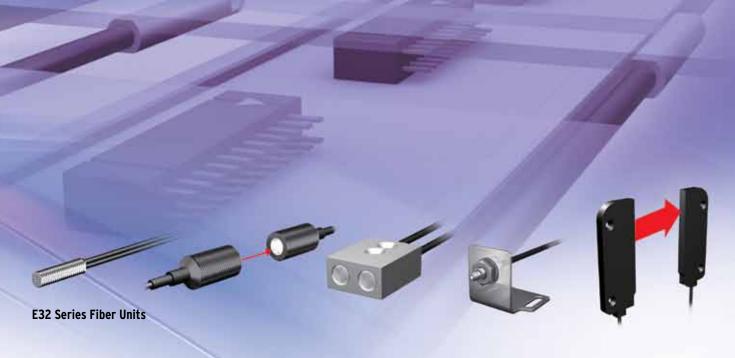


Fiber Sensor Best Selection Catalog

Find the best fiber sensor for your application.



Advanced Functionality Fiber Amplifiers

E3NX-FA

General Purpose Fiber Amplifiers

E3X-HD







OMRON AUTOMATION & SAFETY

Best Selection

Fiber Sensor Best Selection Catalog



Start with Smart!

Easily select the most reliable Fiber Unit for your detection conditions.



Advanced Functionality
Fiber Amplifiers
E3NX-FA

General Purpose Fiber Amplifiers E3X-HD



realizing

iber Sensol eatures

9

iber Units

nstallation

Space

eam improvement

Objects

Immunity

Information 58 Page

Fiber Amplifiers, Communications Unit, and Accessories

> ecnnical Guide and Precautions

Optimal Fiber Sensor for additional

Fiber Units for various Installation Conditions.

Easy

"Mounts Anywhere"

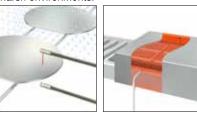
Wide Variety

Variously-shaped, compact heads allow installation in any small space.



Suitable for Harsh Environments

Fiber Units are available for various installation conditions and can be installed as is, even in harsh environments.





"Achieve Easy Detection in Many Applications"

Smart Tuning

Just press the button to set the optimum incident level and threshold.

Consistent settings are achieved for all users with this ultra-easy procedure.





Dynamic Range Increased by a Factor of 40,000

The incident level is optimized to enable stable detection even for saturated or insufficient incident levels.



Smart Fiber Amplifier Units E3NX-FA

Page 62, 64

"Smooth Wiring and Setting"

Reduced Wiring

Simply link the Fiber Amplifier Units together for easy wiring and digital display comparison.

Separate Installation

Use the Distributed Sensor Unit for distributed installation to reduce costs and work.

Easy Setup

Calibration time is reduced with batch setting from a Touch Panel or backup data for process switchovers.





Fiber

'Easy' and 'Stable' for

ber Sensor

installation when starting production.

Fiber Amplifier Units with easy optimum setting

Stable

Fiber Units **E32**

Page 06



"Expanded Application Capabilities"

Improved Basic Performance

Improvements in sensing distance and minimum sensing object increase the range of application for stable detection.

1.5 Times the Sensing Distance*

6 m

For E32-LT11 Fiber Unit with a fiber length of 3.5 m

1/10th
the Minimum Sensing Object*

0.3 μm dia.

Typical example of actual measurements with E32-D11R Fiber Unit.

*Compared to E3X-HD.

Sensor Communications Units

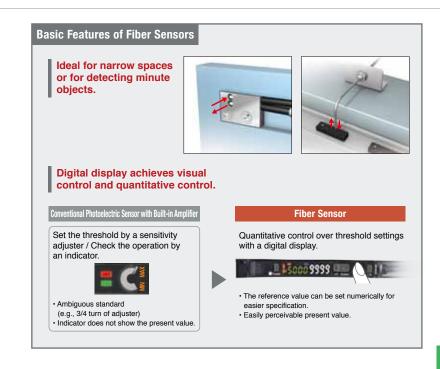
E3NW

Ether CAT.

Page **62, 64**

Sensor

Minimal Cost Process.



Flat

Sleeved

view

BGS

Retroreflective Limited-

resistant, Oil-resistant Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

Technical Guide and Precautions

Model Index

Selection by Category

STEP 1

Select a Fiber Unit.

Select a category.

Fiber Unit Index

STEP 2

Select a Fiber
Amplifier Unit and
Communications
Unit.
Page

STEP 3

Select Accessories of Fiber Amplifier Unit

Page 65,79

Before Selecting Fiber Units

The Fiber Units specifications give the sensing distance when the Fiber Unit and Fiber Amplifier Unit is combined. Check the Fiber Amplifier Unit series for easier selection.

Specifications on Each Fiber Unit Category Page> Densing distance (trem) pagearance (mm) Page

Fiber Amplifier Unit Series

	<u> </u>			
			E3X-HD Series	E3NX-FA Series
	Output		1 output	1 or 2 outputs (depending on the model)
	External input		not supported	Supported or not supported (depending on the model)
Fiber Amplifier	Response time		50 μs (55 μs)/250 μs/1 ms/16 ms (Default: 250 μs)	30 μs (32 μs)/250 μs/1 ms/16 ms (Default: 250 μs)
Unit specifications	Sensing distance	E32-T11R	2,000 mm	3,000 mm
	(Giga-power mode)	E32-D11R	840 mm	1,260 mm
	Minimum sensing object	E32-T11R	5 μm dia.	2 µm dia.
Sensor	Communications m (Sensor Communica		EtherCAT (E3X-ECT) CompoNet (E3X-CRT)	EtherCAT (E3NW-ECT) CompoNet (E3NW-CRT) CC-Link (E3NW-CCL)
Communications Unit application	Applicable Sens	sors	Fiber Sensor (E3X-HD0) Fiber Sensor (E3X-DA0-S, E3X-MDA0) Laser Photoelectric Sensor (E3C-LDA0) Proximity Sensor (E2C-EDA0)	Fiber Sensor (E3NX-FA0) Laser Sensors (E3NC-LA0, E3NC-SA0)
	Ordering Inform	nation	Page 78	Page 64
Page listings	Ratings and Sp	ecifications	Page 80	Page 66
3.	Dimensions		Page 80	Page 68

Selection by Model

STEP 1

Search for the page in the model index.

Page 98

STEP 2

Search for the model on the corresponding pages.

Fiber Unit Index





Standard screw-type installation The Fiber Units is mounted into a drilled hole and secured

Cylindrical Models



Ideal for installation in narrow spaces. The Fiber Unit is secured with

a set screw.

Saving Space



Mount directly in limited spaces without using special mounting brackets.



Sleeve Models



Suitable for close-range detection Ideal for detecting minute objects in areas with limited space

16

Beam Improvements

06

Small-Spot, Reflective (Minute Object Detection)



Small-spot to accurately detect small objects.

High-power Beam



Suitable for detection on large equipment, of large objects, and in environments with airborne particles.



Narrow View (Detection Across Clearance)



The Fiber Unit emits a non-spreading beam to prevent false detection of light reflected off surrounding objects.

Detection without Background Interference



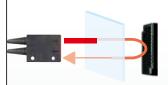
Detect only objects in the sensing range, and not in the background.



Transparent Object Detection

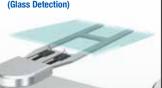
20

Retro-reflective



Detect transparent objects reliably because the beam passes through the object twice, resulting in greater light interruption.





The limited-reflective optical system provides stable detection of specular reflective



Environmental Immunity

Chemical-resistant, Oil-resistant



Made from materials that are resistant to various oils and chemicals.

Bending-resistant, **Disconnection-resistant**



Resistant to repeated bending on moving parts and breaking from snagging or shock.



high-temperature environments at up to 400°C.

44

Special Applications

38

Page 48



Detect across areas for meandering materials or falling workpieces whose positions

Liquid-level Detection



Detect liquid level when being mounted on tubes or in liquid.



Vacuum-resistant



Can be used under high vacuums of up to 10⁻⁵ Pa.

Page **52**

FPD, Semiconductors, and Solar Cells



Designed specifically to reliably detect glass substrates and wafers.



Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD. Semi. Solar

Through-beam → This Page

Reflective → Page 08

iber Sensor eatures

selection suide

Fiber Units

Threaded

Cylindrical

Flat

Sleeved

ndard Installation

Saving Space

Small Spot

High Power

Narrow

view

BGS

Beam

Retro-reflective

Limited-reflective

Chemical-

resistant, Oil-resistant

Bending

Heatresistant

Area

Liquid-level

FPD, Semi, Solar

Vacuum

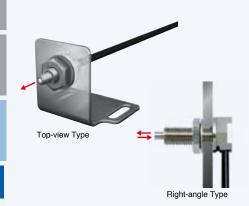
Detection

Installation Information

Fiber Amplitiers, Communications Unit, and Accessories

> echnical Juide and Precautions

> > Model Index



- Standard configuration. These Fiber Units are mounted into a hole drilled in a bracket and secured with nuts.
- The Right-angle Model prevents snagging on the cable because the cable runs along the mounting surface.





Specifications

■→■ Through-beam Fiber Units

Sensing			Bending	Se	nsing dis	tance (mm)		Optical axis		
direction (Aperture	Size	Appearance (mm)	radius of cable	E3X-HD		E3NX-FA		diameter (minimum sensing	Models	Page 07 Dimensions No.
angle)			(mm)	■GIGA=HS	Other modes	■GIGA=HS	Other modes			140.
Right- angle (Approx. 60°)		14.7 M4	Flexible**,	2,000	ST : 1,000	3,000	ST : 1,500	1 dia.	E32-T11N 2M	07-A
Top-view (Approx. 60°)	M4	14 M4 IP67	R1	700	SHS: 280	1,050	SHS: 280	(5 μm dia./ 2 μm dia.)	E32-T11R 2M	07-B
Top-view	IVI -4	15	R25	4,000 2,700	ST : 4,000 SHS: 1,080	4,000 4,000	ST : 4,000 SHS: 1,080	2.3 dia.	E32-LT11 2M	07.6
(Approx. 15°)	M4 Baild-in Jens GIGA Beam [P50]	Flexible**, R1	2,300	ST : 3,500 SHS: 920	4,000 3,450	ST : 4,000 SHS: 920	(0.1 dia./ 0.03 dia.)	E32-LT11R 2M	- (07-C)	

- * The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.
- ** For a definition, see page 90.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μ s, PNP output: 55 μ s) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μ s)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

OMRON

Dimensions

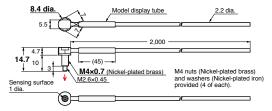
Installation Information → Page 59,60

Standard Installation

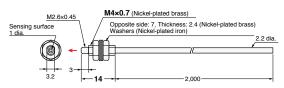


Through-beam Fiber Units (Set of 2)

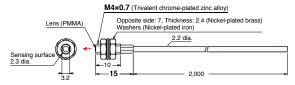
07-A E32-T11N 2M (Free Cutting)



07-B E32-T11R 2M (Free Cutting)



07-C E32-LT11 2M (Free Cutting) E32-LT11R 2M (Free Cutting)



- Reference Information for Model Selection -

Features of the Right-angle Type

- · Cable is less prone to snagging.
- · Cable runs along the mounting surface for less space compared with Top-view Fiber Units.
- The nut is attached to the Fiber Unit to reduce installation work.

What Is "Flexible" Fiber?

The flexible fiber has a small bending radius for easy routing without fiber damage. It improves sensor performance because the cable can be bent without significantly reducing light intensity.



The core consists of a large number of ultrafine fibers surrounded by cladding.



Long-distance Sensing Applications

A separate Lens Unit can be attached to extend the sensing distance.

→ Page 26

Breaking Due to Snagging or Shock

The Fiber Unit can be protected from breaking with a stainless steel spiral tube.

→ Page 40 (Excluding the E32-T11N 2M.)

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limitedreflective Chemical-

resistant. Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi Solar

ilber Sensol eatures

Selectio Suide

Fiber Units

Threaded

Cylindrical

Standard Ins

Flat

Sleeved

Small Spot

High Power
Narrow
view

BGS

Retroreflective

Chemicalresistant, Oil-resistant Bending

Heatresistant

Area Detection

Liquid-level

Vacuum FPD,

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Transparent Object

ıvironmental Immunity

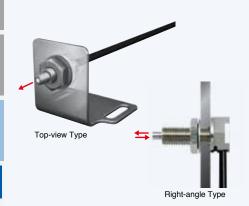
Applications

Semi, Solar Installation Information

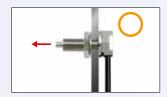
Fiber Amplifiers, Communications Unit, and Accessories

> Fechnical Guide and Precautions

> > Model Index



- Standard configuration. These Fiber Units are mounted into a hole drilled in a bracket and secured with nuts.
- The Right-angle Model prevents snagging on the cable because the cable runs along the mounting surface.





Specifications

Reflective Fiber Units

Sensing			Bending	Se	nsing dis	stance (mm)		Optical axis		Decis 00
direction (Aperture	Size	Appearance (mm)	radius of cable	ЕЗХ-Н	D	E3NX-F	A	diameter (minimum sensing	Models	Page 09 Dimensions No.
angle)			(mm)	■GIGA = HS	Other modes	■GIGA = HS	Other modes			140.
Right-	М3	Coaxial 20.5 M3	Flexible*,	■ 110 □ 46	ST : 50 SHS: 14	■ 160 ■ 69	ST : 75 SHS: 14		E32-C31N 2M	09-A
angle (Approx. 60°)	М6	Coaxial 24 M6	R4	780	ST : 350 SHS: 100	1,170	ST : 520 SHS: 100		E32-C11N 2M	09-B
		11 M3	Flexible*, R1	■ 140 ■ 40	ST : 60 SHS: 16	210 60	ST : 90 SHS: 16		E32-D21R 2M	09-C
	М3	Coaxial 25 M3	R25	330	ST : 150	490	ST : 220	(5 μm dia./	E32-C31 2M	09-D
Top-view (Approx. 60°)		Coaxial 11 M3 IP67	R10	■ 100	SHS: 44	150	SHS: 44	2 μm dia.)	E32-C31M 1M	09-E
(M4	15 M4	Flexible*,	140 40	ST : 60 SHS: 16	210	ST : 90 SHS: 16		E32-D211R 2M	09-F
	M6	17 M6	R1	840	ST : 350 SHS: 100	360	ST : 520 SHS: 100		E32-D11R 2M	09-G
	WO	Coaxial 23 M6	R25	400	ST : 600 SHS: 180	600	ST : 900 SHS: 180		E32-CC200 2M	(09-H)
Top-view		23	R25	860	ST : 360 SHS: 110	1,290	ST : 540 SHS: 110	(4 dia (E32-LD11 2M	
Top-view (Approx. 15°) M6	M6 Build-in Lens GIGA Beam IP50	Flexible*,	840	ST : 350 SHS: 100	1,260	ST : 520 SHS: 100	(1 dia./ 0.03 dia.)	E32-LD11R 2M	09-1	

* For a definition, see page 90.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μs, PNP output: 55 μs) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μs)

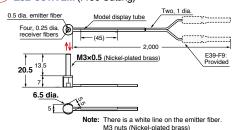
- 2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.
- 3. The sensing distances for Reflective Fiber Units are for white paper.

Dimensions

Installation Information → Page 58,59

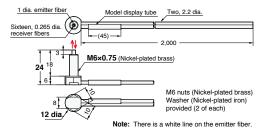
Reflective Fiber Units

09-A E32-C31N 2M (Free Cutting)

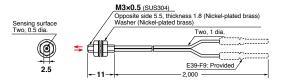


M3 nuts (Nickel-plated brass) Washer (Nickel-plated brass) provided (2 of each)

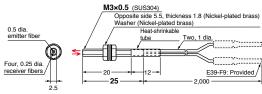
09-B E32-C11N 2M (Free Cutting)



09-C E32-D21R 2M (Free Cutting)



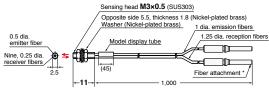
09-D E32-C31 2M (Free Cutting)



Note: There is a white line on the emitter fiber

Emitter Fiber

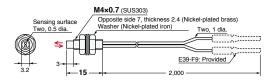
09-E E32-C31M 1M (Free Cutting)



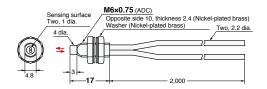
Note: There is a white line on the emitter fiber.

* The Fiber Attachments that are provided were specially designed for this Fiber Unit E39-F9 cannot be attached

09-F E32-D211R 2M (Free Cutting)



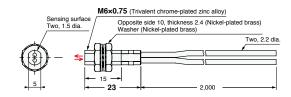
09-G E32-D11R 2M (Free Cutting)



09-H E32-CC200 2M (Free Cutting)



09-I E32-LD11 2M (Free Cutting) E32-LD11R 2M (Free Cutting)



Reference Information for Model Selection -

Features of Coaxial Reflective Type

These Fiber Units offer better detection of small objects at close distances (of 2 mm or less) than Standard Reflective Fiber Units.

They also detect glossy surfaces more reliably than Standard Reflective Fiber Units, even if the surface is tilted

The receiver fibers are arranged around the emitter fiber as shown below.

Features of the Right-angle Type

- · Cable is less prone to snagging.
- · Cable runs along the mounting surface for less space compared with Top-view Fiber Units.
- · The nut is attached to the Fiber Unit to reduce installation work.

Breaking Due to Snagging or Shock

The Fiber Unit can be protected from breaking with a stainless steel spiral tube.

What Is "Flexible" Fiber?

Receiver Fibers

The flexible fiber has a small bending radius for easy routing without fiber damage. It improves sensor performance because the cable can be bent without significantly



The core consists of a large number of ultrafine fibers surrounded by cladding.

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective Limited-

reflective Chemicalresistant. Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum FPD. Semi

Solar

Cylindrical Models

Through-beam → This Page

Reflective → Page 12

iber Sensol eatures

lection ide

iber Units

Threaded

Standard Ins

Cylindrical

Sleeved Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective
Limited-

Chemicalresistant, Oil-resistant

Bending Heat-

Area Detection

Liquid-level

Vacuum

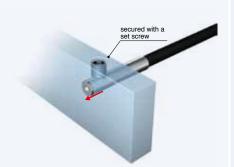
FPD, Semi, Solar

Installation

Fiber Amplifiers Communication Unit, and Accessories

> echnical Juide and Precautions

> > Model Index



- Used where space is limited. (Secured using a set screw.)
- Extreme space-saving with the micro-fiber head. (1 dia. × 10 mm)



Specifications

■ Through-beam Fiber Units

			Bending	Se	ensing dis	stance (mm)		Optical axis		
Size	Sensing direction	Appearance (mm)	radius of cable	ЕЗХ-Н	D	E3NX-I	FA	diameter (minimum sensing	Models	Page 11 Dimensions No.
			(mm)	■GIGA = HS	Other modes	■GIGA = HS	Other modes			110.
1 dia.		10 1 dia.	Flexible**, R1	450	ST : 250 SHS: 60	670	ST : 370 SHS: 60	0.5 dia.	E32-T223R 2M	(11-A)
1.5 dia.	Top-view	10 1.5 dia.	Bendresistant*,	680	ST : 400 SHS: 90	1,020	ST : 600 SHS: 90	(5 μm dia./ - 2 μm dia.)	E32-T22B 2M	(11-B)
3 dia.		14 3 dia.	Flexible**,	700	ST : 1,000 SHS: 280	3,000 1,050	ST : 1,500 SHS: 280	1 dia. (5 µm dia./-	E32-T12R 2M	(11-C)
J ula.	Side-view	35 3 dia.	R1	750	ST : 450 SHS: 100	390	ST : 670 SHS: 100	2 μm dia.)	E32-T14LR 2M	(11-D)

- * Bend-resistant fibers are for repeated bending applications, whereas Flexible fibers are meant for routing around tight corners.
- ** For a definition, see page 90.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μs, PNP output: 55 μs) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μs)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

Installation Information → Page 60



Through-beam Fiber Units (Set of 2)

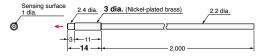
11-A E32-T223R 2M (Free Cutting)



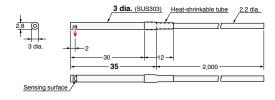
11-B E32-T22B 2M (Free Cutting)



11-C E32-T12R 2M (Free Cutting)



11-D E32-T14LR 2M (Free Cutting)



Reference Information for Model Selection -

Recommended Mounting Hole Dimensions

The recommended mounting-hole dimensions for Cylindrical Fiber Units are given below.



			(OIIIL IIIIII)
Outer diameter of Fiber Unit	1 dia.	1.5 dia.	3 dia.
Dimension F	1.2 +0.5 dia.	1.7 +0.5 dia.	3.2 ^{+0.5} ₀ dia.

Threaded

Cylindrica

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retro-reflective Limited-

reflective Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi. Solar

Threaded

Cylindrical

Flat

Sleeved

Small Spot High Power

Narrow view BGS

Retro-reflective reflective

Chemicalresistant. Oil-resistant Bending

Heatresistant Area

Liquid-level

Detection

Vacuum FPD, Semi. Solar

secured with a set screw

Cylindrical Models

· Inserted where space is limited. (Secured using a set screw.)

Specifications

■≒ Reflective Fiber Units

\longrightarrow	nellec	live Fiber Unit	5							
			Bending	Ser	nsing dis	stance (mm)		Optical axis		
Size	Sensing direction	Appearance (mm)	radius of cable	E3X-HD)	E3NX-F	A	diameter (minimum sensing	Models	Page 13 Dimensions No.
			(mm)	■GIGA =HS	Other modes	■GIGA = HS	Other modes	object)		
1.5 dia.		15	Bend- resistant**,	140	ST : 60 SHS: 16	210	ST : 90 SHS: 16		E32-D22B 2M	13-A
		1.5 dia.	R4		313. 10	_ 00	0110. 10			
1.5 dia.		3 15	R4	28	ST : 12	42	ST : 18		E32-D43M 1M	13-B
0.5 dia.		1.5 dia. 0.5 dia.	N4	■ 8	SHS: 4	12	SHS: 4		LOZ-D-TOIN TIM	
		15.2	Flexible*,	140	ST : 60	210	ST : 90		E32-D22R 2M	13-C
	Top-view	3 dia.	R1	40	SHS: 16	60	SHS: 16	(5 <i>µ</i> m dia./	EVE-DEET EM	
3 dia.		15 &	Bend-	300	ST : 140	450	ST : 210	2 μm dia.)	E32-D221B 2M	13-D
J dia.		3 dia.	resistant**, R4	90	SHS: 40	130	SHS: 40		E32-D221B 2M	13-15
		Coaxial		700	ST : 300	1,050	ST : 450			
		15 3 dia.	R25	200	SHS: 90	300	SHS: 90		E32-D32L 2M	13-E
3 dia.		20		70	ST : 30	100	ST : 45			
+ 0.8 dia.		15 3 dia. 1P67	R4	20	SHS: 8		SHS: 8		E32-D33 2M	13-F

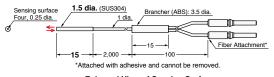
- * For a definition, see page 90.
 ** Bend-resistant fibers are for repeated bending applications, whereas Flexible fibers are meant for routing around tight corners.
- Note 1. The following mode names and response times apply to the modes given in the Sensing distance column. [E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(\mu\)s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 \(\mu\)s, PNP output: 55 \(\mu\)s [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 µs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 µs)
 - 2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.
 - 3. The sensing distances for Reflective Fiber Units are for white paper.

Installation Information → Page 58 ,59

Standard Installation

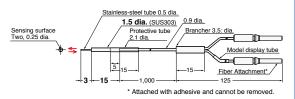
Reflective Fiber Units

13-A E32-D22B 2M (No Cutting)



Enlarged View of Sensing Surface Emitter fiber: two, 0.25 dia.

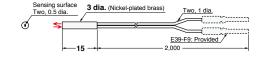
13-B E32-D43M 1M (No Cutting)



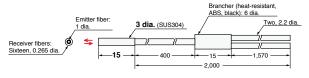
13-C E32-D22R 2M (Free Cutting)



13-D E32-D221B 2M (Free Cutting)

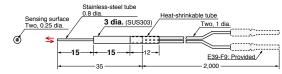


13-E E32-D32L 2M (Free Cutting)



Note: There is a yellow dotted line on the Emitter fiber.

13-F E32-D33 2M (Free Cutting)



- Reference Information for Model Selection -

Features of Coaxial Reflective Type

These Fiber Units offer better detection of small objects at close distances (of 2 mm or less) than Standard Reflective Fiber Units.

They also detect glossy surfaces more reliably than Standard Reflective Fiber Units, even if the surface is tilted.

The receiver fibers are arranged around the emitter fiber as shown below.

Emitter fiber Receiver fibers

Recommended Mounting Hole Dimensions

The recommended mounting-hole dimensions for Cylindrical Fiber Units are given below.



		(=:::::)
Outer diameter of Fiber Unit	1.5 dia.	3 dia.
Dimension F	1.7 ^{+0.5} ₀ dia.	3.2 ^{+0.5} ₀ dia.

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limitedreflective Chemical-

resistant. Oil-resistant

> Bending Heat-

resistant Area

Detection

Liquid-level

Vacuum FPD, Semi

Solar

Flat Models

Threaded Cylindrical

Saving Space Sleeved

Flat

Small Spot **High Power**

Narrow view BGS

Retro-reflective reflective

> Chemicalresistant. Oil-resistant Bending

> > Heatresistant

Area Detection

Liquid-level

Vacuum FPD, Semi. Solar

- Flat-View Type Top-View Type
- Thin profile for mounting in limited spaces.
- · Mounts directly without using special mounting brackets.

Specifications

■→■ Through-beam Fiber Units

		Bending	Se	nsing dis	stance (mm)		Optical axis		D 45
Sensing direction	Appearance (mm)	radius of cable	E3X-HD		E3NX-FA		diameter (minimum sensing	Models	Page 15 Dimensions No.
		(mm)	■GIGA =HS	Other modes	■GIGA =HS	Other modes	1		110.
Top-view	8 13 15 IP67		2,000	ST : 1,000 SHS: 280	3,000 1,050	ST : 1,500 SHS: 280		E32-T15XR 2M	15-A
Side-view	15 31 8	Flexible*, R1	750	ST : 450	1,120	ST : 670	1 dia. (5 μm dia./ 2 μm dia.)	E32-T15YR 2M	15-B
Flat-view	15 8 3		260	SHS: 100	390	SHS: 100		E32-T15ZR 2M	15-C

Reflective Fiber Units

		Bending	Se	nsing dis	stance (mm)		Optical axis		
Sensing direction	Appearance (mm)	radius of cable	E3X-HD		E3NX-F	'A	diameter (minimum sensing	Models	Page 15 Dimensions No.
		(mm)	■GIGA =HS	Other modes	■GIGA =HS	Other modes			140.
Top-view	15 3 I		240	ST : 350 SHS: 100	1,260 360	ST : 520 SHS: 100		E32-D15XR 2M	15-D
Side-view	15 3 10 IP67	Flexible*,	200	ST : 100	300	ST : 150	(5 μm dia./ 2 μm dia.)	E32-D15YR 2M	15-E
Flat-view	15 10 3 IP67		□ 52	SHS: 24	■ 78	SHS: 24		E32-D15ZR 2M	15-F

^{*} For a definition, see page 90.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

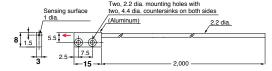
[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(\mu\)s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 \(\mu\)s, PNP output: 55 \(\mu\)s [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μ s)

- 2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.
- 3. The sensing distances for Reflective Fiber Units are for white paper.

Installation Information → Page 60

Through-beam Fiber Units (Set of 2)

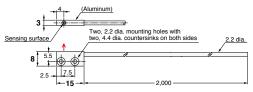
15-A E32-T15XR 2M (Free Cutting)



Note: 1. Set of two symmetrically shaped Fiber Units.

2. Four, M2 x 8 stainless steel countersunk mounting screws are provided.

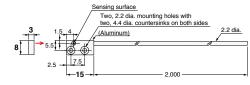
15-B E32-T15YR 2M (Free Cutting)



Note: 1.Set of two symmetrically shaped Fiber Units.

2. Four, M2 x 8 stainless steel countersunk mounting screws are provided

15-C E32-T15ZR 2M (Free Cutting)

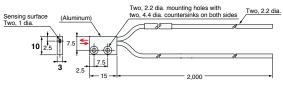


Note: 1. Set of two symmetrically shaped Fiber Units. 2. Four, $M2 \times 8$ stainless steel countersunk mounting screws are provided.

Installation Information → Page 58

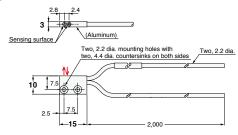
Reflective Fiber Units

15-D E32-D15XR 2M (Free Cutting)



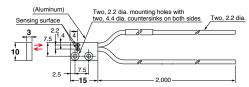
Note: Two, M2 x 8 stainless steel countersunk mounting screws are provided.

15-E E32-D15YR 2M (Free Cutting)



Note: Two, M2 x 8 stainless steel countersunk mounting screws are provided.

15-F E32-D15ZR 2M (Free Cutting)



Note: Two, M2 x 8 stainless steel countersunk mounting screws are provided

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limitedreflective

Chemicalresistant. Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi. Solar

Sleeve Models (Close-range Detection)

Through-beam → This Page

Reflective → Page 18

Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retro-reflective

Chemicalresistant. Oil-resistant

Bending

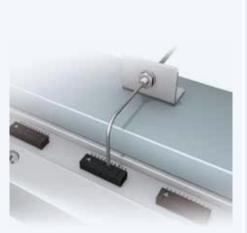
Heatresistant

Area Detection

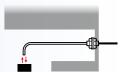
Liquid-level

Vacuum

FPD, Semi. Solar



- · Sleeve Fiber Units allow detection away from the point of installation for stable close-range detection of small objects.
- · Some Sleeve models can be bent a single time.



Specifications

■→■ Through-beam Fiber Units

		Bending	Se	nsing dis	tance (mm)		Optical axis		
Sensing direction	Appearance (mm)	radius of cable	ЕЗХ-Н	E3X-HD		Ά	diameter (minimum sensing	Models	Page 17 Dimensions No.
		(mm)	■GIGA =HS	Other modes	■GIGA =HS	Other modes			
	The sleeve cannot be bent. 20	Flexible*,	170	ST : 100	250	ST : 150		E32-T24R 2M	(17-A)
Side-view	IP67	R1	■ 50	SHS: 20	7 5	SHS: 20	0.5 dia. (5 µm dia./	LO2-12-11 ZW	
Side-view	The sleeve cannot be bent. 15		450	ST : 250	670	ST : 370	2 μm dia.)		47.5
	2.5 dia. 0.81 dia.		150	SHS: 60	220	SHS: 60		E32-T24E 2M	(17-B)
	The sleeve cannot be bent.	D. 0	150	ST : 90	220	ST : 130	0.25 dia. (5 µm dia./		
	0.5 dia.	R10	■ 50	SHS: 20	75	SHS: 20	2 μm dia.)	E32-T33 1M	(17-C)
	3 dia. IP67 The sleeve cannot be bent.		510	ST : 300	760	ST : 450	0.5 dia. (5 µm dia./		
Top-view	15 0.82 dia. M3 IP67		170	SHS: 68	250	SHS: 68	2 μm dia.)	E32-T21-S1 2M	(17-D)
	Sleeve bending radius: 5 mm	Flexible*,	2,000	ST : 1,000	3,000	ST : 1,500	1 dia. (5 μm dia./		
J	11 1.2 dia. IP67	R1	700	SHS: 280	1,050	SHS: 280	2 μm dia.)	E32-TC200BR 2M	(17-E)

^{*} For a definition, see page 90.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μ s, PNP output: 55 μ s) $[E3NX-FA] \ GIGA: \ Giga-power \ mode \ (16\ ms), \ HS: \ High-speed \ mode \ (250\ \mu s), \ ST: \ Standard \ mode \ (1\ ms), \ and \ SHS: \ Super-high-speed \ mode \ (30\ \mu s)$

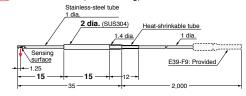
2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

Installation Information → Page 60 ,61

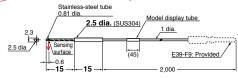


Through-beam Fiber Units (Set of 2)

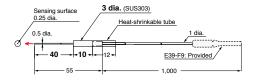




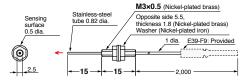
17-B E32-T24E 2M (Free Cutting)



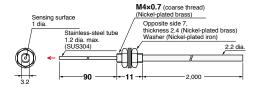
17-C E32-T33 1M (Free Cutting)



17-D E32-T21-S1 2M (Free Cutting)



17-E E32-TC200BR 2M (Free Cutting)



Reference Information for Model Selection -

Bendable Sleeves

The E32-TC200BR has a bendable sleeve. For best results, use the Sleeve Bender, which is sold separately.

Sleeve Bender (sold separately)

Appearance	Applicable Fiber Units	Model
Use for the bending of the sleeve.	E32-TC200BR	E39-F11

Threaded

Cylindrical

Flat

Small Spot

High Power

Narrow view

BGS

Retroreflective Limited-

reflective Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum FPD,

Semi. Solar

Threaded

Cylindrical

Saving Space Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

> reflective Chemicalresistant. Oil-resistant

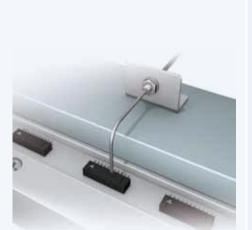
Bending Heatresistant

> Area Detection

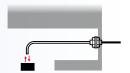
Liquid-level

Vacuum

FPD, Semi. Solar



- · Sleeve Fiber Units allow detection away from the point of installation for stable close-range detection of small objects.
- · Some Sleeve models can be bent.



