detection of minute objects or small marks. <ul style="list-style-type: none"> <li>• Spot diameter: ø0.5 mm <b>ø0.020 in</b> approx.</li> <li>• Distance to focal point: 6 ± 1 mm <b>0.236 ± 0.039 in</b></li> <li>• Ambient temperature: -60 to +300 °C <b>-76 to +572 °F</b></li> <li>• Ambient humidity: 35 to 85 % RH</li> </ul> 

**PRECAUTIONS FOR PROPER USE**

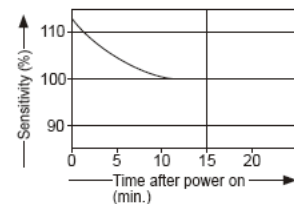
Refer to p.986 ~ for general precautions and p.105 for precautions of fibers.



- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

- Since FX2-A3R-LED is un-modulated and high sensitivity type, take sufficient care against extraneous light. Do not install at places where extraneous light may be directly incident on the receiver. In such cases use a light blocking plate.

- If slight difference between light and dark levels is to be sensed, supply the power 15 min. before commencing the sensing. When power is just supplied, the sensitivity (sensing distance) is approx. 10 % higher.



- The sensing sensitivity is affected by the amplifier's ambient temperature fluctuation. Avoid use of the amplifier where the temperature fluctuation is large and the sensing tolerance is small.
- Do not use during the initial transient time (FX2-A3R-LED: 0.5 sec., FX2-A3R: 30 ms) after the power supply is switched on.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

SAFETY COMPONENTS

PRESSURE SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

LASER MARKERS

Selection Guide

Fibers

FT / FD / FR

Fiber Sensor Amplifiers

FX-100

FX-300

FX-410

FX-311

FX-11A

FX-301-F

Other Products