Specifications

Reflective Fiber Units

		Bending	Se	nsing dis	tance (mm)		Optical axis		
Sensing direction	Appearance (mm)	radius of cable	ЕЗХ-Н	D	E3NX-F	A	diameter (minimum sensing	Models	Page 19 Dimension No.
		(mm)	■GIGA =HS	Other modes	■GIGA =HS	Other modes	object)		
	The sleeve cannot be bent. 15 3 dia.	Flexible*, R1	70	ST : 30 SHS: 8	100	ST : 45 SHS: 8		E32-D24R 2M	19-A
Side-view	Sleeve bending 15 radius: 65 4.8 dia. 1P67	R25	120	ST : 53 SHS: 14	67	ST : 79 SHS: 14		E32-D24-S2 2M	19-B
	The sleeve cannot be bent. 15 3 1.5 dia. 1.5 dia. 1P67		28 8	ST : 12 SHS: 4	42 12	ST : 18 SHS: 4		E32-D43M 1M	19-C
	The sleeve cannot 15 be bent. 15 2 dia. 0.5 dia.		■ 14 4	ST : 6 SHS: 2	2 1	ST : 9 SHS: 2		E32-D331 2M	19-D
	The sleeve cannot be bent. 15 3 dia. 0.8 dia.	R4	70	ST : 30 SHS: 8	100	ST : 45 SHS: 8	(5 μm dia./ 2 μm dia.)	E32-D33 2M	19-E
	The sleeve cannot 5 15 3 dia. 0.82 dia.		63	ST : 27	94	ST : 40		E32-D32-S1 0.5M	19-F
Top-view	The sleeve 15 cannot 15 be bent. 15 M3		1 8	SHS: 7	2 7	SHS: 7	<i>Σ μ</i> π αια.)	E32-D31-S1 0.5M	19-G
Top view	Sleeve bending 11 radius: 5 mm 40 M3 1.2 dia. IP67	Flexible*, R1	40	ST : 60 SHS: 16	60	ST : 90 SHS: 16		E32-DC200F4R 2M	19-H
	The sleeve 15 cannot be bent. 22 4 dia. IP67	R10	250	ST : 110	370	ST : 160		E32-D22-S1 2M	19-1
	Sleeve bending 16 radius: 67 M4 1.65 dia.	1110	72	SHS: 30	100	SHS: 30		E32-D21-S3 2M	19-J
c	The sleeve cannot be bent. 90 M6 2.5 dia.	Flexible*, R1	240	ST : 350 SHS: 100	1,260 360	ST : 520 SHS: 100		E32-DC200BR 2M	19-K
	Sleeve bending 15 10 mm 67 1.65 dia.	R10	250	ST : 110 SHS: 30	370	ST : 160 SHS: 30		E32-D25-S3 2M	19-L

* For a definition, see page 90.aper.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μs, PNP output: 55 μs)

[E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μs)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

3. The sensing distances for Reflective Fiber Units are for white paper.

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow

view

BGS

Retroreflective

Limitedreflective

Chemical-

resistant. Oil-resistant

Bending

Heat-

Area

resistant

Detection

Liquid-level

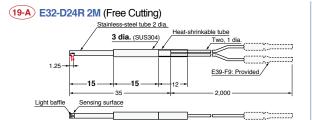
Vacuum

FPD.

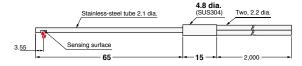
Semi Solar

Installation Information → Page 58,59

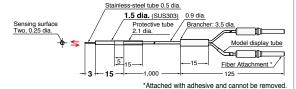
Reflective Fiber Units



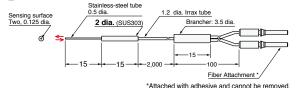
19-B E32-D24-S2 2M (Free Cutting)



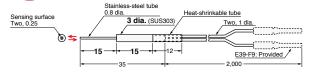
19-C E32-D43M 1M (No Cutting)



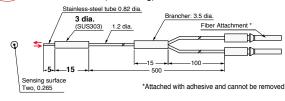
19-D E32-D331 2M (No Cutting)



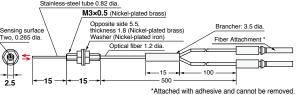
19-E E32-D33 2M (Free Cutting)



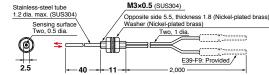
19-F E32-D32-S1 0.5M (No Cutting)



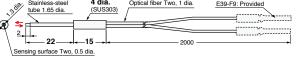
19-G E32-D31-S1 0.5M (No Cutting)

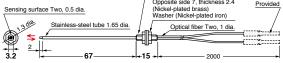


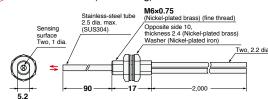
19-H E32-DC200F4R 2M (Free Cutting)



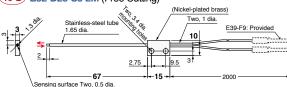
19-I E32-D22-S1 2M (Free Cutting)







19-L E32-D25-S3 2M (Free Cutting)



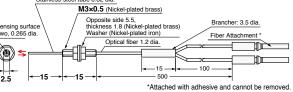
- Reference Information for Model Selection -

Bendable Sleeves

The E32-DC200F4R, E32-D21-S3 and E32-D25-S3 have bendable sleeves. For best results, use the Sleeve Bender, which is sold separately.

Sleeve Bender (sold separately)

Appearance	Applicable Fiber Units	Model
Use for the bending of the sleeve.	E32-DC200F4R E32-D21-S3 E32-D25-S3	E39-F11

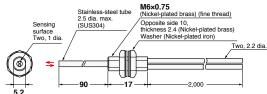


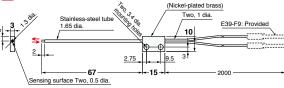
\$ \$ 2	Stainless-steel tube 1.65 dia.	4 dia. (SUS303)	Optical fiber Two, 1 o	11a. <u>E39</u>	-F9: Provided
Sens	sing surface Two,	0.5 dia.			

19-J E32-D21-S3 2M (Free Cutting)

Sensing surface Two, 0.5 dia. Stainless-steel tube 1.65 dia.	M4x0.7 (Nickel-plated brass) Opposite side 7, thickness 2.4 (Nickel-plated brass) Washer (Nickel-plated iron)	E39-F9: Provided
3.2 67	Optical fiber Two, 1 dia.	=

(19-K) E32-DC200BR 2M (Free Cutting)





Small-Spot, Reflective (Minute Object Detection)

Small-spot Lens Unit → Page 22

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

Retroreflective

BGS

Chemicalresistant. Oil-resistant

Bendina

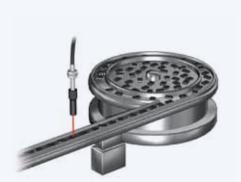
Heatresistant

Area Detection

Liquid-level

Vacuum

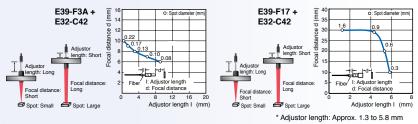
FPD, Semi. Solar



· Small-spot is ideal for detecting minute objects. Select the Fiber Unit that is best suited for the workpiece size and installation distance.

(Refer to Reference Information for Model Selection)

· Available with a variable-spot Lens Unit to change the spot diameter without replacing the fiber. The spot diameter can be adjusted according to the size of the workpiece by changing the adjustor length and sensing distance. Refer to the following graph, which shows the relation between the adjustor length, focal distance, and spot diameter.



Specifications

■ Reflective Fiber Units

Variable-spot types

Lens Units + Fiber Unit

	Cmat	Center	Lens Units	Lens Units + Fiber Units	Fiber	Page 21		
Туре	Spot diameter	distance (mm)	Models	Appearance (mm)	Bending radius of cable (mm)	Model	Dimensions No.	
Voviable anot	0.1 to 0.6 dia.	6 to 15	E39-F3A	23 2 dia. 6 dia.	- R25	E32-C42 1M	21-A	
Variable spot	0.3 to 1.6 dia.	10 to 30	E39-F17	22.2 \\ 2 dia. \\ 6 dia.	- H25	E32-042 IM	(21-B)	

Parallel-light-spot types

Lens Units + Fiber Unit

	Spot	Center	Lens Units	Lens Units + Fiber Units	Fiber	Unit	Page 21 Dimensions	
Туре	diameter	distance (mm)	Model	Appearance (mm)	Bending radius of cable (mm)			
Parallel light	allel light 4 dia. 0 to 20 E39-F3C	10.9 M3 5 dia.	R25	E32-C31 2M	21-C			
raraner ngm	4 uia.	0 10 20	E39-F3C	10.9 5 dia.	Flexible**, R4	E32-C31N 2M	21-D	

Small-spot types

Integrated Lens

integrated E	0.10					
Туре	Spot diameter	Center distance (mm)	Appearance (mm)	Bending radius of cable (mm)	Models	Page 21 Dimensions No.
Short-distance, Small-spot	0.1 dia.	5	Lens: unnecessary	Dos	E32-C42S 1M	21-E
Long-distance, Small-spot	6 dia.	50	11.6 29 Lens: unnecessary 25.6 [IP50	R25	E32-L15 2M	21-F

^{*} The spot diameter and the center distance are the same when using with E3X-HD series or E3NX-FA series.

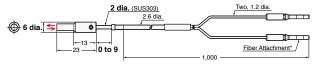
^{**} For a definition, see page 90.

Installation Information → Page 58, 59 and 61

Dimensions

■ Reflective Fiber Units

21-A E32-C42 1M (No Cutting) + E39-F3A



* Attached with adhesive and cannot be removed. Note: There is a white tube on the emitter fiber

E39-F3A



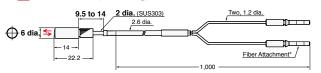
Material:

Aluminum for body and optical glass for lens.

Small-Spot, Reflective (Minute Object Detection)

Note: This is the Lens Unit for the E32-C42.

21-B E32-C42 1M (No Cutting) + E39-F17



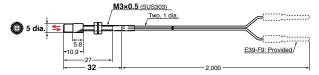
* Attached with adhesive and cannot be removed. Note: There is a white tube on the emitter fiber.

E39-F17



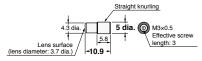
Material: Aluminum for body and optical glass for lens.

21-C E32-C31 2M (Free Cutting) + E39-F3C



Note: There is a white line on the emitter fiber

E39-F3C



Material:

Aluminum for body and optical glass for lens.

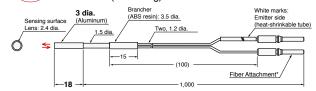
Note: This is the Lens Unit for the E32-C31 and E32-C31N.

21-D E32-C31N 2M (Free Cutting) + E39-F3C



Note: There is a white line on the emitter fiber

21-E E32-C42S 1M (No Cutting)

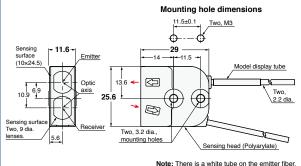


Spot diameter

Models

* Attached with adhesive and cannot be removed. Note: There is a white tube on the emitter fiber

(21-F) E32-L15 2M (Free Cutting)

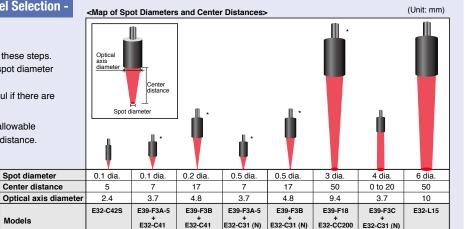


Reference Information for Model Selection -

Model Selection Tips

Select the best model by following these steps.

- 1. Select the model based on the spot diameter suitable for the workpiece size.
 - * The Variable-spot Type is useful if there are different sensing object sizes.
- 2. Select the model based on the allowable installation distance and center distance.



* Refer to Page 22 for details

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retro-reflective

Chemicalresistant. Oil-resistant Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi, Solar



· Small-spot is ideal for detecting minute objects. Select the Fiber Unit that is best suited for the workpiece size and installation

(Refer to Reference Information for Model Selection)

Specifications

Reflective Fiber Units

Small-spot Models

Lens Units + Fiber Units

	Spot	Center	Lens Units	Lens Units + Fiber Units	Fiber	Units	Page 23
Туре	diameter	distance (mm)	Models	Appearance (mm)	Bending radius of cable (mm)	Models	Dimensions No.
	0.1 dia.			16.5 5 dia.M3	R25	E32-C41 1M	23-A
Short- distance, small-spot	0.5 dia.	7	E39-F3A-5	16.5 M3 5 dia.	HZ5	E32-C31 2M	23-B
	0.5 dia.			16.5 A 5 dia. M3	Flexible**, R4	E32-C31N 2M	23-C
	0.2 dia.			25.2 M3 6 dia.	Dos	E32-C41 1M	23-D
Medium- distance, small-spot	0.5 dia.	17	E39-F3B	25.2 6 dia.	R25	E32-C31 2M	23-E
	0.5 dia.			25.2 M3 6 dia.	Flexible**, R4	E32-C31N 2M	23-F
Long- distance, small-spot	0.45-	50		30 M6 10 dia.	R25	E32-CC200 2M	23-G
	3 dia.	50	E39-F18	30 10 dia.	Flexible**, R4	E32-C11N 2M	23-H

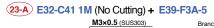
 $^{^{\}star}$ The spot diameter and the center distance are the same when using with E3X-HD series or E3NX-FA series.

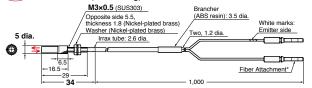
^{**} For a definition, see page 90.

Installation Information → Page 58, 61

Small-Spot, Reflective (Minute Object Detection) **Dimensions**

Reflective Fiber Units



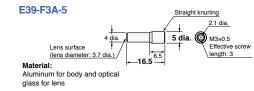


* Attached with adhesive and cannot be removed. Note: There is a white tube on the emitter fiber.

23-B E32-C31 2M (Free Cutting) + E39-F3A-5



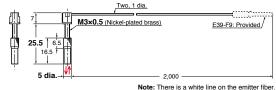
Note: There is a white line on the emitter fiber

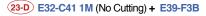


Note: This is a Lens Unit for the E32-C41, E32-C31 and E32-C31N.

Note: This is a Lens Unit for the E32-C41, E32-C31 and E32-C31N

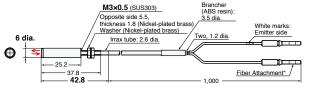
23-C E32-C31N 2M (Free Cutting) + E39-F3A-5





23-E E32-C31 2M (Free Cutting) + E39-F3B

45.8



M3×0.5 (SUS303)

Note: There is a white tube on the emitter fiber.

2.000

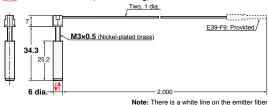
E39-F9: Provided

23-F E32-C31N 2M (Free Cutting) + E39-F3B

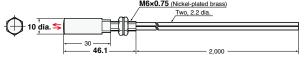
Aluminum for body and optical glass for lens

E39-F3B

Material:



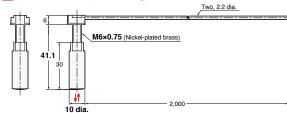
23-G E32-CC200 2M (Free Cutting) + E39-F18



Note: There is a white line on the emitter fiber

Note: There is a white line on the emitter fiber





Spot diameter

Models

Center distance

Note: There is a white line on the emitter fiber.

E39-F18 6 Material: glass for lens

Note: This is a Lens Unit for the E32-C11N and E32-CC200.

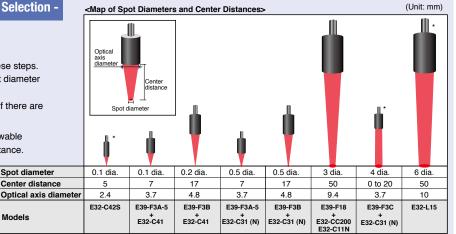
- Reference Information for Model Selection -

Model Selection Tips

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Select the best model by following these steps.

- 1. Select the model based on the spot diameter suitable for the workpiece size.
 - * The Variable-spot Type is useful if there are different sensing object sizes.
- 2. Select the model based on the allowable installation distance and center distance.



* Refer to Page 20 for details.

Threaded

Cylindrical

Flat

Sleeved

M3×0.5 Depth: 4.4

Small Spot

High Power

Narrow view

BGS

Retroreflective

reflective Chemicalresistant.

Oil-resistant Bending

> Heatresistant

Area Detection

Liquid-level

Vacuum

FPD. Semi Solar

High-power Beam (Long-distance Installation, Dust-resistant) Fiber only → This Page

Lens (to 70°C) → Page 26

Threaded Cylindrical

Flat

Small Spot

Sleeved

High Power Narrow view

BGS Retroreflective

Chemicalresistant. Oil-resistant Bendina

> Heatresistant

> > Area

Detection Liquid-level

Vacuum FPD, Semi.

Solar



- Maximum sensing distance without attaching a Lens: 20 m (E32-T17L) Suitable for detection of large objects and for use in large-scale installations.
- · Powerful enough to resist the influences of dust and dirt.
- · In addition to the products listed on this page, Lenses are available to extend the sensing distance. (→ pages 26 to 29)

Specifications

■→■ Through-beam Fiber Units

			Bending	S	ensing dis	stance (mm)		Optical axis		
Sensing direction	Aperture angle	Appearance (mm)	radius of cable	E3X-HD)	E3NX-I	-A	diameter (minimum sensing	Models	Page 25 Dimensions No.
			(mm)	■GIGA=HS	Other modes	■GIGA =HS	Other modes	object)		
	10°	42		20,000 *1	*1 ST : 20,000	20,000 *1	*1 ST : 20,000		F00 T4T1 40M	(F. A)
	10	M14 [IP67	-	20,000 *1	SHS: 8,000	20,000 *1	SHS: 8,000	10 dia.	E32-T17L 10M	(25-A)
Top view		15 M4	R25	4,000 *2	*2 ST : 4,000	4,000 *2	*2 ST : 4,000		E32-LT11 2M	
Top-view	4=0			2,700	SHS: 1,080	4,000 *2	SHS: 1,080	2.3 dia. (0.1 dia./		25-B
	15°		Flexible*,	4,000 *2	ST : 3,500	4,000 *2	ST : 4,000	0.03 dia.)		23-6
		Build-in Lens GIGA Beam IP50	R1	2,300	SHS: 920	3,450	SHS: 920		E32-LT11R 2M	
Oids of sur	000	10.5	Dos	4,000 *2	*2 ST : 4,000	4,000 *2	ST : 4,000	4 dia. (0.1 dia./		(F. 0)
Side-view	30°	36.4 8 > IP67	R25	4,000 *2	SHS: 1,800	4,000 *2	SHS: 1,800			(25-C)

- * For a definition, see page 90.
- *1 The optical fiber is 10 m long on each side, so the sensing distance is 20,000 mm.
- The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm

Reflective Fiber Units

				S	ensing dis	stance (mm)		Optical axis		
Sensing Aperture angle		Appearance (mm)	Bending radius of cable	E3X-HD		E3NX-F		diameter (minimum sensing	Model	Page 25 Dimensions No.
			Oi Gubio	■GIGA=HS	Other modes	■GIGA=HS	Other modes	object)		110.
Top-view	4°	9 17.5 IP40	Bend- resistant*3, R4	40 to 2,800 40 to 900	ST : 40 to 1,400 SHS: 40 to 480	40 to 4,000 *2 40 to 1,350	ST : 40 to 2,100 SHS: 40 to 480	-	E32-D16 2M	25-D

- *3 Bend-resistant fibers are for repeated bending applications, whereas Flexible fibers are meant for routing around tight corners.
- Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.
 - [E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μs, PNP output: 55 μs) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 µs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 µs)
 - 2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.
 - 3. The sensing distances for Reflective Fiber Units are for white paper

Beam Improvements

Installation Information → Page 59 ,60

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective Limited-

Chemicalresistant. Oil-resistant

reflective

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum FPD,

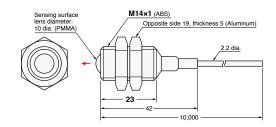
Semi

Solar

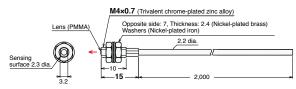
Dimensions

Through-beam Fiber Units (Set of 2)

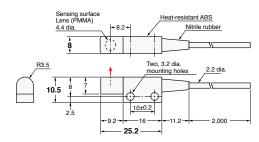
25-A E32-T17L 10M (Free Cutting)



25-B E32-LT11 2M (Free Cutting) E32-LT11R 2M (Free Cutting)



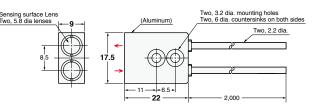
25-C E32-T14 2M (Free Cutting)



Installation Information → Page 58

Reflective Fiber Units

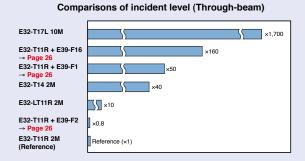
25-D E32-D16 2M (Free Cutting)

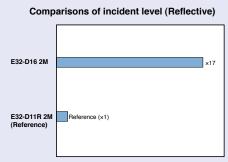


Reference Information for Model Selection -

Comparisons of incident level

Select the model based on the comparisons of incident level against Standard Fiber Units.





High-power Beam (Long-distance Installation, Dust-resistant) Fiber only → Page 24

Lens (to 70°C) → This Page

Threaded Cylindrical

Flat Sleeved

Beam Improvements **High Power** Narrow

Small Spot

view

BGS Retroreflective

Chemical-

resistant. Oil-resistant Bendina

Heatresistant

Area Detection

Liquid-level

Vacuum FPD. Semi.

Solar

Specifications

■→■ Through-beam Fiber Units

	Lens Units	Туре	High-pov	ver (incid	ent level: 5	0 times)	Ultra-high-	power (inc	ident level:	160 times)	Side-Vie	w (incide	nt level: 0.	8 times)
		Models		E39)-F1			E39-I	- 16			E39-	·F2	
		Appearance	•			26-A	26-B			26-B	- F			26-C
		Aperture angle		Appro	ox. 12°			Appr	ox. 6°			Appro	ox. 60°	
Fiber Units		Optical axis diameter (minimum sensing object)	4 dia. (0.1 dia.)			7.2 dia.				3 dia. (0.1 dia.)				
							Sensing distance (mm)							
Models	Appearance (mm)		E3X-HD		E3NX-FA		E3X-		E3NX-FA		E3X-		E3NX-FA	
			■GIGA =HS	Other modes	■GIGA =HS	Other modes	■GIGA=HS	Other modes	■GIGA =HS	Other modes	■GIGA=HS	Other modes	■GIGA=HS	Other modes
E32-T11N 2M	14	7 M4		* ST :4,000 SHS:2,000		* ST : 4,000 SHS: 2,000		ST : 4,000 SHS: 3,600		ST : 4,000 SHS: 3,600		_	_	_
E32-T11R 2M	14	M4		ST :4,000 SHS:2,000		* ST : 4,000 SHS: 2,000		ST : 4,000 SHS: 3,600		ST : 4,000 SHS: 3,600		ST : 800 SHS: 200		ST : 1,20 SHS: 20
E32-T11 2M	14	M4	4,000* 4,000*	ST :4,000 SHS:1,860		* ST : 4,000 SHS: 1,860		ST : 4,000 * SHS: 4,000		ST : 4,000 * SHS: 4,000		ST : 1.320 SHS: 320		ST : 1,98 SHS: 32

 $^{^{\}star}\,$ The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

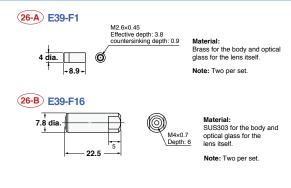
[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μ s, PNP output: 55 μ s) $[E3NX-FA]\ GIGA:\ Giga-power\ mode\ (16\ ms),\ HS:\ High-speed\ mode\ (250\ \mu s),\ ST:\ Standard\ mode\ (1\ ms),\ and\ SHS:\ Super-high-speed\ mode\ (30\ \mu s)$

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

Dimensions

Installation Information → Page 61

Lens Units (Set of 2)





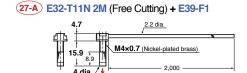
Brass for the body and optical glass for the lens itself.

Note: Two per set.

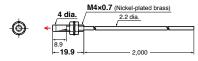
Installation Information → Page 60 ,61

Beam Improvements

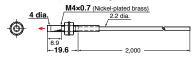
Through-beam Fiber Units (Set of 2)



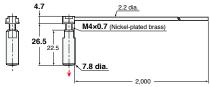




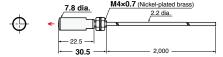
27-C E32-T11 2M (Free Cutting) + E39-F1



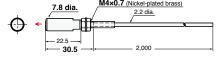
27-D E32-T11N 2M (Free Cutting) + E39-F16



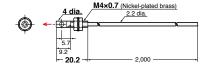
27-E E32-T11R 2M (Free Cutting) + E39-F16

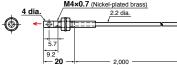


27-F E32-T11 2M (Free Cutting) + E39-F16



27-G E32-T11R 2M (Free Cutting) + E39-F2



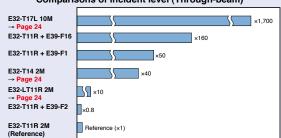


- Reference Information for Model Selection -

Comparisons of incident level

Select the model based on the comparisons of incident level against Standard Fiber Units.







Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective Limited-

reflective Chemicalresistant.

Oil-resistant Bending

> Heatresistant

Area Detection

Liquid-level

Vacuum FPD,

Semi. Solar

Threaded Cylindrical

Flat Sleeved

> **Small Spot** High Power

> > Narrow view

Retroreflective

BGS

Chemicalresistant. Oil-resistant

Bendina

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD. Semi. Solar

Specifications

Through-beam Fiber Units (Heat-resistant)

			1				1							
	Lens Units	Туре	High-pov	wer (incid	ent level: 5	0 times)	Ultra-high-	-power (inc	ident level:	160 times)	Side-Vie	w (incider	nt level: 0	.8 times)
		Models		E39)-F1			E39-	F16			E39-	F2	
		Appearance	28-A		28-A	6			28-B			28-C		
		Aperture angle	Approx. 12°				Appr	ox. 6°			Appro	x. 60°		
Fiber Units	Fiber Units Optical axis diameter (minimum sensing object			4 dia. (0.1 dia.)				7.2 dia. (0.1 dia.)				3 dia. (0.1 dia.)		
							Sensing distance (mm)							
Models	App	pearance (mm)	E3X-HD		E3N	X-FA E3X-HD			E3NX-FA		E3X-HD		E3NX-FA	
			■GIGA =HS	Other modes	■GIGA=HS	Other modes	■GIGA=HS	Other modes	■GIGA=HS	Other modes	■GIGA =HS	Other modes	■GIGA =HS	Other
	Heat-resistant up to		4,000*	ST : 4,000	4,000*	ST : 4,000	4,000*	ST : 4,000	4,000*	ST : 4,000	1,400	ST : 720	2,100	ST : 1,080
E32-T51R 2M		14 M4	3,900	SHS: 1,500	4,000*	SHS: 1,500	4,000*	SHS: 4,000	4,000*	SHS: 4,000	■500	SHS: 200	750	SHS: 200
	Heat-resistant up to	200°C	4,000*	ST : 4,000	4,000*	ST : 4,000	4,000*	ST : 4,000	4,000*	ST : 4,000	1,000	ST : 550	1,500	ST : 820
E32-T81R-S 2M	32-T81R-S 2M		2,700	SHS: 1,000	4,000*	SHS: 1,000	4,000*	SHS: 1,800	4,000*	SHS: 1,800	360	SHS: 140	540	SHS: 140
E32-T61-S 2M	Heat-resistant up to 3 (200°C) (See Note 3)	350°C	4,000*	ST : 4,000		ST : 4,000		ST : 4,000		ST : 4,000	1,680	ST : 900	2,520	ST : 1,350
		M4	4,000*	SHS: 1,800	4,000*	SHS: 1,800	4,000*	SHS: 3,100	4,000*	SHS: 3,100	■ 600	SHS: 240	900	SHS: 240

^{*} The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μ s, PNP output: 55 μ s) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μ s)

- 2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.
- 3. The ambient temperature of E32-T61-S must be between -40 to 200°C when using it with E39-F1 or E39-F2 Lens Unit. The ambient temperature of E32-T61-S must be between -40 to 350°C when using it with E39-F16 Lens Unit.

	Lens Units	Туре	High-pov	ver (incide	ent level: 5	0 times)	Ultra-high-	power (inc	ident level:	160 times)
		Models		E39-F	-1-33		E39-F16			
		Appearance				28-D	•			28-B
		Aperture angle		Appro	ох. 12°			Appr	ox. 6°	
Fiber Units		Optical axis diameter (minimum sensing object)	4 dia. (0.1 dia.)				7.2 dia.	(0.1 dia.)		
			Sensing distance (mm)							
Models	App	pearance (mm)	ЕЗХ	E3X-HD E3NX-			E3X-HD		E3NX-FA	
			∭ GIGA=HS	Other modes	■GIGA=HS	Other modes	■GIGA =HS	Other modes	■GIGA =HS	Other modes
E32-T51 2M	Heat-resistant up to	D 150°C		ST : 4,000 SHS: 1,400		* ST : 4,000 SHS: 1,400		* ST : 4,000 * SHS: 4,000		ST : 4,000 * SHS: 4,000

^{*} The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

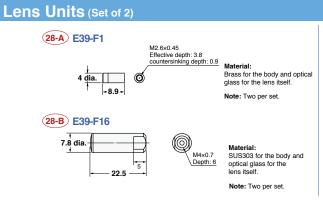
Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

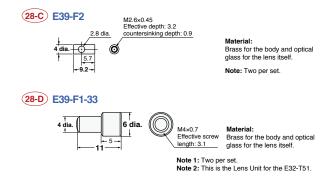
[E3X-HD] GiGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μ s, PNP output: 55 μ s) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μ s)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

Dimensions

Installation Information → Page 61





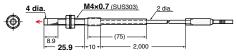
Installation Information → Page 60,61

Beam Improvements

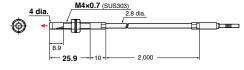
Through-beam Fiber Units (Set of 2)



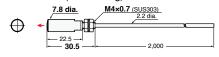




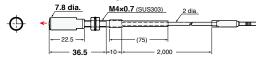
29-C E32-T61-S 2M (No Cutting) + E39-F1



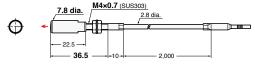
29-D E32-T51R 2M (Free Cutting) + E39-F16



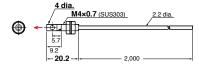
29-E E32-T81R-S 2M (No Cutting) + E39-F16



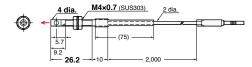
29-F E32-T61-S 2M (No Cutting) + E39-F16



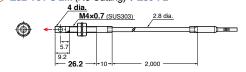
29-G E32-T51R 2M (Free Cutting) + E39-F2



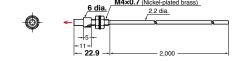
29-H E32-T81R-S 2M (No Cutting) + E39-F2



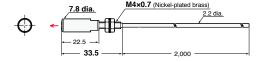
29-I E32-T61-S 2M (No Cutting) + E39-F2



29-J E32-T51 2M (Free Cutting) + E39-F1-33



29-K E32-T51 2M (Free Cutting) + E39-F16

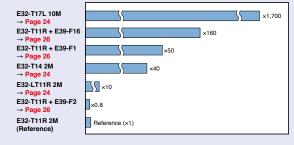


- Reference Information for Model Selection -

Comparisons of incident level

Select the model based on the comparisons of incident level against Standard Fiber Units.

Comparisons of incident level (Through-beam)



Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective Limited-

reflective Chemicalresistant.

Oil-resistant Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi Solar

Narrow View (Detection Across clearance)

Threaded

Cylindrical

Flat

Sleeved

Small Spot High Power

> Narrow view

Retro-reflective

BGS

Chemical-

resistant. Oil-resistant Bending

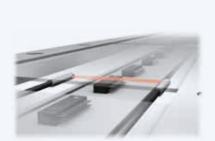
Heatresistant

Area Detection

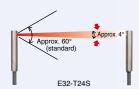
Liquid-level

Vacuum FPD,

Semi, Solar



· A narrow beam prevents false detection of light that is reflected off surrounding objects.



Specifications

■→■ Through-beam Fiber Units

Sensing direction	Aperture angle	Appearance (mm)	Bending radius of cable (mm)	Sensing distance (mm)				Optical axis diameter		Dome 24
				E3X-HD		E3NX-FA		(minimum sensing	Models	Page 31 Dimensions No.
				■ GIGA=HS	Other modes	■GIGA=HS	Other modes			1,0.
Side-view	1.5°	Thickness: 3 mm IP50	R10	3,220	ST : 1,780	4,000*	ST : 2,670	2 dia. (0.1 dia./ 0.03 dia.) 1.2 dia. (0.1 dia./ 0.03 dia.)	E32-A03 2M	31-A
	1.5	24.5 10 Thickness: 3 mm IP50		1,200	SHS: 500	1,800	SHS: 500		E32-A03-1 2M	31-B
	3.4°	20.5 Thickness: 2 mm IP50		1,280 450	ST : 680 SHS: 200	1,920 670	ST : 1,020 SHS: 200		E32-A04 2M	31-C
	4°	20.5 3.5 dia.	Flexible**, R1	1,460	ST : 2,200 SHS: 580	4,000* 2,190	ST : 3,300 SHS: 580		E32-T24SR 2M	31-D
		1950	D.10	1,740	ST : 2,600 SHS: 700	2,610	ST : 3,900 SHS: 700	0.03 dia.)	E32-T24S 2M	31-E
Top-view		15 3 dia. IP50	R10	4,000* 2,500	ST : 3,800 SHS: 1,000	4,000* 3,750	ST : 4,000 SHS: 1,000	1.7 dia. (0.1 dia./ 0.03 dia.)	E32-T22S 2M	31-F

- $^{\star}\,$ The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm. $^{\star\star}\,$ For a definition, see page 90.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

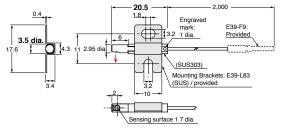
[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(mus\)), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 \(mus\), PNP output: 55 \(mus\), PNP output: 55 \(mus\), and SHS: Super-high-speed mode (NPN output: 50 \(mus\)). [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μ s)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

Installation Information → Page 58 ,60

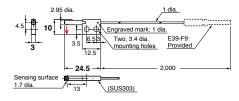
Through-beam Fiber Units (Set of 2)

31-A E32-A03 2M (Free Cutting)



Note: Use the engraved surface and its opposing surface as installation (reference) surfaces.

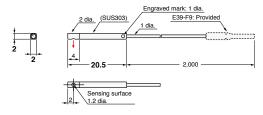
31-B E32-A03-1 2M (Free Cutting)



Note 1: Use the engraved surface and its opposing surface as installation (reference) surfaces.

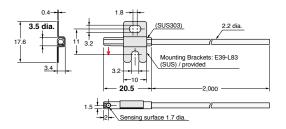
Note 2: Set of two symmetrically shaped Fiber Units.

31-C E32-A04 2M (Free Cutting)

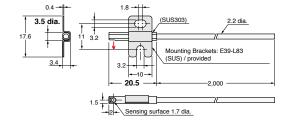


Note: Use the engraved surface and its opposing surface as installation (reference) surfaces.

31-D E32-T24SR 2M (Free Cutting)



31-E E32-T24S 2M (Free Cutting)



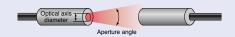
(31-F) E32-T22S 2M (Free Cutting)



Reference Information for Model Selection -

Aperture angle and Optical Axis Diameter

The Aperture angle is the output angle of the emitted beam, and the optical axis diameter is the core diameter of the emitter fiber. A fiber with a narrow view has a larger optical axis diameter than standard fibers, but the aperture angle is smaller so it is not influenced by surrounding objects.



Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective Limited-

reflective Chemical-

resistant. Oil-resistant

> Bending Heat-

resistant Area

Detection Liquid-level

Vacuum FPD, Semi. Solar

Detection without Background Interference

iber Sensor eatures

election inide

Fiber Units

Threaded

Cylindrical

Flat

Small Spot

Sleeved

High Power

Narrow view

BGS

Retroreflectiv

> Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum FPD,

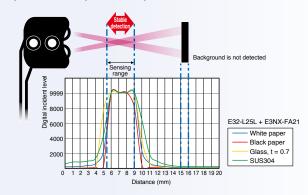
Semi, Solar

ber Amplifiers, ommunications iit, and ccessories

> echnical iuide and recautions

> > Model Index

 These Fiber Units detect only objects in the sensing range. Objects in the background that are located beyond a certain point are not detected.
 They are not easily affected by the material or color of the sensing object.



Specifications

Limited-reflective Fiber Units

Sensing direction	Appearance (mm)	Bending radius of cable (mm)	Se	ensing dis	tance (mm)		Standard		
			E3X-HD		E3NX-FA		sensing object (minimum sensing	Models	Page 33 Dimensions No.
			■GIGA=HS	Other modes	■GIGA=HS	Other modes	object)		140.
Flat-view	20.5 3.8 14 IP40	R25	0 to 15	ST : 0 to 15	0 to 15 0 to 15	ST : 0 to 15	Soda glass with reflection factor of 7%	E32-L16-N 2M	33-A
	2.5 14 11 IP50			ST : 0 to 4 SHS: 0 to 4	0 to 4	ST : 0 to 4 SHS: 0 to 4	(5 <i>μ</i> m dia./	E32-L24S 2M	33-B
Side-view	18 16 IP50	HIU		ST : 5.4 to 9 SHS: 5.4 to 9 (Center 7.2)	5.4 to 9 5.4 to 9 (Center 7.2)	ST : 5.4 to 9 SHS: 5.4 to 9 (Center 7.2)	2 μm dia.)	E32-L25L 2M	33-C

Note 1. If operation is affected by the background, perform power tuning or use the ECO Mode to decrease the incident light level.

- 2. The following mode names and response times apply to the modes given in the Sensing distance column.

 [E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 µs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 µs, PNP output: 55 µs)

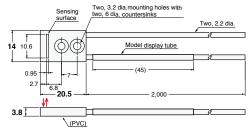
 [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 µs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 µs)
- 3. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.
- 4. The sensing distances for Reflective Fiber Units are for white paper

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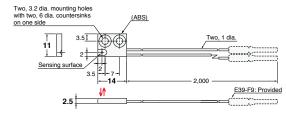


Limited-reflective Fiber Units

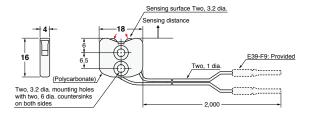
33-A E32-L16-N 2M (Free Cutting)



33-B E32-L24S 2M (Free Cutting)



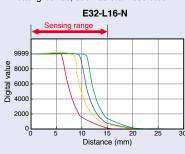
33-C E32-L25L 2M (Free Cutting)

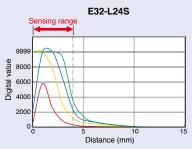


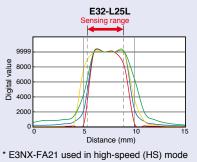
- Reference Information for Model Selection -

Sensing Distance vs. Digital Value

The following graphs show how the digital value is high within the sensing range and small outside. This explains why false detection does not occur outside the sensing range, even against common metal backgrounds, such as stainless steel.







Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

Retroreflective Limited-

reflective Chemical-

resistant. Oil-resistant Bending

> Heatresistant

Area Detection

Liquid-level

Vacuum FPD,

Semi. Solar

White pape Black paper Glass, t = 0.7

SUS304

Retro-reflective

Retro-reflective → This page Limited-reflective → Page 36

iber Sensor eatures

Selection Guide

Fiber Units

Cylindrical

Flat

Small Spot

Sleeved

High Power

Narrow

view

BGS

Retroreflective

Chemical-

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

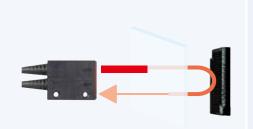
FPD, Semi, Solar

Installation Information

Fiber Ampliners, Communications Unit, and Accessories

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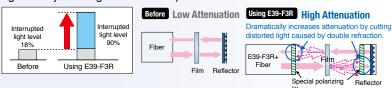


Retro-reflective Fiber Units are ideal for detecting transparent objects.
 The light beam passes through the object twice, rather than only once like a Through-beam model.



 Excellent detection performance with transparent films. (E32-C31 2M + E39-F3R)

The specially designed filter eliminates undesirable light, which allows significantly more light to be interrupted for stable detection of films.



Specifications

Retro-reflective Fiber Units

Туре			Bending	Sensing distance (mm)				Optical axis		D 05
Features	Size	Appearance (mm)	radius of cable (mm)	E3X-HD		E3NX-FA		diameter (minimum sensing	Models	Page 35 Dimensions No.
				■GIGA HS	Other modes	■GIGA HS	Other modes	object)		
Film detection *	М3	13.7 M3 D5 23	R25	250 200	ST : 250	370	ST : 370	-	E32-C31 2M + E39-F3R + E39-RP37	35-A
Square	_	42 21.5 10 10 10 10 10 10 10 10 10 10 10 10 10	ı	150 to 1,500 150 to 1,500	ST : 150 to 1,500 SHS: 150 to 1,500	150 to 2,250 150 to 2,250	ST : 150 to 2,250 SHS: 150 to 1,500	(0.2 dia./ 0.07 dia.)	E32-R16 2M	35-B
Threaded Models	М6	22.5 27.8 38 M6	R10	10 to 250 10 to 250	ST : 10 to 250 SHS: 10 to 250	10 to 370	ST : 10 to 370 SHS: 10 to 250	(0.1 dia./ 0.03 dia.)	E32-R21 2M	35-C

- * This effect may not be as strong for some films. Detection may be unstable if the object is placed directly in front of the Lens Unit. Check suitability beforehand.
- Note 1. Objects with a high reflection factor may cause the Fiber Sensor to detect reflected light as incident light.
 - 2. The following mode names and response times apply to the modes given in the Sensing distance column.

 [E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(mus\)), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 \(mus\)), PNP output: 55 \(mus\)) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(mus\)), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 \(mus\))
 - 3. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

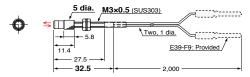
Installation Information → Page 58, 59 and 61

Dimensions

Retro-reflective Fiber Units

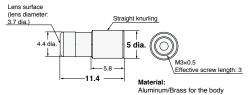


35-A E32-C31 2M (Free Cutting) + E39-F3R

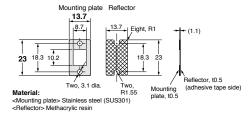


Note: There is a white line on the emitter fiber.

E39-F3R

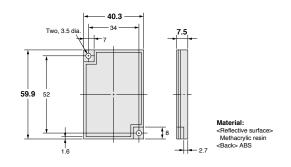


E39-RP37

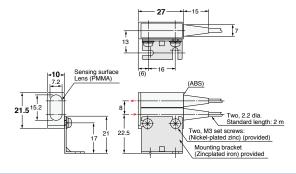


Note: Set includes one Reflector and one Mounting Plate

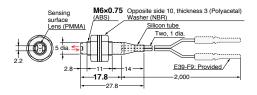
E39-R1 (Provided)



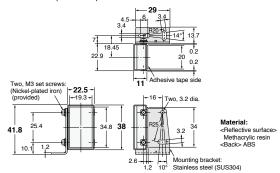
35-B E32-R16 2M (Free Cutting)



35-C E32-R21 2M (Free Cutting)



E39-R3 (Provided)



- Reference Information for Model Selection -

Performance Comparison of Transparent Object Detection

For detecting transparent objects, consider using the following combination: E32-C31, E39-F3R and E39-RP37.

- · This configuration features a special built-in optical filter that ensures stable detection of double-refractive materials, such as films and PET bottles.
- · The retro-reflective model is suitable for detecting glass.

We also offer two models with an integrated lens for detecting glass to prevent lens loss.

Sensing object Models	Film wrapper on cigarette packs	PET bottles	Glass bottles	Plate glass, t: 0.7
E32-C31 2M + E39-F3R + E39-RP37	0	0	0	0
E32-R16 2M		Δ	0	0
E32-R21 2M		Δ	0	0

O= better O = best

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective Limited-

reflective Chemical-

resistant. Oil-resistant

> Bending Heat-

resistant Area Detection

Liquid-level

Vacuum FPD,

Semi.

Solar

iber Sensor eatures

Selection Suide

Fiber Units

Threaded

Cylindrical

Flat

Small Spot

Sleeved

High Power

Narrow view

Retroreflectiv

BGS

Limitedreflective Chemical-

resistant, Oil-resistant

Heatresistant

Area Detection

Liquid-level

Vacuum

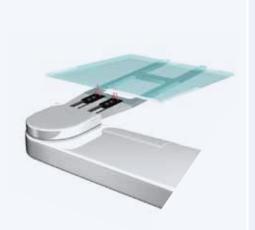
FPD, Semi, Solar

Installation Information

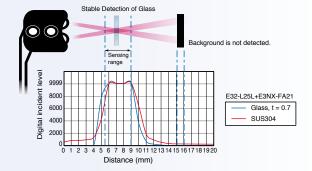
Fiber Amplitiers, Communications Unit, and Accessories

> echnical iuide and recautions

> > Model Index



These Fiber Units are based on a limited-reflective optical system where
the emitting light and receiving light axes intersect at the same angle.
This allows for stable detection of glass because the Fiber Units receives
the specular reflection of the glass when the glass is in the sensing range.



Specifications

□

Ту	ре		Bending	9	ensing di	stance (mm)		Standard		Danie 07
Features	Detection direction	Appearance (mm)	radius of cable	E3X-I	HD	E3NX-	FA	sensing object (minimum	Models	Page 37 Dimensions No.
	uncotion		(mm)	■GIGA=HS	Other modes	■GIGA=HS	Other modes	sensing object)		
Small		14 2.5 <u>1</u>	R10	0 to 4	ST : 0 to 4	0 to 4	ST : 0 to 4	(5 μm dia./	E32-L24S 2M	37-A
size		11 IP50		0 to 4	SHS: 0 to 4	0 to 4	SHS: 0 to 4	2 μm dia.)	E32-L245 2M	U A
		20.5		0 to 15	ST : 0 to 15	0 to 15	ST : 0 to 15			
Standard	Flat-	3.8 1 14		0 to 15	SHS: 0 to 12	0 to 15	SHS: 0 to 12		E32-L16-N 2M	(37-B)
Glass- substrate	view	24.5	B25	10 to 20	ST : 10 to 20	10 to 20	ST : 10 to 20	Soda glass with		
alignment, 70°C		24.5 5 1 14 IP40	H25	== 10 to 20	SHS: -	== 10 to 20	SHS: -	reflection factor of 7%	E32-A08 2M *	(37-C)
Standard		24.5		12 to 30	ST : 12 to 30	12 to 30	ST : 12 to 30		T00 140 011	
long distance		51 14 IP40		12 to 30	SHS: -	12 to 30	SHS: -		E32-A12 2M	(37-D)
Side	Side-	18		5.4 to 9	ST : 5.4 to 9	5.4 to 9	ST : 5.4 to 9	(5 μm dia./		
View form	view	16 IP50	R10	5.4 to 9 (Center 7.2)	SHS: 5.4 to 9 (Center 7.2)	5.4 to 9 (Center 7.2)	SHS: 5.4 to 9 (Center 7.2)	2 μm dia.)	E32-L25L 2M	(37-E)
Glass- substrate	Тор-	23		15 to 38	ST : 15 to 38	15 to 38	ST : 15 to 38	End surface of soda glass with reflection factor		
Mapping, 70°C	view	9 1 20 IP40	R25	15 to 38 (Center 25)	(Center 25) SHS: –	15 to 38 (Center 25)	(Center 25) SHS: -	of 7% (t = 0.7 mm, rounded edges)	E32-A09 2M	37-F

^{*} If the background influences the sensing accuracy, perform power tuning or use the ECO mode to decrease the incident light level.

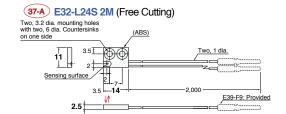
Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(\mu\)s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 \(\mu\)s, PNP output: 55 \(\mu\)s [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(\mu\)s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 \(\mu\)s)

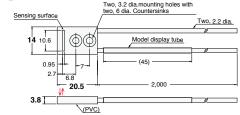
2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

 ${\bf 3.}$ The sensing distances for Reflective Fiber Units are for white paper

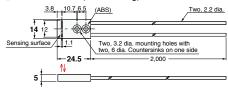
Limited-reflective Fiber Units



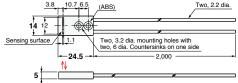
37-B E32-L16-N 2M (Free Cutting)



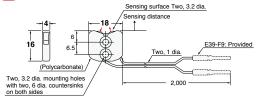
37-C E32-A08 2M (Free Cutting)



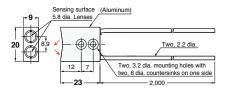
37-D E32-A12 2M (Free Cutting)



37-E E32-L25L 2M (Free Cutting)



37-F E32-A09 2M (Free Cutting)



- Reference Information for Model Selection -

E32-L24S

Distance (mm)

Sensing Distance vs. Digital Value

nsing range

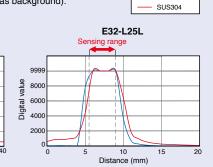
Limited-reflective Fiber Unit can keep high digital value within the sensing area for glass.

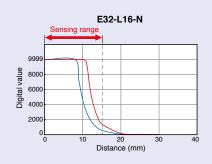
The digital value gets lower out of the sensing area for metals, including SUS (common as background).

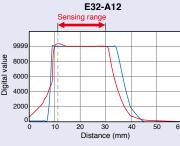
8000

6000 Digital

4000

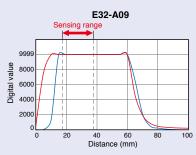






E32-A08

Distance (mm)



* E3NX-FA21 used in high-speed (HS) mode.

Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limited-

Chemicalresistant. Oil-resistant

> Bending Heatresistant

Area Detection

Liquid-level

Vacuum FPD, Semi

Solar

Chemical-resistant, Oil-resistant

Threaded Cylindrical

Flat Sleeved

Small Spot High Power

Narrow view BGS

Retroreflective

resistant, Oil-resistar Bending

Environmental Heatresistant

Detection

Liquid-level Vacuum

FPD, Semi. Solar

• These Fiber Units are made from fluororesin for resistance to chemicals.

Chemical-resistant Data for Fluororesin (Reference)

Material Chemical	Fluororesin	Acryl	ABS	Polycarbonate	Polyethylene	PVC
Hydrochloric acid	0	Δ	Δ		Δ	×
Sulfuric acid	0	×	×	×	×	×
Sodium hydroxide	0	Δ	Δ	×	0	×
Methyl alcohol	0	×	Δ	×	0	×
Acetone	0	×	×	×	Δ	×
Toluene	0	Δ	×	×	Δ	×
Benzene	0	Δ	Δ	×	Δ	×

Note: Results depend on concentration.

 \triangle = good \bigcirc = better

O = best

Specifications

--- Through-beam Fiber Units

		i boain i iboi		0-				Optical axis		
Туре	Sensing direction	Appearance (mm)	Bending radius of cable	E3X-HD		tance (mm)	A	diameter (minimum sensing	Models	Page 39 Dimensions No.
			(mm)	■GIGA = HS	Other modes	■GIGA =HS	Other modes			140.
Oil- resistant	Right- angle	19.1 M8	Flexible*, R1	4,000 *1 4,000 *1	*1 ST : 4,000 SHS: 2,200	4,000 *1 4,000 *1	*1 ST : 4,000 SHS: 2,200		E32-T11NF 2M	39-A
		20 5 dia. IP67	R40	4,000 *1 4,000 *1	*1 ST : 4,000 SHS: 1,600	4,000 *1 4,000 *1	ST : 4,000 SHS: 1,600	4 dia. (0.1 dia./ 0.03 dia.)	E32-T12F 2M	39-B
Chemical/ oil resistant	Top-view	7.2 dia. IP67	R4	4,000 *1 2,600	ST : 4,000 SHS: 1,000	4,000 *1	*1 ST : 4,000 SHS: 1,000		E32-T11F 2M	39-C
	Side-view	5 dia.	D40	1,400 500	ST : 800 SHS: 200	2,100 750	ST : 1,200 SHS: 200	3 dia. (0.1 dia./ 0.03 dia.)	E32-T14F 2M	39-D
Chemical/ oil resistant 150°C *2	Top-view	20 5 dia. IP67	R40	1,800	ST : 2,800 SHS: 700	4,000 *1	*1 ST : 4,000 SHS: 700	4 dia. (0.1 dia./ 0.03 dia.)	E32-T51F 2M	39-E

Reflective Fiber Units

			Bending	Se	nsing dis	tance (mm)		Standard		Danie 00
Туре	Sensing direction	Appearance (mm)	radius of cable	E3X-HD		E3NX-F	A	sensing object (minimum	Models	Page 39 Dimensions No.
			(mm)	■GIGA = HS	Other modes	■GIGA = HS	Other modes	sensing object)		
Semiconductors: Cleaning, developing, and etching, 60°C		Mounting holes A IP67		(Recomme 19 to 31 mm	nded sens	om tip of lens ing distance: 11 m er of mounting hol ing distance: 22 m	e A	Glass	E32-L11FP 2M	39-F
Semiconductors: Resist stripping, 85°C	Top-view	Mounting holes A 1717.5 IP67	R40	(Recomme 32 to 44 mm	nded sens from cent	om tip of lens ing distance: 11 m er of mounting hol ing distance: 35 m	e A	(t=0.7 mm)	E32-L11FS 2M	39-G
Chemical/ oil resistant	Top-view	16 A 6 dia.		GIGA -	ST : 190 SHS: 60	GIGA – ■190	ST : 280 SHS: 60	(5 μm dia./	E32-D12F 2M	39-H
Only cable: chemical resistant		17 M6	R4	■ 840 ■ 240	ST : 350 SHS: 100	1,260 360	ST : 520 SHS: 100	2 μm dia.)	E32-D11U 2M	39-1

^{*} For a definition, see page 90.

 $^{^{\}rm +1}$ The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm. $^{\rm +2}$ For continuous operation, use the Fiber Unit between –40 and 130°C.

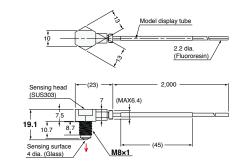
<sup>Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.
[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μs, PNP output: 55 μs)
[E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μs)
2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.
3. The sensing distances for Reflective Fiber Units are for white paper.</sup>

Dimensions

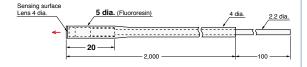
Installation Information → Page 60

Through-beam Fiber Units (Set of 2)

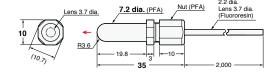
39-A E32-T11NF 2M (Free Cutting)



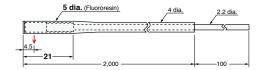
39-B E32-T12F 2M (Free Cutting)



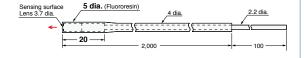
39-C E32-T11F 2M (Free Cutting)



39-D E32-T14F 2M (Free Cutting)

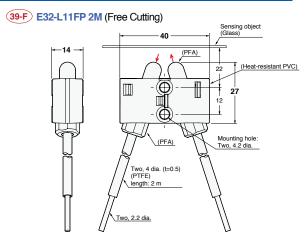


39-E E32-T51F 2M (Free Cutting)

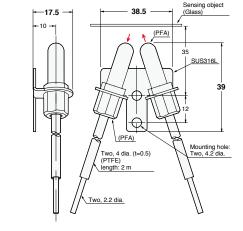


Installation Information → Page 58 ,59

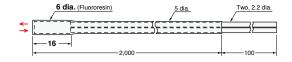
Reflective Fiber Units



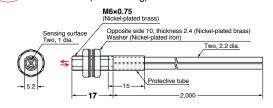
39-G E32-L11FS 2M (Free Cutting)



39-H E32-D12F 2M (Free Cutting)



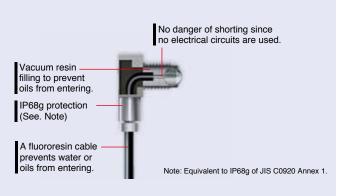
39-I E32-D11U 2M (Free Cutting)



- Reference Information for Model Selection -

Oil-resistance performance of the E32-T11NF

This diagram explains why the new E32-T11NF is oil resistant.



Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS Retro-

reflective reflective

resistant,

Bending Heat-

resistant

Detection Liquid-level

Vacuum

FPD, Semi

Solar

Through-beam → This page

Cylindrical

Flat

Small Spot

Sleeved

High Power

Narrow view

Retroreflective

BGS

Chemicalresistant. Oil-resistant

Bendina

Heatresistant

Detection

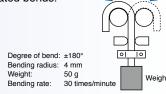
Liquid-level

Vacuum

FPD, Semi. Solar



· Capable of withstanding one million repeated bends.



· A large number of independent fine fibers ensures good flexibility. Suitable for use on moving parts without easily breaking.



· Protective Stainless Spiral Tube is available for covering the fiber cable to protect it from accidental breaking due to snagging or shock.

Specifications

-→ Through-beam Fiber Units

		Bending	Se	nsing dis	tance (mn	n)		Optical axis diameter		D 44
Size	Appearance (mm)	radius of cable	E3X-HD		E3	NX-F	A	(minimum sensing	Models	Page 41 Dimensions No.
		(mm)	■GIGA =HS	Other modes	■GIGA	=HS	Other modes			110.
1.5 dia.	10		680	ST : 400		1,020	ST : 600	0.5 dia. (5 μm dia./	E32-T22B 2M	41-A
М3	11 M3	Bend-	220	SHS: 90	330		SHS: 90	2 μm dia.)	E32-T21 2M	41-B
M4	14 A N4 IP67	resistant*, R4	2,500	ST : 1,350		3,750 1,350	ST : 2,020 SHS: 360	1 dia. (5 μm dia./ 2 μm dia.)	E32-T11 2M	41-C
Square	12 12		500	ST : 300 SHS: 70	250	750	ST : 450 SHS: 70	0.5 dia. (5 μm dia./ 2 μm dia.)	E32-T25XB 2M	41-D

^{*} Bend-resistant fibers are for repeated bending applications, whereas Flexible fibers are meant for routing around tight corners.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 µs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 µs, PNP output: 55 µs) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 µs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 µs)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

Protective Stainless Spiral Tube (Sold separately)

Insert the fiber cable into the protective tube to prevent breaking by snagging or shock.

Applicable Fiber Units	Model	Quantity	Page 41 Dimensions No.
E32-T11R 2M/E32-T11 2M/ E32-LT11 2M/E32-LT11R 2M/ E32-T51R 2M/E32-T51 2M	E39-F32C	2 pieces	41-E

^{*} This Tube cannot be used if a Lens Unit is being used

Installation Information → Page 60 ,61

Cylindrical

Sleeved

Small Spot

High Power Narrow

> view BGS

Retro-reflective

reflective Chemical-

resistant, Oil-resistant Bending

> Heatresistant

Detection

Liquid-level

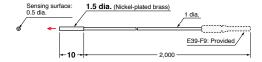
Vacuum FPD, Semi.

Solar

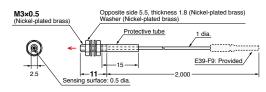
Dimensions

Through-beam Fiber Units (Set of 2)

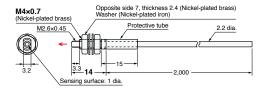
41-A E32-T22B 2M (Free Cutting)



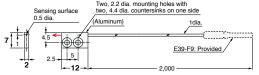
41-B E32-T21 2M (Free Cutting)



41-C E32-T11 2M (Free Cutting)



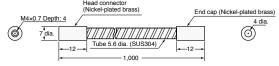
41-D E32-T25XB 2M (Free Cutting)



Note 1: Set of two symmetrically shaped Fiber Units.

Note 2: Four, M2 × 8 stainless steel countersunk mounting screws are provided.

41-E E39-F32C



Through-beam → Page 40

iber Sensor eatures

election uide

Fiber Units

Threaded

Cylindrical

Flat Sleeved

Small Spot

Narrow view
BGS

Retro-reflective
Limited-reflective

Chemicalresistant, Oil-resistant

Heatresistant

Detection

Liquid-level

Vacuum

FPD, Semi, Solar

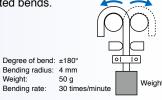
Installation

iber Amplitiers, Sommunications Jnit, and Accessories

> Technical Guide and Precautions

> > Model Index

Capable of withstanding one million repeated bends.



 A large number of independent fine fibers ensures good flexibility. Suitable for use on moving parts without easily breaking.



 Protective Stainless Spiral Tube is available for covering the fiber cable to protect it from accidental breaking due to snagging or shock.

Specifications

Beflective Fiber L

		Bending		Se	nsing di	stance (mm)		Optical axis diameter		Page 43
Size	Appearance (mm)	radius of cable	E	3X-HE)	E3NX-I	FA			Dimensions No.
		(mm)	■GIGA ■	HS	Other modes	■GIGA = HS	Other modes			
1.5 dia.	15 dia.		140		ST : 60	210	ST : 90		E32-D22B 2M	43-A
М3	11 M3		■ 40		SHS: 16	60	SHS: 16		E32-D21 2M	43-B
3 dia.	ф3	Bend-resistant*,	300		ST : 140	450	ST : 210	(5 μm dia./	E32-D221B 2M	43-C
M4	15 M4	R4	90		SHS: 40	130	SHS: 40	2 μm dia.)	E32-D21B 2M	43-D
М6	17 M6 IP67		240	840	ST : 350 SHS: 100		ST : 520 SHS: 100		E32-D11 2M	43-E
Square	12 21 8		240		ST : 100 SHS: 30	360	ST : 150 SHS: 30		E32-D25XB 2M	43-F

- * Bend-resistant fibers are for repeated bending applications, whereas Flexible fibers are meant for routing around tight corners.
- Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

 [E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μs, PNP output: 55 μs)

 [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μs)
 - 2. The values for the E3X-HD and the second value is for the E3X-FA.
 - The first value is for the E3X-HD and the second value is for the E3N 3. The sensing distances for Reflective Fiber Units are for white paper.

Protective Stainless Spiral Tube (Sold separately)

Insert the fiber cable into the protective tube to prevent breaking by snagging or shock.

Applicable Fiber Units	Models	Quantity	Page 43 Dimensions No.
E32-D21R 2M/E32-C31 2M/ E32-D21 2M	E39-F32A	1 piece	
E32-D211R 2M/E32-D21B 2M	E39-F32C	2 pieces	43-G
E32-D11R 2M/E32-CC200 2M/ E32-D11 2M/E32-D51R 2M/ E32-D51 2M	E39-F32D	1 piece	

^{*} This Tube cannot be used if a Lens Unit is being used.

Installation Information → Page 58, 59 and 61

High Power
Narrow

view

Retroreflective Limited-

Chemicalresistant, Oil-resistant

reflective

Bending Heat-

Area Detection

Liquid-level

Vacuum

FPD, Semi, Solar

Installation Information

Fiber Amplifiers, Communications Unit, and

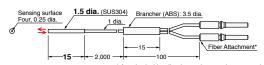
> schnical uide and

> > Model Inde

Dimensions

Reflective Fiber Units

43-A E32-D22B 2M (No Cutting)



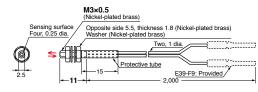
* Attached with adhesive and cannot be removed.

Enlarged View of Sensing Surface
Two 0.25 dia.
emitter fibers
Two, 0.25 dia.
receiver fibers

Enlarged View of Sensing Surface

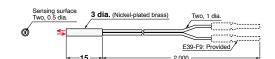
Two 0.25 dia.
emitter fibers

43-B E32-D21 2M (Free Cutting)

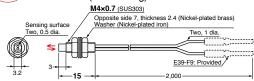


Two, 0.25 dia. receiver fibers

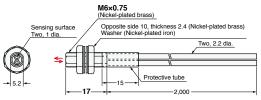
43-C E32-D221B 2M (Free Cutting)



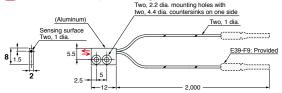
43-D E32-D21B 2M (Free Cutting)



43-E E32-D11 2M (Free Cutting)

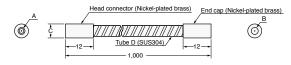


43-F E32-D25XB 2M (Free Cutting)



Note: Two, M2×8 stainless steel countersunk mounting screws are provided

43-G E39-F32A/E39-F32C/E39-F32D



Models	Α	В	С	D
E39-F32A	M3×0.5 Depth: 4	3 dia.	6 dia.	(4.6 dia.)
E39-F32C	M4×0.7 Depth: 4	4 dia.	7 dia.	(5.6 dia.)
E39-F32D	M6×0.75 Depth: 4	5 dia.	8.5 dia.	(7 dia.)

Heat-resistant

Through-beam → This page

Reflective → Page 46

Threaded

Cylindrical

Flat

Sleeved

Small Spot High Power

Narrow view

Retroreflective

BGS

Chemical-

resistant. Oil-resistant

Bendina

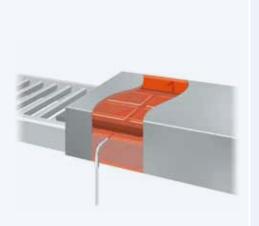
resistant

Detection

Liquid-level

Vacuum

FPD, Semi. Solar



• Wide product variety for temperatures from 100 to 350°C. Select the model according to heat-resistant temperature.

Specifications

■→■ Through-beam Fiber Units

IIt		Bending	Se	nsing dis	tance (mm)		Optical axis diameter		Danie 45
Heat- resistant temperature	Appearance (mm)	radius of cable	f cable E3X-HD		E3NX-F	A	(minimum sensing	Models	Page 45 Dimensions No.
•		(mm)	■GIGA =HS	Other modes	■GIGA = HS	Other modes	object)	Models E32-T51R 2M E32-T51 2M E32-T81R-S 2M	
100°C *1	14.	Flexible*,	1,600	ST : 800	2,400	ST : 1,200	(0.1 dia./	E32-T51R 2M	45-A
	M4 IP50		560	SHS: 225	840	SHS: 225	0.03 dia.)	E32-T51 2M	
150°C *2	17 M4 [IP67	R35	1,000	ST : 1,500 SHS: 400	1,500	ST : 2,250 SHS: 400	(0.1 dia./	E32-T51 2M	45-B
200°C *3	30 20 M4 IP67	R10	1,000	ST : 550 SHS: 140	1,500	ST : 820 SHS: 140	(5 µm dia./	E32-T81R-S 2M	45-C
350°C *4	30 20 M4 IP67	R25	1,680	ST : 900 SHS: 240	2,520	ST : 1,350 SHS: 240	(5 µm dia./	E32-T61-S 2M	45-D
70°C			_	_				Standard Fiber Units can be used.	-

- * For a definition, see page 90.
 *1 For continuous operation, use the Fiber Unit between -40 to 90°C.
- For continuous operation, use the Fiber Unit between –40 to 130°C.

 The heat-resistant rating is not the same for all parts of the Fiber Unit. Refer to the dimensions diagrams for details.
- The ambient operating temperature for the E32-T61-S 2M is -60 to 350°C
- The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA; Giga-power mode (16 ms), HS: High-speed mode (250 us), ST; Standard mode (1 ms), and SHS; Super-high-speed mode (NPN output; 50 us, PNP output; 55 us) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μs)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values The first value is for the E3X-HD and the second value is for the E3NX-FA.

Installation Information → Page 60

Threaded Cylindrical

> Flat Sleeved

High Power

Small Spot

Narrow view BGS

Retroreflective

reflective Chemical-

resistant. Oil-resistant Bending

resistant Area Detection

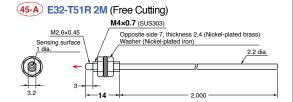
Liquid-level

Vacuum

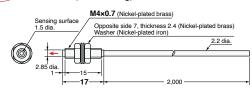
FPD, Semi. Solar

Dimensions

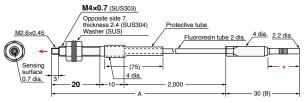
Through-beam Fiber Units (Set of 2)



45-B E32-T51 2M (Free Cutting)

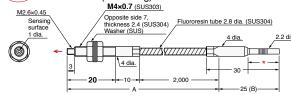


45-C E32-T81R-S 2M (No Cutting)



The maximum allowable temperatures for sections A and B are 200°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by ') must be maintained within the Amplifier Unit's operating temperature range.

45-D **E32-T61-S 2M** (No Cutting)



Note: The maximum allowable temperatures for sections A and B are 350°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by ') must be maintained within the Amplifier Unit's operating temperature range.

- Reference Information for Model Selection -

Long-distance Sensing Applications

A separate Lens Unit can be attached to extend the sensing distance.

→ Page 28

Heat-resistant

Threaded

Cylindrical

Flat

Small Spot

Sleeved

High Power Narrow view

BGS

reflective

Chemicalresistant. Oil-resistant

Bending

resistant Detection

Liquid-level

Vacuum FPD, Semi.

Solar

• Wide product variety for temperatures from 100 to 400°C. Select the model according to heat-resistant temperature.

Specifications

Reflective Fiber Units

Heat- resistant	Appearance (mm)	Bending radius			distance (mm)		Standard sensing object	Models	Page 47
temperature	Appearance (mm)	of cable (mm)	E3X-H	_	E3NX-F		(minimum sensing object)	wodels	No.
100°C *1	17.5 M6	Flexible*,	670 190	ST : 280 SHS: 80	1,000 280	ST: 420 SHS: 80		E32-D51R 2M	47-A
150□ *2	17 M6 IP67	R35	1,120	ST : 450 SHS: 144	1,680	ST : 670 SHS: 144	(5 μm dia./ 2 μm dia.)	E32-D51 2M	47-B
200□ *3	25 M6 IP67	R10	420	ST : 180 SHS: 54	630	ST : 270 SHS: 54		E32-D81R-S 2M	47-C
300□ -	26 5 1 18		10 to 20	ST : 10 to 20 SHS: -	10 to 20	ST : 10 to 20 SHS: -	Soda glass with reflection factor of 7%	E32-A08H2 2M	47-D
3000	9 24		20 to 30	ST : 20 to 30 SHS: -	20 to 30	ST : 20 to 30 SHS: -	End surface of soda glass with eflection factor of 7% (t = 0.7 mm, rounded edges)	E32-A09H2 2M	47-E
350□ *3	28 M4 IP67	R25	420	ST : 180	630	ST : 270		E32-D611-S 2M	47-F
	25 M6		120	SHS: 54	180	SHS: 54	(5 μm dia./ 2 μm dia.)	E32-D61-S 2M	47-G
400□ *3	60 M4 M4		280 80	ST : 120 SHS: 36	420	ST : 180 SHS: 36		E32-D73-S 2M	47-H
70□			_	-				Standard Fiber Units can be used.	-

- For continuous operation, use the Fiber Unit between -40 to 90°C.
- For continuous operation, use the Fiber Unit between –40 to 130°C.

 The heat-resistant rating is not the same for all parts of the Fiber Unit. Refer to the dimensions diagrams for details.

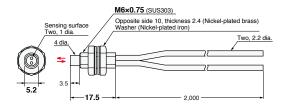
Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

- [E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μ s, PNP output: 55 μ s) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(\mu\)s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 \(\mu\)s)
- 2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.
- 3. The sensing distances for Reflective Fiber Units are for white paper.

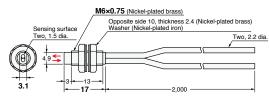
Environmental Immunity

Reflective Fiber Units

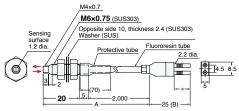
47-A E32-D51R 2M (Free Cutting)



47-B E32-D51 2M (Free Cutting)

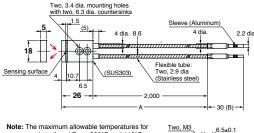


47-C E32-D81R-S 2M (No Cutting)



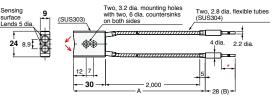
Note: The maximum allowable temperatures for sections A and B are 200°C and The maximum animonate empleatures or sections A and 5 are 500 and 10°C, respectively. The section inserted into the Amplifier Unit's operating temperature range.

47-D E32-A08H2 2M (No Cutting)



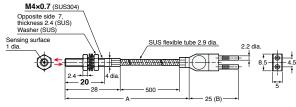
sections A and B are 300°C and 110°C, respectively. Mounting holes

47-E E32-A09H2 2M (No Cutting)



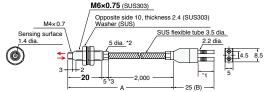
Note: The maximum allowable temperatures for sections A and B are 300°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *) must be maintained within the Amplifier Unit's operating temperature range.

47-F E32-D611-S 2M (No Cutting)



Note: The maximum allowable temperatures for sections A and B are 300°C and 110°C, respectively

47-G E32-D61-S 2M (No Cutting)

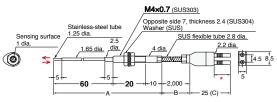


*2. The diameter is 6 dia. if the fiber

length exceeds 10 m.
The length is 10 if the fiber length exceeds 10 m.

The maximum allowable temperatures for sections A and B are 350°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by "1) must be maintained within the Amplifier Unit's operating temperature range

47-H E32-D73-S 2M (No Cutting)



400°C, 300°C, and 110°C, respectively.

The section inserted into the Amplifier Unit (indicated by *) must be maintained within the Amplifier Unit's operating temperature range

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

reflective

Chemicalresistant. Oil-resistant

Bending

resistant

Area Detection

Liquid-level

Vacuum

FPD. Semi Solar

Area Beam (Area Detection)

Threaded Cylindrical

Flat

Small Spot

High Power

Sleeved

Narrow view

Retroreflective

BGS

Chemicalresistant. Oil-resistant

Bendina

Heatresistant

Detection

Liquid-level

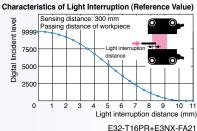
Vacuum FPD,

Semi. Solar

Detection of falling workpieces Meander detection

Detection of workpieces with holes

- · Area beams are optimum for detecting workpieces presented in inconsistent positions, such as falling workpieces, or for meander detection, or for detecting workpieces with holes.
- · This Fiber Unit is ideal for meander detection because it outputs the digital value in a linear relation to the interrupted light distance.



Specifications

■→■ Through-beam Fiber Units

			Bending	Sei	nsing dis	tance (mm)		Optical axis		
Туре	Sensing width	Appearance (mm)	radius of cable (mm) E3X-HD		E3NX-FA		diameter (minimum sensing	Models	Page 49 Dimensions No.	
				■GIGA = HS	Other modes	■GIGA = HS	Other modes			
	11 mm	14.5 27 4 1P50		3,100	ST : 1,700 SHS: 440	4,000 *1 1,680	ST : 2,550 SHS: 440	*2 (0.2 dia./	E32-T16PR 2M E32-T16JR 2M	49-A
Area		27 17.8 IP50	Flexible*, R1	2,750	ST : 1,500 SHS: 380	4,000 *1 1,440	ST : 2,250 SHS: 380	0.07 dia.)		49-B
	30 mm	69 5-3. IP50		4,000 *1 1,700	ST : 2,600 SHS: 680	4,000 *1 2,550	ST : 3,900 SHS: 680	*2 (0.3 dia./ 0.1 dia.)	E32-T16WR 2M	49-C

- * For a definition, see page 90.
- The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.
- The values for the minimum sensing object were obtained for detection in the sensing area with the sensing distance set to 300 mm. (The values are for a stationary sensing object.)

The first value is for the E3X-HD and the second value is for the E3NX-FA.

Reflective Fiber Units

			Bending		Ser	nsing dis	stance (m	m)		Optical axis		D 40	
Туре	Sensing width	Appearance (mm)	radius of cable	E3X-HD			E3NX-FA		A	diameter (minimum sensing	Model	Page 49 Dimensions No.	
			(mm)	■GIGA =	-HS	Other modes	■GIGA	=HS	Other modes			1101	
Array	11 mm	15 5 25	Bend- resistant*, R4	700 200		ST : 300 SHS: 90	1,050		ST : 450 SHS: 90	(5 μm dia./ 2 μm dia.)	E32-D36P1 2M	49-D	

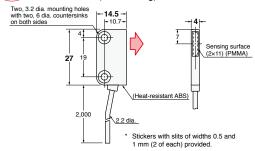
- * Bend-resistant fibers are for repeated bending applications, whereas Flexible fibers are meant for routing around tight corners.
- Note 1. The following mode names and response times apply to the modes given in the Sensing distance column. [E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 µs), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 µs, PNP output: 55 µs) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μ s)
 - 2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

Dimensions

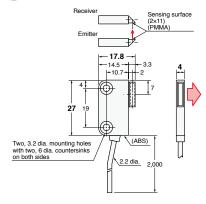
Installation Information → Page 60

Through-beam Fiber Units (Set of 2)

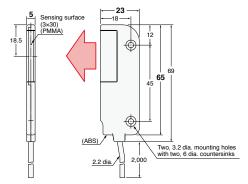
49-A E32-T16PR 2M (Free Cutting)



49-B E32-T16JR 2M (Free Cutting)



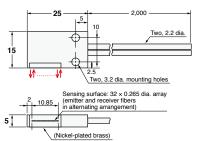
49-C E32-T16WR 2M (Free Cutting)



Installation Information → Page 59

Through-beam Fiber Units (Set of 2)

49-D E32-D36P1 2M (Free Cutting)



Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retro-reflective Limited-

reflective Chemical-

resistant, Oil-resistant

Bending

Heatresistant

Detection

Liquid-level

Vacuum

FPD, Semi. Solar

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power Narrow view

BGS

Retroreflective

Chemicalresistant. Oil-resistant

Bendina

Heatresistant

Area Detection

Liquid-level

Vacuum FPD,

Liquid-level Detection



· Fiber Units for detecting liquid levels are available in two types: for tube mounting and liquid contact.

▶ Tube-mounting Types

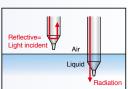
Detect the liquid level inside transparent tubes. Strap the Fiber Unit to a tube with band.



► Liquid-contact Type

Detect the liquid level by direct contact with the liquid.

This model has excellent chemical-resistance because the Fiber Unit is covered in fluororesin.



Specifications

Detection scheme	Tube diameter Features		Appearance (mm)	Bending radius of cable (mm)	Applicable range	Optical axis diameter (minimum sensing object)	Models	Page 51 Dimensions No.
	3.2, 6.4 and 9.5 dia.	Resistant to bubbles and droplets Residual quantity detection	19.9 27	Bend- resistant*, R4	Applicable tube: Transparent tube with a diameter of 3.2, 6.4, or 9.5 dia. and a recommended wall thickness of 1 mm	_	E32-A01 5M	51-A
Tube- mounting	8 to 10 dia.	Ideal for mounting at multilevels	10 T	R10	Applicable tube: Transparent tube with a diameter of 8 to 10 dia. and a recommended wall thickness of 1 mm	_	E32-L25T 2M	(51-B)
	No restrictions	Usable on large diameter tubes Resistant to bubbles and droplets	23.45 215	R4	Applicable tube: Transparent tube (no restrictions on diameter)	_	E32-D36T 2M	(51-C)
Liquid contact (heat-resistant up to 200°C)		_	6 dia.	R40 R25 *3	Liquid-contact Type *1	-	E32-D82F1 4M	(51-D)

- * Bend-resistant fibers are for repeated bending applications, whereas Flexible fibers are meant for routing around tight corners.

 *1 If the incident light level is too high, perform power tuning or use the ECO mode to decrease the incident level.

 *2 The applicable range is the same whether an E3X-HD series or E3NX-FA series is used.

 When using a Fiber Amplifier Unit in gigar-power mode, level detection may not work depending on the tube diameter. Make sure to confirm operation with the actual tube.
- *3 The bending radius of the sensing section (except for the unbendable section) is 40 mm, and the bending radius of the fiber is 25 mm.

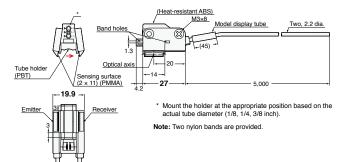
- Reference Information for Model Selection -

Determining the Best Model for Tube-mounted Types

Mounting and conditions	Recommended Unit	Features
When bubbles and the water droplets are generated	E32-A01	This is a Through-beam Model, so the incident light will differ greatly between with and without of liquid. It also uses an area beam, which is less prone to false detection by bubbles and droplets. Without liquid With liquid Light interrupted Light incident
Multilevel installation in limited space	E32-L25T	This model is suitable for mounting at multilevels because of the thin type (height: 10 mm).
Mounting on large diameter tubes	E32-D36T	This model has no restrictions on the tube diameter, so it can be mounted on many different tube sizes. It also uses an area beam, which is less prone to false detection by bubbles and droplets. Without liquid Air Tube Reflective= Light incident

Dimensions

51-A E32-A01 5M (Free Cutting)

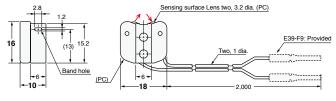


Installation Information → Page 58,59

Tube-mounting Examples



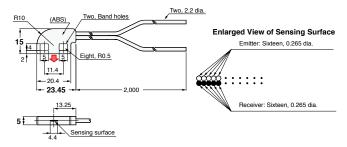
51-B E32-L25T 2M (Free Cutting)





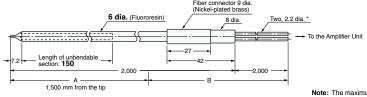
Note: Two nylon bands and one anti-reflector are provided

51-C E32-D36T 2M (Free Cutting)





51-D E32-D82F1 4M (Free Cutting)



* The 2-m section of optical fiber on the Amplifier unit side is plastic and therefore allows free cutting.

Note: The maximum allowable temperature is 200°C for section A and 85°C for section B.

And

Designed for Safe Residual quantity detection (E32-A01 only)

The E32-A01 Fiber Unit is designed to default to the same output as for liquid absent in the event of a failure, such as when the fiber breaks. This makes it suitable for residual quantity detection.

Trouble (disconnection)	Light interrupted
Without liquid	Light interrupted
With liquid	Light incident

If the failure goes unnoticed, this failsafe design will prevent false detection of liquid when there is no liquid present.

Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective Limited-

reflective Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi. Solar

Threaded Cylindrical

Flat Sleeved

Small Spot **High Power**

Narrow view BGS

Retro-reflective

Chemicalresistant. Oil-resistant Bending

> Heatresistant

Area Detection

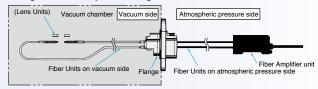
Liquid-level

Vacuum FPD,

Semi. Solar

- Can be used under high vacuums of up to 10⁻⁵ Pa.
- · Available in models with heat resistant up to 120 or 200°C.

Configuration Example for using under vacuum





Specifications

■→■ Through-beam Fiber Units

	Uest		Bending	Ser	sing dis	tance (mm)		Optical axis		Domo F2
Туре	Heat- resistant temperature	Appearance (mm)	radius of cable	E3Y-HD)	E3NX-F	4	diameter (minimum sensing	Models	Page 53 Dimensions No.
	topo.ata.o		(mm)	■GIGA = HS	Other modes	■GIGA = HS	Other modes			
	120□	30 M4	- R30	720 260	ST : 400 SHS: 100	1,080 390	ST : 600 SHS: 100	1.2 dia. (10 µm dia./ 4 µm dia.)	E32-T51V 1M	53-A
Vacuum side	1200	35.9 4 dia.	H30	2,000*	ST : 2,000 SHS: 520	2,000*	* ST : 2,000 SHS: 520	4 dia. (0.1 dia./ 0.03 dia.)	E32-T51V 1M + E39-F1V	53-B
	200□	3 dia.	- R25	1,760	ST : 950 SHS: 260	2,000*	ST : 1,420 SHS: 260	2 dia. (0.1 dia./ 0.03 dia.)	E32-T84SV 1M	53-C
Atmospheric pressure side	70 □		1123	_	ST : - SHS: -	_	ST : - SHS: -	_	E32-T10V 2M	53-D

 $^{^{\}star}$ The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μ s, PNP output: 55 μ s) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μ s)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

Flange

Appearance	Туре	Models	Page 53 Dimensions No.
	4-channel flange	E32-VF4	53-E
5	1-channel flange	E32-VF1	53-F

Installation Information → Page 60,61

Small Spot

High Power

Narrow view

BGS

Retroreflective

Chemicalresistant. Oil-resistant

reflective

Bending Heat-

resistant Area

Detection Liquid-level

FPD, Semi

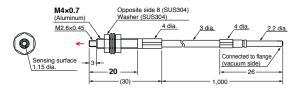
Solar

Dimensions

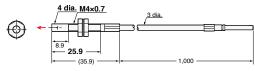


Through-beam Fiber Units (Set of 2)

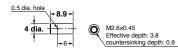
53-A E32-T51V 1M (No Cutting)



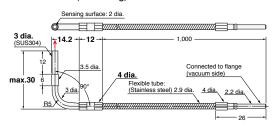
53-B E32-T51V 1M (No Cutting) + E39-F1V



E39-F1V

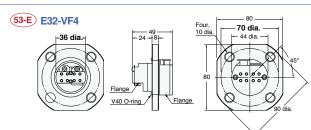


53-C E32-T84SV 1M (No Cutting)



53-D E32-T10V 2M (Free Cutting)



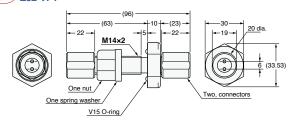


- Note 1. Mount the Flange so that the V40 O-Ring is on the atmospheric-pressure side of the vacuum chamber wall.

 2. Mounting-hole dimensions: 38 dia. ±0.5 mm

 3. The maximum tightening torque is 9.8 N·m.

53-F E32-VF1



- Note 1. Mount the Flange so that the V15 O-Ring is on the atmospheric-pressure side of the vacuum chamber wall.

 2. Mounting-hole dimensions: 14.5 dia. ±0.2 mm

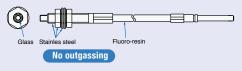
 3. The maximum tightening torque is 14.7 N·m for the clamp nut and 1.5 N·m

 - for the connector

Reference Information for Model Selection -

What Is a Vacuum-resistant Fiber Unit?

- The Flange is designed to create an air-tight seal on the vacuum side.
- The fibers and Flange on the vacuum side are made of non-outgassing materials. These parts are inspected, cleaned, and sealed in an air-tight package in a clean room prior to shipment.



Fiber Sensol Features

selection auide

Fiber Units

Threaded

Cylindrical

Flat

Small Spot

Sleeved

High Power

Narrow view

BGS

Retroreflective

reflective Chemical-

resistant, Oil-resistant

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi, Solar

Information

Fiber Amplitiers, Communications Unit, and Accessories

> echnical Juide and Precautions

> > Model Index

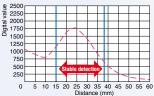
· Glass-substrate Alignment

Detection position accuracy: 0.2 mm max. No variation in detection positions even if the sensing distance changes.

▶ Tilting workpiece does not affect detection.

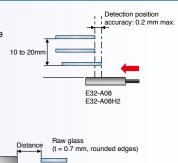
· Glass-substrate Mapping

Stable detection is possible even for difficult-todetect curved surfaces.





- Stable non-contact detection even with warped glass.
- The spherical heads ensure stable detection without being influenced by liquid.



E32-A09



Specifications

Alignment

■ Limited-reflective Fiber Units

			Bending	Se	ensing dis	tance (mm)		Standard		Page 55
Application	Ambient temperature	Appearance (mm)	radius of cable	E3X-HI)	E3NX-I	- A	sensing object (minimum	Models	Dimensions No.
			(mm)	■GIGA =HS	Other modes	■GIGA = HS	Other modes	sensing object)		
Glass presence detection	70□	20.5 3.81 14		0 to 15	ST : 0 to 15 SHS: 0 to 12	0 to 15	ST : 0 to 15 SHS: 0 to 12		E32-L16-N 2M *1	55-A
	700	24.5 51 14		10 to 20	ST : 10 to 20	10 to 20	ST : 10 to 20	Soda glass	E32-A08 2M *1	55-B
Glass- substrate Alignment	300□	26 5 1 18 IP30	R25	10 to 20	SHS: -	10 to 20	10 to 20 SHS: - with ref factor		E32-A08H2 2M *1	55-C
	70□	24.5 5 1 14		12 to 30	ST : 12 to 30 SHS: -	12 to 30	ST : 12 to 30 SHS: -		E32-A12 2M	55-D
Mapping of	700	23 9 20		15 to 38 15 to 38 (Center 25)	ST : 15 to 38 SHS: – (Center 25)	15 to 38 15 to 38 (Center 25)	ST : 15 to 38 SHS: - (Center 25)	End surface of soda glass with reflection	E32-A09 2M	55-E
glass substrates	300°C *2	30 9 24		20 to 30 20 to 30 (Center 25)	ST : 20 to 30 SHS: - (Center 25)	20 to 30 20 to 30 (Center 25)	ST : 20 to 30 SHS: - (Center 25)	factor of 7% (t = 0.7 mm, rounded edges)	E32-A09H2 2M	55-F
Wet processes (Cleaning, Resist developing, and etching)	60□	14 Mounting hole A	- B40	(Recomn 19 to 31 n	nended sen	from tip of lens sing distance: 11 nter of mounting sing distance: 22	hole A	Glass	E32-L11FP 2M	55-G
Wet processes (Resist stripping)	85□	Mounting hole A		(Recomn 32 to 44 n	nended sen nm from ce	from tip of lens sing distance: 11 nter of mounting sing distance: 35	hole A	(t=0.7mm)	E32-L11FS 2M	55-H

- *1 If operation is affected by the background, perform power tuning or use the ECO Mode to decrease the incident level.
- The maximum allowable temperature is not the same for all parts of the Fiber Unit. Refer to the dimensions diagrams for details.

 Must not be repeatedly subject to rapid temperature changes.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(\mu\)s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 \(\mu\)s, PNP output: 55 \(\mu\)s)

[E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 \(\mu\)s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 \(\mu\)s)

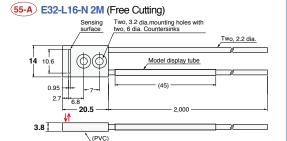
FPD, Semiconductors, and Solar Cells

Dimensions

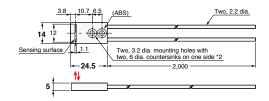
Installation Information → Page 58 ,59



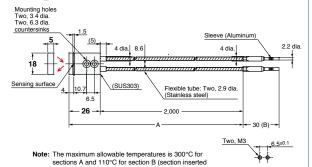
Limited-reflective Fiber Units



55-B E32-A08 2M (Free Cutting)

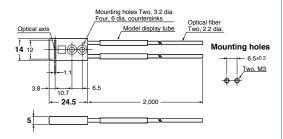


55-C E32-A08H2 2M (No Cutting)



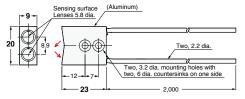
55-D E32-A12 2M (Free Cutting)

into Amplifier Unit).

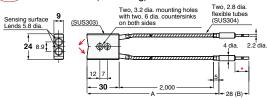


Mounting holes

55-E E32-A09 2M (Free Cutting)

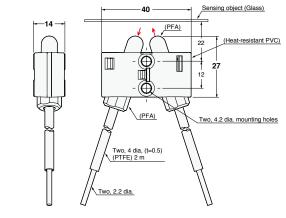


55-F E32-A09H2 2M (No Cutting)

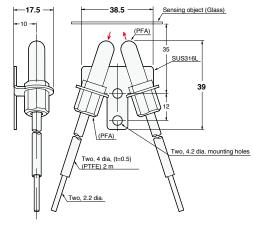


Note: The maximum allowable temperatures for sections A and B are 300°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *) must be maintained within the Amplifier Unit's operating temperature range.

55-G E32-L11FP 2M (Free Cutting)



(55-H) E32-L11FS 2M (Free Cutting)



Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

reflective Chemical-

Limited-

resistant. Oil-resistant

> Bending Heatresistant

Area Detection

Liquid-level

Vacuum

Threaded

Cylindrical

Flat

Small Spot

Sleeved

High Power

Narrow view

BGS

Retroreflective

Chemical-

resistant. Oil-resistant

Bendina

Heatresistant

Area Detection

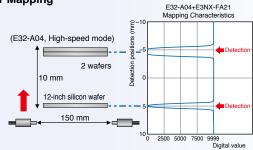
Liquid-level

Vacuum

FPD, Semi,



· Wafer Mapping



- ▶ Thin-profile design enables easy mounting on robot arms.
- Easy to adjust optical axis. (Typical alignment error between mechanical and optical axes is only ±0.1°.)
- Reliable wafer detection, even when stacked closely together.

Specifications

■→■ Through-beam Fiber Units

				Bending	Ser	sing dis	tance (mm)		Optical axis diameter		Domo F7
Application	Ambient temperature	Aperture angle	Appearance (mm)	radius of cable	E3X-HD		E3NX-F/	A	(minimum sensing	Models	Page 57 Dimensions No.
				(mm)	■GIGA =HS	Other modes	■GIGA =HS	Other modes	object)		
		1.5°	Thickness: 3 mm	Flexible**, R1	3,220	ST : 1,780	4,000 *	ST : 2,670	O dia	E32-A03 2M	57-A
		1.5	24.5 10 Thickness: 3 mm	D40	1,200	SHS: 500	1,800	SHS: 500	0.03 dia.)	E32-A03-1 2M	57-B
Wafer Mapping	70°C	3.4°	20.5 Thickness: 2 mm	H10	1,280 450	ST : 680 SHS: 200	.,	ST : 1,020 SHS: 200	(0.1 dia./	E32-A04 2M	57-C
		4°		Flexible**, R1	1,460	ST : 2,200 SHS: 580		ST : 3,300 SHS: 580		E32-T24\$R 2M	57-D
			3.5 dia.	R10	1,740	4,000 * ST : 2,600 ST : 3,900 O.03 dia.)		E32-T24S 2M	57-E		

- * The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.
 ** For a definition, see page 90.

Note 1. The following mode names and response times apply to the modes given in the Sensing distance column.

[E3X-HD] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (NPN output: 50 μ s, PNP output: 55 μ s) [E3NX-FA] GIGA: Giga-power mode (16 ms), HS: High-speed mode (250 μ s), ST: Standard mode (1 ms), and SHS: Super-high-speed mode (30 μ s)

2. The values for the minimum sensing object are reference values that indicate values obtained in standard mode with the sensing distance and sensitivity set to the optimum values. The first value is for the E3X-HD and the second value is for the E3NX-FA.

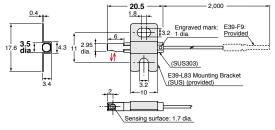
Dimensions

Installation Information → Page 58 ,60



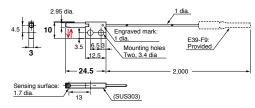
Through-beam Fiber Units (Set of 2)

57-A E32-A03 2M (Free Cutting)



Note: Use the engraved surface and its opposing surface as installation (reference) surfaces.

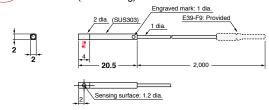
57-B E32-A03-1 2M (Free Cutting)



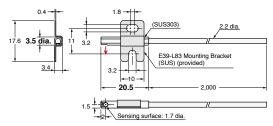
Note1: Use the engraved surface and its opposing surface as installation (reference) surfaces.

2. Set of two symmetrical parts.

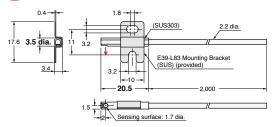
57-C E32-A04 2M (Free Cutting)



57-D E32-T24SR 2M (Free Cutting)



57-E E32-T24S 2M (Free Cutting)



Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Detection

Liquid-level

Vacuum

Cylindrical Flat

Small Spot

High Power

Narrow view BGS

Retroreflective

Limitedreflective

Chemical-resistant, Oil-resistant

Heatresistant

Bending

Area Detection

Liquid-level

Vacuum FPD, Semi,

Installation Information

Models		Ins	tallation Cable									Damanaiana
E32-A01-5M	Models				radius							Demensions Page No.
### ### ### ### ### ### ### ### ### ##	E32-A01 5M	-										Page 51 51-A
E32-A06-12M	E32-A03 2M	-40 to 70°C	0.29N • m	_	R1	0	9.8N	Polyethylene	Plastic	None	40	Page 31 31-A
### ### ### ### ### ### ### ### ### ##	E32-A03-1 2M	-40 to 70°C	0.29N • m	_	R10	10	9.8N	Polyethylene	Plastic	None	50	Page 31 31-B
## 1				2 2+0.5 dia				7 7				Page 57 (57-B) Page 31 (31-C)
## 1769-8-2 1769-8-2								, ,				Page 57 57-C Page 37 37-C
### E32-A09 2M	E32-A08 2M		0.53N • m	-	H25	10	9.8N	Polyethylene	Plastic	None	60	Page 55 55-B Page 47 47-D
### ### #### #########################	E32-A08H2 2M		0.53N • m	_	R25	10	29.4N	SUS	Glass	None	240	Page 55 55-C
### 22-412 M	E32-A09 2M	-40 to 70°C	0.53N • m	-	R25	10	9.8N	Polyethylene	Plastic	None	60	Page 55 55-E
### ### ##############################	E32-A09H2 2M		0.53N • m	-	R25	10	9.8N	SUS	Glass	None	230	Page 47 (47-E) Page 55 (55-F)
### ### ##############################	E32-A12 2M	-40 to 70°C	0.53N • m	_	R25	10	9.8N	Polyethylene	Plastic	None	60	Page 37 37-D Page 55 55-D
### ### ### ### ### ### ### ### ### ##	E32-C11N 2M	-40 to 70°C	0.98N • m	6.2 ^{+0.5} ₀ dia.	R4	0	29.4N		Plastic		70	Page 09 09-B
### ### ##############################	E32-C31 2M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} dia.	R25	10	9.8N	Polyethylene	Plastic		40	Page 09 09-D Page 35 35-A
### ### ### ### ### ### ### ### ### ##	E32-C31M 1M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} ₀ dia.	R10	10	9.8N	Polyethylene	Plastic		40	Page 09 09-E
### ### ##############################	E32-C31N 2M	–40 to 70°C	0.29N • m	3.2 ^{+0.5} ₀ dia.	R4	0	9.8N		Plastic		40	Page 09 09-A
### ### ### ### ### ### ### ### ### ##	E32-C41 1M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} ₀ dia.	R25	10	9.8N	Polyethylene	Plastic		30	Page 23 23-A,
### ### ##############################	E32-C42 1M	–40 to 70°C	0.29N • m	2.2 ^{+0.5} ₀ dia.	R25	10	9.8N	Polyethylene	Plastic		30	Page 21 21-A), 21-B
E32-D11 2M	E32-C42S 1M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} dia.	R25	10	4N	Polyolefin	Plastic		30	Page 21 21-E
E32-D11R 2M	E32-CC200 2M	–40 to 70°C	0.98N • m	6.2 ^{+0.5} dia.	R25	10	29.4N	Polyethylene	Plastic		40	Page 09 09-H
E32-D11U 2M	E32-D11 2M	–40 to 70°C	0.98N • m	6.2 ^{+0.5} dia.	R4	10	29.4N	PVC	Plastic	None	50	Page 43 (43-E)
E32-D15/R 2M	E32-D11R 2M	–40 to 70°C	0.98N • m	6.2 ^{+0.5} dia.	R1	0	29.4N	PVC	Plastic	None	50	Page 09 09-G
E32-D15XR 2M	E32-D11U 2M	-40 to 70°C	0.98N • m	6.2 ^{+0.5} dia.	R4	10	29.4N	Fluororesin	Plastic	None	60	Page 39 39-I
E32-D15YR 2M	E32-D12F 2M	-40 to 70°C	0.78N • m	6.5 ^{+0.5} ₀ dia.	R40	10	29.4N	Fluororesin	Plastic	None	190	Page 39 39-H
E32-D15ZR 2M	E32-D15XR 2M	-40 to 70°C	0.15N • m	-	R1	0	29.4N	PVC	Plastic	None	60	Page 15 15-D
E32-D21 2M	E32-D15YR 2M	–40 to 70°C	0.15N • m	-	R1	0	29.4N	PVC	Plastic	None	60	Page 15 (15-E)
E32-D211R 2M	E32-D15ZR 2M	-40 to 70°C	0.15N • m	-	R1	0	29.4N	PVC	Plastic	None	60	Page 15 15-F
E32-D21R 2M	E32-D16 2M	-40 to 70°C	0.53N • m	-	R4	10	29.4N	PVC	Plastic	None	70	Page 25 25-D
E32-D21B 2M	E32-D21 2M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} ₀ dia.	R4	10	9.8N	PVC	Plastic	None	20	Page 43 (43-B)
E32-D21R 2M	E32-D211R 2M	-40 to 70°C	0.78N • m	4.2 ^{+0.5} ₀ dia.	R1	0	9.8N	Polyethylene	Plastic	None	40	Page 09 09-F
E32-D21-S3 2M	E32-D21B 2M	-40 to 70°C	0.78N • m	4.2 ^{+0.5} ₀ dia.	R4	10	9.8N	PVC	Plastic	None	40	Page 43 43-D
E32-D221B 2M	E32-D21R 2M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} ₀ dia.	R1	0	9.8N	Polyethylene	Plastic	None	20	Page 09 09-C
E32-D22B 2M	E32-D21-S3 2M	-40 to 70°C	0.78N • m	4.2 ^{+0.5} dia.	R10	10	9.8N	Polyethylene	Plastic	None	50	Page 19 19-J
E32-D22R 2M	E32-D221B 2M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} ₀ dia.	R4	10	9.8N	PVC	Plastic	None	40	Page 13 13-D Page 43 43-C
E32-D22R 2M -40 to 70°C 0.29N • m 3.2*0.5 dia. R1 0 9.8N Polyethylene Plastic None 40 Page 13 (E32-D22B 2M	-40 to 70°C	0.2N • m	1.7 ^{+0.5} dia.	R4	10	9.8N	PVC	Plastic	None	30	Page 13 (13-A) Page 43 (43-A)
E22 D22 C4 2M (0 to 70°C 0 20N tm 4 21°5 // D40 40 0 0N Debuth day 0 00N Debuth day 0	E32-D22R 2M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} dia.	R1	0	9.8N	Polyethylene	Plastic	None	40	Page 13 13-C
E32-D22-S1 2M	E32-D22-S1 2M	-40 to 70°C	0.29N • m	4.2 ^{+0.5} ₀ dia.	R10	10	9.8N	Polyethylene	Plastic	None	45	Page 19 19-I

^{*1} Unbendable length of cable from fiber head. Do not bend the cable for at least 20 mm from where the cable inserts into the Fiber Amplifier Unit. *2 The heat-resistant rating is not the same for all parts of the Fiber Unit. Refer to the dimensions diagrams for details. *3 Avoid rapid temperature changes.

Weight (packed state) (g)

Demensions Page No.

Threaded Cylindrical

Flat

Small Spot

High Power

Narrow view

BGS

Retroreflective Limitedreflective

Chemical-resistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

FPD, Semi, Solar

Installation

E32-D24R 2M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} ₀ dia.	R1	0	9.8N	Polyethylene	Plastic	None	40	Page 19 19-A
E32-D24-S2 2M	-40 to 70°C	0.29N • m	5 ^{+0.5} dia.	R25	10	19.6N	Polyethylene	Plastic	None	55	Page 19 (19-B)
E32-D25XB 2M	-40 to 70°C	0.15N • m	-	R4	10	9.8N	PVC	Plastic	None	40	Page 43 (43-F)
E32-D25-S3 2M	-40 to 70°C	0.29N • m	-	R10	10	9.8N	Polyethylene	Plastic	None	50	Page 19 19-L
E32-D31-S1 0.5M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} dia.	R4	10	9.8N	Polyolefin	Plastic	None	35	Page 19 19-G
E32-D32L 2M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} dia.	R25	10	29.4N	Polyethylene	Plastic	Yellow dotted line on emitter cable	50	Page 13 (13-E)
E32-D32-S1 0.5M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} dia.	R4	10	9.8N	Polyolefin	Plastic	None	35	Page 19 19-F
E32-D33 2M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} dia.	R4	10	9.8N	Polyethylene	Plastic	None	40	Page 13 13-F Page 19 19-E
E32-D331 2M	-40 to 70°C	0.29N • m	2.2 ^{+0.5} dia.	R4	10	9.8N	Polyethylene	Plastic	None	30	Page 19 19-D
E32-D36P1 2M	-40 to 70°C	0.78N • m	-	R4	10	29.4N	Polyethylene	Plastic	None	60	Page 49 49-D
E32-D36T 2M	-40 to 70°C	-	-	R4	10	29.4N	Polyethylene	Plastic	None	190	Page 51 51-C
E32-D43M 1M	–40 to 70°C	0.29N • m	1.7 ^{+0.5} dia.	R4	10	9.8N	Polyethylene	Plastic	None	30	Page 13 13-B Page 19 19-C
E32-D51 2M	-40 to 150°C *2	0.98N • m	6.2 ^{+0.5} dia.	R35	10	29.4N	Fluororesin	Plastic	None	60	Page 47 (47-B)
E32-D51R 2M	-40 to 100°C *3	0.98N • m	6.2 ^{+0.5} dia.	R2	0	29.4N	Polyurethane	Plastic	None	60	Page 47 (47-A)
E32-D61-S 2M	−60 to 350°C *4	0.98N • m	6.2 ^{+0.5} dia.	R25	10	29.4N	SUS	Glass	None	190	Page 47 (47-G)
E32-D611-S 2M	−60 to 350°C *4	0.98N • m	4.2 ^{+0.5} dia.	R25	10	29.4N	SUS	Glass	None	170	Page 47 (47-F)
E32-D73-S 2M	-40 to 400°C *4	0.78N • m	4.2 ^{+0.5} dia.	R25	10	29.4N	SUS	Glass	None	170	Page 47 (47-H)
E32-D81R-S 2M	-40 to 200°C *4	0.78N • m	6.2 ^{+0.5} ₀ dia.	R10	10	9.8N	Fluororesin	Glass	None	70	Page 47 (47-C)
E32-D82F1 4M	-40 to 200°C	0.29N • m	6.5 ^{+0.5} ₀ dia.	R25	10	29.4N	Fluororesin	Plastic	None	450	Page 51 (51-D)
E32-DC200BR 2M	-40 to 70°C	0.98N • m	6.2 ^{+0.5} ₀ dia.	R1	0	29.4N	PVC	Plastic	None	60	Page 19 (19-K)
E32-DC200F4R 2M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} ₀ dia.	R1	0	9.8N	Polyethylene	Plastic	None	40	Page 19 (19-H)
E32-L11FP 2M	–10 to 60°C	0.78N • m	-	R40	10	9.8N	Fluororesin	Plastic	None	310	Page 39 39-F Page 55 55-G
E32-L11FS 2M	–10 to 85°C	0.78N • m	-	R40	10	9.8N	Fluororesin	Plastic	None	310	Page 39 39-G Page 55 55-H
E32-L15 2M	-40 to 70°C	0.53N • m	-	R25	10	29.4N	Polyethylene	Plastic	White tube on emitter cable	60	Page 21 21-F
E32-L16-N 2M	-40 to 70°C	0.29N • m	_	R25	10	29.4N	Polyethylene	Plastic	None	60	Page 33 33-A Page 37 37-B Page 55 55-A
E32-L24S 2M	-40 to 70°C	0.29N • m	-	R10	10	9.8N	Polyethylene	Plastic	None	40	Page 33 33-B Page 37 37-A
E32-L25L 2M	–40 to 105°C *3	0.29N • m	-	R10	10	9.8N	Polyethylene	Plastic	None	40	Page 33 33-C Page 37 37-E
E32-L25T 2M	-40 to 70°C	-	-	R10	10	9.8N	Polyethylene	Plastic	None	40	Page 51 51-B
E32-LD11 2M	-40 to 70°C	0.98N • m	-	R25	10	29.4N	Polyethylene	Plastic	None	40	Page 09 (09-I)
E32-LD11R 2M	-40 to 70°C	0.98N • m	-	R1	0	29.4N	Polyethylene	Plastic	None	40	rage 09 (09-1)
E32-LT11 2M	-40 to 70°C	0.78N • m	-	R25	10	29.4N	Polyethylene	Plastic	None	40	Page 07 07-C
E32-LT11R 2M	-40 to 70°C	0.78N • m	-	R1	0	29.4N	Polyethylene	Plastic	None	40	Page 25 25-B
E32-R16 2M	−25 to 55°C	0.54N • m	-	R25	10	29.4N	Polyethylene	Plastic	None	220 (E39-R1 included.)	Page 35 35-B
E32-R21 2M	-40 to 70°C	0.39N • m	6.2 ^{+0.5} dia.	R10	10	9.8N	Polyethylene	Plastic	None	70 (E39-R3 included.)	35 Page 35-C
*1 Unbendable length of ca *2 For continuous operatio	able from fiber hea	ad. Do not b	end the cab -40 to 130°	le for a	least 20	mm from	where the cable	inserts into the	Fiber Amplifier U	nit.	

Cable

Sheath material

Tensile

strength

Core material

Emitter/receiver differentiation

Installation

Tightening

torque

Ambient temperature

Models

Bending radius (mm)

length *1

Mounting

hole

^{*2} For continuous operation, use the Fiber Unit between –40 to 130°C.
*3 For continuous operation, use the Fiber Unit between –40 to 130°C.
*4 The heat-resistant rating is not the same for all parts of the Fiber Unit. Refer to the dimensions diagrams for details.

Cylindrical Flat

Small Spot **High Power**

Narrow view

Retro-

BGS

reflective Limited-reflective

Chemical-resistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum FPD, Semi, Solar

Installation Information

	Ins	tallation		n			Cable			Weight	Demensions	
Models	Ambient temperature	Tightening torque	Mounting hole	Bending radius (mm)	Unbendable length *1	Tensile strength	Sheath material	Core material	Emitter/receiver differentiation	(packed state) (g)	Page No.	
E32-T10V 2M	-25 to 70°C	0.3N • m	-	R25	10	29.4N	Fluororesin	Plastic	None	170	Page 53 53-D	
E32-T11 2M	-40 to 70°C	0.78N • m	4.2 ^{+0.5} ₀ dia.	R4	10	29.4N	PVC	Plastic	None	40	Page 41 (41-C)	
E32-T11F 2M	-40 to 70°C	0.29N • m	-	R4	10	29.4N	Fluororesin	Plastic	None	60	Page 39 39-C	
E32-T11N 2M	-40 to 70°C	0.78N • m	4.2 ^{+0.5} ₀ dia.	R1	0	29.4N	PVC	Plastic	None	70	Page 07 07-A	
E32-T11NF 2M	-25 to 70°C	12N • m	8.5 ^{+0.5} ₀ dia.	R1	0	29.4N	Fluororesin	Plastic	None	80	Page 39 39-A	
E32-T11R 2M	-40 to 70°C	0.78N • m	4.2 ^{+0.5} ₀ dia.	R1	0	29.4N	PVC	Plastic	None	50	Page 07 07-B	
E32-T12F 2M	-40 to 70°C	0.78N • m	5.5 ^{+0.5} ₀ dia.	R40	10	29.4N	Fluororesin	Plastic	None	210	Page 39 39-B	
E32-T12R 2M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} ₀ dia.	R1	0	29.4N	PVC	Plastic	None	60	Page 11 11-C	
E32-T14 2M	-40 to 70°C	0.49N • m	-	R25	10	29.4N	Polyethylene	Plastic	None	60	Page 25 25-C	
E32-T14F 2M	-40 to 70°C	0.78N • m	5.5 ^{+0.5} ₀ dia.	R40	10	29.4N	Fluororesin	Plastic	None	220	Page 39 39-D	
E32-T14LR 2M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} ₀ dia.	R1	0	29.4N	PVC	Plastic	None	60	Page 11 11-D	
E32-T15XR 2M	-40 to 70°C	0.15N • m	-	R1	0	29.4N	PVC	Plastic	None	60	Page 15 15-A	
E32-T15YR 2M	-40 to 70°C	0.15N • m	-	R1	0	29.4N	PVC	Plastic	None	60	Page 15 15-B	
E32-T15ZR 2M	-40 to 70°C	0.15N • m	-	R1	0	29.4N	PVC	Plastic	None	60	Page 15 15-C	
E32-T16JR 2M	-40 to 70°C	0.29N • m	-	R1	0	29.4N	PVC	Plastic	None	60	Page 49 49-B	
E32-T16PR 2M	-40 to 70°C	0.29N • m	-	R1	0	29.4N	PVC	Plastic	None	60	Page 49 49-A	
E32-T16WR 2M	–25 to 55°C	0.29N • m	-	R1	0	9.8N	PVC	Plastic	None	60	Page 49 49-C	
E32-T17L 10M	-40 to 70°C	0.78N • m	14.5 ⁺¹ ₀ dia.	R25	10	29.4N	Polyethylene	Plastic	None	240	Page 25 25-A	
E32-T21 2M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} ₀ dia.	R4	10	9.8N	PVC	Plastic	None	30	Page 41 41-B	
E32-T21-S1 2M	-40 to 70°C	0.78N • m	3.2 ^{+0.5} ₀ dia.	R10	10	9.8N	Polyethylene	Plastic	None	45	Page 17 17-D	
E32-T223R 2M	-40 to 70°C	0.20N • m	1.2 ^{+0.5} ₀ dia.	R1	10	9.8N	Polyethylene	Plastic	None	40	Page 11 11-A	
E32-T22B 2M	-40 to 70°C	0.20N • m	1.7 ^{+0.5} dia.	R4	10	9.8N	PVC	Plastic	None	40	Page 11 11-B Page 41 41-A	
E32-T22S 2M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} ₀ dia.	R10	10	29.4N	PVC	Plastic	None	60	Page 31 31-F	
E32-T24E 2M	-40 to 70°C	0.29N • m	2.7 ^{+0.5} ₀ dia.	R10	10	9.8N	Polyethylene	Plastic	None	40	Page 17 17-B	
E32-T24R 2M	-40 to 70°C	0.29N • m	2.2 ^{+0.5} ₀ dia.	R1	0	9.8N	Polyethylene	Plastic	None	40	Page 17 17-A	
E32-T24S 2M	-40 to 70°C	0.29N • m	-	R10	10	29.4N	PVC	Plastic	None	60	Page 31 31-E Page 57 57-E	
E32-T24SR 2M	-40 to 70°C	0.29N • m	-	R1	0	9.8N	PVC	Plastic	None	60	Page 31 31-D Page 57 57-D	
E32-T25XB 2M	-40 to 70°C	0.15N • m	_	R4	10	9.8N	PVC	Plastic	None	40	Page 41 41-D	
E32-T33 1M	-40 to 70°C	0.29N • m	3.2 ^{+0.5} dia.	R10	10	9.8N	Polyethylene	Plastic	None	40	Page 17 17-C	
E32-T51 2M	-40 to 150°C	0.78N • m	4.2 ^{+0.5} ₀ dia.	R35	10	29.4N	Fluororesin	Plastic	None	70	Page 45 45-B	
E32-T51F 2M	-40 to 150°C	0.78N • m	5.5 ^{+0.5} ₀ dia.	R40	10	29.4N	Fluororesin	Plastic	None	220	Page 39 39-E	
E32-T51R 2M	-40 to 100°C	0.78N • m	4.2 ^{+0.5} dia.	R2	0	29.4N	Polyurethane	Plastic	None	60	Page 45 45-A	
E32-T51V 1M	-25 to 120°C	0.29N • m	4.2 ^{+0.5} dia.	R30	10	29.4N	Fluororesin	Glass	None	160	Page 53 53-A	
E32-T61-S 2M	-60 to 350°C	0.78N • m	4.2 ^{+0.5} dia.	R25	10	29.4N	SUS	Glass	None	200	Page 45 45-D	
E32-T81R-S 2M	-40 to 200°C	0.701	4.2 ^{+0.5} dia.	R10	10	9.8N	Fluororesin	Glass	None	60	Page 45 (45-C)	

^{*1} Unbendable length of cable from fiber head. Do not bend the cable for at least 20 mm from where the cable inserts into the Fiber Amplifier Unit.
*2 For continuous operation, use the Fiber Unit between –40 to 130°C.
*3 For continuous operation, use the Fiber Unit between –0 to 90°C.
*4 The heat-resistant rating is not the same for all parts of the Fiber Unit. Refer to the dimensions diagrams for details.

Small Spot **High Power**

> Narrow view

BGS Retroreflective

Limited-reflective

Chemical-resistant, Oil-resistant

> Bending Heat-

resistant Area

Detection

Liquid-level

Vacuum

FPD, Semi, Solar

Installation

	luo	tallation	tallation Cable Weight Damage												
Models			Mauntina	Bending	Unbendable	Tonoilo	Weight (packed	Demensions Page							
Wodels	Ambient temperature	Tightening torque	Mounting hole	radius (mm)	length *1	Tensile strength	Sheath material	Core material	Emitter/receiver differentiation	state) (g)	No.				
E32-T84SV 1M	–25 to 200°C	0.29N • m	4.5 ^{+0.5} ₀ dia.	R25	10	29.4N	SUS	Glass	None	190	Page 53 53-C				
E32-TC200BR 2M	-40 to 70°C	0.78N • m	4.2 ^{+0.5} ₀ dia.	R1	0	29.4N	PVC	Plastic	None	60	Page 17 17-E				
E32-VF1	-25 to 70°C	-	-	-	-	-	-	-	-	240	Page 53 53-F				
E32-VF4	-25 to 70°C	-	-	-	-	-	-	-	-	280	Page 53 53-E				
E39-F1	-40 to 200°C	-	-	-	-	-	-	-	-	2	Page 26 (26-A) Page 27 (27-A) to (27-C) Page 28 (28-A) Page 29 (29-A) to (29-C)				
E39-F1-33	-40 to 200°C	-	-	-	-	-	-	-	-	3	Page 28 28-D				
E39-F11	-	-	-	-	-	-	-	-	-	30	-				
E39-F16	−60 to 350°C	-	-	-	-	-	-	-	-	15	Page 26 (26-B) Page 27 (27-D) to (27-F) Page 28 (28-B) Page 29 (29-D) to (29-F) (29-K)				
E39-F17	-25 to 70°C	-	-	-	-	-	-	-	-	10	Page 21 21-B				
E39-F18	-40 to 70°C	-	-	-	-	-	-	-	-	5	Page 23 23-G), 23-H				
E39-F1V	–25 to 120°C	-	-	-	-	-	-	-	-	3	Page 53 53-B				
E39-F2	-40 to 200°C	-	-	-	-	-	-	-	-	2	Page 26 (26-C) Page 27 (27-G), (27-H) Page 28 (28-C) Page 29 (29-G) to (29-I)				
E39-F32A	-40 to 150°C	-	-	R30	-	-	-	-	-	70	Page 43 43-G				
E39-F32C	-40 to 150°C	-	-	R30	-	-	-	-	-	110	Page 41 41-E Page 43 43-G				
E39-F32D	-40 to 150°C	-	-	R30	-	-	-	-	-	80	Page 43 43-G				
E39-F3A	-40 to 70°C	-	-	-	-	-	-	-	-	2	Page 21 21-A				
E39-F3A-5	-40 to 70°C	-	-	-	-	-	-	-	-	1	Page 23 23-A, 23-B, 23-C				
E39-F3B	-40 to 70°C	-	-	-	-	-	-	-	-	2	Page 23 23-D, 23-E, 23-F				
E39-F3C	-40 to 70°C	-	_	-	-	-	-	-	-	1	Page 21 (21-C), (21-D)				
E39-F3R	-40 to 70°C	-	-	-	-	-	-	-	-	1	Page 35 35-A				
E39-R1	–25 to 55°C	-	-	-	-	-	-	-	-	20	Page 35 35-B				
E39-R3	-40 to 70°C	_	-	-	-	-	-	-	-	20	Page 35 35-C				
E39-RP37	–25 to 55°C	-	-	-	-	-	-	-	-	4	Page 35 35-A				

^{*1} Unbendable length of cable from fiber head.

Do not bend the cable for at least 20 mm from where the cable inserts into the Fiber Amplifier Unit.

Area Detection

Liquid-level

Vacuum

FPD, Semi, Solar

Technical Guide and Precaution

Model Index

Smart Fiber Amplifier Units

Main Features

E3NX-FA Series

A New Level of Performance for Advanced Detection Capability



Expanded Application Response Capabilities

Improvements in the sensing distance and minimum sensing object have increased the range of applications with stable detection.





Advanced Smart Tuning

Just press the Grove button once with a workpiece and once without a workpiece to automatically set the optimum incident level and threshold. Consistent settings are achieved for all users with this ultra-easy procedure.





Dynamic Range Increased by a Factor of 40,000

The incident level is optimized to enable stable detection even for saturated or insufficient incident levels.

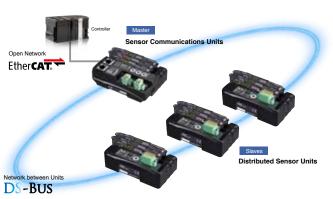


Sensor Communications Units for E3NX-FA

E3NW Series

The Next-generation E3NW Sensor Network Units Revolutionize On-site Sensing

The Sensor Communications Unit with a master function and the Distributed Sensor Units with slave functions enable N-Smart Sensor communication over open networks.



Greatly Reduced Machine Manufacturing Costs

There is no need to change the current distributed installation to introduce a network without increasing costs.

Greatly Reduced Machine Commissioning Time

All of the settings can be made at the same time from a Touch Panel.

Greatly Improved Machine Productivity

Ether CAT

Realtime monitoring lets you perform maintenance before malfunctions occur.

Main Features

Smart Fiber Amplifier Units

E3X-HD Series

Affordable Amplifier Units with Simple Operation and Stable Detection Capabilities



Sensor Communications Units for E3X-HD

E3X-ECT / E3X-CRT

Sensor Communications Units for CompoNet and EtherCAT



Page 78

<Fiber Amplifier Unit Comparison>

			E3NX-FA Series	E3X-HD Series		
	Output		1 or 2 outputs (depending on the model)	1 output		
	External input		Supported or not supported (depending on the model)	not supported		
Fiber Amplifier	Response time		30 μs (32 μs)/250 μs/1 ms/16 ms (Default: 250 μs)	50 μs (55 μs)/250 μs/1 ms/16 ms (Default: 250 μs)		
Unit specifications	Sensing distance	E32-T11R	3,000 mm	2,000 mm		
	(Giga-power mode)	E32-D11R	1,260 mm	840 mm		
	Minimum sensing object	E32-T11R	2 μm dia.	5 μm dia.		
Sensor Communications	Communications method (Sensor Communications Unit model)		EtherCAT (E3NW-ECT)	EtherCAT (E3X-ECT) CompoNet (E3X-CRT)		
Unit application	Applicable Sensors		Fiber Sensor (E3NX-FA0) Laser Sensors (E3NC-LA0, E3NC-SA0)	Fiber Sensor (E3X-HD0) Fiber Sensor (E3X-DA0-S, E3X-MDA0) Laser Photoelectric Sensor (E3C-LDA0) Proximity Sensor (E2C-EDA0)		
	Ordering Inform	nation	Page 64	Page 78		
Page listings	Ratings and Sp	ecifications	Page 66	Page 80		
90	Dimensions		Page 68	Page 80		

Fiber Amplifier Unit Accessories



ber Senso

Selectio

r Units

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi, Solar

Installation Information

Fiber Amplifiers, Communications Unit, and

> chnical iide and ecautions

> > Andel Index

E3NX-FA Series Products

iber Sensor eatures

Selectio Guide

Fiber Units

Threaded

Cylindrical

Flat

Small Spot

High Power

Sleeved

Narrow view
BGS

Retro-reflective
Limited-reflective

Chemicalresistant, Oil-resistant

Bending

Heat-

Area Detection

Liquid-level

Vacuum FPD,

Semi, Solar

Installation

riber Amplitiers, Communications Jnit, and Accessories

> echnical uide and recautions

> > Model Index

E3NX-FA Fiber Amplifier Units and Related Products

Fiber Amplifier Units E3NX-FA Series

_			Inputs/	Мо	dels	Ratings and	
Туре	Appearance	Connecting method	outputs	NPN output	PNP output	Specifications	Dimensions
Standard		Pre-wired (2 m)	1 output	E3NX-FA11 2M	E3NX-FA41 2M		Page 68 68-A
models		Wire-saving Connector	or 1 output E3NX-FA6		E3NX-FA8		Page 68 68-B
		Pre-wired (2 m)	2 outputs + 1 input E3NX-FA21 2M		E3NX-FA51 2M Page 66		Page 68 68-A
Advanced		W	1 output + 1 input	E3NX-FA7	E3NX-FA9		Page 68
models		Wire-saving Connector	2 outputs	E3NX-FA7TW	E3NX-FA9TW		68-B
		M8 Connector	1 output + 1 input	E3NX-FA24	E3NX-FA54		Page 69
		INIC COMMODIC	2 outputs	E3NX-FA7TW	E3NX-FA54TW		(69-A)
Model for Sensor Communications Unit		Connector for Sensor Communications Unit	2 outputs	E3NX-FA0			Page 69 69-B

Sensor Communications Unit

Sensor Communications Unit

Communication method	Appearance	Applicable Fiber Amplifier Model	Model	Ratings and Specifications	Dimensions
EtherCAT		E3NX-FA0	E3NW-ECT	Page 76	Page 77

^{*} For details, refer to your OMRON website.

Distributed Sensor Unit

Appearance	Applicable Fiber Amplifier Model	Model	Ratings and Specifications	Dimensions
	E3NX-FA0	E3NW-DS	Page 76	Page 77 (77-B)

E3NX-FA Series Products

Accessories (sold separately)

Wire-saving connectors (Required for Wire-saving Connector type Amplifiers)

Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately. * Protective stickers: provided.

Туре	Appearance	Cable length	Number of conductors	Applicable Fiber Amplifier Units	Models	Ratings, Specifications and Dimensions
Master Connector			4	E3NX-FA7 E3NX-FA7TW	E3X-CN21	Page 88 88-A
Slave Connector		- 2m -	2	E3NX-FA9 E3NX-FA9TW	E3X-CN22	Page 88 88-B
Master Connector			3	E3NX-FA6	E3X-CN11	Page 88 88-A
Slave Connector			1	E3NX-FA8	E3X-CN12	Page 88 88-B

Sensor I/O Connectors (Required for models with M8 Connectors.)

Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately. * Protective stickers: provided.

Appearance	Cable length	Number of conductors	Models	Ratings and Specifications	Dimensions	
Straight	2m		XS3F-M421-402-A		Page 88	
	5m		XS3F-M421-405-A	Dana 00	88-C	
L-shaped	2m	4	XS3F-M422-402-A	Page 88	Page 88	
	5m		XS3F-M422-405-A		88-D	

Mounting Bracket

A Mounting Bracket is not provided with the Fiber Amplifier Unit and must be ordered separately as required.

Appearance	Model	Quantity	Dimensions
	E39-L143	1	Page 89

DIN Track

A Din Track is not provided with the Fiber Amplifier Unit and must be ordered separately as required.

Appearance	Туре	Models	Quantity	Dimensions
	Shallow type, total length: 1 m	PFP-100N		Page 89
	Shallow type, total length: 0.5 m	PFP-50N	1	89-B
	Deep type, total length: 1 m	PFP-100N2		Page 89 89-C

End Plate

Two End Plates are provided with the Sensor Communications Unit.

End Plates are not provided with the Fiber Amplifier Unit and must be ordered separately as required.

Appearance	Model	Quantity	Dimensions
	PFP-M	1	Page 89 89-D

Fiber Senso

Selection

Fiber Unit

Threaded

Cylindrical

Sleeved

Flat

Small Spot

High Power

Narrow view

BGS Retro-

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

resistant

Area Detection

Liquid-level

Vacuum FPD,

Semi.

Solar Installation

er Amplifiers, nmunications t, and

> schnical uide and

> > odel Inde

Cylindrical

Flat Sleeved

High Power view

Small Spot

BGS

reflective

Chemicalresistant. Oil-resistant Bending

resistant Detection

Liquid-level Vacuum

Semi.

Solar

Ratings and Specifications

	Туре		Stan	dard			Advanced			Model for Sensor Communications Unit
	NPN out	put	E3NX-FA11	E3NX-FA6	E3NX-FA21	E3NX-FA7	E3NX-FA7TW	E3NX-FA24	_	
	PNP out	put	E3NX-FA41	E3NX-FA8	E3NX-FA51	E3NX-FA9	E3NX-FA9TW	E3NX-FA54	E3NX-FA54TW	E3NX-FA0
Item Connecting method		ing method	Pre-wired	Wire-saving Connector	Pre-wired	Pre-wired Wire-saving Connector M8 Connector		nector	Connector for Sensor Communications Unit	
Inputs /	Output		1 0ເ	ıtput	2 outputs	1 output	2 outputs	1 output	2 outputs	
Outputs	External input		-	_	1 input	1 input	_	1 input	_	— *1
Light source	e (wavelength)		Red, 4-eleme	nt LED (625 nı	m)					
Power supp	ly voltage		10 to 30 VDC	, including 10	% ripple (p-p)					
Power cons	umption *2		Standard Mod Normal mod Power savin Advanced Mod Normal mod	odels: e: 1,080 mW n	or Senser Con ax. (Current co 40 mW max.(nax. (Current c	nsumption: 40 Current consumons consumption: 4	mA max.) mption: 35 mA r	,		
Control outp	out		Load current: Gr (Residual volt	upply voltage: Groups of 1 to oups of 4 to 30 age: At load or At load current 0.1 mA max.	3 Amplifier Unit Amplifier Unit urrent of less the	nits: 100 mA m s: 20 mA max nan 10 mA: 1 '	nax.,			_
External inp	ut		-	_	Refer	to *3.		Refer to *3.		_
Indicators Protection of	directite.		Display direct OUT indicator OUT Selectio	7-segment displays (Sub digital display: green, Main digital display: white) Display direction: Switchable between normal and reversed. OUT indicator (orange), L/D indicator (orange), ST indicator (blue), DPC indicator (green) OUT Selection Indicator (orange)(only on models with 2 outputs) Power supply reverse polarity protection, output short-circuit protection,						
	- · · ·		and output reverse polarity protection output short-circuit protection							l '
Response	Super-high-speed (SHS) *4	mode	Operate or re	set for model v	vith 1 output: 3	60μ s, with 2 or	utputs: 32 μs			
time	High-speed mode	` ,	Operate or reset: 250 μs							
	Standard mode (S		Operate or reset: 1 ms							
	Giga-power mode	(GIGA)	Operate or re							
Sensitivity a	ndjustment		Smart tuning (2-point tuning, full auto tuning, position tuning, maximum sensitivity tuning, power tuning, or percentage tuning (–99% to 99%)) or manual adjustment							
	Super-high-speed (SHS) *4	mode	Possible for u	p to 0 units						
Mutual interference	High-speed mode	(HS)	Possible for u	p to 10 units						
prevention	Standard mode (S	itnd)	Possible for up to 10 units							
	Giga-power mode	(GIGA)	A) Possible for up to 10 units							
	Auto power contro	ol (APC)	Always ON							
Functions	Dynamic power co	ontrol	Provided							
	Timer		Select from til	,	OFF-delay, ON	I-delay, one-sł	not, or ON-dela	y + OFF-delay	timer.	
	Zero reset		Negative valu	es can be disp	layed. (Thresh	old value is sh	nifted.)			
		*5		itial reset (fact	• `		•			

*1. Two sensor outputs are allocated in the programmable logic controller PLC I/O table. PLC operation via Communications Unit enables reading detected values and changing settings.
*2. At Power Supply Voltage of 10 to 30 VDC.
Standard Models or Model for Sensor Communications Unit:
Normal mode: 1,080 mW max. (Current consumption: 36 mA max. at 30 VDC, 108 mA max. at 10 DVC)

Power saving Eco mode: 930 mW max. (Current consumption: 31 mA max. at 30 VDC, 93 mA max. at 10 VDC)

Normal mode: 1,230 mW max. (Current consumption: 41 mA max. at 30 VDC, 123 mA max. at 10 DVC)
Power saving Eco mode: 1,050 mW max. (Current consumption: 35 mA max. at 30 VDC, 105 mA max. at 10 VDC)

*3. The following details apply to the input.

	Contact input (relay or switch)	Non-contact input (transistor)	Input time
NPN type	ON: Shorted to 0V (Sourcing current: 1 mA max.). OFF: Open or shorted to Vcc.	ON: 1.5V max. (Sourcing current: 1 mA max.). OFF: Vcc - 1.5 V to Vcc (Leakage current: 0.1 mA max.)	ON : 9ms min.
PNP type	ON: Shorted to Vcc (Sinking current: 3 mA max.). OFF: Open or shorted to 0V.	ON: Vcc - 1.5 V to Vcc (Sinking current: 3 mA max.). OFF: 1.5V max.(Leakage current: 0.1 mA max.)	OFF : 9ms min.

^{*4.} The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.

*5. The bank is not reset by the user reset function or saved by the user save function.

	Туре	Stan	dard			Advanced			Model for Sensor Communications Unit
	NPN output	E3NX-FA11	E3NX-FA6	E3NX-FA21	E3NX-FA7	E3NX-FA7TW	E3NX-FA24	_	FONIV FAO
	PNP output	E3NX-FA41	E3NX-FA8	E3NX-FA51	E3NX-FA9	E3NX-FA9TW	E3NX-FA54	E3NX-FA54TW	E3NX-FA0
Item Connecting method		Pre-wired	Wire-saving Connector	Pre-wired	Wire-saving	Connector	M8 Cor	nnector	Connector for Sensor Communications Unit
Functions	Eco mode	Select from C	OFF (digital dis	plays lit) or EC	O (digital displ	ays not lit).			
	Bank switching	Select from b	anks 1 to 4.						
	Power tuning	Select from C	N or OFF.						
	Output 1	Select from n	ormal detectio	n mode, or are	a detection mo	ode.			
	Output 2	-	_	Select from normal detection mode, alarm output mode, or error output mode.	_	Select from normal detection mode, alarm output mode, or error output mode.	_	Select from n mode, alarm or error outpu	•
External input		-	_	power tuning,	out OFF, tuning, emission OFF, pank switching.	_	Select from input OFF, tuning, power tuning, emission OFF, zero reset, or bank switching.		_
	Hysteresis width	Select from s	tandard setting	g or user settin	g. For a user s	etting, the hyst	eresis width c	an be set to fro	om 0 to 9,999.
Ambient IIIu	mination (Receiver side)	Incandescent lamp: 20,000 lx max., Sunlight: 30,000 lx max.							
Maximum c	onnectable Units	30 units							
Ambient ter	nperature range	Groups of 3 t Groups of 11 Groups of 17	o 10 Amplifer to 16 Amplifer to 30 Amplifer	nits: –25 to 55' Units: –25 to 5' Units: –25 to - Units: –25 to - Units: –25 to - no icing or con	0°C, 45°C, 40°C				Operating: Groups of 1 to 2 Amplifer Units: 0 to 55°C, Groups of 3 to 10 Amplifer Units: 0 to 50°C, Groups of 11 to 16 Amplifer Units: 0 to 45°C, Groups of 17 to 30 Amplifer Units: 0 to 40°C Storage: -30 to 70°C (with no icing or condensation)
Ambient hu	midity range	Operating an	d storage: 35%	6 to 85% (with	no condensati	on)			
Insulation re	esistance	20 M□ min. (at 500 VDC)						
Dielectric st	rength	1,000 VAC at	50/60 Hz for	1 min					
Vibration re	sistance (destruction)	10 to 55 Hz v	vith a 1.5-mm o	double amplitue	de for 2 hours	each in X, Y, a	nd Z directions	S	
Shock resistance (destruction)		500 m/s ² for 3	3 times each in	X, Y, and Z di	rections				150 m/s² for 3 times each in X, Y, and Z directions
Weight (pag	ked state/unit only)	Approx. 115 g/ Approx. 75 g	Approx. 60 g/ Approx. 20 g	Approx. 115 g/ Approx. 75 g	Approx. 60 g	/Approx. 20 g	Approx. 65	g/Approx. 25 g	
	Case	Polycarbonat	e (PC)						
Materials	Cover	Polycarbonat	e (PC)						
	Cable	PVC							
Accessories	3	Instruction M	anual						

Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retro-reflective Limited-

Chemical-

resistant, Oil-resistant Bending

resistant

Detection

Liquid-level

Vacuum FPD,

Semi, Solar

Threaded Cylindrical

Flat Sleeved

Small Spot High Power

Narrow view BGS

Retroreflective

> reflective Chemicalresistant. Oil-resistant

Bendina

Heatresistant

Area Detection

Liquid-level

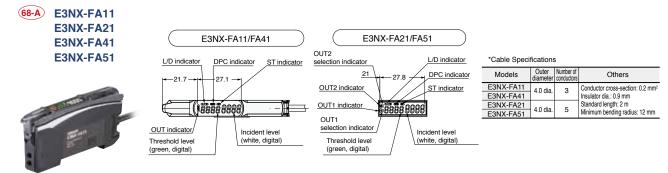
Vacuum FPD. Semi Solar

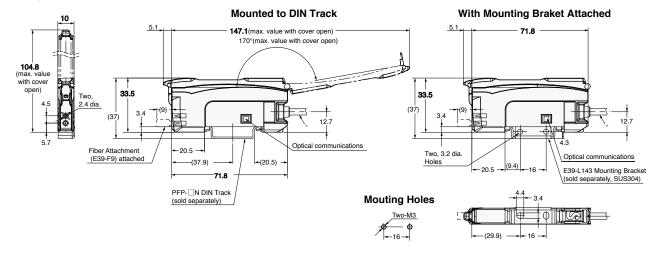
Dimensions

(Unit: mm) Tolerance class IT16 applies to demmensions in this date sheet unless otherwise specified.

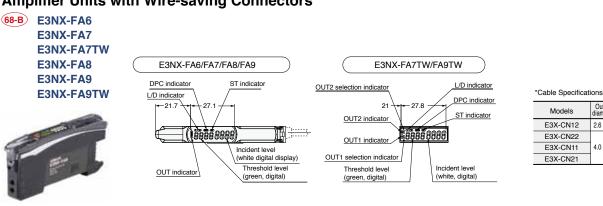
2.6 dia.

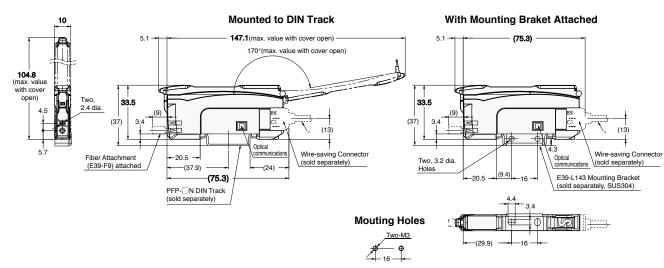
Pre-wired Amplifier Units





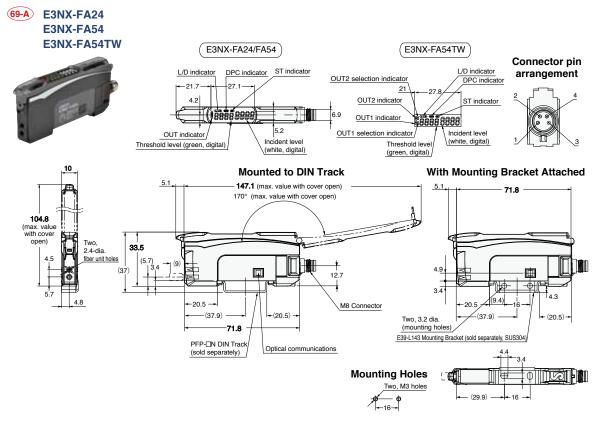
Amplifier Units with Wire-saving Connectors





E3NX-FA

Amplifier Units with M8 Connector



Amplifier Unit with Connector for Sensor Communications Unit



PFP- N DIN Track (sold separately) iber Senso Features

selection

Fiber Units

Threaded

Cylindrical

Flat

Small Spot

High Power

Narrow

BGS

Retroreflective Limited-

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum FPD,

Semi.

Solar Installation

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> chnical uide and ecautions

> > **Model Inde**

E3NX-FA

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election iuide

Fiber Units

Threaded
Cylindrical
Flat
Sleeved

Small Spot

High Power

Narrow view BGS

Retroreflective Limitedreflective

Chemicalresistant, Oil-resistant

Heatresistant

Area Detection

Liquid-level

Vacuum FPD, Semi, Solar

Installation Information

riber Ampliners, Communications Unit, and Accessories

> ecnnical iuide and recautions

> > Model Index

I/O Circuit Diagrams

NPN Output

Models	Operation mode	Timing chart	L/D indicators	Output circuit
E3NX-FA11 E3NX-FA6	Light-ON	Incident light No incident light OUT indicator (crange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between brown and black leads)	L lit.	Display OUT indicator (orange) Brown Black Control output 10 to 30 VDC Blue
	Dark-ON	Incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between brown and black leads)	D lit.	
E3NX-FA21	Light-ON	ch1/ Incident light ch2 No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between brown and black (orange) leads)	L lit.	Display OUT1 indicator OUT2 indicator (orange) Display OUT1 indicator OUT2 indicator (orange) Display OUT1 indicator OUT2 indicator (orange) Black Control output Load Photoelectric Sensor main irrouit Pink ct2 External Blue External Blue
	Dark-ON	ch1/ Incident light ch2 No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Flesset (Between brown and black (orange) leads)	D lit.	
E3NX-FA7 E3NX-FA24	Light-ON	Incident light No incident light OUT indicator (orange) Output ON transistor OFF Load Set (e.g., relay) Reset (Between brown and black leads)	L lit.	Display OUT indicator (orange) Brown Black Control output Sensor main circuit Orange Blue External intput
	Dark-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between brown and black leads)	D lit.	
E3NX-FA7TW	Light-ON	ch1/ Incident light ch2 No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Fleset (Between brown and black (orange) leads)	L/lit.	Display OUT1 indicator OUT2 indicator (orange) Photoelectric Sensor main circuit Black Control output Control output Ch2 Blue
	Dark-ON	ch1/ Incident light ch2 No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between brown and black (orange) leads)	D lit.	

PNP Output

Models	Operation mode	Timing chart	L/D indicators	Output circuit
E3NX-FA41 E3NX-FA8	Light-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between blue and black leads)	L lit.	Display OUT indicator (orange) Brown Control Black output — VDC Blue
	Dark-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between blue and black leads)	D lit.	
E3NX-FA51	Light-ON	ch1/ Incident light ch2 No incident light OUT indicator (orange) Not lit Output ON transistor Load Set (e.g., relay) Reset (Between blue and black (orange) leads)	L/lit.	Display OUT1 indicator OUT2 indicator (orange) Brown Pink Control output Sensor Main Control output Orange Control output Orange Control output Orange Ch2 Dad Blue Dad Dad Dad Dad Dad Dad Dad Da
	Dark-ON	ch1/ Incident light ch2 No incident light OUT indicator (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between blue and black (orange) leads)	D lit.	
E3NX-FA9 E3NX-FA54	Light-ON	Incident light No incident light OUT indicator (crange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between blue and black leads)	L/lit.	Display OUT indicator (orange) Brown Orange Intput Control Black output Load VDC Blue
	Dark-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output ON transistor Load Set (e.g., relay) Reset (Between blue and black leads)	D lit.	
E3NX-FA9TW E3NX-FA54TW	Light-ON	ch1/ Incident light ch2 No incident light OUT indicator (orange) Not lit Output ON transistor Load Set (e.g., relay) Reset (Between blue and black (orange) leads)	L/lit.	Display OUT1 indicator OUT2 indicator (orange) Brown Control output Black ch1 Sensor main oricult Orange ch2 Blue Load Blue Display OUT1 indicator OUT2 indicator (orange) Brown Control output Black ch1 VDC Orange ch2 Blue Load
	Dark-ON	ch1/ Incident light ch2 No incident light OUT indicator (orange) Not lit Output ON transistor Load Set (e.g., relay) Reset (Between blue and black (orange) leads)	D lit.	

Threaded Cylindrical

> Flat Sleeved

Small Spot

High Power Narrow

view BGS

Retro-reflective Limited-

reflective Chemicalresistant, Oil-resistant

Bending

resistant

Detection

Liquid-level

Vacuum FPD, Semi, Solar

E3NX-FA

ber Sensor atures

selection auide

Fiber Units

Threaded

Cylindrical

Flat
Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

> Chemicalresistant, Oil-resistant

reflective

Bending Heat-

resistant Area

Detection

Liquid-level

FPD, Semi, Solar

Installation

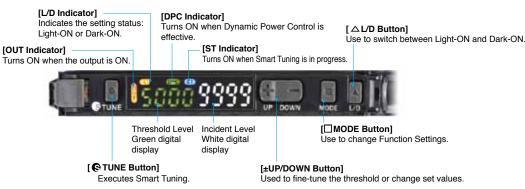
riber Ampliners, Communications Unit, and Accessories

Technical Guide and Precautions

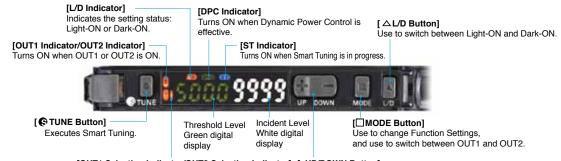
Model Index

Nomenclature

E3NX-FA11/FA41/FA6/FA8/FA7/FA9/FA24/FA54



E3NX-FA21/FA51/FA7TW/FA9TW/FA54TW/FA0



[OUT1 Selection Indicator/OUT2 Selection Indicator] [±UP/DOWN Button]

The indicator for the selected output channel is lit.

Used to fine-tune the threshold or change set values.

Operating Procedures

Basic Settings

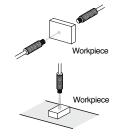


1. Press button.

Through-beam:
Set to "Dark ON" to turn the output ON with a workpiece in the detection area.
[L/D Indicator] turns ON.

Reflective:

Set to "Light ON" to turn the output ON with a workpiece in the detection area. [L/D Indicator] turns ON.



Smart Tuning [Easy Sensitivity Setting]

(1) Detect for Workpiece Presence/Absence

• 2-point Tuning

1. Press o button with a workpiece in the detection area.



2. Press obutton again without a workpiece in the detection area.

Release the button when [2004] is displayed.

Setting is Completed

Incident light level setting

The larger incident level of the Step 1 and 2 values is adjusted to the power tuning level.

Threshold setting:

Set to the middle between the Step 1 and 2 incident light levels.



Step 1 and Step 2 can be reversed.

(2) Enhance Durability of the Fiber Head against Dust and Dirt

Maximum Sensitivity Tuning

1. Hold button for 3 seconds or longer with/without workpiece as shown below.

Release the button when [FURL] is displayed.



Reflective: Workpiece is absent

Setting is Completed

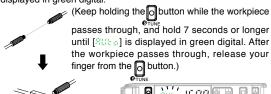
Incident light level setting:
The incident level in Step 1 is adjusted to "0".
Threshold setting:
The value is set to approx. 7% of the incident light level of 1.

However, the Sensor becomes more susceptible to the influence of background objects.

(3) Adjust for Moving Workpiece without Stopping Line

• Full Auto Tuning

1. Hold the button without the presence of a workpiece, and pass the workpiece through while [#8ab]→[84bb]→[84bba] is displayed in green digital.





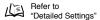
Incident light level setting: Adjust the max. incident light level on Step 1 as the power tuning level. Threshold setting: Set to the middle between max. and min. incident light levels on Step 1.

Basic Settings

(4) Determine Workpiece Position

Position Tuning

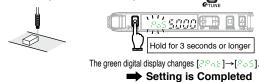
1. Turn ON power tuning in SET mode.



2. Press button without a workpiece in the area



3. Place the workpiece at the desired position and hold button.



Incident light level setting: The Step 3 incident level is adjusted to half the power tuning level. Threshold setting: Set to the same value as the Step 3 incident level.

(5) Detect Transparent or Small Workpiece (Set Threshold by incident light level percentage)

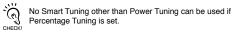
1. Turn ON Percentage Tuning in SET mode.





Incident light level setting: The Step 2 incident light level is adjusted to the power tuning level

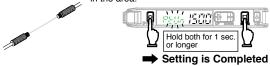
Set to the value obtained by [Incident Level at Step 2 × (1 + Percentage Tuning Level)].



(6) Restore from the Incident Level Changed due to Dust and Dirt

Power Tuning

1. Hold and buttons for 1 second or longer without a workpiece in the area



Incident light level setting: The Step 1 incident level is adjusted to the power tuning level. Threshold setting: Not changed



Perform the procedure with a workpiece in the area for reflective model setting. If the setting is made after position tuning, set both the through-beam model and reflective model with a workpiece



Refer to " • Smart Tuning Error " for error displays.

Smart Tuning Error

Error / Display / Cause	Error Origin Tuning Type	Remedy
Near Error The light level difference between Points 1 and 2 are extremely small.	2-point Tuning Full Auto Tuning	Change the detection function mode to a slower response time mode. Reduce the distance between the emitter and receiver. (Through-beam) Place the Fiber Head closer to the sensing object. (Reflective)
Over Error DuEr Err Incident light level is too high.	Tuning other than Maximum Sensitivity Tuning	Use a thin-diameter fiber. Widen the emitter and receiver distance. (Through-beam) Distance the Fiber Head from the sensing object. (Reflective)
Low Error Lo Err Incident light level is too low.	Tuning other than Maximum Sensitivity Tuning	Reduce the distance between the emitter and receiver. (Through-beam) Place the Fiber Head closer to the sensing object. (Reflective)

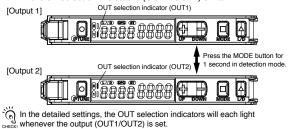
The adjustment range of smart tuning is approx. 20 to 1/100 times. When selecting giga mode as detection function, the range will be approx. 2 to 1/100 times due to the large initial value.

Refer to " Detailed Settings " to change the power tuning level.

Changing the Output

(Models with 2 Outputs: E3NX-FA21,E3NX-FA51,E3NX-FA7TW, E3NX-FA9TW) and E3NX-FA54TW

- The OUT selection indicators and the settings will change.
- 1. Press button for 1 second.
- 2. The OUT selection indicators (OUT1/OUT2) switch.



Minute Adjustment of Threshold Level

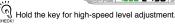
1. Press button to adjust the threshold level.

The threshold level becomes higher. II.0 1000 2 130 🕕 🛚 🖟

The DPC indicator

turns ON when the

DPC function is effective



Convenient Setting Features

(1) Stable Detection Regardless of Incident Level Change due to Dust and Dirt

- . DPC Function (Use of the function with Through-beam model or Retro-reflective model is recommended)
 - 1. Perform Smart Tuning

Refer to "Smart Tuning"
Refer to "Power Tuning"

2. Set the DPC function ON in SET mode Refer to "Detailed Settings"



(2) Reset Settings

Setting Reset

Initializes all the settings by returning them to the factory defaults.

1. Hold button and then hold button for 3 seconds or longer.

2. Press dutton.

3. Select [♣ 🎉 🙉 👍] in 📳 and press 🗖 button.

(3) Save or Read Settings

- 1. Hold button and then hold button for 3 seconds or longer.
 - User Save Function Saves the current settings.
 - 2. Select [5ALE] in 🕀 🖹 and press 🗐 button.
 - 3. Select [58, £ 9£5] in (☐ ☐ and press 🗖 button.
- User Reset Function Reads out the saved settings.
- 2. Select [-5] in [and press 🗖 button.

Hold both for 3 sec. or longer

3. Select [-5₺ U5₺-] in (# |= and press 🗖 button.

(4) Prevent Mistake-operation

Key Lock Function

Disables all button operations. [$\lfloor L \otimes c \otimes a \rangle$] is displayed when the button is pressed.

Enable/Cancel (This procedure)



Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limitedreflective

Chemicalresistant. Oil-resistant

Bending

resistant Detection

Liquid-level

Vacuum

FPD. Semi Solar

BGS

Bending

Liquid-level

Vacuum FPD. Semi

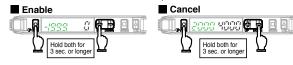
Solar

Convenient Setting Features

(5) Reset Incident Light Level to "0"

Zero Reset Function

Changes the incident light level to "0" The threshould level is also shifted accordingly The lower limit of the threshold is -1,999.



(6) Producing an Output When the Incident Level Is within an Area

Area Detection Mode

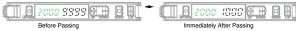
- 1. Select [SET Mode] [OUT1 Mode] -[Area Detection Mode]. Press 🗖 button for at least 3 seconds to leave the SET mode.
- 2. Press Dutton in [Detection Mode] LOW. "HIGH" and "LOW" will appear control output OFF on the green digital display.
- 3. Press button for the high and low thresholds to execute smart tuning.

Percentage Tuning: The thresholds are set as follows: High: Incident level from step 3 + Incident level from step 3 \times Percentage tuning level Low: Incident level from step 3 – Incident level from step 3 \times Percentage tuning level

(7) Monitoring the Incident Level for Sensing Objects Passing at High Speed

Change Finder

- 1. Select [SET Mode]→[Digital Display] to set [4 38 056-].
- The Change Finder cannot be displayed
- 2. Press dutton for 3 seconds or longer to leave the SET mode.
- 3. Send a workpiece past the Fiber Unit.
- 4. The maximum and minimum incident levels will be displayed for 0.5 seconds when the workpiece passes.



(8) Determining If the Workpiece Can Be Detected

- Solution Viewer 1. Press D button and A button threshold together for 3 seconds or longer to set To clear the setting, press 🔲 button Incident level Passing time(ms or µs) and button together for 3 seconds or longer to set [See U est].
 - 2. Send a workpiece past the Fiber Unit.
- 3. Displaying the Passing Time and Difference in Incident Levels.
- 4. Press 🗐 button and 🖺 button together for 3 seconds or longer to leave SET mode.



Detailed Settings

3. DPC

4. Timer

5. Power

Tuning

A Function Selection:

<u> 2-1.59999</u>

Function

6088

Function

dPc.

oFF.

affd

annd

Shab

anaf

Hold Dutton for 3 seconds or longer to enter SET mode. SET mode provides the function settings described

hereafter. The initial display shown after transition from

one function to another represents the factory default.

The OUT selection indicators shows " output 1 or output 2 individually for each output.







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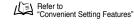
(a) HS High-speed mode 250 µs 1(Standard) (b) STND Standard mode 1ms 1 time 16ms | 12 times (c) GIGA Giga mode SHS Super-high-30μs 0.25 times Smart Tuning is canceled if the detection mode is changed.

The communication and mutual interference prevention functions are disabled when the detection mode is set to super-high-speed mode The response time for models with 2 outputs is 32 µs

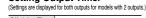
The incident light level in SET mode is a reference value.

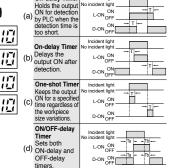
It may be changed when switched to detection mode.

Stable Detection Regardless of Incident Light Level Change









A timer value can be set after pressing button when a timer menu (other display than "---") is displayed. Use button to set the time.

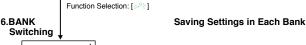
(1 to 9999 ms in 1 ms steps; the initial value: 10 ms)

Changing the Target Incident Light Level (Power Tuning Level)

Use 🖶 🖹 button to set the power tuning level.

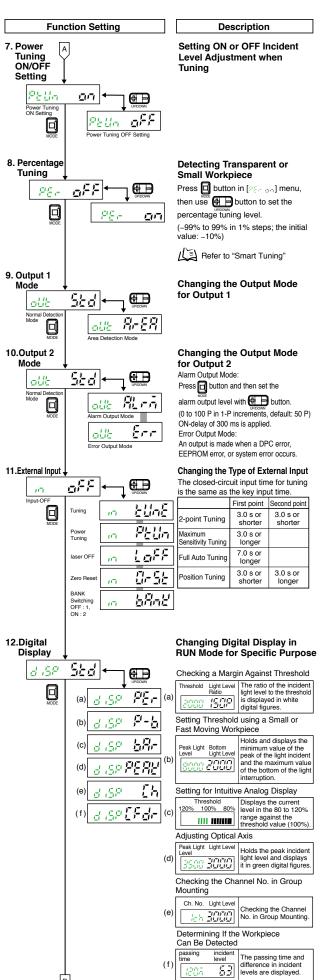
[839 to 9999 in 1 steps; the initial value: 3333]

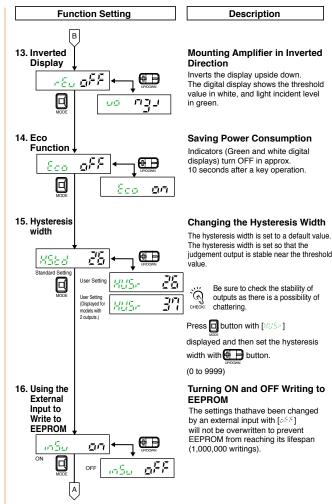
Refer to "Convenient Setting Features"





E3NX-FA





Fiber Senso

election

ber Units

Threaded

Cylindrical

Flat

Small Spot

High Power

Narrow

view

Retroreflective

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

resistant

Detection

Liquid-level

Vacuum

FPD, Semi, Solar

Installation Information

iber Amplifiers, Communications Unit, and

> echnical uide and recautions

> > **Model Inde**

Fiber Amplifiers, Communications Unit and Accessories

Flat

Sleeved

Small Spot High Power

Narrow view BGS

Retro-reflective

resistant. Oil-resistant Bending

resistant

Detection

Liquid-level

Vacuum FPD, Semi, Solar

Ratings and Specifications

Item Models	E3NW-ECT	E3NW-DS					
	N-Smart						
Connectable Sensor Amplifier Units	Smart Fiber Amplifier Unit: E3NX-FA0						
Connectable Sensor Ampliner Onits	Smart Laser Amplifier: E3NC-LA0	·					
	Smart Laser Amplifier Unit (CMOS type): E3NC-SA0						
Power supply voltage	24VDC (20.4 to 26.4 VDC)						
Power and current consumption	2.4 W max. (Not including the power supplied to Sensor.) 100 mA max. (Not including the current supplied to Sensor.) 80 mA max. (Not including the current supplied to Sensor.)						
Indicators	L/A IN Indicator (Green), L/A OUT Indicator (Green), PWR Indicator (Green), RUN Indicator (Green), ERROR Indicator (Red),and SS (Sensor Status) indicator (Green/Red)	RUN Indicator (Green), and SS (Sensor Status) indicator (Green/Red)					
Vibration resistance (destruction)	10 to 60 Hz with a 0.7-mm double amplitude, 60 to 150 Hz 50 m/s² for 1.5 hours each in X, Y, and Z directions						
Shock resistance (destruction)	Destruction: 150 m/s² for 3 times each in X, Y, and Z directions						
Ambient temperature range	Operating: 0 to 55°C, *1 Storage: -30 to 70°C (with no icing	or condensation)					
Ambient humidity range	Operating and storage: 25% to 85% (with no condensation)						
Maximum connectable Sensors	30 *2	10					
Maximum connectable Distributed Sensor units	8	_					
Insulation resistance	20 MΩ min. (at 500 VDC)						
Dielectric strength	500 VAC 50/60Hz 1 min						
Mounting method	35-mm DIN track-mounting						
Weight (packed state/unit only)	Approx. 185 g/Approx. 95 g	Approx. 160 g/Approx. 40 g					
Materials	Polycarbonate						
Accessories	Power supply connector, Communications connector, Connector cover, DIN track End Plates and Instruction manual	Power supply/communications connector, Connector cover, DIN track End Plates, Ferrite core and Instruction manual					

^{*1.} Temperature Limitations Based on Number of Connected Amplifier Units:

Communications Specifications

Item	Specifications			
Protocol	EtherCAT			
Modulation	Baseband			
Baud rate	100 Mbps			
Physical layer	100Base-TX (IEEE802.3u)			
Topology	Daisy chain			
Communications media	STP category 5 or higher			
Communications distance	100 m max. between nodes			
Noise immunity	Compliant with IEC 61000-4-4, 1 kV min.			
Node address setting method	Set the decimal rotary switches or software *1			
Node address range	000 to 192 *2			

Groups of 1 or 2 Amplifiers: 0 to 55°C, Groups of 3 to 10 Amplifiers: 0 to 50°C, Groups of 11 to 16 Amplifiers: 0 to 45°C, Groups of 17 to 30 Amplifiers: 0 to 40°C

^{*2.} A maximum total of 30 Sensors can be connected to a Sensor Communications Unit and Distributed Sensor Units.

^{*1.} The software setting is used when the node address setting switches are set to 0.
*2. The range depend on the EtherCAT master that is used. Refer to the E3NW-ECT EtherCAT Sensor Communications Unit Operation Manual for details.

(Unit: mm)

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retro-reflective

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

resistant

Area Detection

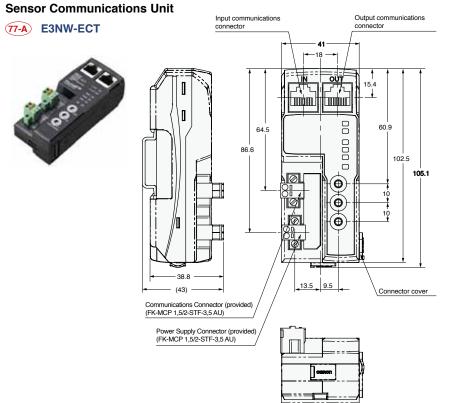
Liquid-level

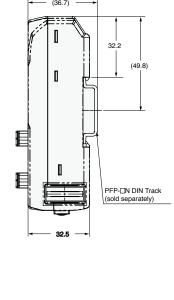
Vacuum

FPD, Semi. Solar

Dimensions

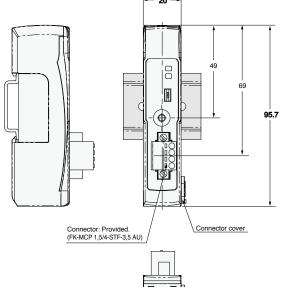
Tolerance class IT16 applies to demmensions in this date sheet unless otherwise specified.

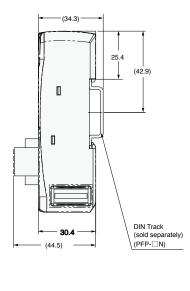




Distributed Sensor Unit







iber Sensoı eatures

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Fiber Units

Threaded

Cylindrical

Flat

Sleeved

Saving Space

Small Spot

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BGS

Retro-reflective
Limited-reflective

Chemical-resistant,
Oil-resistant

Bending

Heatresistant

Area
Detection
Liquid-level

Vacuum

FPD, Semi, Solar

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> > Model Index

E3X-HD Fiber Amplifier Units and Related Products

Fiber Amplifier Units E3X-HD Series

_	_		Мо	dels	Ratings and	
Туре	Appearance	Connecting method	NPN output	PNP output	Specifications	Dimensions
		Pre-wired (2 m)	E3X-HD11 2M	E3X-HD41 2M		Page 80 80-A
Standard models		Wire-saving Connector	E3X-HD6	E3X-HD8	- Page 80	Page 81 81-A
		M8 Connector	E3X-HD14	E3X-HD44	- Fage ou	Page 81 81-B
Model for Sensor Communications Unit		Connector for Sensor Communications Unit	E3X-HD0			Page 81 81-C

Sensor Communications Unit

Communication method	Appearance	Applicable Fiber Amplifier Model	Models	Ratings and Specifications	Dimensions
CompoNet	Roca Co	E3X-HD0 E3X-MDA0 E3X-DA0-S	E3X-CRT		Page 87 87-A
EtherCAT			E3X-ECT	Page 86	Page 87 87-B

Accessories (sold separately)

Wire-saving connectors (Required for Wire-saving Connector type models)

Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately. * Protective stickers: provided.

Туре	Appearance	Cable length	Number of conductors	Models	Ratings and Specifications	Dimensions
Master Connector		- 2m -	3	E3X-CN11	D	Page 88 88-A
Slave Connector			1	E3X-CN12	Page 88	Page 88 88-B

Sensor I/O Connectors (Required for models with M8 Connectors.)

Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately. * Protective stickers: provided.

Appearance	Cable length	Number of conductors	Models	Ratings and Specifications	Dimensions
Straight	2m		XS3F-M421-402-A		Page 88
	5m	_	XS3F-M421-405-A	Dama 00	88-C
L-shaped	2m	4	XS3F-M422-402-A	Page 88	Page 88
	5m		XS3F-M422-405-A		88-D

Mounting Bracket

A Mounting Bracket is not provided with the Fiber Amplifier Unit and must be ordered separately as required.

Appearance	Model	Quantity	Dimensions
	E39-L143	1	Page 89 89-A

DIN Track

A Din Track is not provided with the Fiber Amplifier Unit and must be ordered separately as required.

Appearance	Туре	Models	Quantity	Dimensions
	Shallow type, total length: 1 m	PFP-100N		Page 89
	Shallow type, total length: 0.5 m			89-B
	Deep type, total length: 1 m	PFP-100N2		Page 89 89-C

End Plate

Two End Plates are provided with the Sensor Communications Unit.

End Plates are not provided with the Fiber Amplifier Unit and must be ordered separately as required.

Appearance	Model	Quantity	Dimensions
3	PFP-M	1	Page 89 89-D

Threaded

Cylindrical

Flat Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective Limitedreflective

Chemicalresistant.

Oil-resistant Bending

resistant

Area Detection

Liquid-level

Vacuum

FPD, Semi. Solar

Fiber Amplifiers, Communications Unit and Accessories

E3X-HD

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Selectio Guide

Fiber Units

Cylind Cylind

Saving Space
Sleeved

Small Spot

Narrow view

BGS

Retroreflective

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi, Solar

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Fiber Amplitiers, Communications Unit, and Accessories

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Ratings and Specifications

Туре			Standard		Model for Sensor Communications Unit *1			
		NPN output	E3X-HD11	E3X-HD6	E3X-HD14	FOY LIDO		
		PNP output	E3X-HD41	E3X-HD8	E3X-HD44	E3X-HD0		
tem Connecting method		Pre-wired	Wire-saving Connector *2	M8 Connector	Connector for Sensor Communications Unit			
Light source	(wavelength)		Red, 4-element LED (625	nm)				
Power suppl	y voltage		12 to 24 VDC ±10%, ripple	e (P-P) 10% max.				
Power consu	Normal mode: 720 mW max. (Current consumption: 30 mA max. at 24 VDC, 60 mA max. at 12 DVC) Power saving Eco mode: 530 mW max. (Current consumption: 22 mA max. at 24 VDC, 44 mA max. at 12 VD							
Control outp	ut		(Differs for NPN and PNP cload current: 50 mA max.	(residual voltage: 2 V max.)	, OFF current: 0.5 mA max.	_		
Protection c	rcuits		Power supply reverse polar output reverse polarity pro	arity protection, output short tection	-circuit protection and	Power supply reverse polarity protection and output short-circuit protection		
Para anas	Super-high-s mode (SHS)		NPN outputs: Operate or r PNP outputs: Operate or r					
Response time	High-speed r	mode (HS)	Operate or reset: 250 µs (default setting)				
	Standard mo	de (Stnd)	Operate or reset: 1 ms					
	Giga-power i	node (GIGA)	Operate or reset: 16 ms					
Mutual interf	erence prever	ntion	Possible for up to 10 units (optical communications sync) *3					
Auto power	control (APC)		Always ON					
Other function	ons		Power tuning, differential detection, DPC, timer (OFF-delay, ON-delay, or one-shot), zero reset, resetting settings, and Eco mode					
Ambient Illu	mination (Rece	eiver side)	Incandescent lamp: 20,000 lx max., Sunlight: 30,000 lx max.					
Maximum co	nnectable Uni	ts	16 units			with E3X-CRT: 16 units with E3X-ECT: 30 units		
Ambient temperature range		e	Operating: Groups of 1 to 2 Amplifer Units: –25 to 55°C, Groups of 3 to 10 Amplifer Units: –25 to 50°C, Groups of 11 to 16 Amplifer Units: –25 to 45°C Storage: –30 to 70°C (with no icing or condensation)			Operating: Groups of 1 to 2 Amplifer Units: 0 to 55°C, Groups of 3 to 10 Amplifer Units: 0 to 50°C, Groups of 11 to 16 Amplifer Units: 0 to 40°C Groups of 17 to 30 Amplifer Units: 0 to 40°C Storage: –30 to 70°C (with no icing or condensation		
Ambient hun	nidity range		Operating and storage: 35	% to 85% (with no condens	ation)			
Insulation re	sistance		20 MΩ min. (at 500 VDC)					
Dielectric str	ength		1,000 VAC at 50/60 Hz for	1 min				
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			10 to 150 Hz with a 0.7-mm double amplitude for 80 minutes each in X, Y, and Z directions			
Shock resistance (destruction)		500 m/s² for 3 times each in X, Y, and Z directions			150 m/s² for 3 times each in X, Y, and Z directions			
Degree of pr	otection		IEC 60529 IP50 (with Prot	ective Cover attached)		_		
Weight (packed state/unit only)		Approx. 105 g/Approx. 65 g	Approx. 60 g/Approx. 20 g	Approx. 70 g/Approx. 25 g	Approx. 65 g/Approx. 25 g			
Matariala	Case		Heat-resistant ABS			Heat-resistant ABS (connector: PBT)		
Materials	Cover		Polycabonate (PC)					
Accessories			Instruction Manual					

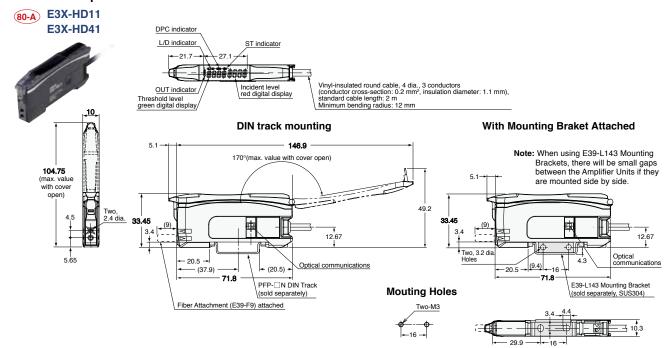
- *1.The E3X-ECT EtherCAT Sensor Communications Unit and the E3X-CRT CompoNet Sensor Communications Unit can be used.
- *2. Use either the E3X-CN11 (master connector, 3 conductors) or the E3X-CN12 (slave connector, 1 conductor).
- *3. The communications function and matual interference prevention function are disabled when the detection mode is set to Super-high-speed mode (SHS). When including E3X-DA-S with activated power tuning the maximum number of mutual interference prevention is up to 6.

 When including E3X-MDA with activated power tuning the maximum number of mutual interference prevention is up to 5.

Dimensions

Tolerance class IT16 applies to demmensions in this date sheet unless otherwise specified.

Pre-wired Amplifier Units

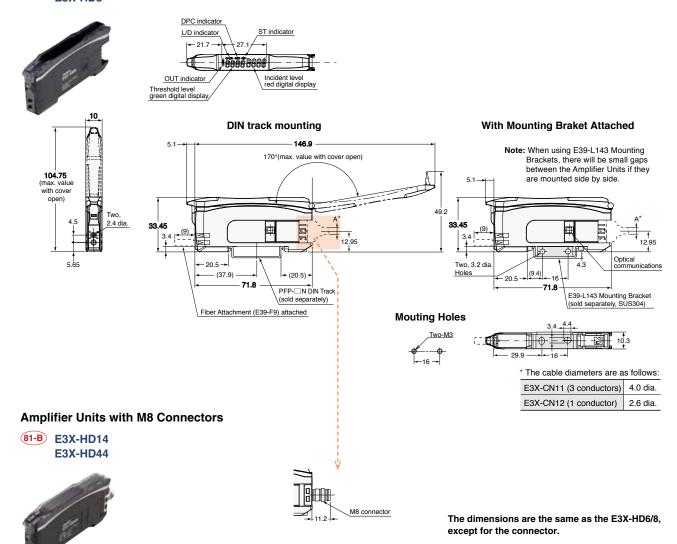


E3X-HD





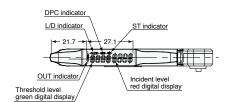


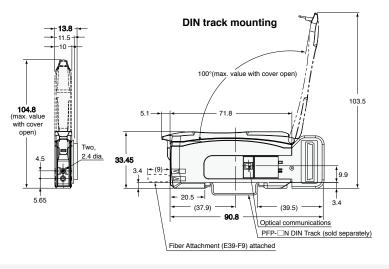


Amplifier Unit with Connector for Sensor Communications Unit









-iber Sensi Features

selectio inide

er Units

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow

BGS

Retroreflective

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi, Solar

Installation

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> echnical uide and recautions

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E3X-HD

iber Sensoi eatures

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Threaded

Cylindrical

Saving Space Sleeved

Small Spot

High Power

Narrow view BGS

Retroreflective

Limitedreflective

> Chemicalresistant, Oil-resistant

Bending Heat-

Area Detection

Liquid-level

Vacuum

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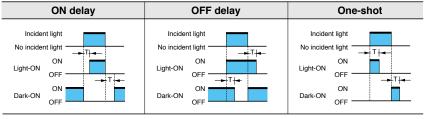
I/O Circuit Diagrams

NPN Output

Models	Operation mode	Timing chart	L/D indicators	Output circuit
E3X-HD11	Light-ON	Incident light No incident light OUT indicator (orange) Output ON transistor OFF Load (e.g., relay) Reset (Between brown and black leads)	L lit.	Display OUT indicator (orange) Brown Black Load Photoelectric Sensor main circuit 12 to 24 VDC
E3X-HD6 E3X-HD14	Dark-ON	Incident light No incident light OUT indicator Lit (orange) Not lit Output Unit ON Uransistor OFF Load Set (e.g., relay) Reset (Between brown and black leads)	D lit.	Serior and the serior

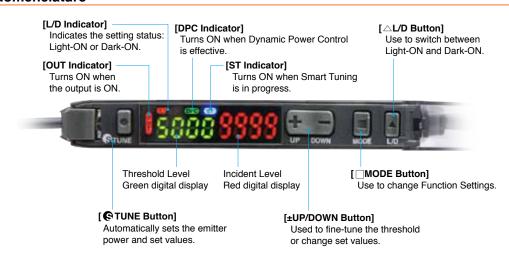
PNP Output

Models	Operation mode	Timing chart	L/D indicators	Output circuit
E3X-HD41	Light-ON	Incident light No incident light OUT indicator (orange) Not lit Output Output Load (e.g., relay) Reset (Between blue and black leads)	L lit.	Display OUT indicator (orange) Brown Photoelectric Sensor Black Control output 12 to 24 VIDE
E3X-HD8 E3X-HD44	Dark-ON	Incident light No incident light OUT indicator Litt (orange) Not lit Output ON transistor OFF Load Set (e.g., relay) Reset (Between blue and black leads)	D lit.	Photoelectric Photoelectric Black Control output 12 to 24 VDC Control output 12 to 24 VDC Control output Sensor main circuit



Note: Timing Charts for Timer Settings (T: Set Time)

Nomenclature



High Power

Chemicalresistant. Oil-resistant

Bending

resistant

Detection

Liquid-level

Vacuum FPD.

> Semi Solar

Operating Procedures

Basic Settings

Switching Control Output

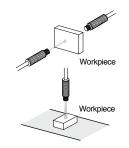
1. Press button.

Through-beam:

Set to "Dark ON" to turn the output ON with a workpiece in the detection area. [L/D Indicator] turns D ON.

Reflective:

Set to "Light ON" to turn the output ON with a workpiece in the detection area. [L/D Indicator] turns L ON.

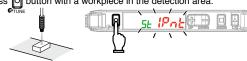


Smart Tuning [Easy Sensitivity Setting]

(1) Detect for Workpiece Presence/Absence

• 2-point Tuning

1. Press button with a workpiece in the detection area.



2. Press button again without a workpiece in the detection area. Setting is Completed

Incident light level setting:

The larger incident level of the Step 1 and 2 values is adjusted to the power tuning level. Threshold setting: Set to the middle between the Step 1 and 2 incident light levels.

Step 1 and Step 2 can be reversed.

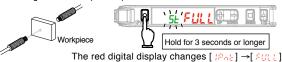
(2) Enhance Durability of the Fiber Head against Dust and Stain

Maximum Sensitivity Tuning

 Hold button for 3 seconds or longer with/without workpiece as shown below.

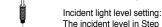
Release the button when [$so F(R_k)$] is displayed.

Through-beam: Workpiece is present



Reflective: Workpiece is absent

Setting is Completed



The incident level in Step 1 is adjusted to "0". Threshold setting:

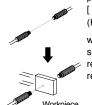
The value is set to approx. 7% of the incident light level of 1

If the incident light level of 1 is smaller during long distance detection, the minimum value by which an output is correctly turned ON will be set.

(3) Adjust for Moving Workpiece without Stopping Line

Full Auto Tuning

1. Hold the o button without the presence of a workpiece, and pass the workpiece through while [!Pat] →



 $[FULL] \rightarrow [RULo]$ is displayed in red digital. (Keep holding the button while the workpiece passes through, and hold 7

seconds or longer until [RUL o] is displayed in red digital. After the workpiece passes through. release your finger from the o button.)



Incident light level setting:

Adjust the max. incident light level on Step 1 as the power tuning level. Threshold setting:

Set to the middle between max. and min. incident light levels on Step 1.

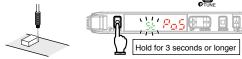
(4) Determine Workpiece Position

Position Tuning

Fiber Amplifiers, Communications Unit and Accessories

Press button without a workpiece in the area.

2. Place the workpiece at the desired position and hold o button.



The red digital display changes $[P_{\alpha b}] \rightarrow [P_{\alpha b}]$

➡ Setting is Completed

Incident light level setting:

The Step 2 incident level is adjusted to half the power tuning level. Threshold setting: Set to the same value as the Step 2 incident level.

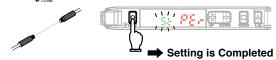
(5) Detect Transparent or Small Workpiece (Set Threshold by incident light level percentage)

Percentage Tuning

1. Turn ON Percentage Tuning in SET mode

Refer to "Detailed Settings".

2. Press button without a workpiece in the area.



Incident light level setting:

The Step 2 incident light level is adjusted to the power tuning level. Threshold setting: Set to the value obtained by [Incident Level at Step 2 × Percentage Tuning Level + Incident Level at Step 2].

No Smart Tuning other than Power Tuning can be used if Percentage Tuning is set.

•	Smart Tuning E	rror			
	Error / Display / Cause	Error Origin Tuning Type	Remedy Change the detection function mode to a slower response time mode. Reduce the distance between the light emitting and light receiving surfaces. (Through-beam) Place the Fiber Head closer to the sensing object. (Reflective) Enhance the power tuning level. Use a thin-diameter fiber. Widen the emitter and receiver distance (Through-beam) Distance the Fiber Head from the sensing object(Reflective)		
	Near Error The light level difference between Points 1 and 2 are extremely small.	2-point Tuning Full Auto Tuning Positioning Tuning			
Incid	Over Error DUET Err Incident light level is too high.	All			
	Low Error Lo Err Incident light level is too low.	Tuning other than Maximum Sensitivity Tuning	Decrease the power tuning level. Reduce the distance between the light emitting and light receiving surfaces. (Through-beam) Place the Fiber Head closer to the sensing object. (Reflective)		



The adjustment range of smart tuning is approx. 20 to 1/100 times When selecting giga mode as detection function, the range will be approx. 2 to 1/100 times due to the large initial value.

Refer to "Detailed Settings" to change the power tuning level.

Minute Adjustment of Threshold Level

1. Press button to adjust the threshold level.



Hold the key for high-speed level adjustment.

Cylindrical

Flat Sleeved

Small Spot High Power

view **BGS**

Retro-

reflective

Chemicalresistant. Oil-resistant Bendina

Heatresistant

Liquid-level

Detection

FPD. Semi Solar

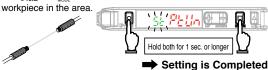
Vacuum

Convenient Setting Features

(1) Restore from the Incident Level Changed due to Dust and Dirt

Power Tuning

1. Hold and ubuttons for 1 second or longer without a



Incident light level setting:

The Step 1 incident level is adjusted to the power tuning level. Threshold setting:

Not changed. If the value is low, it will be set to the minimum value in which an output is turned ON/OFF correctly.

Perform the procedure with a workpiece in the area for reflective model setting. If the setting is made after position tuning, set both the through-beam model and reflective model with a workpiece.



Refer to ". Smart Tuning Error" for error displays.

(2) Stable Detection Regardless of Incident Level Change due to Dust and Dirt

DPC Function (Use of the function with Through-beam model or Retro-reflective model is recommended)

1. Perform Smart Tuning

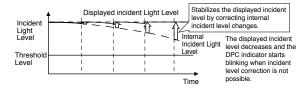
Refer to "Smart Tuning"

The DPC indicator turns ON when the DPC function is

Set the DPC function ON in SET mode. Refer to "Detailed Settings"



- Steps 1 and 2 can be reversed.
- The DPC function will be disabled when a smart tuning error occurs, differential function with maximum sensitivity tuning is performed, or the first incident light level of the positioning tuning is low. The incident light level is corrected to the power tuning level to
- maintain stable threshold and incident light levels. This provides stable detection regardless of the incident level changes caused by dirty sensor head, position error, or temperature changes.

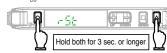


(3) Reset Settings

Setting Reset

Initializes all the settings by returning them to the factory defaults.

1. Hold button and then hold button for 3 seconds or longer.



- 2. Press d button.
- 3. Select [😘 😘 🕹] in 🖶 and press 🗖 button.

Item	Initial Value
Threshold Value	55
Control Output	L-ON

Settings for other functions are returned to the detailed setting initial values. User-saved settings are retained Smart Tuning is canceled.



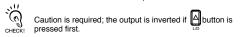
Caution is required; the output is inverted if button is pressed first.

(4) Save or Read Settings

- 1. Hold button and then hold button for 3 seconds or longer.
 - User Save Function Saves the current settings
 - Select [58, E] in 📳 and press 🔲 button.
 - Select [5848 YES] in [and press 🗐 button.
- User Reset Function

Reads out the saved settings.

- 2. Select [-5k] in H and press dutton."
- 3. Select [-5₺ #5₺-] in (# |and press 🔲 button.



(5) Prevent Mistake-operation

Key Lock Function

Disables all button operations. [Loc on] is displayed when the button is pressed.

Enable/Cancel (This procedure)



* Press either of UP/DOWN.

(6) Reset Incident Light Level to "0"

Zero Reset Function

Changes the incident light level to "0". The threshold level is also shifted accordingly.

Enable



Cancel



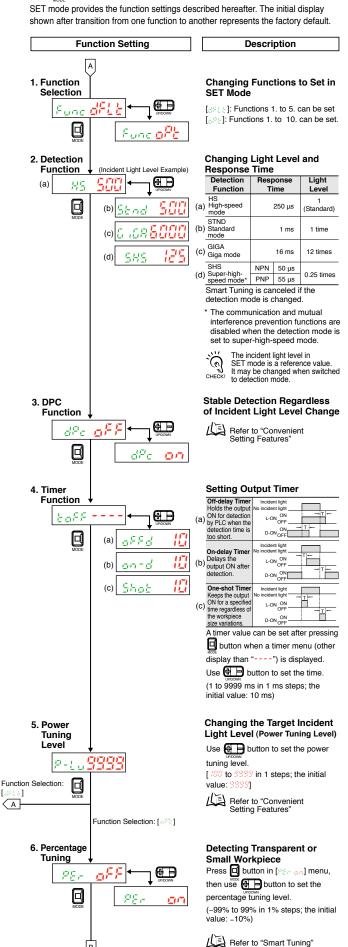
CHECK ,

The zero reset function is canceled when either of the DPC function/differential function/Smart Tuning is performed

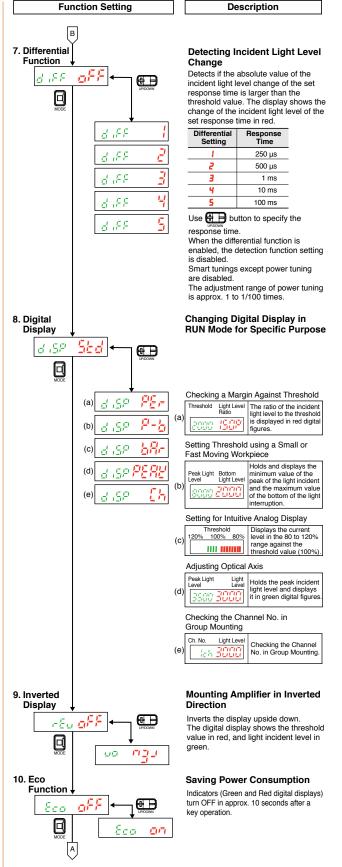
E3X-HD



Hold Dutton for 3 seconds or longer to enter SET mode.



В



Fiber Senso

election mide

Fiber Units

Threaded

Cylindrical

Flat

Small Spot

High Power

Narrow

BGS

Retroreflective Limited-

reflective Chemical-

resistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

FPD, Semi.

Solar

Installation Information

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Fiber Amp
Communic
d Unit, and

Technical Guide and Precaution

Model Inde

Fiber Amplifiers, Communications Unit and Accessories

Cylindrical

Flat

Sleeved

Small Spot **High Power**

BGS

Chemicalresistant. Oil-resistant Bending

> Heatresistant

Detection Liquid-level

Vacuum

FPD, Semi. Solar

Ratings and Specifications

E3X-CRT

Item	Specifications		
Communication method	CompoNet Communications		
Connectable Sensors	Fiber Sensors: E3X-HD0, E3X-MDA0 and E3X-DA0-S Laser Sensor Head with Separate Digital Amplifier: E3C-LDA0 Proximity Sensor with Separate Amplifier: E2C-EDA0		
Communications power supply voltage	14 to 26.4 VDC (Communications Unit draws power from the communications power supply.)		
Power and current consumption	2.4 W max. (Not including the power supplied to Sensor.) 100 mA max. at 24 VDC (Not including the current supplied to Sensor.)		
Functions	I/O communications, message communications, and Sensor error output		
Indicators	MS Indicator (Green/Red), NS indicator (Green/Red), and SS (Sensor Status) indicator (Green/Red)		
Vibration resistance	10 to 150 Hz with double amplitude of 0.7 mm, or 50 m/s ² 80 min each in X, Y, and Z directions		
Shock resistance	150 m/s ² 3 times each in X, Y, and Z directions		
Dielectric strength	500 VAC 50/60Hz 1 min		
Insulation resistance	20MΩ min.		
Ambient operating temperature	0 to 55°C (with no icing or condensation) * The temperature is limited by the number of connected Fiber Amplifier Units.		
Ambient operating humidity	25% to 85% (with no icing or condensation)		
Storage temperature	-30 to 70°C (with no icing or condensation)		
Storage humidity	25% to 85% (with no condensation)		
Mounting method	35-mm DIN track-mounting		
Weight (packed state/unit only)	Approx. 220 g/Approx. 95 g		
Accessories	Connector cover, DIN track End Plates and Instruction manual		

Note. The E3X-CRT has two operating modes: I/O mode 1 and I/O mode 2. The following table gives the differences between these modes

	I/O classification	Number of allocated points	Maximum number of interconnected
I/O mode 1	Input Unit	Input: 32	15
I/O mode 2	I/O Unit	Input: 64 Output: 64	16

Read the User's Manual for precautions on using this Unit. (E412)

Temperature Limitations Based on Number of Connected Fiber Amplifier Units: Groups of 1 to 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units:0 to 45°C

E3X-ECT

Item	Specifications		
Communication method	EtherCAT		
Connectable Sensors	Fiber Sensor E3X-HD0, E3X-MDA0 and E3X-DA0-S Laser Sensor Head with Separate Digital Amplifier: E3C-LDA0 Proximity Sensor with Separate Amplifier: E2C-EDA0		
Power supply voltage	20.4 to 26.4 VDC		
Power and current consumption	2.4 W max. (Not including power the supplied to Sensor.) 100 mA max. at 24 VDC (Not including the current supplied to Sensor.)		
Functions	DC (synchronous) mode, Free run mode, PDO communications,* 1 SDO communications, Sensor error output		
Indicators	L/A IN indicator (Yellow), L/A OUT indicator (Yellow), PWR indicator (Green), RUN indicator (Green), ERROR indicator (Red), and SS (Sensor Status) indicator (Green/Red)		
Vibration resistance	10 to 150 Hz with double amplitude of 0.7 mm, or 50 m/s ² 80 min each in X, Y, and Z directions		
Shock resistance 150 m/s ² 3 times each in X, Y, and Z directions			
Dielectric strength	500 VAC 50/60 Hz 1 min		
Insulation resistance	20MΩ min.		
Ambient operating temperature 0 to 55°C (with no icing or condensation) * The temperature is limited by the number of connected Fiber Amplifier Units.			
Ambient operating humidity 25% to 85% (with no condensation)			
Storage temperature	-30 to 70°C (with no icing or condensation)		
Storage humidity	25% to 85% (with no condensation)		
Mounting method	35-mm DIN track-mounting		
Weight (packed state/unit only)	Approx. 220 g/Approx. 95 g		
Accessories	Power supply connector, connector cover, DIN track End Plates and Instruction manual		

Data Size Assignable to the PDO (Process Data Object):

There is a maximum data size that can be assigned. The maximum size is 36 bytes.

Temperature Limitations Based on Number of Connected Fiber Amplifier Units: Groups of 1 to 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units: 0 to 40°C

Read the User's Manual for precautions on using this Unit. (E413)

Threaded Cylindrical

Flat

Small Spot

Sleeved

High Power

Narrow view

BGS

Retroreflective Limited-

reflective Chemical-

resistant. Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

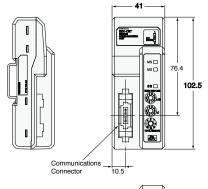
FPD, Semi, Solar

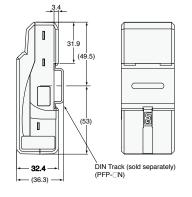


Tolerance class IT16 applies to demmensions in this date sheet unless otherwise specified.





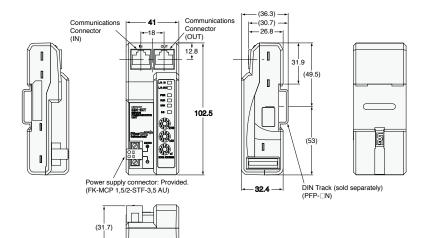






87-B E3X-ECT





Fiber Amplifiers, Communications Unit and Accessories

Accessories (sold separatel

Threaded Cylindrical

Flat Sleeved

Small Spot High Power

BGS

Retroreflective

> Chemicalresistant. Oil-resistant Bending

> > Heatresistant

Area Detection

Liquid-level

Vacuum FPD, Semi. Solar

Ratings and Specifications

Wire-saving Connectors

Item Ty		уре	Master Connector		Slave Connector		
item	Mod	dels	E3X-CN21	E3X-CN11	E3X-CN22	E3X-CN12	
Number	of conduc	tors	4	3	2	1	
Diameter of cable		ble	4 dia.			2.6 dia.	
Rated current			2.5A				
Rated voltage			50VDC				
Contact resistance		nce	20 mΩ max. (20 mVDC max., 100 mA max.) (The above figure is for connection to the Amplifier Unit and the adjacent Connector. It does not include the conductor resistance of the cable.)				
Number of insertions		ons	Destruction: 50 times (for connection to the Amplifier Unit and the adjacent Connector)				
Material Housing		ng	Polybutylene terephthalate (PBT)				
Contact Phosphor bronze/gold-plated nickel							
Weight (packed state)		ate)	Approx. 55 g Approx. 25 g			Approx. 25 g	

Sensor I/O Connectors

Item	Models	XS3F-M42□-40□-A	
Number of conductors		4	
Diameter of cable		4 dia.	
Rated current		1A	
Rated voltage		125VDC	
Contact resistance		40 mΩ max. (20 mVDC max., 100 mA max.)	
Number of insertions		Destruction: 200 times	

(Unit: mm)

Dimensions

Tolerance class IT16 applies to demmensions in this date sheet unless otherwise specified.

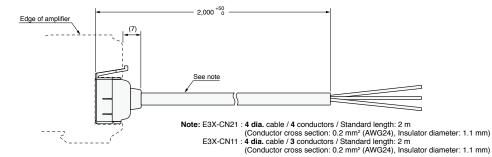
Wire-saving Connectors (for Models with Wire-saving Connectors)

Master Connector



E3X-CN11



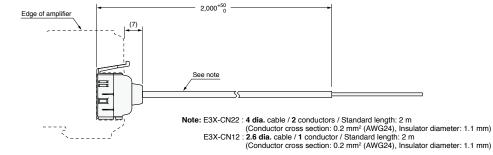


Slave Connector



E3X-CN12

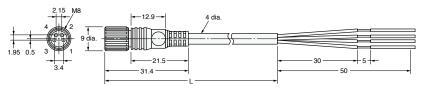




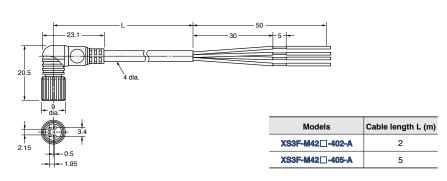
Sensor I/O Connectors (for Models with M8 Connectors)



88-C XS3F-M421-402-A XS3F-M421-405-A



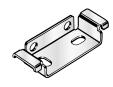


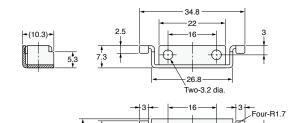


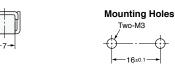
Mounting Brackets



89-A E39-L143





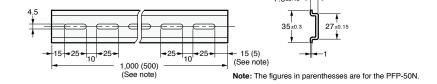


Material: Stainless steel (SUS304)





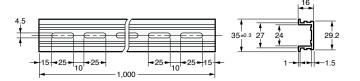




Material: Aluminum





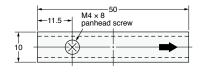


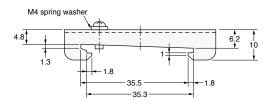
Material: Aluminum

End Plate









Material: Iron, zinc plating

Threaded

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow view

BGS

Retroreflective

Limitedreflective

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi. Solar

iber Sensor eatures

electior uide

Fiber Units

Threaded

Cylindrical

Flat

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Small Spot

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Narrow view

BGS

Retroreflective

Chemical-

chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum

FPD, Semi, Solar

Installation Information

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> Fechnical Suide and Precautions

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Reference Information for Fiber Units

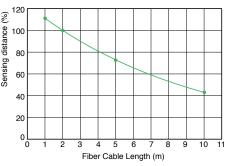
Influence of Fiber Cable Length

The sensing distance listed in the Fiber Units specifications are based on the fiber cable lengths found in the suffix of the model number. The sensing distance will change if the fiber cable is cut or extended.

The following graph shows the percentage change of the various fiber cable length, where 100% is the sensing distance for a fiber cable with a length of 2 m.

Use this as a guideline for installation distances.

Keep in mind that extending the cable with a fiber connector will result in even shorter sensing distances than the value given in the graph.

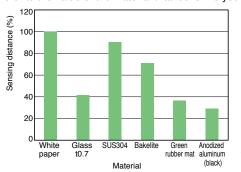


* The 100% value is for a fiber cable with a length of 2 m (same for Through-beam and Reflective Models).

Reflective Models: Sensing Distance Ratios by Workpiece Materials

The following graph shows the percentage change of the various workpieces, where 100% is the sensing distance for white paper, the standard sensing object.

Refer to the value of the material that looks like your workpiece.



* White paper is 100%

Types of Fiber Cables

This section describes the features of different types of fiber cables.

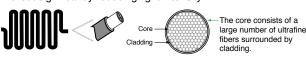
(This is given in the Fiber Unit specifications as either Flexible or Bend-resistant for the cable bending radius, and Coaxial for the appearance.

If no definition is given, a standard cable is used.)

Flexible Fibers

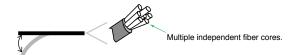
The flexible fiber has a small bending radius for easy routing without fiber damage. Flexible fibers are not intended for applications with repeated bends.

It improves sensing performance because the cable can be bent without significantly reducing light intensity.



• Bend-resistant Fibers

This fiber is resistant to repeated bends for use on moving parts. A common application is a robotic arm.



Standard Fibers

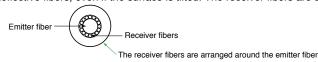
This fiber have a large bending radius compared with bend-resistant or flexible fiber.

Use this fiber where the bending radius is large, or on non-moving parts.

Structure only of one fiber

Coaxial Reflective Fibers

These fibers are suitable for sensing small objects at close range. They also detect glossy surfaces more reliably than Standard Reflective fibers, even if the surface is tilted. The receiver fibers are arranged around the emitter fiber, as shown below.



Threaded

Category	Question	Answer	
	How do I interpret the optical axis diameter in the Fiber Unit specifications?	The optical axis diameter is the beam size that the Through-beam Fiber Unit uses for detection. If you are detecting objects larger than the optical axis diameter, you can expect stable detection performance because the object will block all of the beams of light that are used for detection. The incident level may fluctuate, however, if the workpiece passes the beam at high speed. In this case, it is best to select a Fiber Unit with a smaller optical axis diameter, or change the response time of the Fiber Amplifier Unit to High-speed mode or to Super-high-speed mode setting. Beam spread of 60°	
Fiber Units	Are there any differences between the Fiber Units that are used for emitter and receiver?	With Through-beam Fiber Units, there is no difference between emitter fibers and receiver fibers. With Reflective Fiber Units, the emitter fibers and receiver fibers are different on Coaxial Reflective Models. Emitter fiber cables have identification marks. Refer to the individual dimensions diagrams of Fiber Units for details.	
	What size must the hole be to mount a Threaded or Cylindrical Fiber Unit?	Refer to the recommended mounting hole dimensions given on pages 58 to 61.	
	Are Fiber Cables available in different lengths?	Some models are available with either 5-m or 10-m cable. Ask your OMRON representative for details.	
	What is the aperture angle?	The aperture angle is the angle at which the emitter beam spreads out.	
	Are these Fiber Units CE certified?	Fiber Units do not have any electrical components and therefore are exempt from CE certification.	
	Can these Fiber Units be used in explosionproof areas?	The Fiber Units can be used in an explosion-proof area. Install only the Fiber Unit in the explosion-proof area and install the Fiber Amplifier Unit outside the explosion-proof area.	
	Can the Fiber Amplifier Units be linked with other models?	The E3X-HD Series can be connected only with the E3X-DA-S and MDA Series.	
Eibar Amalisia	Can the Fiber Amplifier Unit be operated from a mobile console?	Mobile consoles cannot be used with either the E3NX-FA Series or the E3X-HD Series.	
Fiber Amplifier			

Q&A

Units

If you use E3NX-FA0 Amplifier Units, you can use the

(CompoNet) or E3X-ECT (EtherCAT).

(CC-Link).

Can a Sensor Communications Unit be used?

E3NW-ECT(EtherCAT), E3NW-CRT(CompoNet) or E3NW-CCL

If you use E3X-HD0 Amplifier Units, you can use the E3X-CRT

Cylindrical

Flat

Sleeved

Small Spot

High Power

Narrow

view

BGS

Retro-

reflective

reflective

Chemical-

resistant.

Bendina

Heat-

Area

resistant

Detection

Liquid-level

Vacuum

FPD.

Semi

Solar

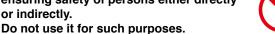
Oil-resistant

For common precautions, refer to www.ia.omron.com

Fiber Amplifier Unit

Warning

This product is not designed or rated for ensuring safety of persons either directly or indirectly.



Do not use the product with voltage in excess of the rated voltage. Excess voltage may result in malfunction or fire.



Never use the product with AC power supply. Otherwise, explosion may result.



Precautions for Safe Use

The following precautions must be observed to ensure safe operation of the product. Doing so may cause damage or fire.

- (1) Do not install the product in the following locations.
 - · Locations subject to direct sunlight
 - · Locations subject to condensation due to high humidity
 - · Locations subject to corrosive gas
 - · Locations subject to vibration or mechanical shocks exceeding the rated values
 - · Locations subject to exposure to water, oil, chemicals
 - · Locations subject to stream
 - · Locations subjected to strong magnetic field or electric field
- (2) Do not use the product in environments subject to flammable or explosive gases.
- (3) Do not use the product in any atmosphere or environment that exceeds the ratings.
- (4) To secure the safety of operation and maintenance, do not install the product close to high-voltage devices and power devices.
- (5) High-Voltage lines and power lines must be wired separately from this product. Wiring them together or placing them in the same duct may cause induction, resulting in malfunction or damage
- (6) Do not apply load exceeding the ratings. Otherwise, damage or fire may result.
- (7) Do not short the load. Otherwise, damage or fire may result.
- (8) Do not use the product if the case is damaged.
- (9) Burn injury may occur. The product surface temperature rises depending on application conditions, such as the ambient temperature and the power supply voltage. Use caution when operating or cleaning the product.
- (10) When setting the Sensor, be sure to check safety, such as by stopping the equipment.
- (11) Be sure to turn off the power supply before connecting or disconnecting wires.
- (12) Do not attempt to disassemble, repair, or modify the product Unit in any way.
- (13) When disposing of the product, treat it as industrial waste.

Precautions for Correct Use

- (1) Connect the load correctly.
- (2) Do not miswire such as the polarity of the power supply.
- (3) Be sure to mount the unit to the DIN track until it clicks.
- (4) When using Amplifier Units with Wire-saving Connectors, attach the protective stickers (provided with E3X-CN-series Connectors) on the unused power pins to prevent electrical shock and short circuiting. When using Amplifier Units with Connectors for Communications Units, attach the protective caps.

Amplifier Unit with Wire-saving Connector Power Supply Connecting Terminal **Amplifier Unit with Connector** for Communications Unit



- (5) Use an extension cable with a minimum thickness of 0.3 mm² and less than 100 m long.
- (6) Do not apply the forces on the cord exceeding the following limits: Pull: 40N; torque: 0.1N·m; pressure: 20N; bending:
- (7) Do not apply excessive force (9.8 N max.) such as tension, compression or torsion to the Amplifier Unit with the Fiber Unit fixed to the Amplifier Unit.
- (8) Always keep the protective cover in place when using the Amplifier Unit. Not doing so may cause malfunction.
- (9) It may take time until the received light intensity and measured value become stable immediately after the power is turned on depending on use environment.
- (10) The product is ready to operate 200 ms after the power supply is turned ON.
- (11) The Mobile Console E3X-MC11, E3X-MC11-SV2 and E3X-MC11-S cannot be connected.
- (12) Mutual interference prevention on the E3NX-FA Series does not function among the E3X-HD, E3X-DA-S, E3X-DA-N, E3X-SD, or E3X-NA Fiber Amplifier Units. Mutual interference prevention on the E3X-HD Series does not function among the E3NX-FA, E3X-DA-N, E3X-SD, or

E3X-NA Fiber Amplifier Units.

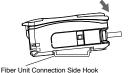
- Mutual interference prevention on the E3X-HD Series does function among the E3X-DA-S and E3X-MDA Fiber Amplifier
- (13) If the unit receives excessive sensor light, the mutual interference prevention function may not work properly, resulting in malfunction of the unit. In such case, increase the threshold
- (14) The E3NW-ECT Sensor Communications Unit can be used with the E3NX-FA0, but the E3X-DRT21-S, E3X-CRT, and E3X-ECT Sensor Communications Units cannot be used. The E3X-CRT and E3X-ECT Sensor Communications Unit can be used with the E3X-HD0, but the E3X-DRT21-S and E3NW-ECT Sensor Communications Units cannot be used.
- (15) If you notice an abnormal condition such as a strange odor, extreme heating of the unit, or smoke immediately stop using the product, turn off the power, and consult your dealer.
- (16) Do not use thinner, benzine, acetone, and lamp oil for cleaning.

Nodel Inde

Mounting the Fiber Amplifier Units

■ Mounting on DIN Track

 Let the hook on the Amplifier Unit's Fiber Unit connection side catch the track and push the unit until it clicks.

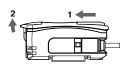


■ Removing from DIN Track

- 1. Push the unit in the direction 1.
- 2. Lift it up in the direction 2.

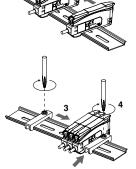


Refer to "I/O Circuit Diagrams" or check the side of the unit for wire color and role indications.



■ Mounting Amplifier Units in Group (Connector Type Models)

- Mount the Fiber Amplifier units one at a time onto the DIN track and push them until they click.
- **2.** Slide the Fiber Amplifier units in the direction 2.
- 3. Use End Plates (PFP-M: separately sold) at the both ends of the grouped Fiber Amplifier units to prevent them from separating due to vibration or other cause.
- **4.** Tighten the screw on the End Plates using a driver.



Tighten the screw while pressing the End Plate.



- Under environments such as vibration, use an end plates even with a single Fiber Amplifier Unit.
- The maximum numbers of connectable Amplifier Units are given in the following table.

		Maximum number of interconnected	Maximum number of mutual interference prevention
E3NX-FA	E3NX-FA series*		10
E3X-HD series standard models* (E3X-HD11/HD41/HD6/HD8)		16	10
FOY LIDO	With E3X-ECT	30	10
E3X-HD0	With E3X-CRT	16	10

- If Units are to be connected, the ambient temperature will change with the number of Units that are connected. Check the Ratings and Characteristics specifications.
- Always turn OFF the power before connecting or disconnecting Units.
- * The mutual interference prevention function cannot be used if the detection mode is set to super-high-speed mode (SHS).

Mounting Fiber Units

■ Use Fiber Cutter

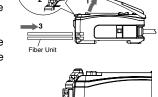
Cut a thin fiber as follows.

For standard fibers, insert to the desired cutting position and cut.

(1)	The fiber is shipped loosely tightened as shown in the figure at the right	Thin Fiber Attachment (E39-F9) Loosely tighten.
(2)	Adjust the fiber to the desired length and fully tighten.	
(3)	Insert the Fiber Unit into E39-F4 and cut it.	Fiber Cutter E39-F4 Thin-diameter Fiber Unit Hole (dia. 2.2 mm) 3
(4)	Finished state. (Correctly cut end)	Note: The insertion direction into the Fiber Amplifier Unit is shown in the above figure.

Mount Fiber Unit

- 1. Open the protective cover.
- 2. Raise the lock lever.
- **3.** Insert the Fiber Unit in the fiber unit hole to the bottom.
- **4.** Return the lock lever to the original position and fix the Fiber Unit.





- When mounting a coaxial reflective Fiber Unit, insert the single-core Fiber Unit to the upper hole (Emitter side) and the multi-core
- Fiber Unit to the lower hole (Receiver side).
- The cables for the Single-core Fiber Units (Emitters) have identification marks. Refer to the dimensions diagrams for details.

Single Core 0

Multi Core

- When removing the Fiber Unit, follow the above steps in reverse order.
 - To maintain the characteristics of the Fiber Unit, make sure the lock is released before removing the Fiber Unit.

iber Sensol eatures

selection Suide

Fiber Units

Threaded

Cylindrical

es Flat

Sleeved

Small Spot
High Power

Narrow view

Retroreflective

BGS

Chemicalresistant, Oil-resistant

Bending

Heatresistant

Area Detection

Liquid-level

Vacuum FPD, Semi.

Solar

Installation Information

Fiber Ampliners, Communications Unit, and Accessories

> lechnical Guide and Precautions

> > Model Index

Fiber Units

This product is not designed or rated for ensuring safety of persons either directly or indirectly.



Do not use it for such purposes.

Precautions for Correct Use

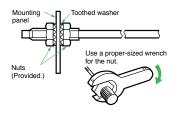
Do not use the Fiber Unit in atmospheres or environments that exceed product ratings.

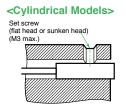
Mounting

Tightening Force

Refer to pages 56 to 59 for the tightening torque to apply when mounting a Fiber Unit.

<Threaded Models>

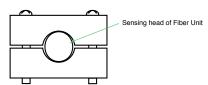




<Chemical and Oil-resistant Models>

The following method is recommended for mounting Fiber Units with fluororesin-covered sensing heads (E32-T□F and E32-D□F) to prevent from cracking the fluororesin case.

If you use a set screw to secure the Fiber Unit, tighten it with care to prevent from cracking the case.



Connections

 Do not subject the Fiber Unit to excessive force, such as tension or compression.

Refer to pages 56 to 59 for tensile strengths.

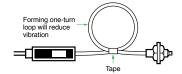
 Make sure any bend in the Fiber Unit is larger than the allowable bending radius.

Refer to pages 56 to 59 for bending radius ratings and length of unbendable sections at the base of the Fiber Unit.

· Do not compress or place heavy loads on the fibers.



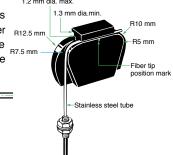
 The method shown below is an effective way to prevent the Fiber Unit from breaking due to vibration.



Sleeve Bender (E39-F11)

 The bending radius of the stainless steel tube should be as large as possible. The smaller the bending radius is, the shorter the sensing distance will be.

 Insert the tip of the stainless steel tube in the Sleeve Bender and slowly bend the tube along the curve of the Sleeve Bender.



Heat-resistant Fiber Units (E32-D51(R) and E32-T51(R))

The fibers of these Units cannot be extended using the E39-F10 Fiber Connector.

E32-T14

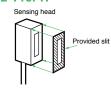
90° max

10 mm

These Units may enter the light-ON state if there are reflective objects at the end of the lenses.

If reflection is a problem, attach the black stickers provided to the ends of the lenses.

E32-T16PR



To use the provided slit, peel off the backing sheet, align the slit with the edges of the sensing surface, and attach it to the sensing head.

Use the slit in applications where saturation occurs (i.e., changes in incident level cannot be detected) due to short sensing distances.

Vacuum-resistant Fiber Units (E32- □V)

Although the Flanges, the Fiber Units on the vacuum side, and the Lens Units have been cleaned, as an extra precaution, clean these with alcohol before using them in high-vacuum environments to ensure that they are properly degreased.

Liquid-level Detection Fiber Unit (E32-D82F1)

- Secure the Fiber Unit using the unbendable section.
 Otherwise, the liquid-level detection position may be displaced.
- For applications in hazardous environments, install the Fiber Unit in the hazardous environment but install the Amplifier Unit in a safe environment.

Liquid-level Detection Fiber Units (Tube-mounting Models)

 Make sure that the tube is not deformed when using a band to secure the Fiber Unit.

Threaded

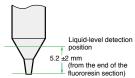
Solar

Adjustment

Detection Position for Liquid-level Detection Fiber Unit (E32-D82F1)

The liquid-level detection position is 5.2 ± 2 mm from the end of the fluororesin section. (Refer to the diagram on the right.)

The liquid-level detection position varies with the surface tension of the liquid and the degree of wetness at the Fiber Unit's detection position.



Other Precautions

Liquid-level Detection Fiber Unit (E32-D82F1)

- · Operation may become unstable in the following cases:
 - 1. Bubbles stick to the cone of the sensing head.
 - 2. Solute deposits on the cone of the sensing head.
 - 3. The liquid has a high viscosity.
- There are some liquids, such as milky white liquids, for which detection is not possible.
- Do not let the end of the fluororesin section bump into other objects.

Damage to or deformation of the sensing head may cause unstable operation.

Chemical and Oil-resistant, Liquid-level Detection Fiber Unit (E32-D82F1)

Fluororesin shows strong chemical-resistant properties but is permeable if exposed to atmospheres with gaseous chemicals or water vapors, resulting in failure or damage.

Confirm applicability sufficiently before using the Fiber Unit in these environments.

Accessories

Use of E39-R3 Reflector Provided with E32-R21

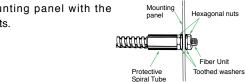
- Use detergent to remove any dust or oil from the surfaces where tape is applied. Adhesive tape will not be attached properly if oil or dust remains on the surface.
- The E39-R3 cannot be used in areas that are exposed to oil or chemicals.

Mounting method of Protective Spiral Tubes

- Insert the Fiber Unit into the Protective Spiral Tube from the head connector (threaded).
- e Protective Fiber Unit
- 2. Push the fiber into the Protective Spiral Tube. The tube must be straight so that the fiber enters without twisting. Turn the Protective Spiral Tube, not the fiber.



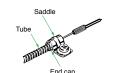
Secure the Protective Spiral Tube to the mounting panel with the provided nuts.



 4. Use the provided saddle to secure the end cap of the Protective Spiral Tube.
 (To secure the Protective Spiral

Tube.
(To secure the Protective Spiral Tube at a position other than the end cap, apply tape to the tube so that the portion becomes thicker in

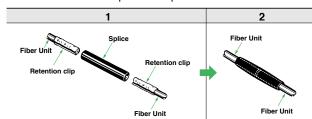
diameter.)



Attaching the E39-F10 Fiber Connector

Attach the Fiber Connecter as shown in the following figures.

- 1. Insert the Fiber Unit in the retention clip.
- 2. Insert the retention clip into the splice.



- The Fiber Units should be as close as possible when they are connected.
 - The sensing distance is reduced by approximately 25% when Fiber Units are extended by the connector.
- · Only 2.2-mm-diameter fibers can be connected.

Model Index

Selection by Model

Fiber Senso Features

election inide

Fiber Unit

Threaded

Cylindrical

Flat

Sleeved

Sleeved

High Power
Narrow

BGS
Retro-reflective

Limitedreflective

Chemicalresistant, Oil-resistant

Heatresistant Area

Detection Liquid-level

FPD, Semi, Solar

nstallation nformation

Fiber Amplitiers, Communications Unit, and Accessories

> l ecnnical Guide and Precaution

> > **Model Index**

Models	Specifica- tions	Dimensions
E32-A	uono	
E32-A01 5M	P.50	P.51 51-A
E32-A03 2M	P.30	P.31 31-A
	P.56	P.57 57-A
E32-A03-1 2M	P.30	P.31 31-B
	P.56	P.57 57-B
E32-A04 2M	P.30	P.31 31-C
	P.56	P.57 57-C
E32-A08 2M	P.36	P.37 37-C
	P.54	P.55 55-B
E32-A08H2 2M	P.46	P.47 47-D
	P.54	P.55 55-C
E32-A09 2M	P.36	P.37 37-F
	P.54	P.55 55-E
E32-A09H2 2M	P.46	P.47 (47-E)
F00 A40 0M	P.54	P.55 (55-F)
E32-A12 2M	P.36	P.37 37-D
E00.0	P.54	P.55 55-D
E32-C		
E32-C11N 2M	P.08 (P.22)	P.09 09-B (P.23)
E32-C31 2M		
E32-C31 ZIVI	P.08 (P.20,22,34)	P.09 09-D (P.21,23,35)
E32-C31M 1M	P.08	P.09 09-E
E32-C31N 2M)(
L02-001N 2W	P.08 (P.20 ,22)	P.09 09-A (P.21 ,23)
E32-C41 1M	P.22	P.23 (23-A)
		23-D
E32-C42 1M	P.20	P.21 21-A
		21-B
E32-C42S 1M	P.20	P.21 21-E
E32-CC200 2M	P.08	P.09 09-H)
	(P.22)	(P.23)
E32-D		
E32-D11 2M	P.42	P.43 43-E
E32-D11R 2M	P.08	P.09 09-G
E32-D11U 2M	P.38	P.39 39-I
E32-D12F 2M	P.38	P.39 39-H
E32-D15XR 2M	P.14	P.15 15-D
E32-D15YR 2M	P.14	P.15 (15-E)
E32-D15ZR 2M	P.14	P.15 15-F
E32-D16 2M	P.24	P.25 25-D
E32-D21 2M	P.42	P.43 43-B
E32-D211R 2M	P.08	P.09 09-F
E32-D21B 2M	P.42	P.43 (43-D)
E32-D21R 2M	P.08	P.09 09-C
E32-D21-S3 2M	P.18	P.19 (19-J)
E32-D221B 2M	P.12	P.13 (13-D)
	P.42	P.43 (43-C)
E32-D22B 2M	P.12	P.13 (13-A)
FOO DOOD OM	P.42	P.43 43-A
E32-D22R 2M E32-D22-S1 2M	P.12	P.13 (13-C)
E32-D22-S1 2W E32-D24R 2M	P.18 P.18	P.19 (19-A)
E32-D24-S2 2M		\sim
E32-D24-S2 2W E32-D25XB 2M	P.18 P.42	P.19 (19-B) P.43 (43-F)
E32-D25AB 2IVI	P.18	P.19 (19-L)
E32-D25-S3 ZW E32-D31-S1 0.5M	P.18	P.19 (19-G)
E32-D32L 2M	P.12	P.13 (13-E)
E32-D32-S1 0.5M	P.18	P.19 (19-F)
TOT DOT O ! 0'0!4!		\sim
E32-D33 2M	P.12	P.13 (13-P)
E32-D33 2M	P.12 P.18	P.13 (13-F)
E32-D33 2M E32-D331 2M	P.12 P.18 P.18	P.13 (13-F) P.19 (19-E) P.19 (19-D)

Model		
Models	Specifica-	Dimensions
E32-D36T 2M	P.50	P.51 (51-C)
		$- \approx$
E32-D43M 1M	P.12	P.13 (13-B)
	P.18	P.19 (19-C)
E32-D51 2M	P.46	P.47 47-B
E32-D51R 2M	P.46	P.47 (47-A)
E32-D61-S 2M	P.46	P.47 (47-G)
E32-D611-S 2M	P.46	P.47 (47-F)
		$-\sim$
E32-D73-S 2M	P.46	P.47 (47-H)
E32-D81R-S 2M	P.46	P.47 47-C
E32-D82F1 4M	P.50	P.51 51-D
E32-DC200BR 2M	P.18	P.19 (19-K)
E32-DC200F4R 2M	P.18	P.19 (19-H)
E32-L		
E32-L11FP 2M	D 20	D 20 (20 E)
E32-LTTP ZIVI	P.38	P.39 39-F
	P.54	P.55 (55-G)
E32-L11FS 2M	P.38	P.39 39-G
	P.54	P.55 55-H
E32-L15 2M	P.20	P.21 (21-F)
E32-L16-N 2M	P.32	P.33 (33-A)
_O 10 14 2191		
	P.36	P.37 (37-B)
	P.54	P.55 (55-A)
E32-L24S 2M	P.32	P.33 33-B
	P.36	P.37 37-A
E32-L25L 2M	P.32	P.33 (33-C)
	P.36	P.37 37-E
E32-L25T 2M		=
	P.50	P.51 (51-B)
E32-LD11 2M	P.08	P.09 (09-I)
E32-LD11R 2M		
E32-LT11 2M	P.06	P.07 07-C
	P.24	P.25 (25-B)
E32-LT11R 2M	P.06	P.07 (07-C)
	D 24	·····
E00 D	P.24	P.25 25-B
E32-R		P.25 25-B
E32-R16 2M	P.34	P.25 25-B P.35 35-B
		P.25 25-B
E32-R16 2M	P.34	P.25 25-B P.35 35-B
E32-R16 2M E32-R21 2M	P.34	P.25 25-B P.35 35-B
E32-R16 2M E32-R21 2M E32-T	P.34 P.34 P.52	P.25 25-B P.35 35-B P.35 35-C P.53 53-D
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M	P.34 P.34	P.25 25-B P.35 35-B P.35 35-C
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M	P.34 P.34 P.52 P.40 (P.26)	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (53-D) P.41 (41-C) (P.27)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M	P.34 P.34 P.52 P.40	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (33-D) P.41 (41-C) (P.27) P.39 (39-C)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M	P.34 P.34 P.52 P.40 (P.26) P.38	P.25 25-B P.35 35-B P.35 35-C P.53 83-D P.41 41-C (P.27) P.39 39-C P.07 07-A
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M	P.34 P.34 P.52 P.40 (P.26) P.38	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (35-C) P.41 (41-C) (P.27) P.39 (39-C)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M	P.34 P.34 P.52 P.40 (P.26) P.38	P.25 25-B P.35 35-B P.35 35-C P.53 83-D P.41 41-C (P.27) P.39 39-C P.07 07-A
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M	P.34 P.34 P.52 P.40 (P.26) P.38 P.06 (P.26)	P.25 25-B P.35 35-B P.35 35-C P.53 \$3-D P.41 41-C (P.27) P.39 \$9-C P.07 (07-A (P.27)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M	P.34 P.34 P.52 P.40 (P.26) P.38 P.06 (P.26) P.38	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (53-D) P.41 (41-C) (P.27) P.39 (39-C) P.07 (07-A) (P.27) P.39 (39-A)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11NF 2M E32-T11R 2M	P.34 P.34 P.52 P.40 (P.26) P.38 P.06 (P.26) P.38 P.06 (P.24)	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (53-D) P.41 (41-C) (P.27) P.39 (39-C) P.07 (07-A) (P.27) P.39 (39-A) P.07 (07-B) (P.25, 26)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11R 2M E32-T11R 2M	P.34 P.34 P.52 P.40 (P.26) P.38 P.06 (P.26) P.38 P.06 (P.24)	P.25 (25-B) P.35 (35-C) P.53 (53-C) P.41 (41-C) (P.27) P.39 (39-C) P.39 (39-A) P.07 (07-B) (P.25, 26) P.39 (39-B)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M	P.34 P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.08 P.38	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (53-D) P.41 (41-C) (P.27) P.39 (39-C) P.39 (39-A) P.07 (07-B) (P.25 ,26) P.39 (39-B) P.11 (11-C)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T12F 2M E32-T12F 2M E32-T14 2M	P.34 P.34 P.52 P.40 (P.26) P.38 P.06 (P.26) P.38 P.06 (P.24) P.38 P.06 (P.24) P.38	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.35 (35-C) P.41 (41-C) (P.27) P.39 (39-C) P.07 (07-A) (P.27) P.39 (39-A) P.07 (07-B) (P.25 ,26) P.39 (39-B) P.11 (11-C) P.25 (25-C)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M	P.34 P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.08 P.38	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (53-D) P.41 (41-C) (P.27) P.39 (39-C) P.07 (07-A) (P.27) P.39 (39-A) P.07 (07-B) (P.25 ,26) P.39 (39-B) P.11 (11-C)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T12F 2M E32-T12F 2M E32-T14 2M	P.34 P.34 P.52 P.40 (P.26) P.38 P.06 (P.26) P.38 P.06 (P.24) P.38 P.06 (P.24) P.38	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (53-D) P.41 (41-C) (P.27) P.39 (39-C) P.39 (39-A) P.07 (07-B) (P.25 ,26) P.39 (39-B) P.11 (11-C) P.25 (25-C)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T12F 2M E32-T14F 2M E32-T14F 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.26) P.38 P.06 (P.24) P.38 P.06 (P.24) P.38	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (35-D) P.41 (41-C) (P.27) P.39 (39-C) P.07 (07-B) (P.27) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-D)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14 2M E32-T14 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.24 P.38 P.10 P.24	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.39 (35-C) P.41 (41-C) P.39 (39-C) P.39 (39-C) P.39 (39-A) P.07 (07-B) P.25 (25-C) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-D) P.11 (11-D) P.15 (15-A)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12R 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T15XR 2M E32-T15YR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.24 P.38 P.10 P.24 P.38	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.53 (35-D) P.41 (41-C) (P.27) P.39 (39-C) P.39 (39-A) P.07 (07-B) (P.25, 26) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-D) P.11 (11-D) P.15 (15-B) P.15 (15-B)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12R 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T15XR 2M E32-T15YR 2M E32-T15YR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.39 (39-C) P.39 (39-C) P.39 (39-A) P.07 (07-B) P.25 (25-C) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-D) P.11 (11-D) P.15 (15-A) P.15 (15-C)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T15XR 2M E32-T15XR 2M E32-T15ZR 2M E32-T15ZR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.39 (
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12R 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T15XR 2M E32-T15YR 2M E32-T15YR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.39 (39-C) P.39 (39-C) P.39 (39-A) P.07 (07-B) P.25 (25-C) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-D) P.11 (11-D) P.15 (15-A) P.15 (15-C)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T15XR 2M E32-T15XR 2M E32-T15ZR 2M E32-T15ZR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.39 (
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15YR 2M E32-T15YR 2M E32-T15YR 2M E32-T15YR 2M E32-T15YR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.37 (35-C) P.39 (39-C) P.39 (39-C) P.39 (39-A) P.11 (11-D) P.15 (15-A) P.15 (15-A) P.15 (15-A) P.15 (15-A) P.15 (15-A) P.19 (49-A) P.49 (49-A)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11N 2M E32-T12F 2M E32-T12F 2M E32-T14 2M E32-T14F 2M E32-T15XR 2M E32-T15XR 2M E32-T15XR 2M E32-T16DR 2M E32-T16DR 2M E32-T16DR 2M E32-T16WR 2M E32-T16WR 2M E32-T16WR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.38 P.10 P.14 P.14 P.14 P.14 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.37 (35-C) P.38 (39-C) P.39 (39-C) P.39 (39-A) P.49 (49-A)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T15XR 2M E32-T15XR 2M E32-T16WR 2M E32-T16WR 2M E32-T16WR 2M E32-T16WR 2M E32-T17L 10M E32-T12 1 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.38 P.10 P.44 P.48 P.44 P.48 P.48 P.48 P.44 P.44	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.37 (35-C) P.39 (39-C) P.39 (
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12R 2M E32-T12R 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14 P.14 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.35 (35-C) P.41 (41-C) P.39 (39-C) P.07 (07-A) (P.27) P.39 (39-A) P.07 (07-B) (P.25 (25-C) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-B) P.11 (11-D) P.15 (15-A) P.15 (15-B) P.15 (15-C) P.49 (49-B) P.49 (49-B) P.49 (49-B) P.49 (49-C) P.25 (25-A) P.41 (41-B) P.17 (17-D)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T16XR 2M E32-T17L 10M E32-T21 2M E32-T21-S1 2M E32-T223R 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14 P.14 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-B) P.35 (35-D) P.41 (41-C) (P.27) P.39 (39-C) P.07 (07-A) (P.27) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-B) P.11 (11-D) P.15 (15-A) P.15 (15-B) P.15 (15-B) P.49 (49-B) P.41 (41-B) P.17 (17-D) P.11 (11-A)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12R 2M E32-T12R 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14 P.14 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.35 (35-C) P.41 (41-C) P.39 (39-C) P.07 (07-A) (P.27) P.39 (39-A) P.07 (07-B) (P.25 (25-C) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-D) P.11 (11-D) P.15 (15-A) P.15 (15-B) P.15 (15-C) P.49 (49-B) P.49 (49-B) P.49 (49-B) P.49 (49-C) P.25 (25-A) P.41 (41-B) P.17 (17-D)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T16XR 2M E32-T17L 10M E32-T21 2M E32-T21-S1 2M E32-T223R 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.24 P.38 P.10 P.14 P.14 P.14 P.14 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-B) P.35 (35-D) P.41 (41-C) (P.27) P.39 (39-C) P.07 (07-A) (P.27) P.39 (39-B) P.11 (11-C) P.25 (25-C) P.39 (39-B) P.11 (11-D) P.15 (15-A) P.15 (15-B) P.15 (15-B) P.49 (49-B) P.41 (41-B) P.17 (17-D) P.11 (11-A)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14F 2M E32-T14F 2M E32-T14F 2M E32-T15XR 2M E32-T16XR 2M E32-T17L 10M E32-T21 2M E32-T21-S1 2M E32-T223R 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.38 P.10 P.14 P.14 P.14 P.14 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.35 (35-C) P.41 (41-C) P.39 (39-C) P.39 (39-A) P.07 (07-B) P.25 (25-C) P.39 (39-B) P.11 (11-C) P.15 (15-C) P.49 (49-B) P.49 (49-C) P.25 (25-A) P.41 (41-B) P.11 (11-A) P.11 (11-B) P.11 (11-B)
E32-R16 2M E32-R21 2M E32-T E32-T10V 2M E32-T11 2M E32-T11F 2M E32-T11N 2M E32-T11N 2M E32-T11N 2M E32-T11R 2M E32-T12F 2M E32-T12F 2M E32-T14 2M E32-T14 2M E32-T14F 2M E32-T15XR 2M E32-T15XR 2M E32-T15ZR 2M E32-T16JR 2M	P.34 P.52 P.40 (P.26) P.38 P.06 (P.24) P.38 P.10 P.38 P.10 P.14 P.14 P.14 P.14 P.14 P.14 P.14 P.14	P.25 (25-B) P.35 (35-B) P.35 (35-C) P.39 (39-C) P.39 (39-C) P.39 (39-A) P.07 (07-B) P.25 (25-C) P.39 (39-B) P.11 (11-C) P.15 (15-C) P.49 (49-B) P.49 (49-C) P.25 (25-A) P.41 (41-B) P.11 (11-B) P.11 (11-B) P.11 (11-B) P.41 (41-A)

Models	Specifica- tions	Dimensions
E32-T24R 2M	P.16	P.17 17-A
E32-T24S 2M	P.30	P.31 31-E
	P.56	P.57 57-E
E32-T24SR 2M	P.30	P.31 31-D
	P.56	P.57 57-D
E32-T25XB 2M	P.40	P.41 41-D
E32-T33 1M	P.16	P.17 17-C
E32-T51 2M	P.44	P.45 (45-B)
	(P.28)	(P.29)
E32-T51F 2M	P.38	P.39 39-E
E32-T51R 2M	P.44	P.45 (45-A)
	(P.28)	(P.29)
E32-T51V 1M	P.52	P.53 (53-A)
E32-T61-S 2M	P.44	P.45 (45-D)
	(P.28)	(P.29)
E32-T81R-S 2M	P.44	P.45 45-C)
	(P.28)	(P.29)
E32-T84SV 1M	P.52	P.53 53-C
E32-TC200BR 2M	P.16	P.17 (17-E)
E32-V		
E32-VF1	P.52	P.53 53-F)
E32-VF4	P.52	P.53 53-E
E39-F	1.02	00
E39-F1	P.26 ,28	P.26 26-A)
E39-F1-33	P.28	P.28 28-D
		F.20 20-D
E39-F11	P.17	D OC OR B
E39-F16	P.26 ,28 P.20	P.26 26-B P.21 21-B
E39-F17		\sim
E39-F18	P.22	P.23 23-G
E00 E41/	D. 5.0	23-H)
E39-F1V	P.52	P.53 53-B
E39-F2	P.26 ,28	P.26 26-C
E39-F32A	P.42	P.43 43-G
	P.42 P.40	P.43 43-G P.41 41-E
E39-F32A E39-F32C	P.42 P.40 P.42	P.43 43-G P.41 41-E P.43 43-G
E39-F32A E39-F32C	P.42 P.40 P.42 P.42	P.43 43-6 P.43 43-6 P.43 43-6
E39-F32A E39-F32C E39-F32D E39-F3A	P.42 P.40 P.42 P.42 P.20	P.43 43-6 P.41 41-E P.43 43-6 P.43 43-6 P.21 21-A
E39-F32A E39-F32C	P.42 P.40 P.42 P.42	P.43 (3-G) P.41 (41-E) P.43 (3-G) P.43 (3-G) P.21 (21-A) P.23 (23-A)
E39-F32A E39-F32C E39-F32D E39-F3A	P.42 P.40 P.42 P.42 P.20	P.43 (3-G) P.41 (1-E) P.43 (3-G) P.43 (3-G) P.21 (21-A) P.23 (23-A) (23-B)
E39-F32C E39-F32D E39-F3A E39-F3A-5	P.42 P.40 P.42 P.42 P.20 P.22	P.43 (3-6) P.41 (41-E) P.43 (3-6) P.43 (3-6) P.21 (21-A) P.23 (23-A) (23-B) (23-C)
E39-F32A E39-F32C E39-F32D E39-F3A	P.42 P.40 P.42 P.42 P.20	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-A) (23-B) (23-C) P.23 (23-D)
E39-F32C E39-F32D E39-F3A E39-F3A-5	P.42 P.40 P.42 P.42 P.20 P.22	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-A) (23-E) P.23 (23-D) (23-E)
E39-F32C E39-F32D E39-F3A E39-F3A-5	P.42 P.40 P.42 P.42 P.20 P.22	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-A) (23-E) (23-E) (23-E) (23-F)
E39-F32C E39-F32D E39-F3A E39-F3A-5	P.42 P.40 P.42 P.42 P.20 P.22	P.43 (43-6) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-A) (23-B) (23-E) (23-F) P.21 (21-C)
E39-F32C E39-F32D E39-F3A E39-F3A-5 E39-F3B	P.42 P.40 P.42 P.20 P.22 P.22	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) P.21 (21-C) (21-D)
E39-F32C E39-F32C E39-F32D E39-F3A E39-F3A-5 E39-F3B E39-F3C	P.42 P.40 P.42 P.42 P.20 P.22	P.43 (43-6) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-A) (23-B) (23-E) (23-F) P.21 (21-C)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A-5 E39-F3B E39-F3C E39-F3R E39-F3R	P.42 P.40 P.42 P.20 P.22 P.22 P.22	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (21-C) P.21 (21-C) P.35 (35-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A-5 E39-F3B E39-F3C E39-F3R E39-F3R E39-R1	P.42 P.40 P.42 P.20 P.22 P.22	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-A) (23-E) (23-F) P.21 (21-C) P.35 (35-A) P.35 (35-B) P.35 (35-B)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A-5 E39-F3B E39-F3C E39-F3R E39-F3R	P.42 P.40 P.42 P.20 P.22 P.22 P.22	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (21-C) P.21 (21-C) P.35 (35-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A-5 E39-F3C E39-F3C E39-F3R E39-R1 E39-R3 E39-R937	P.42 P.40 P.42 P.20 P.22 P.22 P.22	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-A) (23-E) (23-F) P.21 (21-C) P.35 (35-A) P.35 (35-B) P.35 (35-B)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C E39-F3C E39-F3R E39-R1 E39-R3 E39-R97 E39-R1	P.42 P.42 P.20 P.22 P.22 P.24 P.20 P.25 P.26 P.27 P.27 P.28 P.29	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) P.21 (21-C) P.35 (35-A) P.35 (35-B) P.35 (35-C)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C	P.42 P.42 P.20 P.22 P.22 P.24 P.20 P.25 P.26 P.27 P.27 P.28 P.29	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) P.21 (21-C) P.35 (35-A) P.35 (35-B) P.35 (35-C)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C E39-F3C E39-F3R E39-R1 E39-R3 E39-R97 E39-R1	P.42 P.42 P.20 P.22 P.22 P.24 P.20 P.25 P.26 P.27 P.27 P.28 P.29	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) (23-F) P.21 (21-C) (21-D) P.35 (35-A) P.35 (35-B) P.35 (35-C) P.35 (35-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C	P.42 P.42 P.20 P.22 P.22 P.24 P.20 P.25 P.26 P.27 P.27 P.28 P.29	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) (23-F) P.21 (21-C) (21-D) P.35 (35-A) P.35 (35-B) P.35 (35-C) P.35 (35-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C E39-F3C E39-F3C E39-F3C E39-F3C E39-R1 E39-R1 E39-R1 E39-R1 E39-R3 E39-R1 E39-R3 E39-R03 E3	P.42 P.42 P.20 P.22 P.22 P.22 P.34 P.34	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (21-D) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.39 (89-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A-5 E39-F3B E39-F3C	P.42 P.42 P.20 P.22 P.22 P.22 P.34 P.34 P.34 P.36	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (21-D) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.39 (89-A) P.77 (77-B)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C E39-F3C E39-F3C E39-F3C E39-F3C E39-R1 E39-R1 E39-R1 E39-R1 E39-R3 E39-R1 E39-R3 E39-R03 E3	P.42 P.42 P.20 P.22 P.22 P.22 P.34 P.34 P.34 P.36	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (21-D) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.39 (89-A) P.77 (77-B)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A-5 E39-F3B E39-F3C E39-F3R E39-R1 E39-R1 E39-R3 E39-R937 E39-L E39-L E39-L E39-L E3NW E3NW-DS E3NW-ECT E3NX-FA	P.42 P.42 P.20 P.22 P.22 P.23 P.24 P.26 P.34 P.34 P.76 P.76	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) (21-D) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.39 (89-A) P.77 (77-B) P.77 (77-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C E39-F3R E39-R	P.42 P.42 P.42 P.20 P.22 P.22 P.24 P.26 P.34 P.34 P.76 P.76 P.66	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) (21-C) P.25 (35-A) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.37 (77-B) P.77 (77-B) P.79 (89-B) P.69 (89-B)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C E39-F3R E39-R	P.42 P.42 P.42 P.20 P.22 P.22 P.24 P.26 P.34 P.34 P.36 P.76 P.66 P.66	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) P.21 (21-C) P.35 (35-A) P.35 (35-B) P.35 (35-C) P.35 (35-A) P.39 (35-A) P.30
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C E39-F3R E39-R1 E39-R1 E39-R3 E39-R937 E39-L E39-L143 E3NW-E3NW-DS E3NW-ECT E3NX-FA E3NX-FA E3NX-FA0 E3NX-FA11 2M E3NX-FA21 2M	P.42 P.42 P.42 P.20 P.22 P.22 P.24 P.26 P.34 P.34 P.36 P.76 P.66 P.66 P.66	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-E) (23-E) (23-E) P.21 (21-C) P.35 (35-A) P.35 (35-B) P.35 (35-B) P.35 (35-B) P.35 (35-A) P.39 (89-A) P.77 (77-B) P.68 (89-A) P.68 (89-A) P.68 (89-A) P.68 (89-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3B E39-F3C E39-F3R E39-R	P.42 P.40 P.42 P.20 P.22 P.22 P.20 P.34 P.34 P.66 P.66 P.66 P.66	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) P.23 (23-E) P.24 (21-C) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.37 (77-B) P.77 (77-B) P.68 (88-A) P.68 (88-A) P.69 (88-A) P.69 (88-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3C E39-F3C E39-F3C E39-F3C E39-R1 E39-R1 E39-R3 E39-R1 E39-	P.42 P.40 P.42 P.42 P.20 P.22 P.22 P.34 P.34 P.76 P.76 P.66 P.66 P.66 P.66 P.66	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) P.23 (23-E) P.24 (21-C) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.37 (77-B) P.77 (77-B) P.68 (88-A)
E39-F32A E39-F32C E39-F32D E39-F3A E39-F3A E39-F3C E39-F3C E39-F3C E39-F3C E39-R1 E39-	P.42 P.40 P.42 P.42 P.20 P.22 P.22 P.34 P.34 P.76 P.76 P.66 P.66 P.66 P.66 P.66 P.66	P.43 (43-6) P.41 (41-E) P.43 (43-6) P.43 (43-6) P.21 (21-A) P.23 (23-B) (23-E) (23-E) P.23 (23-E) P.24 (21-C) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.35 (35-A) P.37 (77-B) P.77 (77-B) P.68 (88-A)

Models	Specifica- tions	Dimensions
E3NX-FA6	P.66	P.68 @#B
E3NX-FA7	P.66	P.68 688B
E3NX-FA7TW	P.66	P.68 @#B
E3NX-FA8	P.66	P.68 @#B
E3NX-FA9	P.66	P.68 @#B
E3NX-FA9TW	P.66	P.68 688B
E3X-CN		
E3X-CN11	P.88	P.88 88-A
E3X-CN12	P.88	P.88 88-B
E3X-CN21	P.88	P.88 88-A
E3X-CN22	P.88	P.88 88-B
E3X-CRT		
E3X-CRT	P.86	P.87 87-A
E3X-ECT		
E3X-ECT	P.86	P.87 87-B
E3X-HD		
E3X-HD0	P.80	P.81 81-C
E3X-HD11 2M	P.80	P.80 80-A
E3X-HD14	P.80	P.81 81-B
E3X-HD41 2M	P.80	P.80 80-A
E3X-HD44	P.80	P.81 81-B
E3X-HD6	P.80	P.81 81-A
E3X-HD8	P.80	P.81 81-A
PFP		
PFP-100N		P.89 89-B
PFP-100N2		P.89 89-C
PFP-50N		P.89 89-B
PFP-M		P.89 89-D
XS3F		
XS3F-M421-402-A	P.88	P.88 88-C
XS3F-M421-405-A	P.88	P.88 88-C
XS3F-M422-402-A	P.88	P.88 88-D
XS3F-M422-405-A	P.88	P.88 88-D
-		

E32-D36P1 2M P.48 P.49 49-D



Introducing New Fiber Sensor Products

LENS IN Fiber Units E32-LT/LD

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Sleeve Fiber Units E32-□-S□

→ Page 16, 18



New Shapes of Sleeve Fiber Units Allow for Detection at Locations Separated from the Installation Position Fiber Amplifier Units E3NX-FA

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